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Effects of three different scaffolds on mesenchimal cells proliferation and differentiation

R. Marini [1], V. M. Bimonte [2], M. P. Cristalli [3], V. Papa [2], S. Migliaccio [2], S. Annibali [1], A. Lenzi [4]

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Aim. Biomaterials play an important role in the regenerative medicine as "scaffolds" in tissue engineered approach. Main function of scaffold is to promote cell attachment and proliferation within the structure. Biomaterials employed as scaffolds should possess specific features, such as biocompatible, biodegrade into non toxic products, easily handled, high porosity, mechanically strong, and be capable of being formed into desired shapes. The aim of the study is to develop an in vitro model system to assess the ability of different scaffolds (Engipore, HA/TCP 30:70, MSDBA) to induce differentiation of mesenchymal stem cells derived from human bone marrow into osteoblasts.

Materials and methods. Mesenchymal cells derived from human bone marrow (Human Mesenchymal Stem Cell, PT-2501, Lonza) were cultured (growth medium PT-3001, Lonza, specific to this cell type) and expanded in order to have an adequate number for subsequent experiments. For each scaffold mesenchymal cells were seeded (density 1x 104 cells / cm2) in plates coated with collagen matrix or in control plates to promote cell adhesion and proliferation but, also, cell differentiation. The following day culture medium was replaced with a specific culture medium for osteogenic lineage differentiation (PT-3002, Lonza). After 7 days from the induction of differentiation, cells were lysed for RNA extraction and evaluation of potential effects on specific target genes by Real-time PCR (RT-PCR).

Results. Mesenchymal cells seeded onto Engipore and HA / TCP, demonstrated distress, while control cells had normal growth and appearance, indicating bio-incompatibility of mesenchymal cells with the two scaffolds tested in this series of experiments. Mesenchymal cells seeded onto MSDBA (microchips with a particle size of 1 to 2 mm) appeared without specific damage signs, although they showed a lower growth rate and a different morphology as compared to control cells. After 14-21 days gene expression analysis was performed by RT-PCR. Mesenchymal cells grown on MSDBA showed a significant decrease of SSEA4 gene expression, and an increased gene expression of markers of osteoblast differentiation, such as Osterix and IBSP, suggesting an initial process of differentiation. However, after 21 days, the expression of alkaline phosphatase (ALP) and collagen (COLL) decreased presumably due to the high cell mortality but, also, for a poor quality of RNA extracted from cells suffering.

Conclusions. Our preliminary results suggest that of the three tested scaffolds only MSDBA showed compatibility with mesenchymal cells growth and proliferation, although an increased mortality when cultured for longer time. At the same time, surviving cells started to differentiate. On the basis of these results, it could be interesting to repeat the experiments with another cell model (*e.g.* Osteoblasts) that might be less sensitive to the presence of MSDBA allowing the processes of proliferation and/or cell differentiation.

Crestal sinus lift by using a mini-invasive procedure: a case series

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Aim. The aim of this study is to present a series of cases treated with an atraumatic device developed for maxillary sinus membrane elevation by crestal approach. This technique avoids the use of classical osteotomes, decreasing the complications dues to the percussive and vibratory forces, using instead a special drilling system that advances progressively of 0.5 mm and allows the operator to obtain a controlled fracture of the cortical bone. The kit includes a built-in sensor which permits a continuous monitoring of the residual strength of the maxillary sinus floor and its lift reducing strongly the likelihood of damaging the Schneider membrane.

Methods. Three cases are presented with partial edentulism in the distal maxillae and inadequate bone volume for implant-supported prosthesis. TC cone beam confirmed an insufficient bone height to ensure the necessary primary stability of implants (5-6 mm). According with the patients, it was decided to performe sinus augmentation by crestal approach. In order to avoid the main complications associated with a maxillary sinus lift by using classical osteotomes, it was chosen to use theatraumatic procedure SinCrest® (Meta, Reggio Emilia, Italy). Surgical templates were made to choose the best position of implants for the prosthesis. After the execution of a mini-invasive sinus lift with Sincrest® osteotome, the implants were placed and the successful completion of the surgery was verified by an intraoral rx. Rx were repeated after a healing period of 6 months.

Results. SinCrest® allows to get closer to the sinus floor gradually and maintaining the correct axis for implant insertion. The shape of the drill prevents accidental perforation of Schneiderian mucosewhile the stops existing in different lenghts avoid any drill overextension. The manually screwing of SinCrest® Device permits more precision and more care during cortical approach while the built-in sensor make possible to check the residual strength of sinus floor, the achievement of the Schneiderian Membrane and its elevation. This specific technique does not depend on clinicians' skills and it reduces the appearance of adverse effects such as headache and paroxysmal positional vertigo due to

the hammering with classical osteothomes. Because of its mininvasive nature, Sincrest® requires a small flap design and a limited osteotomy: it means less time required for wound healing and more comfort for the patient, both during and after the procedure.

Conclusion. In conclusion, Sincrest® procedure represents a valid alternative to other mininvasive techniques of maxillary sinus elevation in cases of a residual height of at least 5mm, allowing an atraumatic, safe and controlled surgery.

Evaluation of adipocyte vs dental pulp stem cells behaviour during osteogenic differentiation

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Aim. In the latest international scientific studies, great attention was paid to find a suitable stem cell cluster capable to promote a predictable bone regeneration. In this research have been compared 3 different mesenchymal stem cells clusters from 2 different tissues and has been evaluated their different proliferative capability, various rate of differentiation and growth in regenerative dentistry. The aim of this research was to evaluate of the different behavior of human young/adult adipocytes and young dental pulp stem cells during proliferation and osteogenesis differentiation processes matherials: as for matherials were used human young (average age 16 years) and adult (average age 35 years) adipocytes stem cells and human young (average age 16 years) dental pulp stem cells. Both adipocytes stem cells and dental pulp stem cells were selected after surgery procedures. Moreover they were sorted in homogeneous mesenchymal pool with facs analysis. After this phase samples were analyzed with optical and EMS instruments in order to evaluate the morphostructural differences during the different proliferation phases. Samples obtained were subject to cellular reprogramming and separate in osteogenic sense. Cellular clusters of osteoblasts like cells obtained were finally evaluated by ALP activity, spectrophotometric assay and alizarine red and red oil detection.

Results. Analyzed by facs all samples both from human young/adult adipocytes and from human young dental pulp showed a homogenous population of mesenchymal stem cells. The osteogenic differentiation was confirmed by positive alizarine red staining analysis. No sample tested showed differentiation towards the vascular tissue. Moreovre it was possible to observe the different behavior of ALP markers in different cell populations. Finally the MTS assay data showed an increase of the proliferation speed in the differentiated cells but the result was different in each stem cells cluster which was analyzed.

Conclusion. As for all sample analyzed the ALP increase has confirmed the differentiation in osteogenic cluster, instead there was any differentiation in hematopoietic sense. The positive alizarine red analysis and the negative results of red oil staining during human osteoblasts like cells differentiation confirm the potential role of adipocyte and dental pulp stem cells in human tissue engineering. However, more detailed studies should be undertaken in order to clarify the biological mechanisms and functional populations of such stem and regenerative potential in anticipation of their clinical use in the rehabilitation of small and medium atrophy of the jaw.

Large buccal bifurcation cyst in child: a case report literature review

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Aim. The aim of this article was to point out a case of a 6-years-old child affected by a large buccal bifurcation cyst involving the first permanent mandibular molar and a part of second molar crown, discussing diagnosis, radiographic features and treatment of the lesion. A 6-year-old boy presented a hard swelling over the buccal gingiva and a deep probing depth located on the buccal aspect of his partially-erupted mandibular right first molar. Clinically, there was no evidence of inflammation and the mucosa, around the first molar, was clinically healthy whereas the pulp test was positive.

Methods. Radiograph revealed a well-defined semilunar-shaped radiolucency, marked by a fine radiopaque line on the buccal aspect of the partially-erupted lower right first molar and it was wide enough to include a small part of the crown of the second right molar.

Cone Beam Computed Tomography (CBCT) revealed and confirmed the presence of the radiolucent lesion. Clinical, radiographic and anamnestic features proved the initial diagnosis of paradental cyst could be likely. It was decided to undergo to a surgical cyst removal under general anaesthesia, without extraction of the teeth involved. The surgical approach was a full-thickness trapezoidal flap, with gingival crevicular incision and vertical releasing incisions. A buccal ostectomy was performed, taking care of keeping a sufficient band of cortical bone in the coronal aspect. The cyst was exposed and then enucleated trough the surgical access, without the need to extract the tooth. Following irrigation with saline, 4-0 absorbable sutures were placed.

Results. The histological analysis revealed that the cyst capsule was lined by a proliferating, non-keratinised, stratified squamous epithelium, showing an arcading pattern. The cystic wall consisted of a dense, mature fibrous connective tissue, with an intense chronic inflammatory reaction characterised by mononuclear and polymorphonuclear cells, mainly near the epithe-

lium. The histopathological analysis associated with macroscopic and radiographic examinations permitted the definitive diagnosis of paradental cyst.

Conclusion. As reported in the literature, enucleation and curettage of the lesion without extraction of the vital involved tooth remains the preferred treatment. The buccal bifurcation cyst is an odontogenic cyst, frequently associated with permanent molars in paediatric subjects. Given the young age of the patients and the localisation of the lesion, the surgical treatment must be conservative. For these reasons, the treatment of choice is a one-stage surgical protocol with simple enucleation and curettage of the lesion without extraction of the vital tooth involved. This procedure has shown excellent results in both the short and long term as shown in the literature.

Immediate restoration of post-extraction implants. A 7-year prospective single cohort study

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Aim. The aim of the present study was to evaluate the success rate of 32 implants placed in fresh extraction sockets . Implants were inserted in fresh extraction sockets and immediately restored with a provisional crown and a non-functional occlusion. The final prosthesis was made after 6 months and follow-up recalls were planned at year 1, 2, 3, 4, 5, 6 and 7. Marginal bone level (MBL), width of keratinized gingiva (WKG), facial soft tissue level (FST)and papilla index (PI) were monitored . The parameters registered and the final cumulative success rate(92.7-100%) pointed out that the immediately restored single implant protocol could give positive results in long-term survey

Methods. 32 patients (16 female and 16 male) with a mean age of 40.1±13.3 years were enrolled in the present prospective single-cohort study from 2006 to 2007 and were treated with single-implants inserted in fresh extraction sockets immediately restored with temporary abutments and crowns and non-functional occlusion. Final metal-ceramic restorations were cemented from 5 to 6 months after surgery. Peri-implant bone resorption (DMBL or change at Marginal Bone Level), and soft tissue modifications (DFST and DWKG, respectively the changes at Facial Soft Tissue and at Width of Keratinized Gingiva) were calculated over time respect to the baseline, annually from 1 to 7 years; in addition, the Papilla Index (PI) was REGISTERED. Data were analyzed with multi-way ANOVA and pairwise comparison tests with a level of significance of 0.05.

Results. All implants were placed in fresh extraction sockets when hard and soft tissues were adequate. No functional or clinical complications were registered during the entire followup period with the exception of one failure; the implant was removed 4 weeks after placement and excluded from statistics. The mean MBL at baseline was -0.60±o.49mm; after 1 year it was 0.91±0.28 mm; after 7 years it was 1.00±0.00mm. The difference resulted significant at each time-point (p-values were all <0.005). The changes of the soft tissue at buccal aspect showed no significant modifications, supporting the fact that there was a stabilization of the soft tissues after the first year (DFST from -0.37±0.77 mm to 0.02±0.16 mm and DWKG from -0.22±0.42 mm to -0.74±0.65 mm). The height of papilla seemed to improve after 7 years; this was attested by the significant increase from the 1year value of the PI (0.3±0.3) to the final PI (1.0±0.2) with a slow and CONTINUOUS regrowth respect to the value of the first year (p-values less than 0.0001). The final cumulative success rate was 97.5% at 7 years (with confidence interval from 92.7% to 100%).

Conclusions. Present data suggested that three-modal approach can be a valid and long-term successful treatment for single compromised tooth; the architecture of hard and soft tissues after 7years seemed to be preserved during the REGISTERED survey.

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Antimicrobial prophylaxis after second surgery stage on peri-implant tissues: a double blind randomized study

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Aim. The aim of this study is to test the effectiveness of different anti-microbial protocols after the implant re-opening with soft tissue punch technique.

Materials and methods. 20 patients were enrolled in this study and randomly split into 4 groups: a control group using saline water(G1), a group using a chlorhexidine 0.2% mouthwash (G2), a group using Amoxicillin 875mg-Clavulanic Acid 125mg (G3) and a group using an essential oils mouthwash (G4). Members of G1,G2 and G4 used the assigned method making 1 mouthwash every 8 hours, 1 minute for 15 days. Members of G3 had to take 1 tablet of Amoxicillin-Clavulanic Acid every 12 hours for 5 days.Two weeks after the re-opening(T1), the plaque present on the implant was collected and qualitatively (with Oxoid® kit) and quantitatively (with

the Thoma chamber) analyzed. The microbiological forms present in the plaque were split into five categories: G+ coccoid, G- coccoid, G+ straight rod-shaped and filamentous bacteria, G- straight rod-shaped and filamentous bacteria and other forms (spirochete, vibrios, yeasts).

Results. It could be observed a heterogeneous bacterial growth in the different protocols.It was observed that not every protocol was effective on every microbial specie. During the lapse of time from T0 (second stage surgey) to T2 (prosthetic stage) it was observed that the essential oils mouthwash was effective against the G- coccoid, the amoxicillin + clavulanic acid against G+ cocci and bacilli. The chlorhexidine protocol was therefore the only effective treatment against every considered bacterial specie. The ANOVA© test was used to study the variance of the results of the bacillary and coccoid forms quantitative analysis at each interval (T0, T1, T2) for every group. A statistical significance was found on the results for the coccoid species at T2 (P=0.021). For this reason, a Post Hoc Bonferroni's test was therefore carried out to study which one was the most significative comparison. A statistically significative difference was observed between the chlorhexidine group and the control group as well (P= 0.0221). No significative difference was observed in the remaining comparisons.

Conclusion. At the last check time, the fifteenth day after the second surgery stage, the 0.2% chlorhexidine was proven to be significantly more effective than the other products to reduce the plaque accumulation on the peri implant sulcus in both quantitative and qualitative evaluation.The 0.2% chlorhexidine protocol appears to be the gold standard indication for an optimal healing of the surgical site after the second surgery and helps in granting a predictable peri implant tissues maturation. The results obtained in this in vivo trial are comparable to those expressed in literature for in vitro studies. Further studies should be performed to compare a widen range of treatment options.

Use of ozone in the post-surgical therapy of lower third molar: experimental trial

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Patients who undergo surgery of third molar may experience pain, edema, infection, and dry socket. For this reason, in the treatment of post-surgical third molar is widely administered medical therapy with systemic both antibiotics and analgesics/anti-inflammatory drugs. In order to promote healing and control bacterial aggression is also customary to administer topical chlorhexidine, which exerts a broad spectrum towards oral bacteria. However, it has been shown, at least in vitro, that chlorhexidine can have toxic effects on fibroblasts, osteoblasts and endothelial cells with possible negative effects on the healing process of alveolus. Recent studies, on the other hand, always in vitro, have shown that ozone has antimicrobial properties and biostimulatory effect on such cells. A total of 60 non-smoking subjects pertaining to the Department of Dentistry of the San Raffaele Hospital and scheduled for surgical removal of the lower third molar in bone/mucosal inclusion and asymptomatic for at least 30 days, were randomly divided into two groups of 30. Group 1, discharged with medical therapy with systemic antibiotic, analgesic/anti-inflammatory and ozonated gel (Ozoral®), 2 times / day; group 0, discharged with medical therapy with antibiotic, analgesic/anti-inflammatory and chlorhexidine gel 2 times/day. All patients underwent a follow-up period of 30 days according to the following intervals: day 7, day 15 and day 30 after surgery. Variables examined during the observation period were: plaque index, type of healing (first or second intention), color, degree of maturation of tissues, bleeding (spontaneous or on probing), development of infection or dry socket, swelling and pain. In our group of 30 patients undergoing surgery of the lower third molar and treated with systemic antibiotics, analgesic and topical application 2 times/day of ozonated gel on the wound, the results in terms of tissue trophism, speed healing tissue and adverse events (swelling, pain and bleeding on probing), were significantly better than in 30 patients with the same clinical characteristics and subjected to post-surgical therapy with antibiotic, analgesic and 0.2% chlorhexidine gel, after a follow-up period of 30 days after surgery. Further studies on a larger scale are required in this area to confirm these results and to better define the potential of this substance in oro-maxillo-facial surgery.

Maxillary sinus septa and anatomical correlation with the schneiderian membrane: an evaluation of 114 CBCT

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Aim. The maxillary sinus is a large pyramidal cavity with thin walls corresponding to orbital, alveolar, facial and infra-temporal aspects of the maxilla. The size, shape and wall thickness of the sinus varies from one to another even on the two sides of an individual skull. Maxillary septa are walls of cortical bone within the maxillary sinus. The septa shape has been described by Underwood as an inverted gothic arch arising from the inferior or lateral walls of the sinus and may even divide the sinus into two or more cavities. Aim of this investigation is to evaluate prevalence, localization and height of 114 maxillary sinus septa by using Cone beam Computed Tomography scans.

Method. In this study, 114 CBCT exams and 228 maxillary sinuses were analyzed. All the collected data remained anonymous. The thickness of the mucosa has been measured together with the variations of the membrane in relation to those septa. The selected patients received a CT scan in the posterior maxilla for implant

therapy or for other evaluation as impacted canine. Septa were identified using "Panorex" reconstructions and axial scans of CBCT using the software "eXamVision". The thickness of the mucosa has been evaluated in the paraxial scans and related to those septa where they were present. The parameters of the exam were kV=120, mA= 5, e FOV = 140 Å~ 170mm.

Results. In the present study, the prevalence of sinus septa is 38,1%. Significant difference can be found in the height of primary and secondary septa. The mean height of primary septa was 5,5mm (± 1,19) and of secondary septa 3,4mm (± 1,6). Anterior and medium septa resulted significantly higher than posterior septa (p=0,003). The medium thickness of the mucosa was 0,85mm (± 0,58) while close to the septa it turned out to be 1,8mm (± 1,87). The difference is statistically relevant (p= 0,003). There isn't any statistically significant proportional relationship between dimensions of septa and thickness of mucosa (p= 0,53).

Conclusion. Underwood's septa are frequent anatomic variations of the maxillary sinus. Their presence may result in a thickening of the sinus membrane. The systematic study of radiographic anatomy of maxillary sinus is necessary for the sinus lift surgery planning. Furthermore, it can be suggested that in case of a considerable maxillary sinus septum a "double trapdoor" design of the antrostomy and an exposition of the septa as a "new wall" of the sinus, could limit the risk of perforation.

3D evaluation of IAN position related to mandibular third molar root

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Aim. The aim of this study is to evaluate the incidence and prevalence of mandibular impact third molar; distribution by Pell & Gregory classes and Winter class; IAN position related to third molar's apex; main distance between third molar's apex and IAN; distribution of third molar root's morphology; intraosseous IAN course; main angle of root's curvature.

The study also evaluates the correlation between the IAN-apex distance with IAN course (lingual, apical or vestibular) and with Pell & Gregory classification (A, B, C) or IAN position within mandibular bone (lingual, apical or vestibular) with Pell & Gregory classification (A, B, C) in order to know if exist or not statistically significant relations between these measures.

Methods. 200 mandibular CT, randomly selected from ISI of Milan's Radiology, were scanned with the 3 D reconstruction of Nobel Clinician Software (NobelBiocare®, Zürich-Flughafen, Switzerland). The data collected with Excel (Microsoft, Inc, Redmond, WA) were analised with a metanalytic method and the ANOVA technique. The first statistical analisys was performed both with parametric (1-way ANOVA) and non-parametric tests (Mann-Whitney U test or Kruskal-Wallis rank test) to evaluate the correlation between dependent variables (distance apex-IAN; Pell&Gregory class A/B/C) and the independent variable (IAN position related to the apex).

Results. Thanks to IAN's digital coloring and 3D reconstruction we observed that only in 0,6% there was a double nerve. When IAN is lingually positioned the risk of having an apex-IAN distance of 0 mm is infinite (over 1 billion times) than the other two position because all the 42 cases analised had a distance of 0 mm from IAN. In Pell&Gregory B class the same risk is increased by 5,4 times than in A class whereas in Pell&Gregory C class is increased by 6,3 times.

In 80 cases IAN was apically positioned related to the apex or between the roots and the average distance was 2,051 mm ± 3,1150. When IAN was vestibularly positioned (38 cases) the average distance was 1,484 mm ± 2,0897. The average distance between IAN and the root was in general 1,378 mm ± 2,563.

The results showed that in Pell&Gregory A class there's an high probability to find the IAN apical to the apex of the third molar (54,5%) while in the B class it's more likely to find the IAN in a lingual position (51,2%). As for the C class 5 cases (71,4%) pointed out a IAN's apical position related to the third molar's apex whereas in 2 cases (28,6%) IAN was in a lingual position. The C class needs more cases to demonstrate a statistically significant position.

Conclusions. Difficulty degree and risk of IAN's injuries increase in Pell&Gregory C class and when IAN is lingually positioned. Pre-surgery 3D reconstruction allows a better and more precise preoperative evaluation and reduces neurological consequences during the surgery.

Maxillofacial rehabilitations in craniofacial oncological patients

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Aim. Analyze retrospective case series of patients undergoing maxillofacial prosthetic rehabilitation after oncological resections, including both intra- and extra-oral prosthetic devices within the San Donato Hospital Group.

Methods. Were included in the study 51 patients undergoing surgical resection of the head and neck due to neoplastic disease of malignant nature, including both intra- and extra-oral lesions. Patients are constantly subjected to periodic post-operative follow-up in order to exclude the absence of any recurrence or complications, and evaluate the results of the healing process. In patients with intraoral lesions, in order to restore function, were initially performed a provisional palatal obturators. For their realization are detected, before surgery, alginate impressions.

This type of impressions does not detect the defect, but is a good starting point for the construction of a provisional device. Upon this impression the surgeon draws what presumably will be the limits of the defect, resulting from the tumor resection.

Upon the modified plaster model were created the immediate surgical obturator with acrylic resins, made with methyl methacrylate and relined with soft materials (Flex acrylic soft - coesoft) directly in the oral cavity in order to adapt the obturator to the morphology of the defect. Soft materials decrease bedsores on the tissues in this phase of healing process. Such provisional obturators are kept for about 30-45 days or more if necessary with a close follow-up (controls every 7 days).

When healing occurred, proceeds with the detection of precise impressions with polysulphides, using the palatal obturator as trays, for the realization of a definitive prosthesis, also including dental elements.

In patients with extraoral defects (facial defects), epithesis fabrication is carried out as soon as healing process comes about (at least 30-45 days after surgery). If necessary, for psychological reasons, on patient's request, is possible to realize a temporary prosthesis first (with some aesthetic limitation), in order to encourage social relationship. Even for this type of prosthesis an alginate impression is acquired, avoiding the material infiltration into the cavities by application of a wet gauze. The realization of provisional epithesis for nose often requires direct setting on the eyeglass frame, in order to allow the primary stability.

The final epitheses instead, when is it possible, exploits different anchorages: we resort to adhesives or to implant support both intra and extra-oral, as a function of defects or of the therapy.

Results. Cancer incidence was respectively:
36% squamous cell carcinoma
20% Basal Cell Carcinoma
16% Carcinoma Adeidocistico
11% Carcinoma Mucoepidermioide
17% Other

Of these 51 patients, 25 were treated with radiotherapy, 7 have not been treated with radiotherapy, the data of the remaining 19 patients are not available to the study. The radiation dose delivered was between 12-70 Gy. Only 4 of 51 patients received chemotherapy treatment.

Conclusions. Patients treated within San Donato Hospital Group's centers, underwent maxillofacial prosthetic rehabilitation post-cancer, have shown good compliance with both intra and extra-oral rehabilitations. The dentist follow up was shown to be fundamental for the good outcomes. It is also noticeable the positive influence of the prosthesis on the quality of life of patients undergoing maxillofacial resections.

Preliminary histologic analysis of bone tissue formation in maxillary sinus lift with or without biomaterials in humans

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Aim. Recently, the possibility of leaving an empty space during sinus lift procedures has been proposed as an alternative to the traditional grafting technique. This option may exploit the regenerative potential of the residual periosteal and bony walls following membrane elevation in specific cases. This prospective randomized study aimed at histologically comparing the bone regeneration at 6 months after sinus elevation between grafted and non-grafted sites.

Methods. Eight patients were enrolled for this study in the Dental Clinic of the Department of Biomedical, Surgical and Dental Sciences of the Università degli Studi di Milano. The inclusion criteria were: edentulousness of the molar-premolar area of the upper jaw (when the first and/or second premolar and first and/or second molar are lost), absence of systemic disease, no smoking or ≥ 6 cigarettes/day, FMPS and FMBS <20%, residual crest thickness between the two implants < 6 mm. The patients were randomly allocated to the test group (sinus lift with the use of biomaterial, Bio-Oss® Geistlich) and to the control group (sinus lift without biomaterial). During the sinus lift guided surgery, two bone level dental implants (OsseoSpeed™ TX Astra Tech) were placed in premolar and molar regions. Six months later, a third implant was placed between the previous two fixtures and a bone specimen was taken for histological evaluation. The biopsies were processed for ground sections according with the method of Donath and Breuner (1982). Briefly, the specimens were fixed in 10% formalin, dehydrated by increasing ethanol concentrations (70%-100%), infiltrated in alcohol-resin solution with increasing resin concentrations for 1 month and finally embedded in Kulzer Technovit 7200 VLC® resin (Bio-Optica, Milano, Italy). The cores were sliced longitudinally and subsequently reduced by microgrinding and polishing to a thickness of 80 µm (Micromet & LS2®, Remet, Bologna, Italy). The sections were stained with Toluidine blue/Pyronine Y (Sigma-Aldrich, St. Louis, MO, USA). Two central sections for each specimen were used for analysis. For qualitative analysis the sections were observed using Nikon light microscope (Eclipse E600®, Nikon, Tokyo, Japan) equipped with a calibrated digital camera (DXM1200®, Nikon), while for quantitative analysis the proportion of the sample characterized by new lamellar bone (LB), woven bone/osteoid (WB, biomaterial (BO), and bone marrow (BM) were calculated on photographs at a total magnification of 100x using stereologic method.

Results. At histological observation, all samples showed new bone formation without signs of inflammatory infiltrate. Several areas of bone remodeling were seen in the apical portion of both groups. Residual blocks of biomaterial were embedded in mineralized new bone.

Histometric results for the test group were: LB mean 38.83% ± 8.11, WB mean 9.23% ± 2.41, BM mean 30.23% ± 7.53, BO mean 21.70% ± 8.94, and the results for the control group: LB mean 46.55% ± 6.79% , WB mean 18.58% ± 7,68% and BM mean 34.87% ± 5.09%.

Conclusions. The preliminary data may suggest that in maxillary sinus floor lift it is possible to obtain bone reformation without the use of biomaterials in case of: high level of surgical experience, peculiar anatomical conformation of the defect to rehabilitate, the use of implants with enhanced osteoconductive surface and geometry.

An unusual multi-cystic patient: a different solution in the same case

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Aim. The purpose of this work is to describe a case report of a patient with multifactorial etiology cysts, treated with different therapeutic approaches.

Materials. Two bilateral cysts of the third lower molars and radicular cyst of the right second lower molar were treated. The resolutive approach, has been planned depending on the position and the dimensions of the lesions. Therefore, an excisional therapy for the two dentigerous neoformations, and the extractions of the two associated molars were performed.

While, as a function of the remarkable dimensions witch characterized the lesion, a conservative approach by marsupialization for 12 month before, and excission after, were chosen in order to solve the radicular inflammatory cyst. In order to preserv the patency of the cystic cavity, an acrylic obturator were used.

Results. The resulting healing of the excisional treatment of the two bilateral dentigerous cysts, occurred completely, without complications or relapses documentable with a 10 years follow-up.

The choise of a conservative approach with decompression of the inflammatory cyst by marsupialization, has enabled afterwards, to enucleate a cyst which dimension was considerably fell compared to the initial.

Also the resulting healing of the excisional treatment of the inflammatory cyst occurred completely, without relapse signs documentable with a 12 months follow-up.

Conclusions. The treatment of jaws cysts depend on the etiology, the location and the size of the lesions as well as bone integrity of the cyst wall and its neighboring to vital structures. The enucleation, wherever technically safe, is preferable becouse of the less compliance requested to the patient during the postoperative period and becouse of the quickly therapeutic approach.

Nevertheless, when we have a large dimension cyst, the marsupialization treatment is preferred becouse of the possibility to obtain the shrinking of the lesion and stimulate bone regeneration.

However, there is no a preference in lecterature about the results obtained with one technique or the other.

The following case emphasizes how, thanks to a detailed analysis of the neoformations, the right operative choise and its correct execution, it's possible to achieve, also on the same patient, the awaited therapeutic succes.

Coronectomy of third mandibular molars: periodontal outcomes

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Aim. Coronectomy of mandibular thirds molars is a procedure that raises a lot of questions that still have not been completely solved. The aim of this study was to answer one of these questions: the periodontal healing distal to the mandibular second molar after coronectomy of the third molar.

Methods. Twenty patients underwent coronectomy on twenty lower third molars that showed a direct contact with inferior alveolar canal on CBCT. Were excluded from the study teeth with caries, endodontic disease or premature roots. To assess the periodontal situation, these parameters were evaluated: the probing pocket depth (PPD), the distance between the marginal crest (MC) and the bottom of the osseous defect (BC) and the distance between the cementum enamel junction (CEJ) and the bottom of the osseous defect (BC). These clinical indexes were recorded on three points of the distal surface of second molar: the disto-buccal site (DB), disto-medial site (M) and disto-lingual site (DL). Migration of the retained roots was also recorded.

Results. Twenty mandibular third molars of twenty patients were treated. The mean age was 29±8 years (range 19 to 49 years) and the mean follow-up time of the study was 9 months. There were no cases of inferior alveolar nerve injury and no cases of failed coronectomy due to intrasurgical root mobilization.

The pre-surgical PPD was 7±3 mm on the DB site, 6±2.5 mm on the M site and 5.5±1 mm on the DL site. Mean PPD at 9 months was 4.15±2 mm on DB site, 2±2 mm on the M site and 1.5±1.75 on the DL site. The reduction in probing depth was statistically significant. The MC-BC at 9 months was 3±2 mm on the DB site, 3±3 mm on the M site, and 4.5±5.25 mm on the DL site. These data were statistically significant.

The intra-operative CEJ-BC distance was 5±2 mm on the DB site, 5±3 mm on the M site, and 5±2.25 mm on the DL site. At 9 months this distance was 2±2 mm on the DB site, 2±3 mm on the M site and 1.5±3 mm on the DL site. Root migration at 9 months was 2.55±1.38 mm and was noted in 95% of cases. The migration was statistically significant but no correlation between MC-BC and amount of root movement was observed at 9 months.

Conclusion. Coronectomy is a therapeutic option to consider when there is a risk of damage to the inferior alveolar nerve. After coronectomy a progressive periodontal healing distally to second molar with the restoration of a mean PPD of 3 mm at 9 months was recorded.

Geriatric oral lesions treatment with two different techniques

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Aim. Focal overgrowths of gingiva are a common occurrence, and mostly represent nonneoplastic, reactive lesions including pyogenic granuloma, peripheral giant cell granuloma, fibrous hyperplasia and peripheral ossifying fibroma. Lasers have the advantage of clear surgical field offering better visualization, faster healing, less postoperative pain and

scarring as well as better patient acceptance. Diode laser, in particular, have been used successfully for excision of soft tissue proliferations of oral cavity. In this article, we aim to highlight an alternative treatment modality i.e. diode laser vs conventional surgical procedure, for treatment of geriatric gingival fibroma (GGF), with good post-operative results and better patient acceptance, without significant disturbing the microarchitecture of the biopsy specimen.

Methods. A 66-year-old healthy male reported with a gingival overgrowth in relation to upper front teeth. It had been present for the last 1 year. Initially, the lesion appeared as a small swelling on the gums, and slowly grew in size under the prosthetic manufacture. There was no history of pain but patient reported difficulties in speech and bleeding on brushing. Extra-oral clinical examination revealed no evidence of lymphadenopathy or other pathosis. An excisional biopsy of the lesion was planned, using a diode laser, under local anesthesia, and on the other side with conventional surgical technique (Bard-Parker, n. 11) after obtaining informed consent from the patient. For excisional biopsy, a diode laser with a wavelength of 980 nm was used (2 watt), as it has been reported to be effective for excision of intraoral soft tissue lesions, and mucogingival surgeries. The operative field was irrigated with sterile normal saline solution.

Results. Surgical excision was performed, and the specimen was sent for histopathology, which later confirmed that the lesion was, on Hematoxylin & Eosin staining, "hyper parakeratinized epithelium was observed with cellular stroma composed of chorion fibrosis and flogistic lymphomonocitary infiltration of the superficial chorion,". Patient was recalled after 1 week for post-operative evaluation. He did not report any discomfort at the operated site. No scar was observed, and healing time was satisfactory particularly in the side treated with diode laser (14 days vs 28 days). No tenderness was observed on palpation. After 3 months of follow up, there has been no complication or recurrence of the lesion.

Conclusions. In the current investigation, findings were concordant with literature observations. It is advantageous in comparison to conventional surgical modalities in terms of patient acceptance and treatment outcome. Diode laser is however, comparatively cost effective and easy to operate.

Management of rhinosinusitis and maxillary atrophy with piezosurgery, platelet concentrates and heterologous bone: a case report with 18 months follow-up

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Aim. The aim of the present study was to evaluate the outcome of a subject, with considerable sinus membrane pathology that undergoing maxillary sinus floor augmentation using Platelet Rich Fibrin (PRF®) as a filling material, in association with the deproteinized bovine bone and simultaneous implant placement.

Methods. A patient (53 years old man) with presence of severe opacification of the maxillary sinus, was evaluated for sinus pathology for a period of 6–18 months after bone transplantation and implant insertion using pre-operative and post-operative panoramic radiological imaging and Cone Beam Computerized Tomography (CBCT) scan for the purposes of diagnosing the mentioned sinus pathology. The patient were questioned for complaint and symptoms of sinusitis preoperatively, and any positive findings were assessed by an otolaryngology consultation prior the surgical procedure. It was opted for the surgical procedure of one-stage sinus lift by piezosurgery. PRF was used in combination with autogenous bone, an organic bone material and organic bone substitutes. After implant placement, clinical parameters were recorded and evaluated at baseline, 3, 6, 9, 12 and 18 months.

Results. The radiological examination, performed after six months, allowed to notice the presence of newly-formed bone tissue, well amalgamated with the residual bone, and also revealed an average increase in the peri-implant bone density of 29%. In the apical region, the Authors also noticed close contact of implants with the newly-formed bone. One year after loading there were no dropouts and no failure of the definitive prosthesis occurred.

Conclusions. In the present study, even in cases where the surgery was considered risky and not suitable for the presence of a clear pathological state of departure that could affect the final result and expose to a higher risk of complications, there was a full success in centering the objective of regenerative bone therapy and the Authors also performed the collateral objective of no any negative evolution in the sinusitis. For this purpose, the choice of the "filling" material represents an essential aspect for a complete and real achievement of the above-mentioned objectives. The Authors consider it opportune to conclude by stressing the need to continue this study on a wider cohort of patients, and to carry out large-scale analyses which could provide statistically significant criteria about the success of this procedure.

Rhino-cerebral mucormycosis in a paediatric patient affected by acute lymphoblastic leukemia: a case report

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Aim. Mucormycosis, or zygomycosis, is an uncommon disease caused by fungi of the order Mucorales. It consists of an opportunistic infection, which affects patients with severe immune deficiencies or uncontrolled metabolic disorders, mainly diabetes mellitus. The hy-

phae penetrate through the oral and nasal mucosae and subsequently invade the blood vessels, thus causing thrombosis, ischemia and necrosis of the hard and soft tissues. This work was aimed at describing a case of rhino-cerebral mucormycosis occurred in a paediatric patient affected by acute lymphoblastic leukemia (ALL).

Methods. A 12-year-old female patient affected by ALL, treated according to the Italian Association of Paediatric Hematologic Oncology protocol (2009), referred to the Complex Operating Unit of Odontostomatology with 10-15 days severe facial pain and swelling in correspondence of the left cheek, fever, yellow-greenish discharge from the nose and the mouth, teeth loss and mobility, headache, epileptic seizures and a slight esophtalmo. Clinical oral examination showed: rapid expansion of hard hemipalate and maxillary alveolar process with multiple oral ulcers, bone exposure, fistulas and a sinusal defects through which intrasinusal necrotic material was detected. Ortopantomography (OPT) and Computed Tomography (CT) with 3D reconstruction revealed extensive destruction of the involved maxillary sinus with necrosis extended to the nasal cavity, left ethmoidal cells, orbital floor and maxillary alveolar process; MRI showed multiple hyperintense lesions in the frontal, occipital and temporal encephalic regions, suggesting a cerebral abscess. Rhinoendoscopy revealed greenish discharge, which resulted negative for fungi at microbiological examination, and a pale, oedematous and necrotic mucosa, which was removed and sent for histopathological examination, which confirmed the diagnosis of mucormycosis. The patients were accordingly treated with intravenous L-Amphotericin B therapy at a daily dosage of 7,5 mg/Kg for two weeks before surgery which resulted in complete regressions of all encephalic lesions, thus avoiding the necessity of cerebral abscess drainage. The persisting disease and the increasing soft tissue involvement called for surgery. Using upper vestibular and subciliary incisions, a maxillary resection extending into the ipsilateral ethmoidal and orbital regions was performed, with removal of the orbital walls and ethmoidal cells. Osteotomies were carried out with piezoelectrical tools. Due to the removal of a large part of the orbital floor and the paediatric age of the patient, the inferior and medial orbital walls were reconstructed using poli-p-dioxanon (PDS) foil. The post-surgical medical treatment consisted of intravenous L-amphotericin B therapy in a daily dosage of 3mg/Kg until hospital resignation, followed by systemic oral therapy with Posaconazole at the dosage of 200 mg four times daily. Local medical therapy was carried out by using puffs of iodine solution through the orosinusal defect, once a day for one month.

Results. Medical therapies, both local and systemic, and conservative surgical treatment allow the complete healing after one year follow-up. The patient was temporary rehabilitated with an obturator prosthesis waiting for a complete reconstruction at the end of the patient development.

Conclusion. Given the lethal nature of the disease, the authors underline the importance of early diagnosis and of a multidisciplinary approach in order to undertake correct surgical and medical treatments, while keeping the underlying disease under control.

Evaluation of impacted mandibular third molars post operative condition by using clinical evaluation, x-ray investigation and patient's discomfort

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Aim. Impacted lower third molar surgery is today considered a common dental surgery. However, sometime, this clinical condition may be related with several intraoperative and postoperative complications. Clinicians should know all the pathological implication related to this kind of surgery in order to offer patients an healthy and safe post op recovery. The aim of this investigation is to record the possible risk factors for severe discomfort after mandibular third molar surgery and to validate the postoperative condition of the patients by applying the Postoperative Symptom Severity (PoSSe9 scale. Moreover the grade of the impaction, the angulation and the anatomical condition of the third molar have been recorded on each patient. Clinicians should control and manage the patient's discomfort in order to guarantee a safe and complication less post operative control.

Methods. In a 4 year retrospective evaluation, a total of 433 unilateral impacted mandibular third molar teeth were surgically removed under local anesthesia by 2 surgeons. Standardized surgical and analgesical protocol were followed. At the review appointment one week after surgery, all patients returned a completed follow up questionaire (PoSSe scale) and their clinical condition were evaluated by recording for postoperative pain, possible bleeding or edema.

Results. Several parameters like gender, tabacco use, ramus relationship/space available, antibiotic prophylaxis, cortisone application, duration of the surgery, have been applied to the present study. The patients' perceptions of the severity of symptoms (PoSSe scale score) was strongly connected with clinical assessment of edema and pain.

Conclusion. When impacted third molars are removed, post-surgery is characterized by limitation in the mouth opening, pain, reduced masticatory capability and swelling of variable degree. The latter represents a serious issue as it affects the ability of the patient to interrelate and to return to the routine working life, especially during the first 3 days following oral surgery. Although clinical conditions associated with retained third molars are well understood, little is known about the impact of those conditions on the quality of life among affected patients. There is growing recognition that the impact of oral conditions on quality of life is an important outcome that can be quite useful in making treatment decisions. From a patient's perespective, operative factors had a little bearing on the quality of life after removal of mandibular third molars. However the results indicated that the clinical patient's discomfort was related to the cortisone application and to the operation timing. The other parameters are not significantly represented. Moreover, in the evaluation of the records, the female patients seem to better control the postoperative pain.

Kissing molars - 3 cases report

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Introduction. Kissing molars (KMs) are impacted permanent molars that have occlusal surfaces contacting each other while their roots are pointed in the opposite direction sharing a single follicular space with a continuous cement-enamel junction. They are an extremely rare mandibular pathological condition.

Aim. The aim of this study was to report three cases of KMs, the dental involvement type and the treatment outcomes of kissing molars in this patients who underwent lower third molar surgery at Department of Oral Surgery of the Second University of Naples, Italy.

Methods. Three patients (two female and one male) with a mean age of 40,3 years who were found to have KMs. The first showed the inclusion of the first and second lower molar of the right side as KMs with a large cyst of the dental follicle. The treatment choice consisted of surgical removal of the KMs and follicular odontogenic cyst. The control of the second patient revealing the presence of KMs of the third and fourth molars as KMs. The treatment choice consisted of surgical removal of the impacted teeth on both side. For the third patient, sent by a dentist after a OPG-control, there was the presence of KMs of third and fourth molars which have occlusal surfaces contacting each other in same follicular space with indication of their removal. The prophylactic removal of both teeth was proposed and performed.

Results. Patients with KMs not report symptoms and in all cases presented, the patients present only radiographic detection of KMs with one associated to cystic dilatation of their dental follicle. The diagnosis was occasional always and carried out by radiological features on orthopantomography (OPG). A cone-beam study was made to help the surgeon during operation. The treatment of choice was surgical removal in all cases without complications. Histologically, the specimens, included in Haematoxylin and Eosin, showed a abundant fibrous tissue which contains areas of odontogenic epithelial rests and areas of calcifying and calcified tissue; a low grade of chronic inflammatory cells was showed in this wall. In the first case a cystic epithelium lining the lumen was demonstrated.

Conclusions. KMs is a extremely rare phenomenon. Early diagnosis and surgical therapy is essential as this condition can cause serious complications, including formation of pathologies such as dentigerous cyst or destruction of the adjacent bone.

Multidisciplinary approach in a case of mandibular pseudoarthrosis after a transmandibular approach for squamous cell carcinoma of the pharynx

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Aim. The aim of this study is to present a case for a multidisciplinary approach in a patient treated 12 years earlier for a squamous cell carcinoma (SCC) of the pharynx. We attempt to show how a multidisciplinary approach can increase an oncologic patient's residual quality of life, improving both the aesthetic and functional outcome. The present work describes the surgical management of a mandibular pseudoarthrosis, 12 years after a transmandibular approach for the surgical management of a SCC of the pharynx (pT4apN1M0) with radical neck dissection and radiotherapy. The patient was also treated from an aesthetic point of view for the outcome of surgery and radiotherapy on the skin. We present the patient's final functional and aesthetic outcome.

Methods. A 70-year-old woman was referred to our department for right facial pain and swelling. During the intraoral exam, a draining mucosal fistula was identified on the right mandibular ramus area. The computed tomography (CT) scan showed a nonunion of mandibular segments in the ramus area. The patient was treated with surgical removal of the fistula, bone debridement, and a free iliac crest graft with plate substitution. Three months after surgery, the patient began skin treatment. The focus of treatment was postoperative scar, post-irradiation skin sequelae as a result of radiotherapy 12 years earlier, and neuromotor deficits as a result of facial nerve injury. The treatments were: six sessions of face and neck skin biorevitalization with Plasma Rich in Growth Factor (PRGF) monthly, 20 1-mL vials of hyaluronic acid (HA) (variable weight) with mixed media (administered with needle or cannula) and injected on different tissue planes (supraperiosteal, fat compartments and dermal-subcutaneous plane); 1 pair of Silhouette suspension wires for ptotic soft tissue support on the right side.

Results. After mandibular reconstruction with an iliac graft, the patient experienced complete functional recovery without pain. Three months after surgery, the patient was rehabilitated with an inferior total removable denture. Moreover, the result of skin treatments was: improvement of skin texture through a process of hydration and stimulation with autologous plasma growth factors; restoration of planes between the skin and subcutaneous tissue at the laterocervical and mandibular edges with increase in the thickness of severely atrophic subcutaneous areas.

Conclusions. Deformities of the head and neck region can have a devastating effect on a patient's appearance and function, and are among the most disabling and socially isolating defects having a significant impact on the patient's residual quality of life. Nowadays, modern techniques and innovative materials in aesthetic medicine allow non-surgical correction of serious blemishes, such as post-traumatic or oncologic outcomes, with very acceptable results. Notwithstanding the limitations of the medical techniques used, such as the inability to correct excessive ptosis and redundant skin, we believe this is a winning strategy in patients requiring treatments and where there are limits to the surgical procedures used. The cycle set here allowed us to achieve an improved aesthetic and functional outcome for the patient, even considering that further procedures would be necessary for the completion of treatment.

An overview on unwanted events after teeth extractions in patients in therapy with antiplatelet drugs and oral anticoagulants

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Aim. "Oral Surgery and Teeth Extractions Ward" of the Dental School of Turin deals with both healthy and unhealthy patients. Especially hospitalized patients and those waiting for organ transplant, oncologic, cardiopathic, allergic patients, etc... Five chairs are dedicated to simple extractions in the ward. An anesthesiologist is in the building. Starting from the introduction of NOACs (New Oral Antocoagulants: apixaban, dabigatran, and rivaroxaban) a survey of unfavourable events after teeth extractions became necessary. New oral anticoagulants represent an alternative to standard therapy with vitamin K antagonists. We monitored bleeding after teeth extractions in patient in therapy with antiaggregants and anticoagulants to investigate if any therapy is at higher risk.

Methods. Every day, some patients in cure with antiplatelet and coumarinic anticoagulants and NOACs attend to our Oral Surgery Ward. We considered in the survey all patients in therapy with aspirin, dual antiplatelet treatment after stenting with aspirin and Clopidogrel, coumarins (vitamin K antagonists), NOACS. For patients in therapy with coumarins an INR of 2.5 or less is allowed. Local haemostatic procedures are always realised such as suture and fibrin sponge application. The same protocol is applied from either experienced surgeons and less skilled operators such as students of the Faculty of Dentistry.

Patients were enrolled during all year 2014.

Results. A number of 373 patients were considered: 150 in therapy with coumarins, 211 with antiplatelet drugs and 5 with dual antiplatelet, 8 with NOACs.

No bleeding after teeth extractions were observed neither referred from patients at the moment of suture removing. Otherwise, no sistemic trombohembolic complication was referred.

Conclusion. Strict application of validated protocols gives adequate bleeding control also in at risk patients for pharmacological causes. Extraction performed out of a dedicated ward, in our experience, need to be avoided and are affected by an higher risk of complications.

Pattern of third molars' impaction and their main causes of extraction in an italian population: a retrospective survey

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Aim. The aim of this study was to evaluate the correlation between impacted third molars, according to Pell & Gregory and Winter classification, and the risk of their extraction in a sample of Italian patients.

Methods. A retrospective study was conducted on panoramic films of patients, aged 18-50 years, who were referred to the oral surgery unit of the dental clinic - San Paul Hospital via Beldiletto 1/3 Department of Biomedical, Surgical and Dental Sciences in Milan, between January 2013 and December 2014.

Information were collected regarding age and gender, cause of extraction, angulation of impacted teeth (Winter's classification), level of impaction and relationship of the mandibular third molar with the ramus (Pell and Gregory classification). CT scan was requested only when the risk of damage of anatomic structures (nerves, vassels, sinus) on panoramic films seem to be high.

Records of patients aged younger than 18 years or older than 50 years, with any pathological dento-alveolar syndrome such as Down syndrome, cleidocranical dysostosis, or with the presence of incomplete records or poor quality OPG, incomplete root formation of third molar, were excluded.

Data were analyzed among genders and age groups: group I (18-25 years) group II (26-35 years) and group III (36-50 years).

With the consent of the patients, all necessary information about the variables of the study written in a pre-filled form were obtained through historical, clinical exanimation and radiographic study.

Results. A total of 347 impacted third molars were included in the study: 163 (46,97%) were in males and 184 (53,03%) were in females. Assessing the level of impaction using Pell & Gregory classification showed that 90 (26%) third molars were in the maxilla and 257 (74%) were in the jaw.

With regard to the maxilla, 61% of them were in position A, 23% were in position B, and 16% in position C; with a prevalence of group I 18-25 years (56,66%). As regarding to the mandible, 43% were in position A, 36% in position B and 21% in position C; between these, 52,5% were in position I, 39,5% in position II and 8% in position III; with a prevalence of group I 18-25 years (45,5%).

The most common angulation for impacted teeth in the mandible was the vertical (53%), the second was mesioangular (39%); the most common angulation for impacted teeth in the maxilla was distoangular (45%). In most cases, teeth were extracted prophylactically to avoid future complications (54,7%); decay was the second cause of extraction (20,7%).

The most common third molar position in the mandible was IA (29,8%) and it was correlated with decay as main cause of extraction (40%). The second most common position was IIB (18,2%) and dysodontiasis was the main cause of extraction (59%).

Third molars in position IIA, with partial mucosal and bony coverage, were the most susceptible to pericoronitis as cause of extraction (61%).

Conclusion. This study reports that third molars' extractions were more prevalent in females than in males and that the most common angulation was vertical in maxillary third molars and distoangular in the mandibular ones. Although the sample was not particularly large, the results of this study seem to suggest that the class IA had the highest incidence and that the primary indication for extraction was dysodontiasis in class IB (64%), IIB (59%) and IA (27%).

Surgical recommendations for the extraction of erupted upper third molars: landmarks emerging from a clinical study

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Aim. This study evaluated the efficacy of an anatomical-radiological-surgical protocol for the extraction of erupted upper third molars (EUTMs).

Methods. 166 EUTMs were extracted according to two different extraction techniques: Group 1 (G1 – 97 teeth) was treated with the proposed protocol: multiple roots with forceps DG117/DG118; single roots with DG250; tapered roots with DG 270; curved roots with Apexo 303 elevator; Group 2 (G2 – 69 teeth) was treated with straight elevator and forceps DG 250 or 270. Extraction time and total number of complications (TNCs) were the main outcomes; TNCs were also divided in complications during the extraction (CDEs) and complications after the extraction (CAEs) as secondary outcomes.

Results. Differences between G1 and G2 were detected for extraction time (146.8 vs. 225.6 sec. – $p<0.05$) and for complications (G1= 13.4% Vs. G2=47.8% - $p<0.001$). Multivariate analysis showed that extraction time and smoking habit were independent risk factors for TNCs ($p<0.001$); furthermore, "not applying the proposed extraction protocol" increases almost 7 times (6.86; 95% CI= 1.41-33.32 – $p<0.02$) the possible onset of CAEs.

Conclusion. The proposed protocol can be helpful for general dental practitioner in planning the extraction of EUTMs, shortening the extraction time and diminish the complications, especially those occurring after the extraction.

Systemic implications of third molar retention

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Aim. Aim of this study was to evaluate if the retention of third molars presenting signs and symptoms of pericoronitis was associated with altered levels of serum markers and white cells count.

Methods. Medical records of patients attending the outpatient clinic of Dentistry and Oral Surgery of the University Hospital of Pisa were screened for inclusion. Systemically healthy patients with third molar(s) presenting signs and symptoms of pericoronitis for at least one month and scheduled for extraction were included. All patients underwent a blood test one week before the surgical removal of the third molar. Serum levels of glucose; creatinine; white cells; hematocrit; platelets; lymphocytes; neutrophils; monocytes; eosinophils; basophils; INR; aPTT and aPTT ratio were analysed. Data analysis was performed using the software Statistical Package for Social Sciences, version 17.0 (SPSS Inc., Chicago,IL, USA). Descriptive statistics were obtained, and mean scores, standard deviation, and frequency distribution were calculated for gender (male; female), third molar position (upper; lower) and age. The Levene test was used to check the data distribution. T-test was used to assess the statistical significance of the differences observed between male and female patients, upper and lower third molars and blood parameters. The level of statistical significance for all tests was set at 0.05.

Results. A total of 400 patients' clinical records (167 males, 233 females) were analysed. The mean age of the sample (in years) was 28.35 ± 3.52. The clinical records analysed showed that male patients had significantly higher values of glucose and white cells in comparison to female patients ($p<0.05$). Both male and female patients showed significant quantitative alteration of white cells count ($p<0.05$) one week before the surgical removal of third molar. In particular a significantly higher number of granulocytes basophils and eosinophils ($p<0.01$) was recorded when compared to standard parameters both in male and female.

Conclusions. Retention of third molars presenting pericoronitis is often associated with mild symptoms (pain, edema, erythema, intraoral halitosis) and more rarely with severe symptoms that can include dysphagia, lymphonodal involvement, fever and trismus. This inflammatory condition may also determine a systemic reaction reflected by altered blood parameters. Within the limits of this retrospective study, the retention of third molars presenting signs and symptoms of pericoronitis is an oral clinical condition that may determine a consistent alteration of the immune response. The differences observed between male and female patients may be attributed to the greatly divergent and changing levels of sex steroid hormones and their interplay with the immune system. The effect of the retention of third molars presenting pericoronitis should be further investigated in the context of general long-term health.

Use of piezosurgery for the treatment of bisphophonate-related osteonecrosis of the jaws. A clinical prospective investigation

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Aim. Recently the use of ultrasonic bone surgery has been proposed to surgically treat bisphosphonate-related osteonecrosis of the jaws.

This work presents the to date clinical experience of the Oral Surgery Unit of the University of Messina - School of Dentistry with a total of 30 patients treated from January 2011 until February 2015.

This on going prospective study will provide further evidence to develop a reliable surgical conservative treatment of cases not responding to medical therapy.

Methods. Patients receiving bisphosphonates both for oncologic and bone dismetabolic diseases with a diagnosis of ONJ unresponsive to a two months cycle of non-invasive medical treatment were included in the study. No recommendation for bisphosphonates medication discontinuation was made.

The considered variables were: gender (23 female, 7 male), age (51 to 89 years old), underlying diagnosis (14 oncologic reasons, 16 bone disease), type of bisphos-

phonate used, cumulative dose, route of administration, complementary administration of systemic corticosteroids (8 patients treated with Prednisone), location of the osteonecrosis (5 maxilla, 25 mandible), clinical symptoms, association with dental treatment and surgical outcome.

Panoramic radiography and maxillary TC scan were performed before the surgical procedure. All selected patients were affected by osteonecrosis limited to the alveolar bone and not involving basal bone, maxillary sinus or nasal floor. Pre-operative therapy with antibiotics and antiseptic mouthwashes was administered. The surgical procedure, performed under local anesthesia, consisted in removal of all necrotic bone with ultrasonic devices until bleeding walls were detected in the bone defect. In all cases a tension free primary closure was obtained.

Patients were clinically evaluated at surgical time, 2 and 4 weeks after the procedure and followed up for a maximum of 48 months. Clinical outcome and radiographic data were collected.

Results. All patients medicated with oral bisphosphonates showed resolution of the ONJ condition after the surgical procedure, defined as maintenance of the mucosal closure, absence of residual infection and exposed bone at the time of evaluation.

As for the 14 patients treated with bisphosphonates for oncologic reasons, only 7 cases showed a complete clinical resolution. In the remaining cases bone exposure remained without recurrent infections. One case of new primary disease developed postoperatively.

The most important risk factor seemed to be the cumulative dose associated with the drug potency, the administration of systemic corticosteroid and surgical trauma such as tooth extraction.

Conclusion. This clinical prospective study evaluated the efficacy of piezosurgery resection of bisphosphonates related osteonecrotic lesions of the jaws limited to alveolar bone. The present data confirm that piezosurgery can represent a valid and safe treatment of BRONJ lesions in bone dismetabolic patients. Instead, this conservative surgical treatment can be considered a palliative measure for symptomatic oncologic patients unresponsive to irrigation and antibiotic therapy.

Comparison between excision of impacted lower third molar and surgically assisted rapid maxillary expansion (SARME) regarding patient's discomfort

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Aim. The aim of this study was to evaluate if the Surgical Assisted Rapid Maxillary Expansion (SARME) may be safely practiced in local anesthesia and quantify the patient discomfort associated with this protocol.

Materials and methods. The patient discomfort has been compared during and after two different kind of oral surgical treatments in the same patient. Odontectomy of impacted lower thirds molar (control), that it is commonly practiced in local anesthesia was compared with SARME (test) already practiced in local anesthesia. The VAS scale was used by each patient to quantify discomfort pre and after surgery. A total of 35 patients (18 males and 17 females, middle age 24 years old) responded to previous criteria and were enrolled for this study. Data have been analyzed using GraphPad Prism software 6.00 (GraphPad Prism Software, San Diego, CA, USA) by an expert in statistical analysis, they were expressed by mean ± standard deviation. Statistical significance difference ($P < 0,05$) between groups was determined by one-way ANOVA and T test.

Results. The minimum score reported during the odontectomy was 10 mm while the maximum score reported was 22 mm (middle score 19,3). The minimum score reported during the SARME was 19 mm (probably for the osteotomy of pterygod process); the maximum score reported in the same procedure was 26 mm (middle score 21,7). The minimum score reported for post-operative discomfort after a week from odontectomy was 24 mm and the maximum score was 53 mm (middle score 39,5); while the minimum score reported for post-operative discomfort of the SARME was 20 mm and the maximum one was 47 mm (middle score 36 mm). No statistically significant difference ($P>0,05$) have been demonstrated between control and test groups in terms of intra and post-operative discomfort.

Conclusions. Our preliminary data suggest that SARME can be safely practiced in local anesthesia, in fact the intra and post-operative discomfort seems to be similar to that of others procedures usually performed under local anesthesia.

Oral bisphosphonate-related osteonecrosis of the mandible: a case report

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Aim. BRONJ (Bisphosphonate-Related Osteonecrosis of the Jaw) is a severe side effect of bisphosphonate therapy used in patients with osteoporosis, bone metastases, hypercalcemia or other bone disease. This side effect may occur in both oral and parenteral administration.

We document a case of BRONJ in a 80 years old woman who reached Dental Emergency Unit in Trieste. She came to our attention because of paraesthesia and pain, with VAS (Visual Analogue Scale) of 5, localized on left lower lip. These symptoms occurred after a dental intervention that has been performed because of a three-years long unspecified infectious process of left mandible.

Methods. Anamnestic data were collected in order to have patient's complete profile. Extra oral examination revealed altered left lower lip posture with decrease of thermal, proprioceptive and pain sensitivity. A hard, fixed and painful swelling was present on left mandibular contour and the skin above was warm, reddish and dystrophic. Neck examination revealed swollen and painful lymph nodes localized in the first and second lymph nodes levels. Intra oral examination revealed ery-

thematous and edematous mucosa. Bone implants were present in both first mandibular molar site.

Orthopantomography image showed an ill-defined radiolucency of left body mandible extended from canine to second molar site.

An antibiotic therapy with Amoxicillin and Clavulanic acid was prescribed and a biopsy of the lesion was performed. Histopathological examination revealed the presence of necrotic bone and chronic inflammatory infiltrate, hyperplasia and parakeratosis of stratified squamous epithelium and underlying iperplastic granulation tissue.

Computer tomography (CT) of mandible and neck was performed and revealed an osteolytic process with 26x15mm diameter involving the left body of mandible. Volumetric technique was used to perform this exam and images were taken before and after the administration of Iopromide 370 as contrast medium.

At a later stage the patient underwent to surgical toilette of necrotic bone and extraction of first mandibular premolar and implant placed in ex first mandibular molar site. During the surgery the bone cavity was sterilized with Erbium-YAG laser and bacteriological sampling were taken in order to set up the most appropriate therapy.

Results. The clinical case has been solved in three-weeks time after surgery and appropriate antibiotic therapy. A new CT was performed and revealed a well-circumscribed radiolucency without surrounding periosteal reaction.

Conclusion. A correct surgical approach and a targeted and effective medical therapy are fundamental steps to manage patients diagnosed with BRONJ.

Medication-related osteonecrosis of the jaws: an auto-fluorescence guided surgical approach performed with Er:YAG laser

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Aim. Medication-Related Osteonecrosis of the Jaw (MRONJ) therapy remains an unresolved problem and there are no evidence-based guidelines on the management of this disorder. The different proposed conservative and surgical treatment regimens are associated to contradictory success rates. However, the increased experience with MRONJ management suggests that surgical therapy can halt the progression of the disease, and can allow a histology-based diagnosis of the osteonecrosis. One of the difficulties typically encountered during the surgical removal of a MRONJ is the precise individuation of the necrotic bone margins. However, the complete removal of osteonecrosis seems to be essential to avoid recurrence or progression of the disease. The aim of this study is to describe an auto-fluorescence (AF) guided surgical approach performed with Er:YAG laser.

Methods. A 73-year old male patient was affected by a multiple myeloma for which he received 24 infusions of zoledronic acid and corticosteroids. He was diagnosed with a Stage III osteonecrosis (according to the AAOMS staging system) of the left maxilla. The surgical treatment was performed under local anaesthesia. Antibiotic therapy with amoxicillin (2 grams per day) and metronidazole (1 gram per day) was administrated from 3 days before to 3 weeks after intervention. After bone exposure through mucoperiosteal flap, the VELscope™ (LED Medical Diagnostics Inc., Barnaby, Canada) system was used to induce and visualize AF of the maxillary bone. It was evident that necrotic bone areas showed no or only pale autofluorescence. Osteotomy was performed through Er:YAG laser (Fidelis Plus®, Fotona - Slovenia) (Parameters: 300 mJ, 30 Hz, fluence of 60 J/cm2). After the removal of the necrotic bone block AF visualization was used to guide the marginal bone osteoplasty. The maxillary sinus was completely cleaned from infected tissue and sinusal mucosa. Osteoplasty was performed through the use of a traditional ball-shaped bur that is not traumatic on the soft tissues and that is useful to remove sharp angles of the bone. The AF image obtained after osteoplasty showed an evident appearance of fluorescent bone surrounding the maxillary sinus antrum. According to the AF image guide, Er:YAG laser was used for the vaporization of necrotic bone, up to the reachment of healthy bone. The patient received an intra-operative application of low level laser therapy (LLLT) (Nd:YAG laser, 1064 nm, Fidelis Plus, Fotona®, Slovenia – power: 1.25 W; frequency: 15 Hz; diameter of the fibre: 320 μm) which was administered in non-focused mode, at 2 mm of distance from the tissues, for 1 minute (power density: 1562.5 W/cm2, fluence 7 J/cm2), repeated 5 times. Weekly applications of LLLT were administered for 3 weeks after intervention.

Results. Such a technique allowed a highly accurate and minimally invasive approach through the selective ablation of the non-fluorescent or hypo-fluorescent areas. After 6 months of follow-up the complete mucosal healing was evident and the patient was free of symptoms.

Conclusion. Taking into account the demonstrated advantages associated with laser therapy compared to traditional surgery and the possible effectiveness of the AF in highlighting surgical margins, this approach would probably allow to achieve excellent outcomes. Further studies, particularly controlled clinical trials, are necessary in order to validate and standardize the surgical technique reported here.

Sinus floor augmentation procedure with heterologous bone vs. heterologous bone plus PRF: a clinical, histological and histomorphometric analysis

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Aim. A clinical, histological and histomorphometric evaluation of sinus augmentation, prior to implants placement, with heterologous bone vs. heterologous bone plus platelet richfibrin (PRF) after six months of healing.

Methods. A split-mouth study is performed with 15 healthy patients (8 women and 7 men, mean age 45) that require a bilateral sinus augmentation. The first surgical procedure is the same for control and test sites: lateral access with a carbide-tungsten drill and the membrane's elevation with sinus lift instruments. The control sites receive a bovine pericardio membrane Evolution (Osteobiol, Tecnoss Dental, Turin, Italy) in contact with the Schneider-membrane, 2 g of granules of heterolo-

gous bone Gen-os (Osteobiol, Tecnoss Dental, Turin, Italy); graft is covered with a bovine pericardio membrane Evolution (Osteobiol, Tecnoss Dental, Turin, Italy). The test sites receive a PRF (prepared as Choukroun protocol) membrane in contact with the Schneider-membrane, 2 g of granules of heterologous bone Gen-os (Osteobiol, Tecnoss Dental, Turin, Italy) mixed with PRF; graft is covered with a PRF-membrane.

Non-resorbable sutures are used in both surgical procedures. After a six months healing period, both control and test sites underwent second surgical procedure consisting in implants site preparation using a trephine drill (external diameter = 3 mm; internal diameter = 2 mm). Harvested bone is collected for histological and histomorphometrical analysis. Implants are inserted and soft tissues are sutured using a non-resorbable suture.

Harvested bone samples are fixed in buffered formalin, dehidrated in an ascending alcoholic scale and embedded in resin. Samples are sectioned with a high precision diamond disk and ground using a grinding machine. Sections are stained with toluidine blu and acid fuchsine. Samples are analyzed under an optical microscope. Radiographic controls are collected with Orthopanoramic x-ray and Cone Beam TC, before and after first surgical procedures and after second surgical procedures.

Results. Clinical: The test sites showed a lower post-operative pain and accelerated soft tissue healing. During the healing period, no clinical complication occurred. Implants are placed in all patients as planned.

Histological and histomorphometrical analysis: Both test and control sites show the presence of trabecular bone with medullary spaces and residual granules of biomaterials. Granules of grafted materials are uniformly distributed and surrounded by newly formed bone.

Control samples show the presence of a 21,3% of newly formed bone, 23,4% of residual biomaterial and 55,3% of medullary spaces. Test specimens, instead, show the presence of 31,7% of newly formed bone, 23,2% of residual biomaterial and 45,1% of medullary spaces.

Conclusion. PRF is an autologous grafting material; it improves clot and graft materials stability. In the present study PRF also seems to improve osteoconduction of the grafted material. PRF preparation is cheap and time saving procedure. It's rich in fibrin, platelets and leucocytes and shows an angiogenic effect.

Minimally invasive lateral approach for sinus augmentation: a split-mouth randomized clinical trial

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Aim. The primary objective of this study is to demonstrate that a minimally invasive approach in lateral sinus lift procedures may achieve an improved clinical outcome in comparison with a traditional approach in terms of augmented bone height, however determining a reduction of surgical complications and patient's discomfort. Secondary objectives of this study are to collect data about patient's discomfort after surgery, and to measure the time of both the surgical procedures, the minimally invasive approach and traditional procedure.

Materials and methods. Once a patient have been enrolled in the study impressions have been taken. After the wax-up, a radiographic stent has been prepared. Special attention has been given to position radio-opaque references in the positions where the implants will be inserted according to a prosthodontic guided insertion. Presurgical CT scan has been executed after placing the stent in its proper position in patient's mouth. In the study 16 patients were treated with bilateral edentulous area posterior maxilla; the sample was divided into a test group and a control group. Side test: A bone window of measure 6x6mm was prepared using a piezoelectric system; was used as a filler deproteinized bovine bone (1-2mm) (Bio-Oss Pen Geistlich Pharma Wolhusen Switzerland); The login window was covered with a collagen membrane (Bio-Gide, Geistlich). Side control: The access to the maxillary sinus has been made according to the standard approach through the preparation of bone windows of normal size on average equal to 8x10mm; the maxillary sinus was filled with deproteinized bovine bone (1-2mm) (Bio-Oss, Geistlich Pharma Wolhusen Switzerland) and the window was finally covered with a collagen membrane (BiGide Geistlich Pharma Wolhuse Switzerland) One hour before starting the surgical procedure, all patients have received 1 g of amoxicillin, and immediately before the surgical procedure they have rinsed for 2 min with a 0.2% chlorhexidine solution. In all surgical procedures, antibiotic treatment (2 g amoxicillin) have been prescribed for 5 days. Chlorhexidine mouthwash has been prescribed twice daily for the following 21 days. Sutures has been removed after 10 days. Patients have been recalled at 7 days, 14 days, 30 days, 180 days, 360 days. Oral hygiene has been performed every 3 months during follow-up period. At 360 days visit a CT scan has been performed placing the same radiographic stent utilized for the pre-surgical scan.

Results. Statistical analysis, at one year follow up shows that there are not statistically significant differences in terms of bone regeneration between the test group and the control group (p = 0:18); in contrast, parameters such as duration of surgery (p = 0.0001) and the values inherent in the VAS score compiled by the patients showed statistically significant differences between the two groups.

Conclusion. Both surgical procedures provide good results on the clinical level in terms of regeneration of the bone; in particular mini-invasive approach reduces statistically significant values for the duration of the interventions and the post operative discomfort.

A case report as an example of management of osteoradionecrosis

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Aim. Osteoradionecrosis is a bone aseptic necrosis which develops on postirradiated bone tissue of patients

who underwent radiotherapy for head and neck tumors. Osteoradionecrosis defines exposed irradiated bone, which fails to heal over a period of 3-6 months without evidence of residual or recurrent tumor. In the previous decades, a staging and treatment protocol suggested by Marx, has dominated the approach. However, recently this paradigm is shifting to less aggressive treatment such as a medical and pharmacological one. This paper is a case report where we intend give an example of how osteonecrosis of the jaws induced by radiotherapy in oncological patients can be treated. We describe a minor surgical-pharmacological approach to eliminate exposed bone sequestration allowing the epithelium to regenerate on vital bone.

Methods. The patient was fifty-eight years old at the moment of the diagnosis of a carcinoma of the right floor of mouth. The patient refused surgical option and was referred to a radio-chemotherapy. But within a year a lymph nodal metastasis was detected and the patient underwent a surgical intervention of the neck. After three years of well being an osteoradionecrosis of the left mandible was diagnosed. The reported patient underwent intervention of minor oral surgery in local anaesthesia to remove sequestrated and necrotic bone with an incomplete healing after the surgery but with a clinical remission of symptoms; than was treated with local care, application of platelet rich plasma, with hyperbaric oxygen therapy and low level laser therapy untill epithelium covered all bone.

Results. The reported patient underwent curettage of the sequestrated and necrotic bone of the left mandible; than a conservative therapy reached remission of symptoms and bone exposure. An alternative option could be mandibular resection and reconstruction with a vascularized fibula free flap.

Conclusion. Complete recovery, satisfactory quality of life, absence of pain are goals of oncological treatments. When unwanted secondary effects appear treatment became ever and ever difficult and lower goals must be pursued. A conservative approach to osteoradionecrosis can be long lasting and effective and patient's satisfaction reached.

Pilot observational investigation on bisphosphonate content in alveolar bone sequestra

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Aim. Our aim was to identify the presence of bisphosphonate in bone sequestra from patients affected by Bisphosphonate (BP)-Related Osteonecrosis of the Jaw (BRONJ). BP can bind bone tissue with a strong chemical interaction, remaining in bone even months after therapy suspension. To date, no study directly investigated the presence of BP in patients' bone specimens. Our primary objective was to develop and validate a toxicological method to quantify the amount of residual drug in the necrotic human bone and verify whether its content correlated to the duration of the treatment or suspension.

Methods. Since April 2008, a pilot observational study was carried out at the Unità di Odontostomatologia II A.O. "San Paolo" (Università degli Studi di Milano) and Unità di Odontoiatria Ospedale Papa Giovanni XXIII di Bergamo. All BRONJ patients, who experienced spontaneous or surgical removal of bone sequestra, were enrolled. We collected personal and clinical information of each subject and bone specimens were stored at -80 C° until further analysis. BP content was analysed via High Performance Liquid Chromatography (HPLC) coupled to spectrometry mass (ABSCIEX) at Sezione di Tossicologia (Università degli Studi di Milano).

Results. In recruited BRONJ patients, bone sequestra occurred more frequently in lower jaw and, in the most of cases, subjects were under current or previous therapy with zolendronate or alendronate. The method was successfully set up to reliably quantify the presence of zolendronic acid. Thus, zolendronate-related necrotic bone samples were analysed (n=36) and we found an average amount of the drug equal to 4.60 ng/mg (±3.97). Within the limitations of this study, bone BP levels showed correlations with the duration of the treatment and its suspension. Notably, zolendronate was still detectable, at low level, in samples from patients who discontinued the drug several years before bone sequestra removal.

Conclusion. This is the first clinical study aiming to directly identify and quantify BP drugs in human necrotic bone. Zolendronate appears to be detectable in bone tissue even after several years of suspension, but the need of further investigations arises to clarify the clinical meaning of toxicological levels. Moreover, the set-up of experimental protocols for the detection of other BPs is also required. These findings will contribute to better elucidate the pathogenesis of this condition.

Prospective clinical trial on the use of pentoxyfilline and α-tocopherol for preventing osteoradionecrosis of the jaw after oral surgery: preliminary results

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Aim. The aim of this prospective study is to verify the efficacy of a protocol based on the use of pentoxifylline (methylxanthine derivative that increases microvascular perfusion) and α-tocopherol (antioxidant and anti-inflammatory molecule) to prevent the osteoradionecrosis (ORN) of the jaw after tooth extractions and/or dental implant placement. Pentoxifylline improves peripheral blood flow, reducing its viscosity, and enhancing tissue oxygenation and inhibits tumor necrosis factor alpha (TNF-α), producing anti-inflammatory effects and Damodulating fibroblast and collagenase activities. In periodontitis animal model, it has been shown to decrease the duration of soft tissue radiation-induced necrosis and bone loss. α-tocopherol impairs tissue fibrosis and reduce inflammation: it is a potent oxygen radical scavenger decreasing free radicals impacting necrosis and improves endothelial function in patients with hypercholesterolemia or advanced atherosclerosis. Moreover, studies of dietary supplementation reported

significantly lower TNF-α production in animals reducing inflammation in patients with diabetes or subjects who smoked preventing of the early signs of dermal necrosis.

Methods. Patients who received head and neck radiation therapy and needed single/multiple tooth extractions and/or dental implants were recruited, at Unità di Odontostomatologia II of the A.O. San Paolo (Università degli Studi di Milano). Pentoxifylline (400 mg 2 times/day) and tocopherol (800 UI/day) were administered both pre- and post-operatively, in order to promote vascularization and reduce inflammation at the surgical site.

Results. From May 2011 to November 2014, 20 patients were enrolled (13 men and 7 women). Surgery was performed 52 times, including 47 extractions, 3 cases of implant placement and 2 removals of bone sequestra as surgical management of earlier ORN. One case of wound dehiscence was observed after the extractive surgery, but resolved in few days. Further complications included: 3 cases of post-surgical discomfort with longer healing time, then resolved at the following examinations; 1 patient with purulent drainage from the post extractive socket, which occurred 1 week from extraction and completely healed after a cycle of antibiotic therapy; 5 cases of bone exposition (3 subsequent to extractions and 2 to implant placement), detected at 1 month later follow-up.

Conclusion. Although a randomized controlled trial is required to confirm these results, the here proposed protocol appears advantageous in preventing ORN surgically induced. It is simple, safe and with contained costs for the patients, mostly if compared to hyperbaric oxygen therapy.

Case report: complex odontoma as cause of third inferior molar impaction

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Aim. To describe the case of a patient affected by complex odontoma which caused third molar impaction. Complex odontomas are classified as benign tumors of odontogenic origin, and are considered tooth hamartomas, composed by hard calcified tissues from odontogenic epithelial with ectomesenchyme, i.e. enamel, dentin, cementum, well formed but following a disordered pattern. They show nonaggressive behavior and no tendency of recurrence. The etiology is still unknown, although traumatic events can be advocated. They are usually identified on routine radiograph, between 2nd and 4th decade, where their aspect is radio-opaque mass surrounded by radio-transparent area.

Methods. We report the case of a man, who was referred by his dentist to our surgery service (Odontostomatologia II of the A.O. San Paolo, Università degli Studi di Milano), in October 2014.

Results. A 32-year-old male presented to our attention with an asymptomatic lesion above the third mandibular impacted molar (48). Clinical examination showed no swelling areas. Based on clinical features and radiology evidences (TC cone beam, orthopantomography), the clinical diagnosis was complex odontoma, and different diagnosis included sclerosing osteomyelitis, osteoma, periapical cemento-osseous dysplasia, ossifying fibroma, cementoblastoma. The histological exam confirmed the diagnosis of complex odontoma. The absence of local symptoms would have been an indication to leave odontoma untreated, but impaction of the corresponding third molar and local infection of 47 due to perforation of cortical bone, indicated the excision of the lesion.

With the support of TC cone beam it was possible to measure the lesion, which had a size of approximately 18 x 16 mm. After obtaining the consensus of the patient, a surgical intervention to avoid an inflammatory complication involving the second molar was scheduled. The intervention was expected to improve the position of the impacted third molar, in preparation for a future extraction. The follow up demonstrated progressive healing of both oral mucosa and mandibular bone; after two months from the surgery, a new panoramic X ray showed current ossification of the distal site of the second molar and higher position of third molar from the inferior alveolar nerve.

Conclusion. The excision of the lesion prevented in our patient future complications, i.e. 47 infection and complicated extraction of the third molar (48).

Dental management of patients affected by the Gorlin Goltz syndrome: a review of the literature and case report

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Aim. The purpose of this paper is to present a literature review focused on a) the dental management of patients affected by the Gorlin-Goltz syndrome and on b) the surgical treatment of Keratocystic Odontogenic Tumors (KCOT). Additionally, the diagnostic process of the Gorlin-Goltz syndrome and the surgical treatment of the related KCOTs are described through a clinical case presentation.

Methods. The PubMed database was consulted with the following keywords: Nevoid basal cell carcinoma syndrome; Basal cell naevus syndrome; Gorlin syndrome; Multiple basal-cell carcinoma syndrome; Multiple basal-cell naevus syndrome; Multiple naevoid basal-cell carcinoma syndrome; Naevoid basal-cell epithelioma; keratocystic odontogenic tumor. Initially, 410 articles were screened: among them, 15 literature reviews published in english within the last 10 years were selected. Additionally, 2 textbooks and 2 clinical studies cited by the selected reviews were included. The clinical case here presented is related to a 24-year old woman presenting with radiographic evidence of 5 osteolytic lesions located in the upper and lower jaws, associated with multiple palmar and plantar pits. The histological evaluation of incisional biopsies, performed under local anesthesia, confirmed the presence of multiple odontogenic keratocystic tumors. According to the criteria purposed by Kimonis *et al.*, a diagnosis of Gorlin Goltz syndrome was then formulated. Treatment consisted in the enucleation of all keratocystic lesions in a single surgical session, under general anesthesia. The margins of the residual cavities after enucleation were treated with

an aggressive courettage and application of Carnoy's solution, to reduce the risk of relapse. Bilateral oro-antral communications resulting from maxillary tumors removal were treated by means of two Rehrmann's advancement buccal flaps supported by buccal fat pad flaps. Surgery was performed by the first and last authors.

Results. Gorlin-Goltz syndrome is a rare disease with a 1:57.000 to 1:256.000 prevalence rate. In 75% of cases, it is associated with single or multiple KCOTs. The diagnostic hypothesis arises from the observation of multiple/recurrent KCOTs or a single KCOT in patients under 20 year-old. Depending on the clinical presentation of the KCOT, 2 first choice surgical treatments are indicated: a) simple enucleation with surgical revision of the site and application of a cytotoxic agent: this solution is mainly indicated in primary mandibular lesions without cortical erosion; b) "en-bloc" resection of the site with removal of at least 1cm of marginal healthy tissue: this latter procedure is indicated in vast maxillary lesions, in recurrent mandibular lesions, and in all cases of cortical bone erosion. The postoperative recovery of the presented clinical case was uneventful. The histological analysis of all specimens confirmed the diagnosis of KCOT. A two-years radiographic follow-up showed regular re-ossification of the surgical sites with no signs of recurrence.

Conclusions. Despite the absence of specific data, several Authors consider that the simple enucleation of KCOTs is associated with a high recurrence rate, especially in cases associated with the Gorlin-Goltz syndrome. Conversely, aggressive curettage or resection (according to the extent of the lesion and bone erosion) may significantly reduce recurrences.

Reconstruction of panfacial fractures with CAD/CAM: two case reports

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Aim. Goal of the primary and secondary reconstructions of the face after panfacial fractures is to restore function and esthetics. Recent advancements in craniomaxillofacial surgery include the use of digital technology such as computer-aided design and computer aided modeling (CAD/CAM) software programs and hardware devices, which assist with three-dimensional analysis of surgical planning for complex fractures.

CAD/CAM software enables the clinician to import 2-dimensional computer tomography (CT) data from DICOM format (Digital Imaging and communication in Medicine) to a computer work-station and generate an accurate 3-dimensional (3-D) representation of the skeletal anatomy.

Stereolithographic models are currently used in maxillary and mandibular reconstructions as a guide to plate adaptations, jaw contouring and as a guide for constructing patientspecific customized surgical devices with sintered titanium or 3D inkprinted PEEK. Reconstruction of craniomaxillofacial fractures and defects may be preformed using autogenous bone or alloplastic materials (i.e titanium mesh, polymethylmethacrylate ecc). The bony orbit has a complex shape which is extremely difficult to precisely reconstruct and seldom presents wide defects due to its intrinsic weakness. Surgical access is also reduced by small incisions and limited visualization of the posterior orbit. Presurgical planning can then be used to virtually reconstruct the cranial contour and can provide an accurate template for orbital and craniomaxillofacial reconstruction. The primary advantage of this technique over intraoperative free hand modeling is the improved accuracy and the reduced operating time. Disadvantages include laboratory intensive workflow and more expensive price to fabricate the stereolithographic model.

Methods. Two patients with orbital floor blowout fractures and with inferior and upper orbital rim fractures were showed in this study. The decision to proceed surgically was based on the presences of at least one of the following conditions: diplopia, herniation of orbital muscle and fat tissues thorough bony defects in the orbital floor, and concomitant displacement of bone fragments of the inferior orbital rim.

Computer-aided maxilla reconstruction involves three steps: virtual surgical planning, CAD/CAM and stereolithographic model.

Planning began with a high-resolution CT scan of the patient's craniofacial skeleton and soft tissue. The DICOM-format data were processed using the software Devide. The CAD of the model was provided by HP Designjet 3D Print. Mini and micro titanium plates have been hand modeled strictly adhered to the inferior orbital rim, the frontozygomatic fracture and the maxillary zygomatic buttress.

Results and conclusions. New imaging techniques such as surface imaging and three dimensional computed tomography together with stereolithographic modeling have the potential to provide the surgeon with precisely planned procedures and then subsequently to allow the accurate transfer of the virtual reconstruction into reality.

Clinical considerations about an unusual case of maxillary third molar displacement in the buccal space

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Aim. This paper aims to describe a case of iatrogenic displacement of maxillary third molar into the buccal space and the surgical treatment performed to remove it by an intraoral approach.Removal of decayed and or impacted maxillary third molars is a common procedure in oral surgery. However some complications may occur as fracture of tuberosity, wound dehiscence, root fracture, perforation of the maxillary sinus or even displacement into adjacent anatomical spaces. Iatrogenic displacement. Into the buccal space is frequently mentioned but rarely reported.

Materials and methods. A 36-year-old healthy female was referred to our unit of Oral Surgery, School of Dentistry-University of Messina, for the assessment of a maxillary left third molar "lost and not found" during an extractive surgery performed 2 weeks earlier. The event was followed by an acute infection of surrounding cheek tissues. Moreover, due to the misinterpretation of an orthopantomograph, the private surgeon proceeded with an unjustified extraction of the second molar seven

days after. Intraoral examination revealed that the dislodged third molar was not detectable within the soft tissue.

Oral antibiotics and head and neck CT scan were prescribed. Rx examination showed the presence of the maxillary left third molar in the buccal space. After acute infection resolution, under local anesthesia, a mucosal incision was performed in the region between upper left first and third molar and a wide flap raised beyond the vestibulum until the tooth was displayed, reached and removed.

Discussion. Surgical removal of maxillary third molars is a common procedure routinely carried out in dental offices. Displacement of maxillary third molars into adjacent anatomical spaces, such as the infratemporal fossa, the pterygomandibular space, the maxillary sinus, the buccal space, lateral pharyngeal space or the pterygopalatine fossa, is usually associated with an incorrect extraction technique or insufficient surgical training or experience. Because the anatomic location of the displaced tooth can't be clinically determined, a head and neck TC examination is mandatory to locate the molar and perform a correct surgical approach.

Conclusions. In order to avoid the displacement of maxillary third molar, the surgeon should carefully evaluate the condition of the tooth preoperatively and perform a controlled dislocation. If an accident does occur, a three dimensional Rx examination of the head and neck is highly recommended, thus allowing the removal of such a displaced tooth with minimal morbidity.

Experience of the University of Parma on management of 260 patients affected by bisphosphonates-related osteonecrosis of the jaw (BRONJ)

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Aim. Bisphosphonates-related Osteonecrosis of the Jaws (BRONJ) has been reported with increasing frequency in literature over past years. Therapy for this condition is still a dilemma. The aim of this study is to compare surgical and non-surgical approaches for the treatment of BRONJ and the possible usefulness of lasers for surgical and non surgical applications.

Materials and methods. Two hundred and sixty patients (79 males and 181 females, 192 oncological and 68 non oncological patients) affected by BRONJ were evaluated at the Oral Pathology, Medicine and Laser Surgery Unit of the Dental School of the University of Parma, Italy, between 2004 and 2015. Treated sites were 230 and were subclassified as follows: Group 1 (G1): 33 sites treated with medical therapy; Group 2 (G2): 55 sites treated with medical therapy associated to Low Level Laser Therapy (LLLT); Group 3 (G3): 17 sites treated with the combination of medical and surgical therapy; Group 4 (G4): 42 sites treated with the combination of medical and traditional surgical therapy with LLLT; Group 5 (G5): 83 sites treated with the combination of medical and laser-assisted surgical therapy. Outcome of treatment was assessed using the staging system proposed by Ruggiero: transition from a higher Stage to a lower one for at least 6 months was considered as clinical improvement and suggestive of a successful treatment.

Results. Clinical improvement was achieved in 8 out of 33 (24.2%) BRONJ sites in G1. Sites of G2 with an improvement were 39 out of 55 (71.74%). Eleven out 17 BRONJ sites (64.7%) in G3 had a transition to a lower stage after treatment. A clinical improvement was recorded in 38 out of 42 cases (90.47%) in G4 and in 81 out of 83 cases (98.3%) in G5. Complete healing was obtained in 79 out of 83 cases (95%) in G5.

Conclusions. In our experience, percentage of success obtained with a combined approach based on medical, surgical (including laser-assisted) and LLLT (G4-G5) is significantly higher than percentage of improvement obtained in G1, G2 and G3. Management of BRONJ is still controversial: the introduction in the treatment protocols of laser-assisted and surgical approach could improve the therapeutical results.

Deep uprighting of a lower second molar by undertissue skeletal anchorage

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Aim. The aim of this paper is to report the rapid uprighting of impacted second lower molar with miniscrew-anchorage in adult patients, using a submerged tecnique.

Methods. The prevalence of severely impacted second molars is about 2.3%; it results to be one of the rarest diseases in the orthodontic field. The causes of impaction can be summarized as:

- Location of ectopic follicle;
- Error in loading mechanism of eruption;
- Obstacle to the path of eruption;
- Iatrogenic.

Treatments suggested by the literature are:

- Leaving the tooth in situ;
- Surgical repositioning treatment. This technique is fast, but is not so predictable;
- Surgical-Orthodontic treatment.

Currently the orthodontic-surgical treatment with the aid of skeletal anchorage is the most predictable and the most suitable treatment choice.

In this study, we tested the corrective effectiveness of a submerged technique, which consists of the extraction of the 3rd molar and the concomitant insertion of a miniscrew distal to the lower second molar, an attachment on the 2nd molar and a traction gear. All the components involved are submerged underneath the flap. The technique was tested on 10 patients, of which 2 are described here. In these particular cases CBCT and pantomography were used to check the progress of tooth uprighting. A reopening was needed to reactivate the closed coil after 3 months and after 7 months the second molar was detectable in the oral cavity. The orthodontist can now proceed with mounting of braces and finishing of the cases.

Results. Uprighting of the lower second molar was achieved in seven months. Radiographic evaluation indicated a new bone formation at the mesial aspect of the lower second molar.

Conclusion. The use of miniscrew allowed to achieve rapid uprighting of the impacted lower second

molar. Retromolar area presents adequate thickness and high quality of cortical bone for stable fixation of miniscrew, therefore it may be routinely considered in treatment of a second molar impaction. The use of miniscrews reduces treatment time, it is comfortable for the patient, it is easy to insert and remove and is placed directly by the orthodontist, with a light local anesthesia. This technique also provides that all of the components, miniscrew, button, traction gear, have to be covered by soft tissues, in order to avoid peri-implantitis, occlusal trauma on the miniscrew, and discomfort for the patient.

Sinus dislocation of maxillary impact third molars

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Ectopic eruption of a tooth into the dental environment is common, whereas ectopic eruption of a tooth in other sites is rare. Its presence in the maxillary sinus is a rare entity: very few cases have been reported in literature. Ectopic eruption may result due to one of three processes: developmental disturbances, pathological process and iatrogenic activity. Dentigerous cysts are benign odontogenic cysts. They usually appear as single lesions. They are the second most commonly occurring odontogenic cyst after radicular cyst, and accounts for 15% of all true cysts in the jaws. The dentigerous cysts are most frequently mandibular (70%), associated with impacted third molars, and in the remaining 30% of cases they are located in maxilla. When maxillar, they are usually associated with an impacted canine. A dentigerous cyst is very rarely seen in association with an impacted third molar. This happens mostly in the age group between 18 and 25 years, when third molars are supposed to erupt. The surgical treatment of this lesion has to be evaluated depending on the age of the patient, the site and the extension of the cyst. Various treatment options have been proposed. Basic surgical procedure includes marsupialization or enucleation. Failure to intervene may cause impingement on the surrounding structures such as nasal septum, orbit, alveolar arch, and hard palate. Some untreated dentigerous cysts may develop odontogenic tumors like ameloblastoma, and malignancies like oral squamous cell carcinoma and mucoepidermoid carcinoma. We reviewed the literature reports of these particular conditions over the past 30 years.

The Techniques for removal of upper third molars from maxillary sinus are: Caldwell-Luc procedure: the main advantages of this technique are a good visualization of the operative field (which facilitates better access to the sinus), prior experience with it in the surgeon's routine, and the absence of serious complications; transalveolar procedure: it is only indicated when the already existing opening is larger than the foreign body to be removed. The advent of endoscopy has also helped with the process of removing small foreign bodies from paranasal cavities . It allows sufficient visualization of the surgical field, has low morbidity, and is easily accepted by patients.

Custom-made bioactive bone grafts in segmental jaws defects

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In the last few years the research in oral and maxillofacial surgery has been strongly focused in finding valid osteogenic biomaterials for bone augmentation. The atrophic bone in the edentuolous regions often prevents the correct placement of dental osteointegrated implants and therefore of a fixed prosthetic rehabilitation. When a previous surgical treatment of bone reconstruction was needed, many different materials has been tested and employed in filling jaws defects in oral surgery. In this project, we present an innovative method for bone augmentation, employing a new hybrid bioactive material, partially synthetic and partially natural, digitally designed via CAD and mechanically shaped for custom made bone grafts in oral bone defects. This bone substitute is extremely biocompatible, and cell attractive. It adsorbs blood very easily and has good mechanical stability. It is easy to handle and fast in fixing into the bone defect, because it is pre-shaped and it offers a high tenacity to fixation screws. To use this procedure, a CBTC exam is mandatory to study the real morphology of the bone loss. Thanks to a virtual 3D reconstruction, we can model a virtual graft so to verify on the 3D images the exact fitting into the bone defect. As a result, we have a global graft project with all the information needed for its building. This file, once approved by the surgeon, is sent to the milling center where the graft is milled, reinforced and sterilized. Clinical, radiographical and histological results of the first cases we treated seem to confirm the efficiency of this material's use with this surgical technique.

Evaluation of efficacy of plasma-rich growth factor in the healing of post-extraction sockets in patients affected by insulin-dependent diabetes mellitus: a split mouth study

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Aim. To evaluate the efficacy of plasma-rich growth factor (PRGF) in improving socket healing after tooth extraction in diabetic patients.

Platelet gels were introduced in dentistry for improving the healing and regeneration of soft tissues and bones relies.

They have proved to play a central role during the physiologic healing process, as hemostatic agents and as a means for releasing secretory proteins that shape and stimulate the actions of the healing cascade. In particular, the plasma-rich growth factor (PRGF) technique provides a biological and autologous product in the form of a platelet membrane, which, when positioned in the healing site, delivers platelet-derived growth factor, which stimulates soft tissue and bone regeneration.

The primary goals of this study were to measure socket reduction, visual analog scale (VAS) scores, and the Healing Index (HI) at postextraction checkups and to assess patients' satisfaction based on answers to a questionnaire.

The secondary goal was to assess whether certain patient baseline characteristics, such as glycated hae-

moglobin (HbA1C), End Organ Disease Score (EODS), smoking habits, and glycemia values, had an impact on the healing proces

Methods. This was a split-mouth study in which each patient also served as the control: the study socket was treated with PRGF, whereas the control socket underwent natural healing. The outcome variables were the Healing Index, residual socket volume, visual analog scale score, postsurgical complications, and outcome of a patient questionnaire. The investigation considered the impact of hyperglycemia, glycated hemoglobin, End Organ Disease Score, and smoking habits. Follow-up included 4 postextraction check ups over a 21-day period. Pairs of correlated continuous variables were analyzed with the Wilcoxon test, independent continuous variables with the Mann-Whitney test, and categorical variables with the ^{2} test or Fisher test.

Results. From January 2013 to December 2014, 58 patients affected by insulin-dependent diabetes mellitus underwent contemporary bilateral extractions of homologous teeth, with 116 total extractions. The treatment-versus-control postoperative comparison showed that PRGF resulted in significantly smaller residual socket volumes and better Healing Indices from days 3 to 14. The patients' questionnaire outcomes were unanimously in favor of PRGF treatment. The small sample of patients with glycemia values of at least 240 mg/dL showed worse Healing Index and minor socket decreases.

Important general results, which held true for the study and control sides, were the complete absence of any complications from surgery, such as excessive bleeding, infection, or alveolar osteitis; an consistently observed HI of at least 8; and complete socket closure at the 21-day checkup for 86.2% of patients In the side treated with PRGF. Extraction were performed by two different surgeons, and there are not found statistically significant differences between the 2 operators both as regards the monoradicular ($p = 0.89$) both multirooted ($p = 0.48$).

Conclusion. PRGF application after extraction improved the healing process in diabetic patients by accelerating socket closure (epithelialization) and tissue maturation, proving the association between PRGF use and improved wound healing in diabetic patients.

Moreover, this study confirms the fact that the use of PRGF is a technique clinically safe for the patient and shows the effectiveness independent of the operator.

Aspecific interdental bone necrosis: a case report

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Aim. This paper reports a case of bone necrosis floss because nonspecific.

The female patient, 35 aa, good oral health, went to our attention in July 2014, to visit consultation following pain symptoms in area 34 35. On examination it showed an area of bone exposure at the interradicular septum. Radiographically throughout the area between the elements 34 and 35 resulted seized with greater impairment charged to item 35.

According to medical anamnesis the patient was in good health, not taking medication and had not been subjected to previous medical therapies. To the anamnesis dental she reported to have been subjected to endodontic therapy which was performed under local anesthesia and nerve block. The patient reported that intraoperatively, for persistent pain, subsequent infiltration of anesthetic had been repeated. The hypothesis was therefore of a necrotic lesion etiology iatrogenic by local ischemia.

The literature shows possible causes of bone necrosis, such as using drugs like endodontic sodium hypochlorite (nb), pastas arsenical (nb), etc; trauma from overheating caused by endodontic plugger (nb) or ultrasonic instruments (nb). Have also been reported bone necrosis herpetic infections (nb).

In the case reported were excluded all such causes as a result of the information reported by the colleague, who treated the patient.

Materials and methods. After local anesthesia was raised a mucoperiosteal flap and we proceeded to the extraction of the 35 considered not recoverable and compromised from the endodontic point of view. Extraction was followed by the removal of bone sequestration and review of the entire area honeycomb. A closure as optimal has been tried thanks to the passivation of the buccal flap and suture. The element 34 has been maintained because judged recoverable and its viability has been monitored after 1,3 months and 6 months. The element 35 extracted and the portion necrotic bone were placed in formalin buffered at pH 7.2 to be assessed histologically. After inclusion in the resin, the cutting and preparation of sections of 30 microns, the survey was conducted by the use of an optical microscope in bright field.

Results. With microscopic observation the bone fragment showed numerous bacterial colonies on the surface of the coronal fragment as well as on the baseline. The bacterial infiltration was clearly facilitated by vascular channels. Several bacterial colonies were present in the channels of havers and marrow spaces. Within the structure of the bone fragment are found a great number of features related to bone necrosis with large areas of focal inflammatory cell infiltrate.

Conclusion. The histological findings show a direct association between bone necrosis and bacterial infiltration. It's also clear the spread of microorganisms through vascular channels and medullary present in the tissue. However, etiology of the lesion remains unknown.

The effect of insertion torque and buccal bone thickness on the clinical outcome of single implants: a randomized clinical trial

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Aim. The insertion torque value has been extensively used as an indicator for implant primary stability, which

is considered a determining parameter for the implants success. The primary goal of the present study was to evaluate and compare the clinical outcome for implants, placed with high insertion torque (between 50 Ncm and 100 Ncm) and regular insertion torque (within 50 Ncm) in healed ridges.

Materials and methods. One hundred and sixteen partially edentulous patients, missing one or more mandibular or maxillary teeth, having an adequate amount of bone, allowing implant placement, were randomized to receive implants with regular insertion torque (< 50 Ncm) or high insertion torque (³ 50 Ncm). Implants were left to heal submerged for 3 months. Implants were restored, with individualized abutments and cemented metalceramic crowns. Outcome measures were: insertion torque values (IT), thickness of buccal bone plate after implant insertion (TBB), marginal bone level (MBL), and facial soft tissue level (FST). All patients were followed 12 months after implant restoration.

Results. One hundred and sixteen implants were placed in one hundred and sixteen patients, and enrolled for the study. Fifty-eight implants were randomly allocated in regular-IT and high-IT groups, with a mean insertion torque, respectively ranging from, 20 to 50 Ncm and from, 50 to 100 Ncm. Results were verified by pair-comparison tests; significant differences between the two groups (P values < 0.0001) were observed in the lower as well as in the upper jaws. Three implants failed (2 in the high-IT group and 1 in the regular-IT group); five implants (4 in the high-IT and 1 in the regular-IT group) showed, at the 12-month evaluation, a marginal bone level (MBL) reduction greater than 1.5mm, being considered unsuccessful.

Conclusion. The findings from this study suggested that implants inserted with high-IT (higher than 50 Ncm) in healed bone ridges showed more peri-implant bone remodeling and buccal soft tissue recession than implants inserted with a regular-IT (lower than 50 Ncm). Moreover, sites with a thick buccal bone wall (greater than 1 mm) - after implant placement - seemed to be less prone to buccal soft tissue recession, at the12-month evaluation, than sites with thin buccal bone wall (lower than 1 mm). The consideration that cortical bone is substantially more represented in the mandible, could explain, why the worst clinical effects of high insertion torque were more pronounced in the mandible.

A great clinical attention should be paid to the importance of the residual width of alveolar bone ridge, the amount of cortical bone, the implant macro-geometry and the potential risks of high insertion torque for implants, placed where the cortical bone component is well represented.

Effect of implant length and crown height in a single implant positioned in the posterior edentulous maxilla: 3D finite element analysis

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Aim. The objective of this research was to evaluate the stress transmitted to surrounding bone by single short implants with different prosthetic crown configurations compared to the stress transferred to bone by single standard length implant by means of finite element analysis.

Methods. The 3D geometry of the edentulous maxilla was reconstructed from computerized tomography (CT) scans. The symmetry of the structure permitted the reconstruction of a half maxilla. Bone material properties have been assigned to each tetrahedral element based on the Grey Value. The meshes of the implants (Astra Tech AB OsseoSpeedTM TX, Dentsply Implants) were placed in molar position. A superstructure representing a porcelain crown was built using beam elements for each configuration. Three single implant configurations were compared: A) 4 mm diameter x 6 mm long implant with 8 mm long crown; B) 4 mm diameter x 6 mm long implant with 13 mm long crown; C) 4 mm diameter x 11 mm long implant with 8 mm long crown. A 200 N axial and 45° oblique load were applied to the crown. For each configuration the effect of both loading scenarios was evaluated in terms of state of stress in the bone-implant interface (Von Mises stress, maximum and minimum principal stresses).

Results. Stress values were from 8 to 10 times higher under oblique load than under axial load. When vertical load was applied, stress distribution was more homogeneous all around the implant than in the case of oblique load, in which the stress is concentrated in the cervical area of the peri-implant bone for all the configurations. Considering axial load, the values of Von Mises, maximum and minimum principal stresses were comparable among the 3 configurations. Under oblique load the maximum values of peri-implant stress were found in the B configuration and the minimum in the C configuration.

Conclusion. Crown height and implant length seem to be both influencing factor in the peri-implant bone stress even if the stress values were in a physiological range. From a biomechanical point of view short implants with higher crowns can be considered a potential alternative to standard length implants, but axial and lateral forces have to be carefully analyzed in every patient.

Surgical management of patients affected by BRONJ: effect of surgeon learning curve

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Aim. Of this study was to retrospectively evaluate the effect of the learning curve of the surgeon in the surgical treatment of bisphosphonate-related osteonecrosis of the jaw (BRONJ).

Materials and methods. 120 subjects affected by BRONJ and requiring surgical treatment of sites not responding to previous medical treatment were included. A single surgeon performed all surgical interventions between January 2004 and December 2012. The effect of the surgeon experience on the complete healing of the BRONJ lesions was the primary outcome. Age, gender, underlying diseases, smoking and co-morbidities of study population were analysed. A logistic regression was applied to individuate factors that could potentially affect the surgical outcome. Stratification of the outcome

of surgery according to BRONJ stage was also performed. Subjects were followed up for at least 6 months.

Results. One hundred twenty-nine lesions in 120 patients (86 women, 66%; average age 67 years; standard deviation, 11 years; age range: 32-87) were identified. Ninety-three patients were receiving intravenous bisphosphonates for the treatment of oncologic pathologies: metastatic breast cancer (37 patients, 40%); multiple myeloma (26 patients, 28%) and metastatic prostate cancer (17 patients, 18%). Other treatment indications for intravenous BPs were lung, colon, kidney and thyroid tumours. Twentyseven patients were taking oral bisphosphonates for the management of osteoporosis. The BPs used were zoledronate (97 patients, 80%), followed by alendronate (17 patients, 14%), ibandronate (3 patients, 3%) and risedronate (3 patients, 3%). Fifty-three percent of patients were also treated with corticosteroids.

The most frequent stage of BRONJ was stage II (77 subject, 60%), whereas stage I (26 subject, 20%) and stage III (26 subject, 20%) were less common. BRONJ lesions were mainly symptomatic (119 sites, 92%) and accompanied in the vast majority of the cases by bone exposure (107 sites, 83%) and suppuration (118 sites, 91%). Lesions were prevalently located in the mandible (63%).

Surgeon learning curve was extending as complete disease resolution was referred. Complete healing after surgery increased from 40 to 80% over a period of 8 years ($p< 0.001$). The majority of subjects (84%) showed improvement after surgery, 15% showed no modification, and 1% exhibited a deterioration of the clinical condition. Logistic regression indicated that smoking and BRONJ staging could affect the outcome. Stratification indicated 100% improvement and total disease resolution for all stage I patients, 87% of improvement for stage II and 52% for stage III. Disease resolution was observed in 75% of stage II and 40% of stage III cases.

Conclusion. Our data suggest that complete healing of BRONJ lesions after surgery increases along with the increment of the surgeon experience. Smokers with severe BRONJ stage seem to present an increased risk of surgical treatment failure.

Histological and histomorphometric analysis of post-extraction sites treated with two different ridge preservation procedures: flap *vs.* flapless technique

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Aim. The aim of this study was to evaluate and compare the histological and histomorphometric features of two different procedures carried out in extraction sockets grafted with a xenograft and a collagen membrane; namely, the flapped and flapless technique.

Methods. Patients were recruited from the consultation clinic at the Dentistry Department of Versilia General Hospital, University of Pisa, from January 2010 to September 2011. Patients who were included in the study were accurately evaluated by examining clinical aspects and periapical/panoramic radiographs; moreover, data were collected for each patient such as age, gender, smoking habits, and indications for tooth extraction based on both clinical and radiographic examination, tooth location and presence/absence of adjacent teeth.

Patients considered eligible for the study were randomized to receive tooth extraction and ridge preservation with the porcine bone and collagen membrane, with a full thickness mucoperiosteal flap and primary soft tissue closure (control group), or, with a flapless procedure and a secondary soft tissue closure (test group).

After 3 months of healing, the surgical re-entry procedure was performed and implants were inserted in the test as well as in the control sites. Bone core samples were harvested from both groups and processed to be observed under light microscopy. Outcome variables were percentages of newly formed bone, residual graft particles and marrow spaces.

Results. Forty-three patients were initially considered eligible, even though nine patients were not included in the trial. All of the scheduled implants were placed. Histological and histomorphometrical analyses did not report significant differences between the two groups (with P-values ranging from 0.690 to 0.917). The mean percentages of newly formed bone, soft tissues and residual grafted particles were 22.5 and 22.5%, 59.3 and 59.4%, and 18.6 and 18.2% respectively for flap and flapless approach.

Conclusion. The ridge preservation procedure allows to counteract the bone loss after tooth extraction even though the bone modelling and remodelling after a tooth extraction is not completely avoidable. The dimensional bone changes occurring after flap and flapless procedures for tooth extraction were reported to be very similar, even though contradictory outcomes were observed by other authors who reported differences in the remodelling of the alveolar process after flap or flapless approaches.

No histological and histomorphometrical differences were observed when comparing the flap and the flapless technique for tooth extraction and socket grafting procedures.

This study supported the hypothesis of the non-detrimental effect of collagen membrane exposure on bone regeneration during the ridge preservation procedures with a flapless approach.

Surgical enucleation as a treatment of cysts involving the inferior alveolar nerve

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Aim. of this study was to evaluate the efficiency of enucleation in treating cystic lesions of the jaws involving the inferior alveolar nerve.

Materials and methods.

Study Design. Patients attending the outpatient clinic of Dentistry and Oral Surgery of the University Hospital of Pisa and presenting cystic lesions involving the inferior alveolar nerve planned to treat by enucleation were included in the present study. Clinical variables analysed were age, gender and cystic histopathologic diagnosis - dentigerous cysts, keratocysts or radicular cysts. Orthopantomographies and TC dentascans were performed to evaluate an eventual involvement of adjacent vital anatomic structures, locularity, precise location and extension of the cyst area. Subjects were followed up for at least 6 months. A logistic regression was used to individuate factors that could potentially affect the surgical outcome.

Treatment protocol. Under local anaesthesia, a mucoperiosteal flap was elevated. Enucleation was initiated by performing a fenestration in the vestibular cystic wall to allow the escape of the cystic fluid; consecutively the tooth involved was extracted and the lesion was enucleated. Because of the proximity of the inferior alveolar nerve and to minimize the risk of damage, the removal of the cystic lesion was performed using piezosurgery. All patients were invited to follow-up every 2 weeks during the first 2 months and then once a month for the last four months.

Results. Ten cystic lesions from 10 patients (7 men [70%]) treated with enucleation between January 2013 and December 2014 and with at least six months follow-up were included.

The average age at the time of the intervention was 47,3 ± 14,7 years. Preoperatively, all patients reported hypesthesia or anesthesia of the lower lip (Vincent's symptom). Additionally to that, eight patients reported pain and one patient reported history of abscess. All cysts were unilocular at presentation. Root resorption was observed in one case. TC dentascan showed lesions of an average size of 22,4 mm x 13,9 mm and an average volume of 341,8 ± 225,6 mm^2. Nine out of ten cysts (90%) showed tooth involvement. The histopathologic diagnoses revealed dentigerous cysts in 8 cases [80%]), one keratocyst (1 case [10%]) and one radicular cyst (1 case [10%]). Six months after surgery all patients reported improved clinical conditions. In nine cases a complete restoration of the sensibility of the lower lip was observed whereas only one patient still presented a small zone of paresthesia limited to the inside area of the inferior hemilip homolateral to the localization of the cyst.

Conclusion. Data of the present study suggests that surgical enucleation of cystic lesions involving the inferior alveolar nerve is a valid therapeutic option leading in considerable clinical improvement.

Prevalence and incidence of peri-implant mucositis and peri-implantitis in patients rehabilitated with a fixed full-arch restoration supported by two mesial axial and two distal tilted implants

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Aim. This retrospective study was aimed to evaluate the incidence and prevalence of periimplant mucositis and peri-implantitis in patients treated with a combination of axial and tilted implants supporting a fixed full arch prosthesis.

Methods. Sixty-nine patients were included in the study. Each patient was treated with an immediate loading restoration supported by two mesial axial and two distal 30° tilted implants. Threehundred thirty-six implants were placed and eighty-four fixed full-arch prosthesis (55 mandibular and 29 maxillary) were delivered. The 79,8% of patients had periodontitis' history, while the 20,2% of them did not. 49 restorations were delivered to nonsmoking patients, 14 to light-smokers (< than twelve cigarettes/day), and 21 to heavy-smokers (> than twelve cigarettes/day). Follow-up visits were scheduled every 6 months in the first 2 years and yearly after. At each follow-up visit patients received professional oral hygiene treatment and detailed oral hygiene instructions, furthermore plaque index, bleeding index and probing depth were recorded. Peri-implant mucositis (BI>2) and peri-implantitis (BI>2, PD>4 mm, detectable radiographical bone loss) were diagnosed.

Results. The overall follow-up range was from 12 to 130 months after surgery (mean 63,2 months). The prevalence of peri-implant mucositis varied from the 7,14% of patients (5,06% of implants) to 0%, while the prevalence of peri-implantitis ranged from the 4,55% of patients (3,81% of implants) to 0%; in both cases no significant differences were found between axial and tilted implants. All patients that developed peri-implantitis were not diagnosed with peri-implant mucositis in the previous follow-up visit: this could suggest that a visit every 6 months in the first 2 years and yearly after may be not enough frequent to prevent it properly. Moreover, no significant differences were found between smoker and nosmoker patients.

Conclusion. The use of immediate loaded full-arch prosthesis supported by two mesial axial and two distal tilted implants, that allows to avoid bone graft procedures in lateroposterior area of mandibular and maxillary bone, is a viable rehabilitation option, specially considering the lower rate of peri-implant mucositis and peri-implantitis compared to what was found in most of the studies in literature. However a meticulous attention to the hygienic conditions and the adoption of a systematic follow-up schedule are necessary. Further long-term studies are needed in order to define and validate effective preventive and therapeutic protocols and to better understand peri-implant mucositis and peri-implantitis risk factors.

Fornix deepening and tongue debridement in caustic trauma to the mouth: case report

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Aim. Use of the 810 nm diode laser for the reconstruction of the fornix and tongue debridement in a coloured patient, 13 years old, with caustic trauma.

Methods. In a single session local anesthesia was made, lower lip and tongue totally joined to keratinized gum were dissected by skimming tissues with Fibre Optics according to sweeping technique. Continuous mode 2.5W power was applied under surgical aspiration as to

obtain a complete hemostasis. In order to avoid relapse and protect the surgical wound a soft resin bite with vestibular bump was realized and applied with the aid of vaseline gauzes. The patient was also recommended to massage the area several times a day in order to ease the rooting of a new favourable labial insertion. An antibiotic and antiinflammatory therapy was prescribed together with topic application of spray Clorexidine 20%.

Results. Despite the presence of cicatricial tissues covering the whole area, six weeks later the vestibular fornix was one centimetre wider and the tongue reached the correct function and mobility, allowing the patient a better mouth opening, a satisfactory oral hygiene and the enhancement of labial and phonetic expressions. After 45 days the duct of Wharton was detected in the original position.

Conclusion. We wish to remarke the simplicity of the 15 minutes operation completely bleedingless both during and after surgery, the moderate pain in absence of suture and the quicker healing generated by the biostimulation through diode laser together with the absence of retracing scars which would compromise the final result.

Clinical and radiological evaluation of peri-implant tissue in relation to design of dental implants

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Aim. The main purpose of this research was to applied a randomized clinical trial using two different implant systems that should preserve peri-implant tissues and minimize crystal bone lysis after positioning the fixtures and abutments. Peri-implant gingiva such as that of teeth should provide a protective barrier against microbial plaque. Recent papers has indicated a need for keratinized gingiva of adequate width and thickness to reduce periimplant soft tissue recession and bone loss.

Materials and methods. The study design were designed to investigate the following aspects: 1) to evaluate the efficacy of Laser Lok dental implant according to the results of various studies in the context of periimplant soft and hard tissue response to single tooth implant-supported restorations; 2)to test the hypothesis that PS would reduce peri-implant bone loss in the implants placed 1,5 mm below bone level. All patients assigned to trail were divided in two groups A and B.

Results. The measurements of bone levels (mesial and distal) were performed on periapical radiographs taken with parallel technique at the session of crown cementation of prosthetic loading (T0) and the third month (T1), sixth month (T2), 12th month (T3), and 12 month (T4) after crown cementation of prosthetic loading. The mean mesial CBL during loading was at the beginning 0.65±0.40 mm, 12 months after loading was 0.88±0.36 mm, and 18 months after loading was 1.13±0.32 mm. The mean distal CBL during loading was at the start of loading 0.53±0.26 mm, 12 months after loading was 0.73±0.38 mm, and 18 months after loading was 1.00±0.28 mm.

Conclusion. Within the limitations of this study, it can be concluded that bone resorptions occur in small amounts around implants with PS design. In the third year following loading, more bone resorptions were determined in implants placed 1 mm below bone level compared with implants placed at bone level.

However, the resorptions did not reach the implants thread or create inappropriate clinical results. It can be concluded that, especially when implants must be placed below bone level to create an appropriate emergence profile, the use of implants with PS design is useful. Additionally, to reduce resorption, it may be recommended to place PS implants below bone level.

Reliability and efficacy of palifermin in prevention and managmenent of oral mucositis in paediatric patients with acute lymphoblastic leukemia: a randomized, double-blind controlled clinical trial

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Aim. Oral mucositis (OM) is a frequent complication of myeloablative and Hematopoietic Stem Cells Transplantation therapy (HSCT) with no effective treatment. Palifermin, a recombinant human keratinocyte growth factor, specifically stimulates the growth and anti-apoptotic potential of epithelial cells expressing the KGF receptor without directly affecting non-epithelial cells lacking this receptor and was demonstrated as useful in preserving the integrity of the epithelial lining in animals undergoing chemoradiotherapy followed by hematopoietic stem cell transplantation. This randomized-controlled trial studied the efficacy of Palifermin, administered as a dose during HSCT therapy, as primary prophylaxis on paediatric patients with Acute Lymphoblastic Leukemia (ALL).

Methods. Fifty-six patients (aged 7-16 years old) with B-cell acute lymphoblastic leukemia (B-ALL) classified according to the WHO classification. The patients underwent allogenic HSCT conditioned by myeloablative regimen. Patients in the Palifermin group were randomly assigned in a 1:1 ratio to receive Palifermin, 60 µg/kg, intravenously as a single dose 3 days before and after transplant conditioning regimen cycle. The patients in the Control group received only a placebo treatment that consisted in a mouthwash containing 2% mepivacaine and dexamethasone and 0.05% chlorexidine for three times/day 3 days before and after transplant conditioning regimen cycle. OM-related assessments were the WHO oral-toxicity scale and the patient-reported outcomes (PRO). Maximum severity of OM (WHO grades 0/1, 2, 3 or 4) was the primary efficacy end point. Secondary efficacy end points included incidence and duration of ulcerative OM (WHO grades 2, 3 and 4), incidence and duration of severe OM (WHO grades 3 and 4) limitations.

Results. The administration of Palifermin was generally safe and without considerable complications. The only adverse reactions were rashes, erythema, and altered taste. There was a statistically significant reduction in the incidence of OM ≥ grade 1, 2 and 3 in the Palifermin group compared to the Control group. There was also a reduction in the degree of severity of mucositis in the Palifermin group, with an average of 1.65 grade in the Palifermin group, and of 2.33 in the Control group and the reduction of the use of opioid analgesics. The results were confirmed at 60 days after the last transplant conditioning regimen cycle during the routine check up sessions.

Conclusion. This study indicates that a single dose of Palifermin used as primary prophylaxis during HSTC therapy can prevent severe OM in paediatric patients with ALL. The findings of the study also suggest that Palifermin used as secondary prophylaxis can prevent the recurrence of severe OM in high-risk patients with previous mucosal injury. The reduction in OM had several clinical benefits, including the relief of mucosal pain; decreased use of narcotics; and improvements in the ability to drink, eat, and, in general, the quality of life in paediatric patients with ALL.

The OSAS treatment with MAD

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Aim. Obstructive sleep apnea syndrome (OSAS) is a respiratory disorder characterized by the repeated collapse of the upper airway during sleep, resulting in cessation of breathing and reduced levels of oxygen in blood. The current prevalence of this disease is estimated to be around 1-5% in the adult population. It is important to diagnose OSAS as soon as possible as it is demonstrated the progressive evolution of this disease without any treatments. The diagnosis is usually made through polysomnography which is also able to determine the severity of the disease. The study of morphological characters showed that a narrow space between maxillary and cranial base increases the probability of having obstructive respiratory disorders from three to seven times. The finding of a retrognatic facial profile is common in patients with OSAS: the retromandibular position is associated with the retroposition of the lingual base. This is a significant contribution to the development of obstructive disease.

The purpose of this work is to analyse and compare different treatment approaches used. Specifically, our interest focused on comparing the use of the MAD (mandibular advancement devices) compared to other methods CPAP (continuous positive air way pressure) and surgical procedures.

Methods. A literature review was performed on principal online scientific database searching the articles dealing with OSAS treatment.

Results. The oral devices act repositioning the jaw more ahead, in order to increase the diameter of the airways, to decrease the collapse of the pharyngeal wall and to activate the dilator muscles that contribute to the maintenance of an adequate airflow.

Necessary conditions for the use of oral devices are an adequate number of teeth and a periodontal healthy, in order to ensure the stability of the retainer.

In all comparative studies between MAD and CPAP major therapeutic benefits are highlighted through the use of the last one; oral devices are more easily accepted, considering the compliance of the patient.

Surgical therapies give satisfactory **results** but are extremely invasive so they are reserved for patients with multiple sites of obstruction.

Among the most frequent side effects of the oral devices two are strictly related to the profession of the

dentist: the variation of the dental position that caused a modified occlusion and the possible appearance of temporomandibular disorders (TMD).

Conclusion. Most of the authors conclude that, despite the possible onset of different degrees of TMD at the beginning of treatment, during patient follow up these side effects usually reduce until disappearing; this is due to the ability of the complex temporomandibular joint to adapt to a more forward position of the jaw.

MADs are recommended as first-choice therapy with the light forms of OSAS that do not comply with the treatment with behavioural measures (weight loss, change of sleep position) and in moderate or severe forms in case of intolerance or refusal of treatment by CPAP.

In addition, oral devices are suggested for patients who refuse or are not suitable to be candidates for surgery.

Hexetidine-chlorobutanol and oxygenated glycerol triesters for treating mucositis in head and neck cancer radiotherapy patients

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Aim. Oral mucositis is a frequent, often severe complication of radiotherapy and manifests with different degrees of burning, dysphagia, odynophagia, dry mouth and dysgeusia. The aim of the study was to determine the efficacy of intensive topical hexetidine-chlorobutanol treatment with or without oxygenated glycerol triesters on oral mucositis in patients with head and neck cancer undergoing radiotherapy.

Methods. In the period 2009-2014 we enrolled 56 patients (29 males) with head and neck tumours treated with radiotherapy (adjuvant or monotherapy). All underwent professional oral hygiene and were instructed in daily oral hygiene. Pain was scored by visual analogue scale (VAS) and only patients with scores of 1-3 were enrolled. Patients were assigned randomly to two groups. Symptoms included erythema, dry mouth and erosions or small ulcers of the oral mucosa. Diet was prevalently semisolid and liquid; hot or spicy foods were avoided.

Group 1: 29 patients (14 males) were treated with hexetidine-chlorobutanol mouthwash 4 times a day. Group 2: 27 patients (15 males) were treated with hexetidine-chlorobutanol mouthwash and protective gel containing oxygenated glycerol triesters 4 times a day. Patients were examined every 7 days for three consecutive weeks and scored for pain, burning sensation and feeding capacity.

Results. The population of 56 patients (29 males) had all undergone radiotherapy of the head and neck for different types of cancers, prevalently rhinopharyngeal, oropharyngeal, salivary, oral and laryngeal. Group 1 patients, treated only with mouthwash for 3 weeks, showed no improvement in 10/29 cases (34.48%) and VAS 0 in 19/29 cases (65.52%). Group 2 patients treated with mouthwash and protective gel for 3 weeks showed no improvement in 3/27 cases (11.11%) and VAS 0 in 24/27 (88.89%). The difference proved to be statistically significant (chi-squared test) and indicate that combined treatment of postactinic mucositis with mouthwash and gel was effective in reducing the VAS pain score in almost 90% of patients, compared to treatment with mouthwash alone, effective in only about 65% of patients.

Conclusion. Radiotherapy blocks the reproductive capacity of basal epithelial cells. The absence of cell replacement causes thinning of the mucosa that becomes atrophic and predisposed to ulceration. The mucosa slowly returns to normal thickness but is more subject to mucositis than before[1, 2, 3]. Oral mucositis has a significant economic impact on public health in terms of pain management, feeding difficulty and frequent hospitalisation. The present result indicate that patients treated with hexetidine-chlorobutanol-based mouthwash show an improvement in mouth pain. This improvement is more significant if the mouthwash is associated with protective gel containing oxygenated glycerol triesters. Improvement of mucositis is inevitably associated with improved feeding capacity and fewer hospitalisations.

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Lactobacillus reuteri DSM 17938 in prevention and treatment of Candida albicans infections in multiple myeloma patients with ONJ

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Aim. This study investigated the effect of a probiotic in the prevention and treatment of fungal infections in patients with multiple myeloma and osteonecrosis of the jaw.

Materials and methods. Patients enrolled in the study had all performed an oral swab that detected Candida albicans. Patients with pathogenic bacterial species requiring focused antibiotic therapy were not recruited. The study was conducted at the Department of Dentistry, University Hospital "Le Scotte" in Siena from 2013 to 2014.

We enrolled 37 multiple myeloma patients (20 males) who developed osteonecrosis of the jaw after administration of zoledronic acid. The patients were divided into two groups: Group I with 18 patients (10 males); Group II with 19 patients (10 males). The study was a double-blind trial using two identical 5 ml containers marked with the letters A and B, containing a suspension of Lactobacillus reuteri DSM 17938 and placebo, respectively. Container A was assigned to Group I and container B to Group II.

Patients were instructed to practise daily oral hygiene, to take 5 drops per day of solution from their container for 30 days and to return for an oral swab every week for 4 consecutive weeks. The swabs were analysed by a microbiologist for bacterial and fungal species. Patients with bacterial superinfection were immediately excluded from the study and treated by conventional protocol.

Results. Group I (container A) showed eradication of Candida albicans in 14/18 cases. The third swab of one patient was positive for E. coli and he was excluded from the study; three patients remained positive for Candida albicans (rare colonies).

Group II (container B) showed absence of Candida

albicans in only 3/19 cases. Five patients were excluded for positivity for different bacterial species in the second (3 patients) or third swab (2 patients); 11 patients remained positive for Candida albicans.

Discussion. In this double-blind randomized trial, container A contained Lactobacillus reuteri DSM 17938 and B contained placebo. The results indicated that the group that took probiotic (group I) achieved improvement in Candida albicans infection in 14/18 cases (77.7%). Conversely, in the group treated with placebo (Group II), only 15.8% of Candida albicans infections improved. If probiotics work in combination with normal personal and professional oral hygiene, they presumably have beneficial effects. Moreover, L. reuteri treatment should be without side effects, unlike some commonly used antifungal agents (fluconazole and nystatin) which may cause nausea, diarrhoea, vomiting, intestinal pain, hepatotoxicity and cardiotoxicity.

L. reuteri is a commensal of the human gut. Resistant to gastric and pancreatic juices and bile acid, it thrives in harsh environments, discouraging oropharyngeal candidiasis and reinforcing intestinal defences. It is therefore indicated without limits of age or disease.

Conclusion. Our results suggest that it is good practice to administer Lactobacillus reuteri as an aid in the prevention and treatment of Candida albicans infections in cancer patients with osteonecrosis of the jaw.

In vivo OCT analysis of an oral pemphigus case

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Aim. The purpose of this preliminary study is to present the available evidence on the ability of Optical coherence tomography (OCT) to image pathological oral mucosa *in vivo* for the diagnosis and management of oral bullous diseases.

Methods. A 62 years old, female patient referring at the Dental Clinic of the Second University of Naples (S.U.N.) affected by oral pemphigus was enrolled. The diagnosis of pemphigus was histological and serological: indirect pemphigus antibodies were positive for desmoglein 3 (DSG-3) but negative for DSG-1 antibodies. There were no cutaneous lesions. The patient reported no other systemic diseases. Oral lesions were imaged in vivo by OCT, which is a noninvasive imaging modality in situ and in real time. This device provides a cross-sectional evaluation of the tissue microstructure. It is often characterized as the optical analogue to ultrasound using infrared light instead of sound waves to probe a biological sample and map the variation of reflected light as a function of depth. The penetration depth is highly tissuedependent and is typically limited to a few millimeters. Although the depth of imaging is not as deep as echography, OCT guarantees an axial resolution really higher than ultrasonography (in the order of 1-15μm instead of 150-200μm of B-scan echography).

Results. Analyzing the image obtained by OCT, we can highlight an intraepithelial blister, with the presence of lymphocytic infiltrate and the conservation of the basal membrane.

Conclusion. More research is needed to definitively confirm OCT's capabilities as a tool to accurately analyze the epithelial layers. OCT is an emerging technology in the diagnosis of mucous-cutaneous diseases. Bullous diseases form an important group of oral diseases, where immediate diagnosis would be of great benefit; on this purpose, OCT imaging appears able to distinguish intraepidermal and subepidermal bullae. In conclusion OCT imaging has the potential to serve as an objective, non-invasive measure of oral mucosa's status, disease progression and response to treatment longitudinally for use in both research trials and clinical practice, but also as a non-invasive diagnosis method mucous-cutaneous bullous diseases. Currently, penetration depth is a significant limitation. Moreover, the cost, the portability of OCT are significant obstacles that hinder widespread adoption. Despite these limitations, advances in OCT technology and further research on clinical applications have the potential to contribute to the trend toward non-surgical evaluation.

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Psychiatric disorders in burning mouth syndrome: a case-control study

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Aim. Burning mouth syndrome (BMS) refers to chronic orofacial pain, unaccompanied by mucosal lesions or other evident clinical signs. It is observed principally in middle-aged patients and postmenopausal women. BMS is characterized by an intense burning or stinging sensation, preferably on the tongue or in other areas of the oral mucosa. It can be accompanied by other sensory disorders such as dry mouth or taste alterations. Probably of multifactorial origin, and often idiopathic, with a still unknown etiopathogenesis in which local, systemic and psychological factors are implicated. The aim of this observational study was to evaluate the prevalence of psychiatric symptoms in a coort of patients with BMS.

Materials and methods. 49 patients were enrolled, relating to UOC of Pathology Odontostomatology of the Second University of Naples. 25 subjects with BMS were included in group A and 24 with traumatic alteration of the oral mucosa were the control group (group B). The patients were subjected to psychiatric evaluations, through the use of 5 psychometric scales: VAS, HRSD, STAI1-2, DT, HAM-D. The level of Distress was also evaluated and tested in a linear regression model with the gradual method with independent variables VAS, STAI-state, STAI-trait.

Results. The results of this study demonstrated the presence of psychiatric symptoms in almost all of the sample. A significant correlation between the intensity of the symptom "burning", the presence of a anxious trait and the presence of Distress have been found. Moreover, the anxious trait and a greater intensity of burning are predictors for the development of Distress.

Conclusion. The results corroborate the clinical observation reported in literature about the role of psychiatric disorders in the pathophysiology of BMS. However, discrepancies in the correlation between BMS and specific psychiatric disorder still persist: for example in some cases there is a higher prevalence of anxiety, in other depression. Anyhow, considering the great impact that this disorder has on the quality of life of patients, became important that the clinicians may suggest a psychiatric consultation to improve treatment efficacy.

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Psychiatric disorders in oral lichen planus: a pilot study

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Aim. Oral Lichen planus (OLP) is an idiopathic inflammatory disease of oral mucosa, characterised by an autoimmune attack by epithelial infiltrating T cells. It remains unknown, however, how such aggressive T cells could be activated in vivo to cause epidermal damage. The disease has both skin and oral lesions, while 25% of patients shows only oral lesions (oral lichen planus, OLP). It results in severe morbidity, thus a multidisciplinary approach is needed (1). There is a general agreement that psychological disturbances (anxiety, depression, and psychological stress) could play a role in the onset of some oral lesions such as OLP (2). The aim of this observational study was to evaluate the prevalence of psychiatric symptoms in the population of patients with Oral Lichen Planus.

Methods. 11 patients (mean age 65,2 y.o.), 7 females (63,6%) and 3 males (36,4%), with diagnosis of OLP, of the Dental Clinic of the Second University of Naples, underwent a psychiatric evaluation, with clinical interview and the feeding of five psychometric scales: Visual Analogue Scale (VAS), Hamilton Rating Scale for Depression (HAM-D), State-Trait Anxiety Inventory (STAI 1-2), Distress Thermometer (DT) and Brief Fatigue Inventory (BFI). Pearson's analysis (r) was performed for variables distress, pain (VAS score), state and trait anxiety and depressive symptoms on the HAM-D. Distress was tested in a linear regression model with stepwise method, with independent variables HAM-D.

Results. No patients in the sample presented a VAS score of severe and moderate type, 73% of them presented pain symptoms of mild type and 27% presented no pain; 18,6% had depressive symptoms; 100% of the sample had a score above the cut-off for state and trait anxiety; only 9% presented Fatigue (only one patient have Fatigue of severe type); 45% presented Distress (9% severe, 36% moderate type). Pearson's analysis (r) showed that variable Distress correlates with HAM-D ($r = 0.593$, $p = 0.027$).

Conclusion. OLP patients may have higher levels of anxiety and depression and show increased vulnerability to psychological disorders. Significant correlation between the Distress and the HAM-D has been found. Oral Lichen Planus is a chronic disease with alternation of exacerbation and remission periods, long drug therapies and unpredictability of prognosis: this could be the cause of patient's distress. Those patients present the risk of leading to depressive symptomatology (correlation between distress and Hamilton Scale for depression). It seems still unclear if psychological factors play a role in the pathogenesis or are consequences of the disease. Therefore, OLP patients may require supportive psychological care. Probably improving the parameter Distress could avoid depressive symptoms for the patients.

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Non-invasive visual tools for diagnosis of oral cancer and dysplasia: a systematic review

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Aim. The aim of this study is to perform a systematic review on non-invasive visual tools for the diagnosis of oral epithelia dysplasia (OED) and early oral squamous cell carcinoma (OSCC). OSCC is the sixth most common malignant tumour. Gold standard for the diagnosis of oral dysplastic and malignant lesions is the histological examination. The most important prognostic factor is the tumour stage at diagnosis. Several adjunctive diagnostic techniques have been proposed in order to increase the sensitivity (SE) and specificity (SP) of conventional oral examination and to improve the diagnostic first level accuracy.

Methods. Medline, Scopus, Web of Knowledge databases were searched, using as entry terms "oral dysplasia" and "diagnosis" / "oral cancer" and "diagnosis". Data extracted from each study included authors and

publication year, typology of the study, diagnostic tool analysed, number of lesions evaluated, histopathological diagnosis, SE, SP, positive and negative predictive value (PPV and NPV), diagnostic accuracy (DA) and the main conclusion of the study. Level of evidence of each study was assessed according to the Oxford Evidence-based Medicine (OEBM) Levels for Diagnosis updated in March 2009. Mean SE, SP, PPV, NPV e DA with relative standard deviation (SD) were calculated for each typology of non-invasive visual diagnostic tool identified.

Results. After title and abstract scanning of 11.080 records, we selected 35 articles for full text evaluation according to the established exclusion criteria. Eight typologies of non-invasive visual diagnostic tools were identified: direct visual fluorescence examination (DVFE), chemiluminescence (CL), toluidine blu (TB), chemiluminescence associated with toluidine blue (CLTB), bengal rose (BR), laser-induced fluorescence examination (LIFE), 5aminolevulinic acid (ALA) induced protoporphyrin IX (PPIX) fluorescence and systems based on optical spectroscopy. Most evaluated tools were the DVFE, the CL, the TB and the CLTB. Regarding DVFE, mean SE was 72.4% ranging from 20% to 100% (SD = 27.1); mean SP was 63.79% ranging from 15.3% to 100% (SD = 28.17). Regarding CL, mean SE was 86.72%, ranging from 69.6% to 100% (SD = 15.65); mean SP was 38.37%, ranging from 14.2% to 81.5% (SD = 29.59). Regarding TB, mean SE resulted 72.5%, ranging from 56.1% to 95% (SD = 13.13); mean SP resulted 61.4%, ranging from 25% to 74.1% (SD=15.95). Regarding CLTB, mean SE was 53.93%, ranging from 0% to 81.8% (SD = 46.72); mean SP was 66.44%, ranging from 37.5% to 97.5% (SD=25.88).

Conclusion. Our systematic review highlighted that there is a great inhomogeneity of the reported values and there is no significant evidence of superiority of one tool over the other. The principles of functioning of non-invasive visual diagnostic tools for OSCC are very different, being based on diverse specific cellular and tissue characteristics. Such a great diversity may partly explain the impressive discrepancy of results obtained in the studies analysed. Another reason which can give some reasons for the wide range of results, in terms of SE, SP and DA is the great variability both of the typology of the studied lesions and of the diagnostic criteria used for the clinical and histological assessment of such lesions. The difficulty to establish univocal and broadly-accepted criteria for the assessment of the OED has been widely reported, particularly, with regard to the inter- and intra-observer disagreement for the diagnosis. Further clinical trials with a higher level of evidence are necessary in order to assess the real usefulness visual diagnostic tools.

Multiple chemical sensitivity (MCS) and dental amalgam: an overview of literature

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Aim. Multiple Chemical Sensitivity (MCS) has been classified by WHO as "Not specified respiratory disorder in relation to the exposure to chemicals, gases, fumes, vapors" in ICD10 with code J68.9.

It is an environmental immuno-neuro-toxic disease characterized by recurrent symptoms related to multiple organs and systems. Symptoms are caused by hypersensitivity against environmental xenobiotic substances with whom the patient comes into contact. Therefore, in patients with MCS, exposure to concentrations of xenobiotics much lower than those toxic to the general population is sufficient to determine disorders.

The most frequently manifested symptomatology is a multi-systemic disorder affecting the respiratory, gastrointestinal, musculoskeletal and central nervous systems.

Responsible xenobiotic substances are commonly detectable both in indoor and outdoor environments and consist of heavy metals, chemicals, natural gases, metabolites of fungi, pesticides, detergents, plastic derivatives, bactericides, and drugs.

Many materials which are present in dental office or used in clinical practice could determine symptomatology.

Dental amalgam is an alloy obtained by mixing mercury with a powder based on silver-tin, to which are added small amounts of copper and zinc. It has been used for over 150 years in dentistry as filling material in the management of dental caries because of its excellent physical and mechanical properties.

In recent years, dental amalgam has become a highly debated topic because of the possible toxicity of mercury contained therein, both for patients and operators.

The aim of this work is to provide a preliminary search of the scientific literature dealing with the correlation between dental amalgam and MCS.

Methods. In order to perform an overview on the topic we consulted PUBMED database. We considered articles of the most recent scientific literature regarding MCS and heavy metals, in particular mercury.

Results. Mercury is a highly toxic heavy metal whose accumulation in the human body is capable of causing the onset of MCS and the aggravation of its symptoms. It has a high vapor pressure and moves to the gaseous state since from room temperature.

In the mouth of patients with dental amalgams there is a continuous mobilization of mercury due to contact with hot food and to the effect of galvanic cell that is created in the oral environment. Mercury can be found in the blood of patients with dental amalgam fillings.

The dentist is frequently exposed to mercury through the manipulation of materials that contain it and through the inhalation of particles that are released during the interventions of positioning, processing or removal of dental amalgam in the oral cavity.

The determination of mercury accumulations into the body can be performed by testing hair tissue, through blood tests in order to detect it free in the blood stream or bound to circulating metallothioneins and by means of epigenetic analyzes aimed at tracking it in lymphocytes' DNA adducts. Furthermore any sensitivity of lymphocytes against mercury can be investigated through lymphocytic sensitivity testing.

Conclusion. The results show a substantial correlation between mercury and MCS. This work sheds light on a still little known disease, which is closely related to the field of dentistry, and represents the starting point of a series of research works on the topic.

Age estimation by cameriere's normalized measurements (CNM) of the single tooth

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Aim. Radiographic evaluation of tooth development is one of the most used age estimation techniques in children, together with the analysis of hand/wrist radiographies. Most of those methods require the presence of an exact number of mandibular permanent teeth to perform age estimation. On the other hand in forensic and anthropological disciplines it is not unusual to face cases in which age has to be estimated by a single or just a few available teeth.

In 2006 Cameriere et al. presented a new method for assessing chronological age in children, based on the relationship between age and normalized measurement of open apices of the seven left mandibular permanent teeth.

The aim of this study is to evaluate the applicability of Cameriere's normalized measurements (CNM) of each single mandibular tooth for age estimation in children.

Methods. A sample of OPTs of 362 (198 girls and 154 boys) Italian healthy subjects aged between 4 and 13 years was collected from the Radmedica, Radiologia Odontoiatrica Digitale of Rome, Italy. Patients' identification number, gender, date of birth and date of X-rays were recorded in Microsoft Excel® file. Radiographs were converted in computer files and processed by a computer-aided drafting program (Adobe® Photo-shop CS4).

Dental maturity was evaluated by using CNM on the seven left permanent mandibular teeth. CNM were calculated through the normalization of the distance between the inner sides of the open apex by the tooth length. For teeth with two roots, the sum of the distances between the inner sides of the two open apices was considered. The intra- and inter-observer agreement was almost perfect, as demonstrated by interclass correlation coefficient of CNM on 50 randomly selected OPTs.

Results. The seven mandibular teeth completed their growth up to 14 years in most of the subjects of the sample. Apex closure appeared first, in central incisors at 8 years, followed by lateral incisors and first molars at 9 years of age. The canines and first premolars matured at 12 years, followed by second premolars and second molars at 13 years of age. Sex contributed significantly only to the CNM growth model of the lateral incisors and second molars. From the results of the preliminary regression analysis, linear models were more accurate if the upper age limit was selected for a specific tooth.

Results also showed that development and distribution of CNM varied among mandibular teeth, suggesting their possible usage in only specific age ranges. CNM correlates well with the chronological age for the group of teeth which have finished their development before the age of ten (No.37, No.34, No.35 and No.33), while correlations for the those whose development finished by the age of fourteen (No.31, No.32 and No.36), are smaller.

Conclusion. Mandibular teeth, taken separately, do not seem to have equal applicability for age estimation. The obtained results from this study suggest that further evaluation of the usefulness of a single mandibular tooth in larger and more significant samples is necessary. Furthermore, improvements for more accurate age estimation based on CNM of a single tooth may be needed, in combination with other skeletal information of hand/wrist or vertebra asses

Isolation, *in vitro* and *in vivo* characterization of osteogenic stem cells from human jaw periosteum

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Aim. Stem and progenitor cells from adult tissues offer great promise in the therapy of several pathological conditions. In recent decades, stem cells have been isolated from adult organs previously thought to be capable of only limited self-repair, offering the prospect of new therapeutic strategies to repair damaged tissues. In particular, multipotent mesenchymal cells have been isolated from a variety of post-natal (adult) tissues. Also in the field of dentistry, regenerative medicine and tissue engineering are interesting innovations: by exploiting stem cells, growth factors, and biomaterials, they promise regeneration or de novo formation of dental, oral, and craniofacial structures, lost for congenital anomalies, trauma, or disease. The study aimed to isolate and characterize, first in vitro then in vivo, sources of stem cells on periosteal cells isolated from the periosteum of human maxilla or mandible.

Methods. Periosteum squares (5 mm x 5 mm; average weight 0.96 grams) were taken from human maxilla or mandible during surgical procedures in the oral cavity (e.g. implant placement, periodontal regeneration), for a total of 30 specimens from 30 patients (18 male, 12 female, age range 32 to 68, mean age 51.4). The tissue was gently minced, digested enzymatically in a Collagenase type II 0.25% solution for 90 mins at 37°C, then plated. Periosteal stem cells (PSCs) were cultivated in Coon's F12 with 10% FBS fortified with 2 mM Gln, penicillin 100 U/ml, and streptomycin 0.1 mg/ml. The medium was changed every 4 days. In-vitro studies were done to characterize the cell population (Alkaline Phosphatase and Collagen I, and RT-PCR) also applying the immunodeficient mouse model to preliminarily test the in-vivo osteogenicity of PSCs: they were loaded onto a 4 mm cubic porous ceramic (hydroxiapatite) scaffold and implanted subcutaneously; the animals were killed either 2 or 4 months after surgery.

Results. After 10 to 15 days, the PSCs were clearly visible in the culture dishes. Phenotypic characterization by immunohistochemical analysis showed that they were positive for Collagen type I and ALP activity. By RT-PCR investigation, PSCs were seen to express Sox9, cbfa-1, BSP and Osteocalcin: i.e. the cell population expressed both early and late bone markers. The histologi-

cal analysis of the scaffolds implanted in the immunodeficient mice showed a good quantity of lamellar bone had formed inside the scaffold, at both 2 and 4 months after implantation.

Conclusion. PSCs insolated during surgical procedures should be carefully evaluated in future clinical practice as a valid alterative stem cells source for tissue engineering purposes. This in-vitro study revealed that this population possesses strong osteogenic capability, and the immunodeficient mouse model showed that PSCs can form bone *in vivo*.

Adverse reactions to dental local anaesthetics: mandibular nerve paresthesia

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Aim. Mandibular block analgesia is normally a safe and rewarding method of pain control for interventions in dental and oral maxillofacial surgery practice. Prolonged or permanent changes in sensation due to nerve damage can occur after dental injections. There are many theories that try to explain this damage: direct trauma from the injection needle, hematoma formation, and neurotoxicity by the local anesthetic. The aim of this study was to analyze the incidence of mandibular nerve injury by anesthetic block in the scientific literature and to value if it necessary an informed consent to carry out this procedure.

Methods. A bibliographic search of English language publications indexed in Pubmed was performed. The keywords "mandibular nerve injuries", "nerve block adverse effects", "prolonged anesthesia", and "paresthesia" were used.

Results. Ten papers that included in their studies the prolonged effect of anesthetic were selected: six literature reviews, four studies of which two were retrospectives. Nerve injury caused by injection of local analgesics is considered a rare event. Early estimates predicted the likelihood of such a complication as 1 in 785000 injections. According to another author, the approximated frequency of this adverse event was between 1 in 160571 and 1 in 26762 mandibular blocks.

In another study, the incidence of non-surgical paresthesia in dentistry was 1 in 609000 injection. The study of Sambrook and Goss showed a rate of approximately 1 in 27415. A frequency of 1 in 750000 was reported in another work, although the authors felt this was an underestimation. In another work, involving students and junior staff, an incidence of prolonged lingual anesthesia was found in 1 in 12104 injections.

Different studies underlined the relationship between the prolonged effect of anesthesia, in particular to lingual nerve, and the type of local anaethetic. In fact, the use of articaine 4% and prilocaine 3% was associated with a higher frequency of parasthesia, compared to the use of lidocaine, mepivacaine and bupivacaine. Gaffen and Haas suggested that articaine alone, prilocaine alone, or a combination of both drugs may be associated with an increased risk of paresthesia. It appears that is not drug per se, but the higher dose of the anesthetic, combined with mechanical insult, that predisposes the nerve to permanent damage.

Conclusion. These results suggest that paresthesia arising from a local anesthetic injection alone is a rare event. All dentists need to be aware that prolonged anaesthesia may occur following blocks for non-surgical purposes. This risk of prolonged anaesthesia is not usually discussed during consent for treatment. However, if it occurs it should be documented early, and denial of responsibility or promises that it always quickly resolves should not be given.

Correlation between Candida spp. infection and oral health status

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Aim. To assess whether the level of oral health may be a risk factor for oral candidiasis. The outcomes of this study were: the type of fungal infection, the relationship between the level of oral hygiene and fungal infection, the association with other risk factors.

Methods. A case-control study was conducted with geriatric, self-sufficient patients referred to the Dental clinic. The case group included patients with a confirmed diagnosis of oral candidiasis, while the control group comprise subjects not affected by fungal infection. Inclusion criteria were: people aged more than 65 years, self-sufficient patients, absence of antifungal therapy in progress. Moreover, were admitted to the study patients with the following risk factors for oral candidiasis: diabetes, oral lichen planus, xerostomia, removable dentures, antibiotic or corticosteroid therapy, prior head and neck radiotherapy. Exclusion criteria were: non self-sufficient patients, subjects not able to perform oral hygiene procedures, HIV-infected patients.

For the oral health evaluation were considered: oral hygiene level, gum inflammation indicated as plaque index (PI) and bleeding on probing (BoP), clinical attachment loss (CAL), number of missed teeth and prosthetic rehabilitation. A careful examination of the oral cavity was performed in order to detect any lesions. In all patients, palatal o lingual mucosa was brushed with a sterile swab. The samples were inoculated in Sabouraud agar plates at 37° for 48 hours. Subsequently, the plates were monitored for 7 days in order to evaluate the colony-forming units (CFU) of Candida.

Results. 38 geriatric, self-sufficient patients (>65 years, mean age of 72.3 years) were considered. 18 patients (7 males and 11 females) showed oral candida infection. The risk factors in order of descending frequency were: diabetes (39%), removable dentures (33%), chronic corticosteroid therapy (17%), oral lichen planus (11%), xerostomia (11%), radiotherapy (5%). The sum of the percentages is greater than 100% because some patients had more than one risk factor.

Regarding the oral hygiene status, no statistically significant difference between the two groups was found.

BoP index was increased in the group with oral candidiasis, but without reaching statistical significance.

Conclusion. In the present study, was not found any relationship between PI and fungal infection. On the contrary, oral candidiasis was associated with removable dentures and their poor hygiene.

Oral health related quality of life (OHRQoL) in elderly population

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Aim. In recent years it has been placed increasing attention to the perceptions that patients have of their oral health status and related problems. However, among the many tools of measurement of the perception of the state of oral health and OHRQoL, only a few have been recommended for possible use in the elderly. Thus, aim of present work is to evidence changes, by OHRQoL measurement, in patients' oral health perception after oral hygiene treatments.

Methods. A study was conducted with 22 geriatric, self-sufficient patients (>65 years, mean age of 69.8 years), 8 males and 18 females. For the oral health evaluation were considered: oral hygiene level, gum inflammation indicated as plaque index (PI) and bleeding on probing (BoP), clinical attachment loss (CAL), number of missed teeth and prosthetic rehabilitation. Patients answered two structured questionnaires: OHIP-14 and GOHAI, both administered at the moment of the admission in the Dental clinic and repeated at the 3 months check-up. OHIP-14 (Oral Health Impact Profile in 14 items) is a questionnaire that analyzes psychological and behavioral problems related to oral health. It is a multiplechoice questionnaire with a score ranging from 0 to 4, where 0 means "never" and 4 means "very often". Using the additive method, the amount of the answers produces a total score that goes to 0 (best score possible) from 56 (worst score possible). Thus, lesser score means a better perception of the oral health. GOHAI (Geriatric Oral Health Assessment Instrument), is a questionnaire consisting of 12 items. It focuses on limitations of oral function, feeling of oral pains and complaint, as well as their psychological effects. Each item has 5 possible answers with a score range of 0-48: scores between 45 and 48 show an awful life quality, while ≤ 40 suggest a good quality of life.

Results. At T0 the patients resulted into a no-sufficient hygiene level and they were exposed to the professional hygiene operations and an appropriate motivation. During the 3 months check-up, clinical data were collected again, and the patients repeated the questionnaires. It was possible to check-up only 16 of the 22 patients. The oral health got better after non-surgical periodontal therapy, and also the score of GOHAI was lower. No significant differences were found for OHIP-14 score.

Conclusion. At first (T0) it was no possible to show a strict relation between oral health (PI, BoP, CAL) and questionnaires' scores. Nevertheless, it was possible to see that the better was the oral health after the non-surgical periodontal therapy, the lower was the GOHAI score. To evaluate the OHIP-14 score results we have to consider the periodontal risk factors as age, sex, smoke, and socio-economic factors as confounding variables to understand the final outcomes. Other surveys will be pushed through to confirm these results.

Localized hyperplasia of the gingival tissue associated with a dental implant: a 19 months follow-up

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Aim. Localized hyperplasias of the gingival tissue can be observed very frequently in the oral cavity and they are identified by the unspecific term "epulis". Nevertheless the classification of these entities is, still today, very variable and controversial, since the same definition conveys several kinds of hyperplastic proliferations of the connective tissue; in fact, although epulis are identified with localized outcomes of chronic inflammatory agents, like subgingival plaque or scale, they are characterized by clinical, and above all, histological aspects very different among them. Peripheral giant cell granuloma (PGCG) is a rare exophytic lesion that develops on the gingiva and alveolar ridge. Although the precise etiology of this lesion is unknown, it could represent a local reaction to trauma or irritation. PGCG associated to dental implants is a very infrequent peri-implant soft-tissue complication.

This work is an updating of a clinical case of PGCG associated to a dental implant with a 19 months follow up.

Methods. The present study describes a 60-years-old apparently healthy male patient who presented to our observation complaining a swelling of the palate. Intraoral examination revealed a non ulcerated red-purple pedunculated mass, of about 2 cm of diameter, with elastic consistency and smooth erythematosus surface, arising from the gingival margin associated to a fixed prosthesis cemented on a dental implant which replaced the upper right lateral incisor. Patient's oral hygiene was poor. The Radiographic evaluation (ortopantomography) revealed concave bone loss involving almost half of the implant, which, however, showed no signs of mobility at clinical examination. Furthermore a probing depth of 10 mm was recorded vestibularly to the implant. Although implant removal could be indicated as therapeutic option, we opted for the only surgical excision of the lesion, preserving the prosthetic rehabilitation. Excisional biopsy was performed in local anesthesia, accompained by accurate curettage of the remaining surgical site and followed by the application of an absorbable suture. The lesion was diagnosed as a peripheral giant cell granuloma. Patient was included into a programmed oral hygiene and follow-up protocol.

Results. The current follow-up shows that patient improved his oral hygiene. Furthermore the implant-supported prosthetic rehabilitation was healthy and there was no relapse after 19 months from the surgical treatment.

Conclusion. The authors suggest that implant removal doesn't seem to be unavoidable as long as accurate

surgical removal of PGCG is performed. Furthermore the removal of possible causes, like dental plaque and calculus, together with the maintenance of a good oral hygiene, seem to be fundamental in order to prevent relapse and improve tissue healing.

Sweet liking and taste genes: the effect on dental caries prevalence in an adult genetically isolated Italian population

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Aim. The aim of the study was to explore the association between sweet liking and sugar intake with dental caries prevalence in a large sample of adults. In addition, the relationship between sweet taste genes and dental caries was also investigated.

Methods. Caries were measured by the DMFT (Decayed, Missing, Filled Teeth) index in 647 subjects coming from six different villages in Northeastern Italy. Sweet liking was assessed using a 9-point scale, while simple sugar consumption by a dietary history interview. For each subject the DNA was extracted from peripheral blood and a genotyping was carried out. All the SNPs (Single Nucleotide polymorphisms) genotyped inside TAS1R2 and GLUT2 genes were analyzed. The associations between sweet food liking and sugar consumption with DMFT were tested.

Results. A positive significant correlation between sweet liking and dental caries was found (p-value=0.009), while no association was shown with sugar intake. Furthermore, our study confirmed that polymorphisms in TAS1R2 and GLUT2 genes are related with DMFT index.

Conclusion. Although caries is a multifactorial disease in which diet, oral hygiene and microflora are key-factors, these findings suggest that both sweet liking and genetic factors contribute to dental caries prevalence, opening new perspectives for individual risk identification and implementation of target preventive strategies.

Update of Cameriere's age estimation methodusing a bayesian calibration: a pilot study

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Aim. This work provides a preliminary analysis of new data emerging from the collaboration of the University of Macerata (AgEstimation Project, Institute of Forensic Medicine, University of Macerata) and the Department of Odontostomatological and Maxillofacial Science, Sapienza University of Rome.

Age estimation is essential in resolving a variety of legal questions, including majority status, criminal liability, and identification of both dead and living individuals. In 2006 Cameriere et al. introduced a method to estimate chronological age in children using measurements of open apices of permanent teeth. The data were processed through regression models: results obtained were reliable, though one serious limitation was the unavoidable bias in age estimation.

The aim of the study is to argue the value of Bayasian method to overcome problems of bias in age estimation when regression models are used. This study begins as a "pilot study" when applied to a random sample of 50 opts from subjects aged between 5 and 24 years.

Materials and Methods. This cross-sectional study included 50 orthopantomographs (OPGs) from healthy living Italian subjects, aged between 6 and 17 years and with no obvious developmental abnormalities. All OPGs were collected in digital formatfrom the Radmedica, Radiologia Odontoiatrica Digitale of Rome and processed by the ImageJ computer-aided drawing program. The distance between the inner side of the open apex was measured for each tooth. Dental maturity was then evaluated according to the sum of normalized open apices.

Results. Mean absolute errors were 0.70 years (standard deviation 0.60) for males and 0.71 years (standard deviation 0.61) for females. Estimate bias was βERR = -0.004 for males and 0.002 for females, corresponding to a bias of a few days for all individuals in the sample. The proposed Bayesian calibration method does not significantly outperform the classical methods in terms of estimate accuracy: it does not greatly reduce the standard deviations of errors. However, it is useful, because it greatly reduces the bias inherent in the regression model approach and it is generally more reliable than the classical calibration method.

Conclusion. In line with expectations for this pilot study, the Bayesian method represents a significant contribution in order to obtain more accurate estimation results. The asset of the calibration according to the Bayesian method is not found much in the elimination of the standard deviation error, as in reducing the bias derived from the use of regression models. Moreover other age predictors can be also examined with this method.

The Bayesian calibration method appears to be suitable for assessing both age and its distribution in children, according to tooth maturity. It can be deduced that age estimation supported by the Bayesian method provides more accurate results than the classic method of calibration.

The results obtained from this pilot study are satisfactory and the Bayesian technique should be extended to a wider sample of subjects.

Oral and dental prevention of bisphosphonate osteonecrosis of the jaws: a 5-year longitudinal study in oncological patients

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Aim. Several clinical recommendations for the prevention of isphosphonate-related osteonecrosis of the

jaw (BRONJ) have been proposed, but their real effectiveness in reducing the BRONJ incidence is unknown. The aim of this study was to evaluate the incidence of bisphosphonate-related osteonecrosis of the jaws (BRONJ) in two groups of patients affected by solid tumors who received dental care after bisphosphonate (BP) treatment (group 1) in comparison to those underwent a dental prevention program before BP treatment (group 2).

Methods. This 5 years longitudinal study included all consecutive oncological patients who underwent at least one infusion with BP between January 2004 and April 2013 for bone metastases due to solid neoplasms. Group 2 patients, before beginning BP therapy, were enrolled in a specific dental program designed to prevent the occurrence of BRONJ. The primary end-point was to compare the onset of BRONJ in group 1 and 2. Then, in order to evaluate other variables relating to BRONJ at 5 years, a multivariate binary model of logistic regression was used.

Results. Of the 156 patients enrolled in the study, 11/60 patients in group 1 (18.3%) and 6/96 patients in group 2 (6.3%) developed BRONJ (P=0.019; OR=3.37, CI=1.17-9.66 – RR=2.93, CI=1.18-7.30). Kaplan Meier analysis showed that group 2 patients tend not to develop BRONJ in the long term (>2 years) in comparison to group 1 patients. The group 1 patients had a more advanced stage of BRONJ and in particular 7/11 (63.6%) presented a stage 2, whereas in group 2 stage 2 was present in 3/6 patients (50%). However, this difference was not statistically significant (P=0.99). Severe periodontal disease (P=0.025) and tooth extraction (P<0.0001) were the only local factors which showed a significant association with the occurrence of BRONJ. In particular comparing patients who had never undergone to extractions to those who had extractions before BP therapy, a statistically significant difference was observed (P=0.003). This difference becomes more evident (P<0.001) comparing patients who never had undergone tooth extractions to those who had extractions after BP therapy. No statistical significant difference was obtained comparing patients who underwent to tooth extractions before BP therapy to those who had the extractions after BP therapy.

Conclusion. This study demonstrated the importance of dental prevention in reducing BRONJ occurrence, especially in the long term period. Control of periodontal disease and an increase of the time between tooth extraction and first BP administration could be recommended in order to reduce the risk of BRONJ development.

Results of a screening program for jaws bone necrosis in 492 patients treated with bisphosphonates for solid tumors

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Aim. Bisphosphonates-related Osteonecrosis of the Jaws (BRONJ) has been reported with increasing frequency in literature over past years. Therapy for this condition is still a dilemma and preventive strategies maybe the right tool to reduce the incidence of this disease. The aim of this study realized at the Azienda Ospedaliero-Universitaria of Parma is to analyse variables involved as possible risk factors for BRONJ in a pool of 834 patients treated with bisphosphonates and, out of these, to focus on the 492 patients treated with bisphosphonates for solid tumours.

Materials and methods. Patients included in the analysis have been involved in the study before starting bisphosphonates therapy: oral evaluation has been carefully realized and completed with the observation of radiological findings and the record of presence of prosthetic rehabilitation, parodontal disease, and performed dental extraction. Clinical documentation of the patients have been accurately analyzed recording variables as sex, smoking habits, primary disease, type of BPs, other drugs, particularly monoclonal antibodies as bevacizumab and denosumab and hormonal therapy and comorbidities (e.g. diabetes, hypertension, tyroid disease, etc.).

Results. Out of the 492 patients (290 women and 202 men), 63 (12.8%) were smokers and 111 (22.5%) ex-smokers; 238 (48.3%) were treated with BPs for breast cancer, 99 (20.1%) for prostate cancer, 66 (13.4%) for lung cancer ad 89 (18.1%) for other cancers; 485 (98.6%) were treated with zoledronate and 7 (1.4%) with pamidronate. In 40 out of 492 patients (8.13%) diagnosis of BRONJ was made: out of these, 7 patients were smokers (17.5%), 13 (32.5%) ex-smokers, 18 (45%) diabetics, 14 (35%) affected by heart disease. Seventeen out of 40 BRONJ patients (42.5%) were treated with monoclonal antibodies: out of 492 patients this therapy was performed in 38 cases (7.7%).

Conclusion. Among the 492 patients treated with BPs for solid tumors, even if the preventive strategies, BRONJ was observed in 40 cases (8.13%) and of these 17 were treated with BPs and monoclonal antibodies (44.7%), suggesting monoclonal antibodies as an important etiological factor for Medical-related osteonecrosis of the jaws. Comorbidities as hypertension, diabetes and tyroid disease could be confirmed as risk factor increasing the incidence of BRONJ. Prevention can only partially influence the incidence of BRONJ being this related to polipharmacological therapies, sistemic diseases and uncorrect oral habits, but could be essential for the detection of BRONJ at early stages.

Sealing performance of resin composite to pulp chamber floor: evaluation by optical coherence tomography

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Aim. The long-term success of endodontic treatment highly depends on the following restorative treatment. The disinfection of the root canal system must be protected by a coronal restoration. The aim of this in vitro study was a non-invasive evaluation of the composite resin adaptation to cavity floor in post-endodontic restorations using the optical coherence tomography (OCT). The OCT has been described for the first time by Fujimoto et al. in 1991 as a diagnostic tool. It is not invasive, non-radioactive and uses the principle of interferometry. The OCT has been widely used in various branches of medicine: gastroenterology, ophthalmology, dermatology and dentistry. Using a low-coherence light source it get excellent spatial resolution (~ 20 mM) and images in real time. The null hypothesis is that there is no difference in sealing performance of the pulp chamber floor between resins of different viscosity.

Methods. 30 intact upper molars, extracted for periodontal reasons, were selected, endodontically treated and filled with gutta-percha. Excess of gutta-percha was entirely removed from the chamber floor and teeth were randomly divided into 3 groups (n=10) according to the material used for the restoration: Group A: 0,5 mm of flowable composite (Venus Bulk-Fill, Hereus-Kulzer) and stratification of nanohybrid composite (Clearfil Majesty ES-2, Kuraray); Group B: single apposition of flowable composite (Venus Bulk-Fill, Hereus-Kulzer); Group C: stratification of nanohybrid composite (Clearfil Majesty ES-2, Kuraray). Materials adaptation to the cavity was assessed with the OCT ('Spectralis', Heidelberg Engineering, Germany) as follow: all samples were analyzed with the technique that combines multimode OCT images (wavelength 870 nm) with infrared images. The specific objective for the analysis of the anterior eye was used (Anterior Segment Lens, Heidelberg Engineering, Germany). Images are acquired in High Speed and EDI (Enhanced Depth Imaging, Heidelberg Engineering, Germany), by selecting the settings for images iridocorneal angle through a pattern always repeated for each sample (ART set to 60 frames, 15° x5 °, 10 sections at a distance of 278 microns). Obtained images were analyzed with the software ImageJ to assess the percentage of marginal gap between composite and chamber floor. Collected data were statistically analyzed with the ANOVA test and significance was set for $p<0.05$.

Results. Statistical analysis showed a significant better adaptation of flowable composites compared to the traditional packable nanohybrid composites ($p<0,05$). No differences were found between group A and B.

Conclusion. Within the limitations of an in vitro study we can affirm that the use of a thin layer of flowable composite is recommended as first increment in post-endodontic restorations. Further investigations are necessary to confirm these results.

Influence of synthetic hydroxyapatite application on fiber posts bond strength and durability

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Aim. Nowadays, adhesive systems that exploit chemical adhesion to bind with tooth have been introduced. These adhesive systems, so called self-etch, create micromechanical interlocking along with a chemical interaction of functional monomers with calcium. A recent study conducted by Yoshihara et al. (2011a,b) showed that self-etch adhesive systems which contain the phosphoric-acid ester functional monomer 10-MDP (10-methacryloyloxi-decyl-dihydrogen-phosphate) create a nano-layered structure at the adhesive-dentin interface based on 10-MDP – calcium salts binding, having been associated with outstanding bond integrity and clinical longevity. Recently, a calcium phosphate containing material composed by tetracalcium phosphate [TTCP; Ca4(PO4)2O] and dicalcium phosphate anhydrous (DCPA; CaHPO4) has been introduced for dental hypersensitivity treatment. Because of the well-known difficulties in smear layer removal along post-space walls during fiber post luting procedures, the aim of this in vitro study was evaluate the effect of Calcium-Phosphate minerals application on fiber post bond strength and durability.

Methods. 64 single root teeth, extracted for periodontal reasons, were endodontically treated and a 10mm post space was prepared in each sample. Specimens were randomly assigned to four groups (n=16) according to the fiber post luting procedures. Group 1: EDTA10%+selfadhesive cement (Panavia SA,Kuraray); Group 2: EDTA 10%+TeethMate Desensitiser (Kuraray, Japan)+self-adhesive cement (Panavia SA,Kuraray) Group 3: AllBond Universal (Bisco, USA)+Core-X Flow (Dentsply, Germany); Group 4: AllBond Universal (Bisco)+TeethMate Desensitiser (Kuraray)+Core-X Flow (Dentsply). Teeth were cut in 1mm thick slices; sample were pushed until failure with an Instron Machine after 24hours and 12 months of storage in artificial buffer at 37°C. 2 samples per group were prepared for the SEM analysis. An EDS (EDAX Integrated GENESIS APEX 2i EDS System with Apollo X Silicon Drift Detector) detector was used together with the SEM for elemental analysis of the sample surface. Results were statistically analyzed with one-way ANOVA test ($p<0.05$).

Results. Statistical analysis showed a significant difference in bond strength between Group 1 and Group 2 (p=0,0001)and between Group 3 and Group 4(p=0,001). Hydroxyapatite application significantly helps to prevent bond strength decrease overtime (p=0.0001).EDAX analysis showed that TeethMate created a Calcium-Phosphate precipitation over dentinal tubules.

Conclusion. Within the limitations of an in vitro study we can affirm that the creation of calcium phosphate precipitation over dentinal walls could improve and stabilize bond strength of fiber post luted with 10 MDP-containing adhesive systems.

Influence of DCC in ethanol-wet bonding technique on bond strength to radicular dentin

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Aim. The inhibition of metalloproteinasis activity represents a fundamental step in nowadays adhesive procedure. Several studies showed that digluconate clorhexidine is effective in MMPs inhibition, even if it could leach out of the hybrid layer and reduce MMPs inhibition effect. Radicular dentin is subjected to bonding procedures when fiber posts are employed within post-endodontic restorations. Thus, new MMPs inhibitors should be tested in order to improve hybrid layer stability overtime. The aim of this in vitro study was to evaluate the effect of a cross-linker agent (DCC) used in addition to ethanol in ethanol wet bonding technique for fiber post cementation to radicular dentin. The null hypothesis tested was that DCC do not influence immediate fiber post bond strength when employed with ethanol.

Methods. 18 intact single root teeth, extracted within one month for periodontal reason, were selected and endodontically treated and obturated with guttaperca. After 7 days, a 10 mm post space was prepared with dedicated drills and etched with 37% phosphoric acid for 15 seconds. Samples were randomly divided into 3 groups (n=6) according to the dentin pre-treatment procedure: 1) water wet bonding: post space irrigation with distilled water for 60 seconds; 2) ethanol wet bonding: post space irrigation with ethanol for 60 seconds; 3) ethanol wet bonding with DCC: post space irrigation with 0.5M DCC in ethanol for 60 seconds. Adhesive (All Bond 3, Bisco, USA) was, then, applied following manufacturer instructions, and fiber posts were luted into the post space with Duo-Link Universal (Bisco) and cured for 40 seconds with polywave LED curing light (Bluephase Style, Ivoclar, Luxemburg). To perform push-out test of the coronal and apical region, samples were cut in 1 millimeter thick slices and pushed until failure with an Instrom Machine. Results were statistically analyzed with ANOVA test, and statistical significance was set for p<0.05.

Results. ANOVA showed that both regions had comparable results for group 2 and 3, while for water-wet bonding the coronal region performed significantly better (p=0.0001). No differences were found between the three pre-treatment techniques considering the region.

Conclusions. The null hypothesis has to be accepted since DCC did not influence immediate bond strength to radicular dentin when applied with ethanol. Additional samples have been yet prepared and stored in artificial saliva to test the efficacy of DCC in bond strength maintenance after 6 and 12 months of storage.

Comparative evaluation of the effectiveness of Vertise Flow in dental hypersensitivity

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Aim. To investigate in a comparative clinical trial, the 12-weeks effectiveness of Vertise Flow™ (VF), self-adhering resin composite, as desensitizing agent.

Methods. The study was designed as a split-mouth randomized clinical trial. The protocol and informed consent forms were approved by the ethics committee at the University of Sassari (n° 1000/CE). VF was compared to: Universal Dentine Sealant (UDS), Clearfil Protect Bond (CPB), Flor-Opal® Varnish (FOV). Inclusion criteria: 1) two or three teeth hypersensitive to the stimulation, 2) abrasion, erosion or recession with the exposure of the cervical dentine. A total of 116 teeth were included in the study. Teeth were randomly assigned to four groups for the treatment with the four desensitising agents. The pain experience was generated by a cold stimulus directly to sensitive tooth surface and assessed using the Visual Analogue Scale (VAS). The response was recorded before the application of the materials (PRE-1), immediately after (POST-1), at 1 week (POST-2), 4 weeks (POST-3) and 12 week controls (POST-4). Statistical differences in VAS were performed using the Kruskal–Wallis analysis at the different time-points (P<0.05), adjusting statistical significances for multiple comparisons (Bonferroni correction).

Results. Different responses could be observed in the post-treatment controls as a consequence of the material composition and interaction capacity in dentin under oral environment. VF showed the ability to significantly reduce the sensitivity immediately after the application, however lowering its efficiency within the 12-week post-treatments. The acidic monomer in VF (GPDM) might raise the concentration of Ca and P from the dentin to a point where it exceeded the product's solubility constants, thus allowing for the subsequent precipitation of Ca-P complexes with micromechanical reduction of the tubular orifices, that can explain the significant decrease of dentine hypersensitivity (DH) in POST-1. It is likely, however, that the chemical components of the composite mass absorb water in an aqueous environment, producing hydrolytic processes that might be responsible for the deterioration of the physico-mechanical properties of the resin cover within the 12-week controls. UDS revealed Ca, Cl, and Si as the highest ions in the resin matrix, also containing Al ion peaks. In comparison to VF, UDS produced a slowly but continue decrease of the VAS showing the higher most stable desensitizing effect at POST-4. Results may be related to the different composition and filler treatment in UDS in respect to VF, leading to a fillerpolymer bond probably less attackable by water degradation under oral exposure. CPB showed a significant decrease of the VAS in post-1 that remained stable within the

12week controls. The significant decrease in DH immediately after CPB application may be related to the high bonding capacity in tubular dentine, but the reduction in efficiency observed within the 12-week controls may be explained in the incapacity of the resin adhesive to resist in face to the fluid exposure unless a composite cover is performed. FOV demonstrated low efficiency in DH when compared to the other materials. The reduction of VAS value by FOV may be explained by the precipitation of crystallites of calcium in the opening of the tubules However, the progressive decline in effectiveness demonstrated the inability of the varnish to produce a firm seal in dentine within the 12week controls.

Conclusion. The 12 weeks of oral environmental fluids affected significantly the sealing efficiency of VF in dental hypersensitivity probably due to water degradation of the composite with weakness of the bond in dentin.

Comparative evaluation of the effectiveness of desensitizing agents in xerostomic patients with head and neck cancer

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Aim. Xerostomia as well as dental hypersensitivity (DH) are very common complications in patients who need radiotherapy for head and neck cancer (HNC). Thus, the aim of the present study was to compare the clinical effectiveness of four desensitizing agents in xerostomic patients due to radiotherapy for HNC, in comparison to a non-xerostomic healthy group.

Methods. The study was designed as a split-mouth randomized clinical trial. A total of 50 patients needed to be treated with radiotherapy for HNC were subjected to dental check up and treatment, if needed before, during and after the therapy. 17 patients began to complain DH few months after the end of radio-exposition Basal and stimulated salivary flow was recorded for each patient according to European classification criteria (1993). The materials used as desensitizing agents were 1) Vertise Flow™ (VF), 2) Universal Dentine Sealant (UDS), 3) Clearfil Protect Bond (CPB), and 4) Flor-Opal® Varnish (FOV). The inclusion criteria were: 1) good general health status, 2) clinical reduction of salivary flow 3) two or three teeth hypersensitive to the stimulation, 3) abrasion, erosion or recession with the exposure of the cervical dentine. All the patients met the inclusion criteria and were selected for the study (group A). They were compared to a group of 46 patients suffering for dental hypersensitivity who met the same inclusion criteria except for the clinical reduction of salivary flow (group B).

In both groups, the pain experience was generated by a cold stimulus directly to a sensitive tooth surface and assessed using the Visual Analogue Scale (VAS) of pain. The response was recorded before the application of the materials (PRE-1), immediately after (POST-1), at 1 week (POST-2), 4 weeks (POST-3) and 12 weeks controls (POST-4). The Shapiro-Wilk normality test was used to assess the normality distribution of the collected variables. Statistical differences in the VAS values of VF, UDS, CPB and FOV were evaluated performing the Kruskall-Wallis analysis, adjusting the statistical significance for the multiple comparisons (Bonferroni correction). Statistical differences between the baseline VAS values and those obtained at any time-points were calculated performing the Mann–Whitney U test.

Results. In group A, the mean basal salivary flow rate was 0.24 ml/min (min. 0.06 – max. 0.42), while the stimulated rate was 0.54 ml/min (min. 0.29 – max. 0.86). In the control group B, the salivary flow rate was ≥ 0,2 ml/min while the stimulated rate was ≥ 0,5 ml/min.

In xerostomic group, data demonstrated that VF and CPB significantly reduced VAS scores at POST-1 and POST-2. However, after 12-week controls, both VF and CPB decreased their performance with an increase of the VAS scores. UDS produced a slow but continue decrease of the VAS. However, after 12-week controls UDS VAS decreases showing similar values to those noted at PRE-1, similarly to VF and CPB. As regard to FOV, it demonstrated the lower efficacy in DH when compared to the other materials.

Conclusion. After 12-weeks there was no statistically significant hypersensitivity reduction using any of the materials tested in xerostomic group. Except in the case of UDS, which produced a statistical decrease of the VAS value at Post 4 in group B, any other statistical differences in the efficacy of the materials were noted between the two groups.

Effect of exposure distance with multiled lamps on surface micro-hardness in a bulk-fill composite

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Aim. An inhomogeneous irradiance distribution from a light-curing unit can locally cause inhomogeneous curing with locally inadequately cured and/or overcured areas causing *e.g.* monomer elution or internal shrinkage stresses, and thus reduces the lifetime of dental resin based composite restorations. The aim of this in vitro study was to assess the effect of exposure distance on surface microhardness obtained with different MultiLED curing lights of a bulk-fill composite. The hypothesis is that polywave multiLED curing lights induce uniform microhardness distribution on composite surface independently of curing distance.

Methods. A bulk fill composite (Filtek Bulk Fill Posterior, 3M ESPE) was selected and placed in a 2 mm metallic mould in order to create composite discs. Samples were exposed to irradiation with 3 different curing lights: Two Wave (Heraeus Kultzer, Germany; Group1), Valo (Ultradent, USA; Group 2), Swiss Master Light (EMS, Switzerland; Group 3) at the same energy density (27J/cm2). Polymerization was performed with the curing tip at a distance of 0 mm, 2 mm, 4 mm, 6 mm and 8 mm from the top surface of the sample. All specimens were stored in distilled water in a light proof container at 37° C for 24 hours. Top and bottom surface of samples were then submitted to Vickers test on the central and peripheral area. Analysis of variance (ANOVA) was performed to evaluate the effects of light distance, sample zone

(central vs peripheral area of the sample), curing light and their interactions on microhardness. All statistical analyses were performed at a significance level of 0.05.

Results. Exposure distance significantly influenced microhardness with all tested lamps (p=0.0001). Between curing units, Two Wave performed significantly better than Valo and Swiss Master Light (p=0.0001). Sample central area was significantly harder than peripheral area in all groups (p=0.0001).

Conclusion. The hardness distributions in the sample surface are caused by the corresponding distributions of the degree of conversion. Furthermore, shrinkage depends also on degree of conversion. Thus, any hardness distribution implies an inhomogeneous shrinkage behavior. The consequence is a distribution of internal stresses leading to unfavorable conditions and possible reduction in the longevity of restorations. The initial hypothesis of this in vitro study was rejected, since exposure distance, curing light and surface zone all significantly affected surface microhardness of bulk-fill resin composite. Locally insufficient curing of the bulk fill composite is the consequence causing not only mechanical instability, but further problems such as the elution of residual monomers or other substances.

Pulp vitality preservation in traumatic avulsion of maxillary central incisor: case report with 2-year follow-up

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Aim. Dental trauma are frequent in young people after accident or injuries. This clinical case shows the complete procedure and 2-year follow-up result for the resolution of a severe dental trauma.

Methods. The patient, a 21-year-old female, was visited in the Department of Operative Dentistry of Turin after a dental trauma, which occurred 20 hours before. The patient showed a partial avulsion (6mm out of alveolar bone) of 1.1 and coronal fractures on 1.1 and 2.1. After clinical and radiographic exams, which showed any bone fractures, 1.1 was immediately replaced in the correct position and splinted with glass fibres (GrandTec, Voco) and flowable composite to adjacent teeth. Teeth vitality was evaluated with thermal and electric pulp tests every 7 days for the following weeks. After 2 months the teeth were still vital, thus splint was removed and tooth mobility was absent. An impression with polyvinylsiloxane was taken and a wax up was created on a gypsum model. Then, 1.1 and 2.1 fourthclass direct composite restorations were performed as follows: anesthesia and field isolation through rubber dam; dentin cleaning and enamel margin bevelling and finishing; 30 seconds enamel etching and 15 seconds dentin etching; primer (Optibond FL) application and gentle air drying followed by bonding resin application, gentle air blowing and 20 seconds of polymerization; direct restoration was performed with Asteriacomposite (Tokuyama) in an incremental layering technique with the aid of oral and buccal silicon guides; palatal walls were built before interproximal walls, both with enamel shade; then, dentin shade was anatomically layered and final buccal layer of enamel shade was placed; finishing and polishing with fine-grit burs and silicon points was performed after final curing under transparent gel. Final radiographs were taken and follow-up visits were planned to check the composite integration and the pulp tissue vitality.

Results. 6, 12, 18 and 24 months follow-up showed teeth vitality maintenance, any mobility of the involved teeth, soft tissue healing and perfect composite integration.

Conclusion. Immediate tooth repositioning and stable splint trough glass fibers and composite are key factors in the treatment of dental traumas, above all when severe damage such as avulsion (partial of complete) happens. Further follow-up are necessary to verify treatment behavior overtime, because the risk of root resorption is still present.

MTBS of an etch-and-rinse adhesive system enriched with chlorhexidine digluconate loaded nanodroplets

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Aim. The inhibition of metalloproteinasis activity represents a fundamental step in nowadays adhesive procedure. Several studies showed that digluconate clorhexidine is effective in MMPs inhibition, even if it is not complete. Drug Loaded Nanodroplets (DLNs) could be employed for MMPs Inhibiton Agents delivery and release in dentin. The aim of this in vitrostudy was to evaluate the influence of dentin pre-treatment with Chlorhexidine-digluconate loaded Nanodroplet (CHXLNs) on the bond strength of an etchand-rinse adhesive system. The null hypothesis is that DLNs did not negatively affect the bond strength obtained with etch-and-rinse adhesives.

Methods. 10 molars crowns were flattened and standardized smear layer was created with 600 grit paper.Exposed dentin surfaces were etched with 36% phosphoric acid (Ultraetch, Ultradent) for 15sec. Sample were divided in two groups according to the application (Group 1) or not (Group 2) of CHXLNs for 30sec and dried. Then, in all samples,Schotchbond Universal (3M ESPE, USA) was applied and cured for 60sec at 1400mW with Valo (Ultradent). Then, 4 millimeters of resin composite (Clearfil ES2, Kuraray, Japan) was applied. Specimens were serially sectioned to obtain 1 mmthick beams in accordance with the μTBS test technique. Beams were stressed to failure after 7 days of storage in artificial buffer. Two more samples were prepared and sectioned in order to observe hybrid layer with confocal laser scanning microscopy. One-way Anova was performed to evaluate the effects of CHXLNs pre-treatment on the bond strength of and etch-and-rinse adhesive system. Confocal laser microscopy has been employed to evaluate DLNs penetration into dentinal tubules after etching. 20 extra samples were prepared using the same technique; they will be analyzed after 6 and 12 months of artificial aging to evaluate the effect in time of CHXLNs inhibition on MMPs.

Results. Mean bond strength in Group 1 was 35.03±8.94MPa, in Group 2 was 38.73±8.97. ANOVA test showed any influence of CHXLNs pre-treatment on the

bond strength of adhesive tested. CLMS showed that CHXLNs are present under adhesive resin tags.

Conclusion. Within the limits of this study we can conclude that CHXLNs do not influence the immediate bond stregth of etch-and-rinse adhesive system. The effect of CHXLNs on bond strength durability is under investigation. Thus, the null hypothesis has been accepted

Pulp chamber temperature increase during adhesive system irradiation with multiled curing lights

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Aim. Light curing units for dental applications were developed to initiate photopolymerization of resin composites, adhesives, sealants and resin cements. The degree of polymerization of a resin composite is affected by the irradiation time and light intensity. Several new curing units, including multiLED polywave curing units, have been introduced to the dental profession within the past few years. Even if LED lights have been showed to induce low temperature increase, multiLED lights should be tested in order to avoid pulpal injuries during composite ittadiance. Thus, the aim of this in vitro study was to compare temperature rise in the pulp chamber induced by different lights when curing adhesive system. The null hypothesis is that curing lights (1) and irradiation time (2) do not influence temperature increase.

Methods. 60 intact molars, extracted for periodontal reasons, were selected. A first class cavity 3mm depth with pulpal floor 1mm distant from the pulp chamber was prepared on each sample by the same expert operator. Roots were cut, a J-Type thermocouple was inserted into the pulp chamber that was then sealed with composite resin. Samples were divided in 4 groups (n=15) according to the curing light employed: Swiss Master Light (EMS, Switzerland), Two Wave (Heraeus Kultzer, Germany), Valo (Ultradent, USA), Bluephase Style (Ivoclar, Luxemburg). Adhesive system (Clearfil Universal, Kuraray, Japan) was applied on dentin and irradiated with different time regimens (10sec, 20sec, and 40sec). The temperature rise in the pulp chamber, the time to reach maximal temperature (tMax) and to return to initial temperature (tBack) were registered. Results were statistically analyzed with ANOVA test ($p<0.05$).

Results. There were no statistically significant differences between halogen and multiLED tested curing lights regarding pulp chamber temperature increases when polymerizing a universal adhesive, independently of the irradiation time. The greatest temperature increases were observed with Valo (2.1 degrees Celsius), followed by halogen (1.4 degrees Celsius) and TwoWave and Bluephase Style (0.9 degrees Celsius). tBack was significantly higher ($p=0.0001$) with halogen light.

Conclusion. Since pulp is vulnerable to a rise in temperature as a result of its low-compliance nature, there is the potential for light curing units to cause pulpal damage. The null hypothesis of this in vitro study was accepted since curing lights tested did not differ in temperature increase induction, independently of irradiation time. However, halogen light induce more persistent heat in the pulp chamber.

Effect of polywave multiled curing lights on surface micro-hardness distribution of two nanofilled composites

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Aim. The aim of this in vitro study was to assess the effect of different poliwave MultiLED curing lights on surface microhardness topography of two nanofilled composites. The hypothesis is that polywave multiLED curing lights induce uniform microhardness distribution on composite surface.

Methods. A non-carious molar tooth, extracted for periodontal reasons, was selected. Crown was horizontally sectioned 2-mm above the CEJ. A 3x4-mm Class I cavity was prepared in order to obtain a "tooth mould". Composite samples, 2mm thick, were prepared using the tooth mould and divided in two groups (n=10 each) according to the composite (GrandioSo – VoCo, Germany; Filtek XTE - 3M ESPE, USA). Samples were cured with 5 curing lights (TwoWave-Heraeus,Valo-Ultradent, Bluephase G2-Ivoclar Vivadent, Demi Ultra-Kerr, Swiss Master Light-EMS) at the same energy density (27J/cm2). After 7 days of storage, composite samples were submitted to Vickers test on the central and peripheral area. Analysis of variance (ANOVA) was performed to evaluate the effects of curing light and specimen zone (central vs peripheral) and their interactions on microhardness.

Results. Two-way Anova showed comparable results for both composites (Filtek and GrandioSo). The two variables (lamp and zone) statistically affected micro-hardness ($p<0.0001$), but not the interactions between them.

Conclusion. The two composites employed showed a decrease in micro-hardness values from the central to the peripheral area for all five curing lamps, thus the initial null hypothesis must be rejected. Probably the hardness distribution of composite surface reflects the irradiance distribution of each curing light tested in this study.

Effect of water storage and brushing on dentinal permeability of teeth treated with desensitizing agents

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Aim. The aim of this in vitro study was to assess the effect of ageing and electric brushing on dentinal permeability of samples previously treated with three different desensitizing agents. The null hypothesis is that dentinal permeability is not influenced by ageing and periodical electric brushing.

Methods. 18 intact molars were selected, occlusal enamel and crowns were then cut in 0,5 mm slices, perpendicular to the long axis of the teeth, in order to obtain 1mm thick dentin discs. Samples were than randomly divided into 3 groupsaccording to desensitizing treatment performed: 1) ReminPro (Voco); 2) AllBond Universal (Bisco); 3) TeethMateDesensitizer

(Kuraray). Groups were further divided into 2 subgroups considering different ageing treatment: a) storagein artificial saliva; b) subgroup a) treatment + 10 min standardized brushing once a week for 3 months. Dentin permeability was assessed before and immediately after treatment, after 3 months of ageing treatment. Samples were subsequently prepared for SEM analysis to evaluate differences in tubules occlusion. Kruskal-Wallis and Wilcoxon test were performed to evaluate dentin permeability changes before and after samples treatment ($p<0.05$).

Results. Statistical analysis showed that water storage ($p<0.001$) and brushing ($p<0.0001$) significantly increaseddentin permeability except for TeethMate Desensitizer.

Conclusion. All occluding agents reveal comparable tubular occlusion at baseline SEM analysis. However, statistical analysis showed that water storage and daily brushing increase dentin permeability for all groups except for TeethMateDesensitizer that remain stable both after storage in artificial saliva and controlled brushing.

Shear bond strength between CAD/CAM resin nano ceramic and dentin: influence of glycine pretreatment

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Aim. Advances in computer-aided design (CAD) and computer-aided manufacturing (CAM) systems have provided new solutions for dentistry, creating an alternative to the conventional impression and casting technique for producing dental restorations. A requirement for the successful function of a CAD/CAM restoration is an adequate adhesion with the dental substrate. The purpose of the study was to evaluate and compare the shear bond strength values between dentin and a resin nano ceramic material based on CAD/CAM technology, bonded together with adhesive cements using three different luting protocols (total-etch, self-etch and self-adhesive). The influence of dentin surface pretreatment with glycine powder was also evaluated.

Methods. Thirty cylinders (5 mm in diameter, 3 mm thick) designed and obtained by milling from resin nano ceramic blocks (Lava Ultimate – 3M ESPE) with CAD/CAM technology (CEREC – Sirona Dental) were cemented to the exposed dentin of thirty freshly extracted bovine permanent mandibular incisors stored in a 0.1% (g/cm3) thymol solution until testing. The specimens were randomly assigned into six groups of five teeth each, according to the luting procedure and dentin pretreatment. In the first two groups (A1, A2) cylinders were sandblasted then cemented to the etched dentin of specimens using Scotchbond Universal Adhesive and Relyx Ultimate; in groups B1 and B2 cylinders were sandblasted then cemented directly to the exposed dentin of specimens using Scotchbond Universal Adhesive and Relyx Ultimate; in groups C1 and C2 cylinders were cemented directly to the exposed dentin of specimens using only Relyx Unicem 2 Automix; in groups A1, B1 and C1 the dentin surface was also pretreated with glycine powder. All cemented specimens were submitted to a shear bond strength test to verify the adhesion between dentin and resin nano ceramic. Statistical analysis was performed with Stata 9.0 software (Stata, College Station, Texas, USA). Descriptive statistics were calculated for all groups. The normality of the data was calculated using the Kolmogorov-Smirnov test. Analysis of variance (ANOVA) was applied to determine whether significant differences existed in debond strength values among the groups. Tukey's test was used as post-hoc. Significance for all statistical tests was predetermined at $P < 0.05$.

Results. ANOVA showed significant differences among the various groups ($P < 0.0001$). Post-hoc Tukey's test revealed that the highest shear bond strength values ($P < 0.001$) were reported in groups B1 and B2: no significant differences were detected between the two groups ($P > 0.05$). Significantly lower ($P < 0.001$) results were calculated in groups A1, C1 and A2: no significant differences were found among the three groups ($P > 0.05$). The lowest data were reported in group C2 ($P < 0.001$). After glycine application groups A1 and C1 showed significantly lower shear bond strength values when compared with group B1 ($P < 0.05$). Without glycine application group B2 also recorded significantly higher shear bond strength values than groups A2 and C2 ($P < 0.05$).

Conclusion. Both with or without glycine application the most effective adhesion between resin nano ceramic and dentin was obtained using a self-etch protocol of cementation. Dentin pretreatment with glycine powder has not significantly ($P < 0.05$) influenced shear bond strength values when using total-etch (groups A1, A2) and self-etch (groups B1, B2) protocols of cementation but seemed to increase the adhesion strength of self-adhesive cements (groups C1, C2).

Effect of self-assembling peptide P_{11}-4 on enamel erosion: AFM and SEM studies

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Aim. The aim of the present in vitro study was to evaluate the protective effect of self-assembling peptide P_{11}-4 (Curodont™ Protect/Credentis) on enamel erosion produced by a soft-drink. The evaluation consists of a comparison with a reference-remineralizing agent (Tooth Mousse/GC) throughout the analysis of data captured at Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM) tools. Curodont™ Protect (Credentis AG, Windisch, Switzerland)is a product that incorporates the P_{11}-4-based Curolox ™ technology, together with fluoride and calcium phosphate. Curodont™ Protect builds a stable, adhesive and mineral-rich protective layer on all tooth surfaces. Tooth Mousse (GC Corp., Tokyo, Japan) is the CPP-ACP paste. It is a water based, sugar free dental topical crème containing Recaldent™ CPP-ACP. The complex

of CPP-ACP (Recaldent™) is an ideal delivery system for bio-available calcium and phosphate ions. The amorphous calcium phosphate is biologically active, and is able to release calcium and phosphate ions to maintain the supersaturated state, thus enhancing the remineralization process.

Methods. 20 human incisors, extracted for periodontal reasons and free of caries, were selected as samples of the study. The specimens were prepared into fragments by cutting the enamel at the enamel-dentin junction, with a high-speed diamond rotary bur with a water-air spray. The labial surfaces were grounded using silicon carbide papers under water irrigation to produce flat enamel surfaces. Samples were kept in artificial saliva during whole experimentation in order to simulate as much as possible the oral conditions. The specimens were divided into 4 groups: group 1: intact enamel, group 2: enamel + soft drink, group 3: enamel + soft drink + Curodont™ Protect, group 4: enamel + soft drink + Tooth Mousse. The control specimens (group 1) were taken on storage and they did not receive any treatment. A soft drink (Coca Cola) was chosen for the demineralization process and the specimens of group 2 were immersed in Coca Cola for 8 minutes at 0, 8, 24 and 36 hours. In groups 3 and 4 the toothpastes were applied (for 3 min at 0, 8, 24 and 36 hours) one hour after every immersion in Coca Cola. Images of each specimen's surface were captured by AFM and by SEM.

Results. From the comparison between group 1 and group 2, a significant difference between the two (intact enamel and enamel + soft drink) comes to notice ($P < 0.05$): intact enamel and intact enamel + soft drink have been proved to be different. Among treatment specimens of group 3 (Curodont™ Protect) and 4 (Tooth Mousse) no statistical difference in roughness values are registered ($p>0.05$; ANOVA). Both the results for the Curodont™ Protect group and for the Tooth Mousse group were statistically significantly different from the group 2 (soft drink) at $p<0.05$. Morphological analysis of enamel was done using scanning electron microscopy. The SEM observations revealed the enamel erosion caused by Coca-Cola in group 2. Comparing SEM images of goup 3 and group 4 specimens treated with Curodont Protect and with Tooth Mousse revealed slight changes in morphological features.

Conclusion. The use of Curodont™ Protect and of Tooth Mousse had a protective effect on enamel demineralization in an in vitro model; the two pastes may offer a degree of protection from erosion of enamel.

Ultrastructural evaluation of enamel surface morphology after tooth bleaching followed by the application of protective pastes

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Aim. The aim of this in vitro study was the qualitative evaluation, through scanning electron microscopy (SEM), of enamel surface morphology after tooth bleaching (Perfect Bleach Office/VOCO) followed by the application of different protective pastes (Tooth Mousse/GC, MI Paste Plus/GC, Remin Pro/VOCO).

Methods. Specimens were prepared from 50 human incisors free of caries and defects, extracted for periodontal reasons. The teeth were cleansed of soft tissue debris and inspected for cracks, hypoplasia and white spot lesions; they were disinfected in 5.25% sodium hypochlorite solution for one hour and stored in artificial saliva (pH 7.0, 14.4 mM NaCl; 16.1 mM KCl; 0.3 mM $Cl_2 \cdot 6H_20$; 2.9 mM K_2HPO_4; 1.0 mM $CaCl_2 \cdot 2H_2O$; 0.10 g/100 ml sodium carboxymethylcellulose) during the whole experimentation. The crowns were separated from the roots at the enamel-dentin junction, then they were sectioned mesiodistally with a double-faced diamond disk (KG Sorensen, Sao Paulo, SP, Brazil) to separate labial and lingual fragments. The labial surfaces were wet-polished using aluminium oxide abrasive papers (600-grit and 1200-grit) under water irrigation to produce flat enamel surfaces. Only labial sections were used. Samples were placed into Teflon moulds measuring 10 x 8 x 2 mm, embedded in flowable composite resin and polymerized. Specimens were randomly assigned to 8 groups of 5 specimens each: group 1: intact enamel (control, no treatment was done); group 2: enamel + Perfect Bleach Office; group 3: enamel + Tooth Mousse; group 4: enamel + Perfect Bleach Office + Tooth Mousse; group 5: enamel + MI Paste Plus; group 6: enamel + Perfect Bleach Office + MI Paste Plus; group 7: enamel + Remin Pro; group 8: enamel + Perfect Bleach Office + Remin Pro. The protective pastes were applied onto the surface of the specimens to cover the enamel without brushing and wiped off with distilled water washing; the control specimens (group 1) did not receive any treatment; during these intervals the specimens were kept in artificial saliva. The bleaching treatment was applied according to the manufacturer's instructions: apply Perfect Bleach Office directly from the mixing tip onto the labial surfaces of the teeth in a 1 to 2 mm thick layer; the material applied to the teeth can be evenly distributed and moved around every 5 min with an instrument to improve effectiveness; leave whitening gel to act on the teeth for approximately 10 to 15 min. The specimens were air dried, dehydrated with alcohol, sputter-coated with gold and analyzed under scanning electron microscopy (440 SEM with Oxford EDS/WDS, LEO). Serial SEM microphotographs of the surfaces at 5,000X original magnification were obtained. The superficial morphology was examined and scored as follows: 0, enamel with smooth surface morphology; 1, enamel with slight irregularities; 2, enamel with moderate irregularities; 3, enamel with accentuated irregularities. The photomicrographs were evaluated in a double-blind manner by three examiners, previously calibrated. The results were analyzed by a Kruskal–Wallis nonparametric test, at the significance level of 5%, followed by multiple comparisons of the median by Dunn's post-test.

Results. Scanning electron microscopy analysis: the surface morphology of enamel was not significantly different between the groups ($P < 0.05$).

Conclusion. Under the limitations of the present in vitro study, the application of the tested protective pastes is effective on reducing enamel erosion produced by bleaching procedures.

Shear bond strength of universal adhesives on etched *vs.* non-etched enamel

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Aim. The purposes of this study were to evaluate the effect of surface pretreatment with 37% phosphoric acid (etching) on the enamel bond strength of different universal adhesives. The null hypothesis of the study was that etching of the enamel had no significant effect on the shear bond strength and on adhesive remnant index scores of all universal adhesives tested.

Methods. 160 bovine permanent mandibular incisors freshly extracted were used as a substitute for human teeth. The buccal enamel surface of all specimens was flattened with aluminum oxide disks of sequentially decreasing granulation with copious water coolant to obtain flat enamel/dentin surfaces. The materials tested in this study included seven universal adhesives (Futurabond M+/VOCO, Scotchbond Universal/3M ESPE, Adhese Universal/Ivoclar Vivadent, Clearfil Universal Bond/Kuraray, GBU-500/GC, Peak Universal Bond/Ultradent, OptiBond XTR/Kerr,) and one self-etch adhesive (Claearfil SE Bond 2/Kuraray) as control. The adhesive systems were applied to the demarcated bonding area, following each manufacturer's instructions. The teeth were randomly assigned into 2 groups. In the first group, etching was performed using 37% phosphoric acid for 30 s (Total Etch/Ivoclar Vivadent). In the second group, no pretreatment agent was applied. All adhesive systems were cured using a LED curing light in softstart-polymerization mode for 10 s at a light intensity of 1000 mW/cm2. After adhesive application, a nanohybrid composite resin (Grandio/VOCO) was inserted and cured into the enamel surface by packing the material into cylindrical-shaped plastic matrices with an internal diameter of 2 mm and a height of 2 mm. After storing, the specimens were placed in a universal testing machine. The tensile bond strength was performed at 0.5 mm/minute until the sample rupture. Specimens were stressed in an occluso-gingival direction at a crosshead speed of 1 mm/min. The maximum load necessary to debond was recorded in Newton (N) and calculated in MPa as a ratio of Newton to surface area of the cylinder. After the testing procedure, the fractured surfaces were examined with an optical microscope to determine failure modes and classified as adhesive failures, cohesive failures within the composite or cohesive failures within the tooth. The adhesive remnant index (ARI) was used to assess the amount of adhesive left on the enamel surface. This scale ranges from 0 to 3. The ARI scores were used as a more complex method of defining bond failure site among the enamel, the adhesive, and the composite. Statistical analysis was performed with Stata 9.0 software. The normality of the data was calculated using the Kolmogorov-Smirnov test.

Analysis of variance (ANOVA) was applied to determine whether significant differences in debond strength values existed among the various groups. Tukey's test was assessed as post-hoc. Significance for all statistical tests was predetermined at ($P < 0.05$).

Results. ANOVA showed the presence of significant differences among the various groups ($P < 0.0001$). Post-hoc Tukey testing showed that groups with phosphoric acid application showed significantly higher shear bond strength values than groups with no enamel pretreatment ($P<0.001$). No statistical difference in shear bond strength was reported among various adhesives systems when no enamel pretreatment was performed ($P>0.05$). Moreover no significant variation in shear values was detected when comparing the different adhesive systems applied onto enamel after 37% phosphoric acid application ($P>0.05$).

Conclusion. Enamel pretreatment with phosphoric acid significantly increased bond strength values of all universal adhesives tested. No significant differences in bond strength were detected among the different universal adhesives.

Effects of irrigating solutions on mineral content of root canal dentin

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Aim. The objective of the study was to evaluate and compare the decalcifying capability of different irrigating solutions by determining the concentration of calcium extracted from root canal dentin, at three immersion time periods, by inductively coupled plasma atomic emission spectrometry. The null hypothesis of the study was that there is no significant difference in concentration of calcium extracted among the various groups and among the successive 5-min immersion.

Methods. Sixty maxillary central incisors, freshly extracted for periodontal reasons, not decayed, neither filled, nor endodontically treated, were stored in 0,1% thymol solution until use. Root canals were instrumented under abundant irrigation with Peeso burs n° 4 to 6 (Dentsply Maillefer, Ballaigues, Switzerland) using a contra-angle handpiece. After each instrument, the root canal was irrigated with 5 ml of distilled water. One transversal section of 2-mm thickness was obtained from the cervical third of each root using a preprogrammed automatic Accutom-50 diamond cutter (Accutom-50, Struers A/S, Ballerup, Denmark). Each slice was then sectioned in equal sections, obtaining a total of four (s1, s2, s3, s4) samples from each root. The specimens were assigned randomly to one of four experimental homogeneous groups (n = 60) for treatment with different irrigating solutions, as follows: Group 1: "EDTA 17%" (EDTA 17%), Ogna Laboratori Farmaceutici, Muggiò, Italy; Group 2: "Tetraclean" (citric acid 10.5% + Cetrimide 0.2% + 1% Doxycycline Hyclate + Polypropylene Glycol), Patent n. KR2004A000001; Group 3: "Tetraclean NA" (citric acid + Cetrimide + Polypropylene Glycol), Patent n. KR2012A000001; Group 4: saline solution as control. Each specimen was initially immersed in 15 ml of the correspondent irrigating solution and kept under constant stirring. At three interval immersion times (t = 5 min; t =10 min; t = 15 min), 5 ml of irrigant was sampled with a graduated pipette and placed in labeled tubes. An inductively coupled plasma atomic emission spectrometer (ICPAES Perkin Elmer, Waltham, MA, USA) was used for calcium determination in each solution, by external standard calibration: linearity range between 0.5 and 100 mg/l; limit of detection (LOD) 0.1 mg/l, limit of quantification (LOQ) 0.5 mg/l. Data analysis was performed by Stata 12 (StataCorp LP, College Station, TX, USA). The assessment of normality was developed with Shapiro-Wilk test ($P < 0.05$), while comparison tests between groups were conducted with Mann-Whitney U test with a level of significance of $P = 0.05$.

Results. The irrigating solutions tested promoted higher calcium release values from root canal dentin at 10 minutes exposition time than at 5 minutes; instead calcium release was not significantly different between 10 and 15 minutes, except for citric acid based agents (Tetraclean NA) which induced a higher and still increasing calcium release even after 10 minutes contact time ($P < 0.05$). Moreover both the citric acid based agents (Tetraclean and Tetraclean NA) promote the highest calcium release at the three different contact times.

Conclusion. The null hypothesis of the study has been rejected. A significantly higher release of Ca2+ was observed in samples submitted to citric acid based agents. Under the experimental conditions and restricting to the irrigating solutions considered in this investigation, to obtain an efficient decalcifying action on dentin (and subsequently the smear layer removal) and to facilitate the biomechanical procedures, citric acid based irrigants can be applied.

Cleaning effectiveness of single-use Ni-Ti systems: ultrastructural analysis

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Aim. One-file systems have recently appeared, with the aim of reducing the number of steps and files to reach a correct endodontic treatment. The aim of this in vitro study was to evaluate by SEM the root canal dentine surfaces after instrumentation with two different single-use Ni-Ti systems: OneShape and F6 Skytaper. The amount of debris and the morphology of smear layer at the coronal, middle, and apical third were parameters for the evaluation of the cleanliness of root canals. The null hypothesis of the study is that there is no significant difference in debris scores and smear layer scores between the two systems.

Methods. 20 single-rooted human teeth freshly extracted for periodontal reasons were selected for this study and were divided into two groups. The crown of each tooth was removed at the level of the cementum-enamel junction (CEJ) in order to obtain root segments similar in length. The root canals were preliminary instrumented using stainless steel #08-10 K-files (Maillefer, Konstanz, Germany) and with two rotary Ni-Ti instruments, G1 file (12/.03) and G2 file (17/.03) (Micro Mega, Besancon, France), in order to create a glide path (engine settings: 300 rpm and 2.0 N/cm). Root canals were shaped with two different Ni-Ti instruments using 5,25% NaOCl and 17% EDTA solutions. The instruments are single-file technique and requires only one instrument to shape all the root canal; they were used with a digital endodontic engine (Silver Reciproc, VDW) in clockwise rotation respecting manufacturers' instructions and protocols. Group A (n=10): OneShape (Micro Mega, Besancon, France); protocol requires file 25/06 with apical diameter 0.25 mm and 6% taper finishing preparation using in continuous motion (engine settings 400 rpm and 2,5 N/cm); Group B (n=10): F6 Skytaper (Komet Brasseler GmbH & Co., Lemgo, Germany); protocol requires file F6 25/06 with apical diameter 0.25 mm and 6% taper finishing preparation using in continuous motion (engine settings 300 rpm and 2,2 N/cm). Specimens were fractured longitudinally and prepared for scanning electron microscopy (SEM) analysis at a standard

magnification of 1000x and 2500x. Photomicrographs were taken in three areas (coronal, middle and apical). The presence/absence of smear layer and the presence/absence of debris at the coronal, middle, and apical third of each canal were evaluated using two 5-step scale for scores, according to Hulsmann method. Numeric data were analyzed using Kruskall-Wallis and Mann-Whitney statistical tests and significance was predetermined at P<0.05.

Results. The Kruskal-Wallis test showed the absence of significant differences among the two groups (P>0.05). The Mann-Whitney U test confirmed no significant differences in debris scores between the OneShape and F6 Skytaper groups when comparing coronal, middle and apical thirds (P>0.05).

Conclusion. Within the limitation of this analysis, the Ni-Ti rotary instruments tested have been shown to produce moderate to heavy smear layer that need to be removed with the use of irrigating solutions. SEM analysis revealed that OneShape and F6 Skytaper associated to EDTA and NaOCl irrigation leave dentine surfaces substantially free from smear layer. Previous SEM studies investigated the effect of Ni-Ti rotary instruments on dentine and obtained similar conclusion: the present study also confirmed that the apical third is the area where more debris is still visible under SEM inspection.

Evaluation of postoperative pain after endodontic instrumentation technique performed with traditional rotary files or reciprocating

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Aim. The main purpose of root canal treatment is to prevent or eliminate pain. The purpose of this study was to evaluate postoperative pain, following root canal treatment, testing the null hypothesis that there are no statistically significant differences in postoperative pain after endodontic instrumentation techniques performed with traditional rotary files or reciprocating files.

Methods. 10 patients in need for root canal treatment were selected. All treatments were performed on teeth not previously treated, with no lesion, using traditional irrigant solutions (Sodium Hypochlorite and EDTA), after a preoperative radiography. The patients were then divided randomly into two groups A and B. In group A root canal treatments were carried out using rotary files Flexmaster (VDW, Monaco, Germany), while in group B treaments were performed using reciprocating instrumentation Reciproc (VDW , Monaco, Germany). All treatments were carried out using the techniques chosen according to the manufacturer instructions (VDW, Monaco, Germany), by the same operator (Dentist with five years of experience) within a single session in our department. In each patient 2 vials of local anesthetic Citocartin 100 (Molteni Dental Srl, Milan, Italy) were used before the treatment. Each patient was then given Ibuprofen 600 mg granules to be taken as a single dose immediately after the treatment. Then each patient recorded his postoperative pain using a VAS scale over 24 hours after treatment.

Results. Statistical tests on the VAS Scale show no statistically significant differences between the two groups (A e B).

Conclusion. The null hypothesis is rejected as there are no statistically significant differences in postoperative pain after endodontic instrumentation performed with traditional rotary files or reciprocating files.

Quality of preparation by two nickel-titanium instruments activated by continuous rotation or adaptive motion: a micro-computed tomography study

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Aim. To evaluate the shaping ability of curved root canals using Twisted FileAdaptive (TFA) files (SybronEndo, Orange, CA) and Mtwo (Sweden & Martina, Padova, Italy) activated by continuous rotation or Adaptive motion.

Methods. Thirty-two mandibular molars with 2 separate mesial canals and severeangle of curvature were selected. Each canal was randomly assigned to 1 of the 4 experimentalgroups (n=16): TFA and Mtwo files used in continuous rotation (groups 1 and 3) or in Adaptive motion(groups 2 and 4). Root canals before and after preparation were assessed by micro-computed tomography. Volume, surface area, canal transportation, centering ability and preparation time were recordedand analyzed using 2 way analyses of variance.

Results. Volume and surface area increased less with TFA files in continuous rotation than in other groups (P<0.001 and P<0.01 respectively for each comparison) that were not different (P>0.05).

TFA files had significantly less transportation and centring ability than Mtwo both in continuous and "Adaptive" motion (P<0.0001), only centring ratio for both instruments was improved by adaptive motion compared with continuous rotation (P<0.01). However, no differences were found in canal transportation and centring ability in the apical third for both instruments and motions (P>0.05).

Conclusion. Shaping outcomes with TFA files and Adaptive motion were found better than Mtwo and continuous rotation respectively except in the apical third.

Surface tension and wettability comparison of sodium hypochlorite and ethylenediaminetetraacetic acid with or without surfactants

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Aim. Aim of this study was to evaluate surface tension, viscosity and wettability (contact angle) of endo-

dontic irrigants as 5,25% sodium hypochlorite (NaOCl) and 17% ethylenediaminetetraacetic acid (EDTA) with and without the addition of surfactants. In fact Surfactants improve wetting properties of irrigants by diffusing in water and adsorbing interfaces between air and water (dentinal fluide) and reducing water's surface tension and increasing its wettability on surface.

Materials and Methods. Seventy-five halves of single-root teeth were randomly distributed into five experimental groups (n=15) in order to investigate the surface tension, wettability and viscosity of: 5.25% NaOCl; 5.25% NaOCl containing surface-active agents; 17% EDTA; 17% EDTA with surfactants; freshly obtained distilled water MilliQ as control group. The surface tension was calculated by the method of the dropper, the wettability by the "sessile drop" method measuring the contact angle and the viscosity by the time drifting. All measurements were performed at two different temperatures: 22 and 37°C.

Results. In our study was shown, in agreement with other studies, that the highest surface tension and the least wettability values were observed for distilled water and 5,25% sodium hypochlorite (P>0.05) at 22 and 37°C. At the same temperatures, EDTA with or without surfactants and Hypoclean showed a significant lower surface tension and higher wettability (lower contact angle) than distilled water and hypochlorite alone (P < 0.001). The addition of surfactants reduced the surface tension and the contact angle of sodium hypochlorite (as in Hypoclean, P<0.001), but not those of EDTA (as in EDTA Plus, P>0.05). For every irrigant solution analized, the viscosity decreases with the increasing of the temperature.

Conclusion. Sodium hypochlorite solution modified with surfactants showed a lower surface tension and a higher wettability than sodium hypochlorite alone and distilled water. However, the addition of surfactant agents did not reduce the surface tension and the wettability despite of the EDTA alone. Further investigations into biological and physical experimental models should be performed to demonstrate higher penetration, protein solvent power and bacterial decontamination in uninstrumented areas of root canal system of endodontic irrigants with surfactants than that ones without surfactants.

Torsional stress properties of the new HyFlex EDM and F6 SkyTaper instruments and their comparison with Reciproc and WaveOne

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Aim. The purpose of this study was to compare the in vitro torsional stress characteristics of 2 new single-file instruments for continuous rotation: HyFlex EDM (Coltene/Whaledent, Inc, Cuyahoga Falls, OH) and F6 SkyTaper (Brasseler USA, Savannah, GA) with 2 M-wire reciprocating single-file instruments: Reciproc (VDW, Munich, Germany) and WaveOne (Dentsply Maillefer, Ballaigues, Switzerland).

Methods. HyFlex EDM OneFile (size #25, 0.08 taper) (HEDM), F6 SkyTaper size #25, 0.06 taper (F6ST), Reciproc R25 (Rec) and WaveOne primary size #25, 0.08 taper (WO) were used in this study (n = 15/group). Torsional stress resistance was evaluated by measuring the torque in grams per centimeters and the angle of rotation (°degrees) required for instrument separation with the using a custom-made device produced following the ISO 3630-1. Each file was clamped at 3 mm from the tip using a chuck connected to a torquesensing load cell. HEDM and F6ST was tested rotating they in the clockwise direction (CW), while Rec R25 and WO Primary was tested rotating they in the counter clockwise direction (CCW). The fractured files were examined using a scanning electron microscope to look at deformation and fracture surface characteristics. The data were analyzed by the analysis of variance test and the Student-Newman-Keuls test for multiple comparisons to determine statistical differences.

Results. The maximum torsional strength of the HEDM was significantly higher than F6ST (P<0.0001), while it was no different comparing with Rec R25 and WO Primary (P>0.05). The torsional resistance of F6ST was lower than Rec R25 and WO Primary (P<0.0001 for each comparison). Moreover, no significant difference was found comparing the maximum torque load of Rec R25 and WO Primary. The HEDM and F6ST showed higher angular rotation to fracture than Rec R25 and WO Primary (P<0.0001), while no difference was found between HEDM and F6ST or Rec R25 and WO Primary (P>0.05). The scanning electron microscopic analysis of all 3 file types revealed dimpling near the center of rotation on the fractured surface indicative of torsional stress.

Conclusion.HEDM showed equal torsional stress resistance but higher angular rotation than Rec and WO reciprocating single-file instruments. F6ST showed lower torsional stress than other instruments tested, but the angular rotation was no different than HEDM and higher than Rec and WO.

Effect of cyclic torsional preloading on cyclic fatigue resistance of nickel-titanium instruments

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Aim. To investigate the effect of different torsional preloads on cyclic fatigue resistance of endodontic rotary instruments made by conventional nickel-titanium (Ni-Ti), M-Wire or CM-Wire.

Methods. Eighty new Mtwo size 25/.06 taper, HyFlex CM size 25/.06 taper and ProTaper Next X2 were used. The Torque and distortion angles at failure of new instruments (n=10) were measured and 0% (n=10), 25%, 50%, and 75% (n = 20) of the mean ultimate torsional strength as preloading condition were applied according to ISO 3630-1 for each brand. The twenty files tested for every extent of preload were subjected to 20 or 40 torsional cycles (n = 10). After torsional preloading, the number of cycles to failure was evaluated in a simulated canal with 60° angle of curvature and 5mm of radius of curvature. Data were analyzed using 2-way analysis

of variance. The fracture surface of each fragment was examined with a scanning electron microscope (SEM). Data were analyzed by two-way analyses of variance.

Results. Preload repetitions did not influence the cyclic fatigue of the three brands, however, the 25%, 50% and 75% torsional preloading significantly reduced the fatigue resistance of all instruments tested ($P<0.01$, $P<0.001$ and <0.0001 respectively) except for the HyFlex CM preloaded with 25% of the maximum torsional strength ($P>0.05$).

Conclusion. Torsional preloads reduced the cyclic fatigue resistance of conventional and treated (M-wire and CM-wire) NiTi rotary instruments except for HyFlex CM size 25/.06 taper with a 25% of torsional preloading.

Conservative treatment of a maxillary inflammatory radicular cyst due to traumatic dental injury: a case report

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Aim. Radicular inflammatory cyst is a relatively late common outcome of trauma to the tooth supporting structures. It's a general belief that apical true cysts caused by root canal infection are less likely to heal after nonsurgical root canal therapy. Nevertheless, there is no direct evidence to support this assumption. The purpose of this paper is to point out the value of conservative treatment with non-invasive surgical management and then the maintenance of the pulp vitality of adjacent elements. It can be considered an efficient and feasible alternative that can recover the aesthetics and function.

Methods. A 43-years-old male patient was referred to the Department of emergency dentistry by his dentist for a vestibular-palatal maxillary swelling and first right maxillary incisor mobility. The patient came with panoramic radiograph. History revealed trauma in young age due to a fall, for which no treatment was sought, and secondary decays in the same tooth. Clinical and radiological findings were suggestive of periapical radicular cyst. This cyst lesion underwent asymptomatic evolution and reached large dimensions, until began to swell periodically. The patient was informed of diagnosis and treatment options. Nonsurgical endodontic therapy was performed using intra-canal medicament with 5,25% sodium hypochlorite solution irrigant and calcium hydroxide.

Results. After a one year-follow-up, clinical and radiographic evaluation revealed a progressive bone healing, without any clinical symptoms and a satisfactory aesthetic and normal function. **Conclusion.**This case is a reminder that the careful anamnesis, clinical examination and early diagnosis are very important. Differential diagnosis, endodontic infection control, apical foramen enlargement and filling of the cyst cavity with calcium hydroxide paste, are important procedures for case resolution. For the correct diagnosis and planning of the complete treatment, dentist should be careful on general and dental anamnesis and complete clinical and radiological examination. Periapical cysts respond favourably to non-surgical endodontic treatment and should be considered as primary treatment. However clinicians must recognized that the cyst can persist, so they should consider the surgical option, particularly when earlier attempts at orthograde retreatment have not attained healing.

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Comparison of three dimensional parameters after shaping with ProTaper and WaveOne systems. A micro-CT study on S-shape simulated root canals

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Aim. The aim of this study was to understand if there could be differences in: volume of shaping and canal surface area after the use of ProTaper Universal and WaveOne systems in S-shape simulated root canals.

Materials and methods. Forty ISO 15, 0.02 taper, S-shaped endo training Blocks (Dentsply, Maillefer) were assigned in two groups (n=20 for each group). For each block the initial working length (WL) was evaluated with a 10 K-files (Dentsply Maillefer), so the glide path was created with PathFile 1, 2 and 3 (Dentsply Maillefer) at the WL. After that, simulated canals in group 1 were shaped with S1, S2, F1 and F2 at WL; while in group 2 it was used single-file WaveOne primary in reciprocating motion. A dedicated shaping program has been used for the utilization of each single file with parameters suggested by the handpiece (X-Smart plus; Dentsply Maillefer). After shaping, resin blocks were analyzed with Skyscan 1172 scanner (Skyscan, Kontich, Belgium) and analyzed volumetrically at a source voltage of 65 kV and a source current of 153 uA. Data have been analyzed using GraphPad Prism software 6.00 (GraphPad Prism Software, San Diego, CA, USA) by an expert in statistical analysis. Statistical significance between different groups was determined by one-way ANOVA and T test.

Results. Mean volume of shaping in group 1 was 29,59 ± 2,42 mm^3 while in group 2 was 30,10 ± 2,08 mm^3. Data for surface of interest were 158,53 ± 25,80 for Protaper and 163,61 ± 21,09 mm^3 for WaveOne Primary. No statistically differences ($p > 0,05$) has been found in terms of volume and surface area after the use of ProTaper Universal and WaveOne systems.

Conclusion. Conclusion from this study revealed no statistically differences between ProTaper and WaveOne groups related to Surfaces Area and Volume of interesting. Neverthless, shaping with Wave One Primary system conclusion in a lower amount of Surfaces Area and Volume of interesting in S-shape simulated root canals.

Influence of operator's experience on the shaping and centering ability of WaveOne single-file system

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Aim. The aim of this study was to assess the influence of operator experience on the centering ability of WaveOne reciprocating system on S-shape simulated root canals.

Methods. Forty S-shaped canals in resin blocks were assigned in two groups (n=20 for each group). Groups 1 was shaped by an expert operator, postgraduate in endodontics with more of ten years experience, while a not expert operator, a student in the last year of study, with poor endodontic experience performed shaping in Groups 2. A first survey of canals has been made with K-file 10 to assess the working length (WL), after that the glide path was achieved with PathFile 1, 2, and 3 (Dentsply Maillefer) at the WL. Subsequently, samples in groups 1 were shaped with ProTaper system (S1-S2-F1-F2), while group 2 was shaped with single WaveOne Primary reciprocating file in order to have in each method a tip size of 0.25 mm. Photographic method was used to record pre- and post-instrumentations images. After superimposition, it has been evaluated centering ability and total amount of resin removed between the two groups. Data have been analyzed using GraphPad Prism software 6.00 (GraphPad Prism Software, San Diego, CA,USA) by an expert in statistical analysis. Statistical significance between different groups was determined by oneway ANOVA and T test.

Results. Centering ability was evaluated at each point (9 points in total) subtracting the amount of resin removed from the inner part to that removed from the outer aspect of the canal, while shaping ability was evaluated summing each others these parameters. Centering ability result to be different only at 4 and 5 millimeters from the apex, while shaping ability seems to be different between 4 and 6 millimeters from the apex.

Conclusion. Shaping and centering abilities seems to be minimally conditioned by operator experience. Differences between the two groups were found only from 4 to 6 point levels, showing no differences at the apical levels.

Ultrasonic activation of canalar irrigants in post-space. A study with a new type of SEMs

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Aim. The bonding between post, dentin, and adhesive resin cement and its durability are essential for the longevity of the restorations. Previous research has suggested that the efficacy of some dentin adhesives mostly depends on the smear layer removal and the resin dentin hybrid layer.

Our SEM study has analyzed the efficacy of irrigating agents with or without the ultrasonic activation on the canal surface.

Materials and methods. 12 single rooted teeth, destined for extraction due to periodontal disease, were prepared by using ProTaper system to size F2. Then samples were filled using the continuous wave of condensation technique.

After post space preparation every sample was assigned to one of three experimental groups (n = 3, in each group) and to one control group (no ultrasonic activation, n = 3). Groups were: Group A: irrigation with 17% EDTA for 15 sec. with ultrasonic activation, then etching with 35% orthophosphoric acid for 15 sec.; Group B: irrigation with 17% EDTA for 15 sec., then etching with 35% orthophosphoric acid for 15 sec. with ultrasonic activation; Group C: irrigation with 17% EDTA for 15 sec. with ultrasonic activation, then etching with 35% orthophosphoric acid for 15 sec. with ultrasonic activation. Group D (control): irrigation with 17% EDTA for 15 sec., then etching with 35% orthophosphoric acid for 15 sec.; After irrigation the samples were split in two half and the surface of post space was scanned using a innovative SEM without sample metallization Phenom G2 PRO at three different depths (apical, middle, coronal). The presence of smear layer on the canal surface was evaluated qualitatively using the score by Serafino et al. with values included between 0 and 2.

Results. Our statistics showed in Group A a score mean of 1.33 ±0.67; in Group B a score of 1.19 ±0.77; in Group C a score of 0.78 ±0.57; and in Group D a mean of 1.70 ±0.60. Also the mean values showed there is less smear layer in the coronal section compared to the middle and apical ones, these conclusion are independent from ultrasonic activation.

Conclusion. The conclusion of our study show that the ultrasonic activation increase the efficacy of endocanalar irrigants. In particular the combination of EDTA and orthophosphoric acid both ultrasonic activated ensure an optimal removal of smear layer compared to the control group (Group D). Also the ultrasonic activation of the orthophosphoric acid (Group B) showed better conclusion compared to the activation of the EDTA only (Group A).

Middle-root fractures. A retrospective study

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Aim. Dental fractures can be split in horizontal and vertical fractures, acccording to the direction of fracture lines, which can be single or multiple. According to location, root fractures can be divided into cervical, middle and apical ones. Amongst fractures, root ones are relatively rare with incidence rete in 0.5–7% range. Between root fractures, middle ones are the less frequent. According to location, therapy and prognosis of these pathologies considerably differ. Particularly, middle-third root fractures present most problems about

long-distance prognosis, because of biomechanical problems (unfavourable coronal-radicular rate) After adequate clinical managment, it is fundamental that patients be followed up during a certain period of time for clinical treatment success. Our retrospective analysis evaluates conservative therapy success and fractured teeth survival according to the treatment given.

Methods. Through clinical and radiological investigations, the Authors have analyzed several cases of middle-root fractures in anterior teeth, particularly, 1.1-2.1-4.1-1.4 dental elements. 21 teeth have been studied in a population of 6 – 62 years old patients. Considered parameters were: possible related fracture, fragments delocation, mobility, tooth sensitivity and pulp complications, diastasis, periodontal inflammation. Observation was made after 6 months, 1 year and 3 years from traumatic event. Data have bene the statistically analyzed.

Results. In our statistic analysis, immediately after traumatic event (time 0), multiple fractures were releaved in 38.1% of cases. Mobility was observed in 28.57% of cases. From a clinical point of view, most frequent symptoms were: hypersensitivity in 66.7%, pulp lesion in 42.85%, periapical pathology in 19% (1 on 21). In time 0, in 47.61% of cases, delocation of fracture coronal fragment was observed. In that case, splinting with adjacent teeth, immediately followed by endodontic treatment of involved teeth in 52% of cases was planned. Endodontic treatment was necessary because of pulp complications onset in one of cases after 6 months and in two one-year follow-ups. In one of cases, after 3 years from the therapy, tooth extraction beacause of diastasis, mobility and flogosis was required.

Conclusion. Clinical and statistical analysis shows a high index of survival and success rate in restoration therapy of horizontal middle-root fractured teeth. Just in one case, tooth extraction was mandatory after 3 years. In most cases, an immediate endodontic treatment was necessary. In a restricted number of the cases a late endodontic treatment, beacause of complications onset, was needed.

Evaluation of debris and smear layer removed by different irrigation protocols performed with and without the use of the passive ultrasonic irrigation: a SEM analysis.

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Aim. The purpose of this study is to evaluate by SEM the efficacy of different irrigation protocols in the removal of debris and smear layer from the root canal walls.

Methods. Fifty-six extracted human single teeth were selected for this study. Radiographs were taken in buccolingual and proximal directions to confirm the presence of a single canal and absence of calcifications or resorptions. Crowns were trimmed to a uniform length of 15 mm with a carborundum disk.Chemomechanical preparation was performed by a single operator with Reciproc system and irrigation was carried out with 3 mL of NaOCl 5,25% for 20 seconds. The groups differed in the final washing.

Samples were randomly divided into ten test groups (n=5) and three control groups (n=2): control 1, no irrigation; control 2, distilled water for 1 min; control 3, distilled water activated with PUI for 20 sec; test 1, 17%EDTA for 1 min; test 2, 17% EDTA activated with PUI for 20 sec; test 3, 5.25% NaOCl for 1 min; test 4, 5.25% NaOCl activated with PUI for 20 sec; test 5, 17% EDTA for 1 min+ 5.25% NaOCl for 1 min; test 6, 17% EDTA activated with PUI for 20 sec + 5.25% NaOCl for 1 min; test 7, 17%EDTA activated with PUI for 20 sec + 5.25% NaOCl activated with PUI for 20 sec; test 8, 17%EDTA with PUI for 20 sec + three cycles of 5.25% NaOCl with PUI for 20 sec; test 9, three cycles of 17% EDTA with PUI for 20 sec + 5.25% NaOCl with PUI for 20 sec; test 10, three cycles of 17% EDTA with PUI for 20 sec + three cycles of 5.25%NaOCl with PUI for 20 sec.

Finally, two longitudinal grooves were prepared on both buccal and lingual surfaces by using a diamond disc without penetrating the canal. The roots were then split into two halves with a hammer and chisel. 12 SEM photomicrographs were taken at X200 and X400 magnification at the coronal, middle, and apical thirds of each specimen. The canal walls were evaluated for the amount of debris and smear layer by using the 5-score system introduced by Hulsmann et al. by two blinded operators.

Results. Root canal walls absolutely free of smear layer were not observed with any irrigation solution. The Kruskal-Wallis test revealed statistically significant differences in all the canal sections between the groups that used chelation (EDTA17%)+PUI and other groups; the EDTA and EDTA/PUI groups presented similar smear layer removal, but EDTA/PUI removed significantly more debris as compared to EDTA alone. The groups with NaOCl+EDTA showed statistically significant differences in smear layer scores compared to NaOCl and EDTA alone. There were also statistically significant differences between the control group and all the experimental groups in three canal sections.

Conclusion. The best conclusion in this study were obtained when a final irrigation with a chelating agent was used. Within the limitations of this in vitro study it can be concluded that PUI did not improve smear layer removal by EDTA. Moreover, the smear layer scores were similar regardless of the root canal third after the final irrigation protocol with EDTA. On the other hand EDTA/PUI removed significantly more debris as compared with EDTA alone.

Comparison on sealer penetration into dentinal tubules using self-adjusting file cleaning-shaping-irrigation system and conventional endodontic needle irrigation

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Aim. The aim of the study was to compare the effect of the self-adjusting file cleaning-shaping-irrigation system and conventional needle root canal irrigation on sealer penetration into dentinal tubules using confocal laser scanning microscopy.

Methods. Twenty-two upper incisors were selected from a pool of extracted teeth. The teeth had a single round canal with a long-short cross-section diameter ratio ≤2,5 at 8 mm from the apex and similar root canal anatomy. The teeth were randomly divided into two groups in according to the irrigation technique used: self-adjusting file system (SAF) (group 1) and conventional endodontic needle irrigation (group 2). The groups resulted homogeneous according to the canal width. The same operator performed all experimental procedures. The crowns were sectioned at the cementoenamel junction and the root length was standardized to 13 mm from the apex. The coronal thirds was enlarged with size 1, 2, 3 and 4 Gates-Glidden drill. The working length (WL) was established by the insertion of a 21-mm #10 K-File until its tip appeared at the apical foramen under microscopic vision at 10x. A glide path was performed using size 13, 16 and 19/.02 PathFile at 300 rpm. In the group 1 the 1,5-mm-diameter SAF was operated for four minutes and continuous irrigation with 5,25% NaOCl was performed by a VATEA peristaltic pump at a rate of 4 mL/min. In the group 2 the canals was instrumented using Protaper Universal to a size of the F2 instruments at the working length and irrigated with 1 ml 5% NaOCl at every instrument changes. In both groups a final irrigation of 2.0 mL 1% EDTA for 30s was performed. Roots filling was performed with Guttacore Obturators with TopSeal labeled with 0,1wt% Rhodamin B. Transverse sections at 2, 5 and 7 mm from apical foramen were observed using a confocal laser scanning microscopy. Total percentage and maximum depth of sealer penetration were measured and registered using ImageJ software. Statistical analysis was performed by ANOVA and Turkey test.

Results. The 7-mm and 5-mm sections of group 1 showed a significantly higher percentage and maximum depth of sealer penetration respect the group 2. Not significant difference was found at 2-mm sections between the two groups.

Conclusion. The self-adjusting file cleaning-shaping-irrigation system improved the sealer penetration at coronal and middle sections respect the conventional endodontic needle irrigation. At apical sections not differences were found.

HyFlex EDM rotary Ni-Ti prototypes: the effect of an innovative machining technology on Ni-Ti wear

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Aim. HyFlex EDM files were recently introduced presenting an innovative electro discharge machining (EDM) process of fabrication. The aim of this study was to evaluate the surface and microstructural alterations of new and in vitro used HyFlex EDM Ni-Ti rotary prototypes.

Methods. The surface and microstructural characteristics of 15 new HyFlex EDM instruments were analyzed by ESEM equipped with energy dispersive x-ray spectrophotometry (EDS) and optical metallographic imaging. Instruments were subjected to instrumentation tests on severely curved root canals (ranging between 50° and 70°) of extracted multi-rooted teeth. Once that canal patency was verified with a #10 K-file, the working length was determined by subtracting 1mm. HyFlex EDM files were used with a 16:1 reduction handpiece X-Smart (Dentsply Maillefer, Baillagues, Switzerland) following the manufacture's direction, at 500 rpm and 2.5Ncm, with slightly apical pressure and pecking motion. The operative sequence was: 25/12 at 2/3 of the WL, 10/05 and 25/08 at WL. Irrigation was performed at every change of instrument, with a total amount of 3 ml of 5% NaOCl and 3 ml of 10% EDTA (Ogna, Muggiò, Italy). Each instrument was used in 10 curved canals, washed in an ultrasonic bath containing detergent for 10 min and then autoclaved at 134°C. Surface and microstructural characterizations were repeated on used instruments at same points and with same angulations to compare the pre- and postoperative micrographs, in order to verify the appearance of fractures, unwinding, microcracks, blade disruption and tip deformation.

Results. Surface and microstructural characterization of new instruments revealed the typical features of a NiTi ED-Machined alloy with an irregular and "craters-like" surface. High magnification micrographs disclosed a non-uniform structure were pits, pores and voids caused the peculiar aspect of a "rough-spark-machined" surface. No fractures were registered during instrumentation of curved canals. Surface and microstructural characterization of used files revealed no wear and no degradation of the 25.12 and 25.08 files. The tip segment was confirmed as the most mechanically stressed portion of 10.05 prototypes. All the instruments, after several uses, well-preserved the "craters-like" irregular surface without cutting edge alterations. The metallographic inspection on the cross section of brand new HyFlex EDM files showed an homogeneous martensitic phase. The microstructure appeared uniform from the surface to the bulk, and no microcracks or defect were identified, even at high optical magnification (1000X).

Conclusion. Unaltered spark-machined surface and low microstructural degradation are the main features of recently introduced HyFlex EDM. Caution would be recommended regarding reuse of small HyFlex EDM files. Instruments exhibited a safe in vitro use in presence of severely curved canals.

Vascular endothelia growth factor (VEGF) expression in human tooth germs early and later stage development

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Aim. The angiogenesis plays a crucial role in many human physiological and pathological processes during

tissue development and growth. Vascular Endothelia Growth Factor (VEGF) expression, was evaluated in human tooth germs at two different stages of embryogenesis, to clarify the angiogenesis critical role during tooth tissues differentiation and growth.

Materials and Methods. 72 third molar germ specimens were selected during Oral Surgery and Orthodontic treatment in Oral Science Department of Chieti University, Varese-Insubria University and Milan-S. Raffaele University. 36 human third molar germs were in the early stage and 36 in the later stage of tooth development. After surgical procedure the samples obteined were examined. The samples were evaluated with Semiquantitative Reverse transcription-Polymerase Chain Reaction analysis (RT-PcR), Western blot analysis (W.B.) and Immunohistochemistry analysis.

Results. RT-PcR, Western Blot and Immunohistochemistry analysis showed a Vascular Endothelial Growth Factor positive reaction in all samples analized. RT-PcR and W.B. different behaviour were detected in different cluster of tissue evaluated. High positive reaction it was possible to observe in early stage of tooth germ in stellate reticulum and in ameloblast clusters. Moderate reaction was showed in stellate reticulum in advanced stage of tooth development. Positive or moderate positive reaction was detected in early stage of odontoblast and endothelial cells compared to later stage of tooth germs growth. VEGF immunoreactivity was detected in both early and later stage germs in ameloblasts, odontoblasts and stellate reticulum cells and moderately in endothelial cells. The stellate reticulum cells showed a significant decrease expression of VEGF from the early to the later stage with and an increased expression of VEGF activity in ameloblast and odontoblast claster from advanced stage compared to early stage of tooth development.

Conclusion. The angiogenesis process has a critical role during tissue growth in physiological and pathological condition, indicating increased demands for blood in the less differentiated tissues. The VEGF molecules action is possible to considerate to be an important mediators of angiogenesis processes during physiological dental tissues development. More in-depth research could be need to explain the purpose mechanisms that induce the development process of the dental tissues. However, the VEGF high positive expression in stellate reticulum cells in early stage of tooth development compared to later stage and the other cells types, could be to suggest a critical role of the stellate reticulum during dental embryo-morphogenesis processes.

Micro-CT evaluation of protaper next shaping performances in curved root canals

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Aim. The ProTaper Next (PTN) (Dentsply Maillefer, Ballaigues, Switzerland) rotary system exhibits M-wire technology and it is characterized by an off-set centered rectangular cross section that gives the files a characteristic swaggering motion when rotating. Another recently introduced file, manufactured from conventional austenite NiTi, is the BioRace system (BR) (La Chaux-de Fonds, Switzerland). These files are characterized by triangular cross section, non-cutting tip and NiTi electropolishing to reduce the number of surface irregularities, cracks and residual stresses for an implemented cyclic fatigue resistance. The aim of this study was to describe the canal shaping properties of ProTaper Next and BioRace after glide path performed respectively with ProGlider (PG; Dentsply Maillefer, Ballaigues, Switzerland) and ScoutRace (SR; FKG, La Chaux-de Fonds, Switzerland) in maxillary first molars by using micro-computed tomographic (micro-CT) scanning.

Methods. Thirty extracted upper first permanent molars were scanned with a micro-focus cone-beam geometry system. A total of 2400 projections over an angular range of 360° were acquired at 100 kVp and 80 μA, with a pixel size of 9.1 mm. Mesio-buccal 1 root canals (N=30) of each specimen were randomly assigned to PG/PTN group or SR/BR group to perform glide path at full working length. Specimens were micro-scanned at the apical level (A) and at the point of maximum curvature (C) for post-treatment analyses. Root canal volume and surface area, root canal centering ability, centrifugal enlarge of the root canal space with ratio of diameter ratios (RDR) and ratio of cross sectional areas (RA) parameters and thickness of dentinal wall at inner curvature was assessed. The effect of the swaggering motion on root canal volume after shaping with PTN was also assessed. Two balanced one-way factorial ANOVAs evaluated the significance of the instrument factor (PG/PTN or SR/BR) at both A and C.

Results. The values of initial surface areas and volumes displayed homogeneity between groups preoperatively. The instrumentation of canals increased their volume and surface area, but there were no significant differences between instrument types regarding the uninstrumented area and postoperative changes in root canal volume. In the apical point of analysis (A) RA was closer to 1 in the PTN group, suggesting a less evident enlargement of the root canal apical portion in PTN group while RDR showed no statistical differences. The mean distance between pre- and postinstrumentation centers of gravity (d_c) was lower in PTN group indicating a better maintenance of the original canal path; the percent reduction in dentine wall thickness through furcation (d_inn) showed no statistical differences between groups. In the maximum curvature point of analysis, RA was further from 1 in the BR group compared with the PTN group, demonstrating a tendency of the BR to provide a more evident enlargement of the root canal in the middle and coronal portion while RDR showed no statistical differences. The mean distance between pre- and post-instrumentation centers of gravity (d_c) was lower in PTN group suggesting a better centering ability of PTN group in the middle and coronal third of the canal; the percent reduction in dentine wall thickness trough furcation (d_inn) showed no statistical differences between groups.

Conclusion. X-ray micro-CT analyses suggest that PG/PTN system is able to create continuous taper preparation with respect of the original canal anatomy, with a more centered shaping performance.

Micro-CT evaluation of glide path with single file M-Wire rotary ProGlider in curved root canals

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Aim. The biomechanical preparation of the root canal should eliminate canal infection by enlarging and shaping the canal for an adequate debridement, while preserving the original root canal anatomy. Compared with manual glide path, mechanical glide path is less technique-sensitive, resulting in an improved preservation of the canal anatomy, fewer canal aberrations, reduced time required for shaping and a lower incidence of postoperative pain. The ProGlider (PG) single file system was recently introduced to perform mechanical glide path. The system is manufactured in M-Wire™ alloy and consists of a single instrument with 0.02 taper and 0.16 mm at tip level. The instrument is progressively tapered (up to 0.85) with an active part of 18 mm. X-ray computed micro-tomography (micro-CT) was used to evaluate the ability of ProGlider (PG) single file technique for glide path creation to maintain the original canal anatomy.

Methods. Extracted upper first permanent molars were scanned with a micro-focus cone-beam geometry system. A total of 2400 projections through 360° were acquired at 100 kVp, 80 µA, pixel size 8 µm. Mesiobuccal 1 root canals of each specimen were randomly assigned (n = 15 per group) to manual K-file (KF), PathFile (PF) or ProGlider (PG) to perform glide path at full working length. Irrigation was with 5% NaOCl and 10% EDTA. Specimens were micro-scanned for matching volumes and post-treatment analyses. Canal volume, surface area, centroid shift and canal geometry variation through ratio of diameter ratios (RDR) and ratio of crosssectional areas (RA) were assessed at the apical level (A) and at the point of maximum curvature (C). Two balanced, one-way factorial ANOVAs evaluated the significance of instrument factor (PF, PG and KF) at A and C.

Results. Instrument factor was significant at A for both RDR and RA ($P < 0.001$), with an improved maintenance of root canal anatomy by PG and PF. At C, PG demonstrated a tendency to pre-flare the root canal compared with KF and PF. The centroid shift at C did not differ between groups ($P = 0.51$). PF and PG demonstrated a superior centering ability compared with KF at A ($P = 0.023$).

Discussion. The objective of this study was to evaluate the capability of a new single file of progressive taper design to create glide path consistent with the original canal anatomy. Initial canal scouting provides the clinician with tactile feedback and information regarding anatomy. Subsequent manual or mechanical glide path creation may protect rotary instruments from excessive torsional stresses as they present non-cutting tips NiTi rotary instruments (PF and PG) demonstrated significantly better maintenance of the original canal anatomy compared with hand K-files, with less impact to the shift of the canal axis and root canal geometry after instrumentation, especially at the apical level.

Conclusion. The present study supports the reliability, in terms of root canal anatomy preservation, of ProGlider single NiTi rotary glide path file compared with the existing NiTi rotary multiple file system and manual glide path techniques without apical transportation.

Etiology of sleep bruxism: a systematic review

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Aim. Sleep bruxism (SB) is the sleep-related motor disorder of outmost importance for orthodontists, considering several harmful consequences on the stomatognathic system, including tooth wear, masticatory muscle tenderness and pain, headache and temporomandibular disorders (TMDs). SB could interfere with the orthodontic therapy or, even worse, aggravate pre-existent disorders during treatment. To perform a systematic review of the existing literature in order to underline the known etiology and thus support the orthodontist in the diagnostic process. The aim of the study was to estimate the scientific evidence of bruxism etiology and its association with the identified risk factors.

Materials and methods. Medical literature was investigated between January 1980 and October 2014. The reviewing process included RCTs, CCTs, Cohort, Cross-Sectional and Case-Control studies. Selected papers had to include Odds Ratio/Relative Risk analysis for investigated risk factors. All considered participants were bruxers, identified using diagnostic criteria of the AASM or polysomnographic analyses. The article selection and data extraction process were conducted by two of the authors and all the decisions about inclusion of the studied were reached by consensus. For the data extraction process a modified PICO table have been used, while for the quality assessment of included studies the Cochrane Tool for Risk of Bias Assessment have been adopted.

Results. Three RCTs, one CCT, five longitudinal cohort studies, one case-control study and three cross-sectional studies were selected. The risk of bias was low for two studies and medium for the remaining sample. From the 26 on 4543 identified articles, the investigators independently extracted data regarding the identified risk factors for SB.The identified risk factors were: sleep disturbances, functional and parafunctional habits, psycho-social factors, vicious habits (smoking, alcohol and coffee intake) and risk factors (i.e. sex, age, genetics). Snoring (OR 12.58), nail biting (OR 4.93), GERD (9.33), smoking (OR 3.39 – 4.50), genetic factors (OR 4.250) and history of childhood SB (OR 8.09) were the strongest correlations revealed. The most consistent source of bias was represented by the tools adopted to diagnose bruxism in the selected studies, which were not reliable enough in the majority of them to obtain an accurate diagnosis of sleep bruxism.

Conclusion. Several risk factors were identified. Smoking, functional alteraltions, psychosocial factors,esophageal acidification, alterations of the dopaminergic system and genetic factors seem to be involved. However this review revealed the need for methodologically well-designed studies to discern probable physiological bruxism from a probable pathological one.

Malocclusion in sports and DTM analysis of the concept of malocclusion for clinical or instrumental evidence, and screening prevalence and retrospective on competitive athletes

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Aim. The aim of this multicentric study, in which collaborated Francesco and Nicola Sparano (Università degli Studi di Sassari), is to evaluate the possible correlation between TMD, malocclusion, muscular and postural interference caused by occlusion in agonistic athletes.

Methods. We decided to evaluate agonistic athletes because, as stated by many authors, muscles guide the dynamic and no one better than athletes can have a highly stimulated system. We tested 74 agonistic athletes belonging to CUS Rugby Genova (referring doctor Sandro Gregorio), Società Educazione Fisica Torres, Torres Tennis and Sportivo Atletica Brugherio.

According to the protocols drawn by AIG (Associazione Italiana Gnatologia) we evaluated the presence of TMD (articular rumors, anomaly in the condylar movements, sagittal asymmetry and pain during palpation) and the presence of malocclusion (partial edentulism, deviation of dental midlines, overjet, deep bite, open bite, cross bite, dental crowding, Angle's class).

In order to evaluate the presence of muscular interference caused by occlusion we performed a surface EMG using BTS TMJoint protocols, developed by professor Ferrario and Sforza. Each athlete was submitted to 4 clench tests (on cotton rolls with eyes closed, on cotton rolls with eyes open, on their own teeth and on an articulating paper of 200 µm with eyes closed).

As regarding the evaluation of the efficacy and the efficiency of the postural strategy in balance control we tested the athletes on a stabilometric platform in order to compare area and length swaying. According with SIOS (Società Italiana Odontostomatologia dello Sport) protocols we performed the tests in mandibular rest position, in maximum intercuspation and with cotton rolls placed between the upper and lower dental arches without clenching. Each test lasted 51.20 seconds.

Thanks to Dr. Barattini, the resulting data were elaborated by Opera Group, an independent company of research ethic analysis. According to the BTS TMJoint protocols we used the clenching strength on cotton rolls as reference point: if there was a variation (worsening) on the clenching test we defined it a muscular interference caused by occlusion. Similarly, a test on the stabilometric platform on which, in maximum intercuspation, there was a worsening in the area and length of sway compared with the one with cotton rolls was defined a postural interference caused by occlusion.

Results. The statistic analysis was performed with the chi-square test, using a significance index of $\chi^2>0.05$. There was no significance in the correlation of postural interference and muscular disharmony ($\chi^2=0.15$), nor with muscular disharmony and anatomic malocclusion ($\chi^2=0.62$) and there was neither a correlation between TMD and muscular disharmony ($\chi^2=0.15$). The association between TMD and malocclusion is close to the

significance index, but there wasn't a clear connection between the two variables (^{2}=0.09). In contrast with our expectations the only statistical significance was the correlation between TMD and the postural interference caused by occlusion.

Conclusion. A deductive reasoning lead us to believe that the dysfunctional patient with TMD has a system in which the capability of compensation of the balance is reduced. It is possible that the postural aspect can be more relevant than the local one. This can require a multidisciplinary approach and can be a reason for the big variety of discordant approaches.

Occlusal splints in patients with temporomandibular disorders. Long-term follow-up

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Aim. Occlusal splints are widely used in the management of temporomandibular disorders. Despite the wide use of these therapeutic aids, there are still controversial opinions about their choice, management, mode of action and therapeutic efficacy. The aim of this study was to evaluate the efficacy of the application of occlusal splints for the resolution of temporomandibular disorders (TMD) through the short and long term analysis of the results.

Methods. 337 patients were selected among the subjects arrived spontaneously to visit in the period from January 2009 to January 2012 at two different specific structures, the Service of Clinical Gnathology of the Umberto I Policlinic of the University "Sapienza" of Rome and a private specialist dental office. The sample was divided in three study groups: G1 (183 patients) pertaining to the first structure, G2 (154 patients) pertaining to the second structure and G1+G2 (337 patients). Data were collected before the beginning of the treatment (T0) and at the end of treatment (T1). For the long term follow-up (T2) a group of 77 patients (GF), belonging to the G1+G2, was reexamined in order to estimate the stability of result of the therapy after at least one year after treatment. Clinical data were evaluated by descriptive and correlational statistical analysis.

Results. In all the study groups the female gender was prevalent and the most frequently represented age group was 30-40 years, with the trend of an increased incidence by the higher range of age. Disc displacement with reduction and muscular disorders were present more often and the direct tridimensional repositioning splint (Di.T.R.A.) was more frequently used. The analysis of the painful and functional symptomatology has shown a marked improvement of all symptoms present in all groups at the end of the therapy and a stabile maintenance of the result on the follow-up. Specifically, joint pain showed a qualitative improvement of 43% and a quantitative improvement of 74%; muscular pain qualitative improvement of 37% and quantitative of 69%; headache a qualitative improvement of 33% and quantitative of 69% and cervical pain qualitative of 24% and quantitative of 64%. Concerning the functional symptomatology (maximal mouth opening and joint noises) was noticed an important increase of the physiological functional symptomatology of 34%.

Conclusion. The therapy proved to be effective for all the types of treatment proposed. The occlusal splints applied in an individualized mode provided positive results, both at the end of therapy and on the long term. The treatment outcome at the end therapeutic protocol was represented as cured and cured/improved in the 52% and improved in the 45% of the patients. Only 3% represented unvaried symptomatology and none worsened. At the long term follow-up 68% maintained the result unvaried, 20% improved the previous state and 13% get worsened compared to before. Statistical data confirmed this positive trend evaluated for each individual patient and for every type of disorder present at diagnosis.

Temporomandibular disorders in psoriasis patients with and without psoriatic arthritis: an observational study

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Aim. Psoriasis is a chronic, remitting and relapsing inflammatory disorder, involving the skin, nails, scalp and mucous membranes, that impairs patients' quality of life to varying degrees. Psoriatic arthritis (PsA) is a chronic seronegative, inflammatory arthritis, usually preceded by psoriasis. Temporomandibular disorders (TMD) is a generic term referred to clinical conditions involving the jaw muscles and temporomandibular joint (TMJ). The aim of this study was to assess symptoms and signs of TMD in psoriasis patients with and without PsA.

Methods. The study group included 112 patients (56 men, 56 women; median age 49.7±12 years) with psoriasis; 25 of them were affected by PsA. A group of 112 subjects without psoriasis (56 men, 56 women; median age 47.7±17 years) served as controls. Signs and symptoms of TMD were evaluated according to the standardized Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD). Psoriasis patients were subgrouped according to the presence/absence of PsA and also by gender, to assess the prevalence of traditional TMD symptoms and signs.

Results. Patients with psoriasis, and to an even greater extent those with PsA, were more frequently affected by TMD symptoms and signs, including an internal TMJ opening derangement (OD) than healthy subjects. A statistically significant increase in TMDs, OD, bruxism (BRUX) and temporomandibular joint sounds (TMJS) was found in patients with PsA as compared with psoriasis patients without arthritis and controls.

Conclusion. Psoriasis seems to play a role in TMJ disorders, causing an increase in orofacial pain and an altered chewing function.

Retrospective observational study of temporomandibular disorders and headache

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Aim. Temporomandibular disorders (TMDs) represent a set of diagnoses involving several alterations of

the temporomandibular joint (TMJ), masticatory muscles and the structures related to them. Headache is one of the most common symptoms in patients with TMD, and represents one of the most prevalent and disturbing problems.

The aim of this research was to analyze the association between TMD and headache on a sample of TMJ dysfunctional patients comparing the data with a control population without TMD.

Methods. The sample recruited was selected between the populations of patients who referred to the Service of Clinical Gnathology (SdGC) DAI Head-neck Policlinico Umberto I of Sapienza University of Rome during the period 2011–2013. All patients studied underwent to a gnathological visit performed by calibrated specialist staff who drafted the medical charts according to the RDC/TMD supplemented by methods currently in use at the SdGC.

This selection method determined the analysis of 1014 medical charts.

Headache was analyzed using both clinical-anamnestic parameters recorded on patient's medical charts, and answers to the RDC/TMD questionnaire, together with previous neurological diagnoses.

The intensity of cephalic pain and other types of pain were evaluated using the Verbal Numeric Scale (VNS).

The data obtained for this sample were analyzed using descriptive statistical instruments, such as distributions of frequency and percentage, measures of central tendency (including mean, median and modality) and variability (for example standard deviation and variance).

To assess the significance of statistical correlation between the variables considered and the headache was performed both in-depth statistical analysis through contingency tables and the calculation of Pearson Chi-Square.

Results. The prevalence of headache in the dysfunctional population turned out to be higher than in the control group (respectively 67.3% vs 38.3%).

In TMD patients headache was frequently of severe intensity (n =486; 78%) while in the control population was less frequent and with a moderate intensity (n=26; 79%).

Painful conditions of the craniofacial area as arthralgia and myalgia are more frequent and intense in patients simultaneously suffering from headache compared with the patients without headache. Cervical pain is associated with headache independently of TMD presence.

However TMD presence determined an increase of the correlation between headache and the intensity of the cervical pain (chi-square value of 81.3128 vs 15.4746).

TMD patients with headache had more frequently an emotional tension period in the last 6 months (n= 282; 45.1%), which confirms that emotional factors could act as co-factors in the development of headache and TMD.

A positive association between parafunctional habits and headache was found more frequently in the TMD patients than in the control population (respectively 70% vs 55%).

In agreement with the classification RDC/TMD the most frequently diagnosis associated with headache resulted to be TMJ pain, muscle pain (myalgia and myofascial pain) and disc displacement with reduction.

Conclusion. This research underlines that dysfunctional patients require an early and multidisciplinary treatment. In particular patients with TMD's and headache represent categories of greater complexity as a result of the presence of multiple and intense pain symptomatology (joint, muscle and cervical pain), they require a customized multi specialist (gnatological, neurological, physiotherapist) approaches both for diagnosis and therapeutic management.

Chewing pattern evaluation in subjects with adolescent idiopathic scoliosis

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Aim. Being the relationship between masticatory function and spine pathology of importance and increasing interest, the aim of this study is the evaluation of the masticatory function parameters of a group of patients with Adolescent Idiopathic Scoliosis (AIS). The hypothesis is the existence of an influence of the spine posture on the masticatory function.

Material and methods. Thirty-two subjects (8 males, 24 females; age, mean ± SD, 15 ± 5 years) with spinal disorders were selected for the study. Orthopedic exams of the rachis (Adam's test – Bunnel's Scoliometer) was performed with radiographs on orthostasis subjects. The study group was compared with a control group of fourty subjects (age, mean ± SD, ± years) without spinal disorders. The mandibular motion and surface EMG signals from the masseter and anterior temporalis muscles were recorded with a K7 kinesiograph (Myotronics Inc., Tukwila, WA, USA) interfaced with a computer for data storage and subsequent analysis. The soft bolus was a chewing gum and the har bolus was a winegum with the same size (20 mm large, 1.2 mm height, 0.5 mm width) and different weight (2 g the soft, 3 g the hard). The statistical analysis was conducted with a T-Student test and statistical significance set to $p<0.05$.

Results. In the group of patients, the percentage of reverse cycles when chewing on both sides , both with hard and soft bolus, was significantly higher than in the control group (Right side soft bolus: 17.96% for test group and 4.4% for control group; $p<0.001$ - Right side hard bolus: 19.12% for test and 2.2% for control; $p<0.001$ - Left side soft bolus: 20.9% for test and 4.9% for control; $p<0.001$ - Left side hard bolus: 14.87% for test and 4.1% for control; $p<0.001$).

Conclusion. The assumption on which the hypothesis on the correlation between the occlusion and the scoliosis is based is that there is an anatomical and functional relationship between the stomatognathic apparatus and the spinal column. The possibility of a connection between the reverse cycle in masticatory movements and asymmetrical posture should be evaluated, it might be difficult to fully correct all features of the malocclusion or maintain the correction. It was hypothesized that the mechanism of transmission of an imbalance from the occlusion to the vertebral column may be related to the consequential tilt of the cervical spine that affects the vertical alignment of the entire spine, also changing the functionality of each

cervical muscle. The results of this study draw the attention to the necessity of early examination of patients with AIS from an orthodontic and orthopaedic point of view.

Jankelson's method for temporomandibular disorders treatment

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Aim. We present the modified Jankelson method and the clinical success achieved with it in our department.

Materials and methods. Establishing an acceptable relationship between the mandible and maxilla in patients with temporomandibular disorders (TMD) is one of the main objectives of the clinical gnathologist. However, the habitual mandibular position is constantly varying and therefore cannot be considered as a stable reference temporomandibular point. Moreover, there isn't a unique centric relation, since the mandibular posture depends mainly on the posture of the head. It follows that the clinical assessment of the occlusal vertical dimension is mainly empirical, and neither the vertical dimension at rest, nor the centric relationship can be determined with methods based on existing clinical instruments. In fact, both the centric relation and the habitual intercuspal position present contractile activity of the masticatory muscles and do not represent a rest muscles condition needed to reach the "stand by" condition of the maxillofacial skull complex. However, there are some physiological conditions that facilitate the recording of a craniomandibular position. The ultimate purpose of this registration is to provide an orthotic device capable of relieving painful symptoms in patients with TMD. Janckelson proposes a simple method, minimally invasive and clinically valid to reach a mandibular position that allows the maximum relaxation of myofibers of the masticatory musculature, that can be obtained through the use of an apparatus tense to apply for an hour on the head surface of the masseter muscles with the aim to obtain relaxation of the muscle bundles. Following this, we build a orthotic device in "myocentric relationship" which is a position that allows the articular condyles to maintain a relationship with the articular fossa convenient for the patient and free from interference resulting from idiopathic muscle. From 2011 to November 2013 at the Department of Gnathology we visited 914 patients. 760 were treated according to the protocol of the Department.

Results. Applying method we evidenced remission or even disappearance of pain and significant improvement of patient's life quality. Given the high clinical success rate we can attest to the efficacy of the 'use of Jankelson's neuromuscular orthotic in patients with Dysfunctional Pain.

Conclusion. Jackelson's method,still little known by the generic clinical, appears to be intuitive, easy to reproduce and extremely effective and deserves to be popularized and used more widely, not only from the specialist in TMJ problems but also in Orthodontics and Prosthesis, being able to solve many problems and prevent others, such as iatrogenic damage due to an incorrect assessment of the rise of an occlusal orthodontic device rather than of a prosthetic one. Such use would be at least desirable if not essential in day-by-day clinical practice.

Jankelson's cad cam orthotic device: a clinical case report

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Aim. We present a clinical case in which we have chosen to use Jankelson's orthotic device for the treatment of a subject in which our usual method was ineffective.

Materials and methods. Comes to our attention the patient S.G., thirty years old. suffering of TMJ pain, reduced ability to open, muscle-tensive pain and tension due to temporomandibular joint syndrome disorder (TMD). The subject refers a recent trauma. After the routine diagnostic tests (rRMN for TMJ evaluation, dynamic evaluation of articular disc with mouth closed and open, electro myography and cone beam CT skull with evaluation of TMJ, mouth closed and open) and excluding other diseases, we decide for a therapy and the realization of a lower bite plane after TENSE protocol. However, after three months of therapy, despite a slight improvement in the ability to open the mouth, the pain persisted, especially during the act of chewing, with significant improvement that affected mainly the left side. After reviewing our procedures, whereas the painful symptoms revealed mainly during chewing, we opted for the construction of a new orthotic device according Jankelson's standards with Cad Cam method that could be used during meals, which maintain a myocentric occlusion in order to to minimize movement of the mandibular asynchronous chewing act. Each cusp must have ease of entering into contact with the ditch without encountering any hindrance and or inclined plane. The contacts take place simultaneously and result stable. this way, the occlusal load can be better distributed also during chewing.

Results. Since the early days of treatment, the patient reported an improvement in symptoms although they still persist. The therapy is still in progress and proceeds with good results.

Conclusion. Jankelson's Cad Cam orthotic device can be achieved as an affordable method that facilitates its functionalization in the oral cavity.

Evaluation of masseter dimension in patients with temporomandibular joint disk displacement without reduction: a MRI retrospective study

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Aim. The goal of this study was to evaluate dimensional differences between right and left masseters of subjects suffering of unilateral joint disk displace-

ment without reduction. The null hypothesis is that right and left masseters of subjects suffering of joint disk displacement without reduction have the same dimension.

Methods. 24 MRI examinations were retrospectively selected from the archive of the orthodontic and TMJ disorders clinic of the University of Messina. The exams were selected according to the following characteristics of the patients: age ranged from 17 to 45 years old, both sexes, complete dentition with or without third molars, temporomandibular joint disk displacement without reduction diagnosed by anamnestic findings reported in the medical records and by MRI exams. All sagittal class of skeletal and dental malocclusion were included in the final sample.

The transversal dimensions (anterior, posterior, medial) of right and left masseters of each patient were measured by means of a specific software (Mimics®: Materialise's Interactive Medical Images Control System, Materialise BV, Leuven, Belgium). The measurement was performed on the coronal scans passing trough the center of the condyle. The center of the condyle was considered the middle point of the linear distance connecting the medial pole with the lateral pole of the condyle. The left or right masseters were categorized as "same side" or "opposite site" compared to side of the TMJ presenting disc displacement. "same side" and "opposite site" masseters dimensions were statistically evaluated with descriptive statistics and inferential statistics. More specifically inferential statistics was performed executing paired T.test comparing "same side" and "opposite site" masseters dimensions.

Results. On average the masseter dimensions of the "same side" is dimensionally grater if compared to the masseter of the "opposite site". The differences between the two groups were statistically significant ($p<0.05$).

Conclusion. Patients suffering of joint disk displacement without reduction show an asymmetric masseter tropism. The masseter of the same side of the joint disk displacement present a significantly greater volume compared to the side without disk displacement. This finding could show that usually TMD patients present both articular and muscular alterations localized on the same side.

Frenulectomy of the tongue and the influence of rehabilitation exercises on the sEMG activity of masticatory muscles. A pilot study

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Aim. This study aim ed to assess by surface electromyography (sEMG) the changes in submental and orbicularis oris muscles after a lingual frenulectomy. Rehabilitation exercises in subjects with ankyloglossia, characterized by Class I malocclusion, were assessed as well. A total of 24 subjects were selected.

Materials and methods. Thirteen subjects (mean age 7 ± 2.5 years) with Class I malocclusion and ankyloglossia were treated with lingual frenulectomy and rehabilitation exercises, while 11 subjects (mean age 7 ± 0.8 years) with normal occlusion and normal lingual frenulum were used as controls. The inclusion criteria for both groups were the presence of mixed dentition and no previous orthodontic treatment.

The sEMG recordings were taken at the time of the first visit (T0), and after 1 (T1) month (T2) for the treated group. Recordings were taken at the same time for the control group. Due to the noise inherent with the sEMG recording, special attention was paid to obtain reproducible and standardized recordings. The tested muscles were the orbicularis oris, and sub-mental muscles. The sEMG recordings were performed at rest, while kissing, swallowing, opening the mouth, clenching the teeth and during protrusion of the mandible. These recordings were made by placing electrodes in the area of muscle contraction.

Results. At T0, the treated group showed different sEMG activity of the muscles with respect to the control group, with significant differences at rest and during some test tasks ($p < 0.05$). In the treated group, During swallowing and kissing, the sub-mental muscles showed a significant increase in their sEMG potentials from T0 to T1. During the protrusion of the mandible, the submental area increased significantly.

No significant change was observed in the control group during the follow-up.

Conclusion. Lingual frenulectomy and rehabilitation exercises seem to affect the function of the orofacial muscles. Improvement in muscle sEMG potentials after treatment was demonstrated by sEMG, which can be considered the correct method to monitor this intervention.

Oral appliance treatment for obstructive sleep apnoea in a patient with severe dental condition: case report

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Aim. Obstructive sleep apnea (OSA) is a chronic disorder of sleep and breathing characterized by recurrent obstruction of the upper airway. Oral appliances can be recommended to treat moderate-severe OSA when nasal continuous positive airway pressure (nCPAP) treatment is not tolerated. Insufficient number of teeth in maxillary and mandibular jaws is considered a contraindication to oral appliance therapy. The purpose of this case presentation is to report the use and results of a modified mandibular advancement device (MAD) as complete denture in an edentulous upper jaw patient with a severe OSA.

Methods. A 77-year-old male patient was referred from the Neurological Institute "C. Mondino" with a history of snoring and excessive daytime sleepness to evaluate the chance of a MAD treatment. An overnight polysomnography revealed an apnea/hypopnea index (AHI) of 30,5 events per hour of sleep always supine with a lowest oxygen saturation of 71%, an average oxygen saturation of 90,9%, an oxygen desaturation index of 29,5 and a time with saturation under 90% of 18.7%. The patient had a severe dental

condition: complete edentulous on the upper jaw and 9 teeth remaining on the lower.

A SomnoDent® Flex Edentulous was prepared for the patient. Upper Edentulous splint covers the palate in the same way as a full upper denture. The minimum number of teeth required on the lower arch may vary based on the patient's dentition. Advantages:

— Full range of mouth opening
— Superior retention and comfort
— Easily adjustable.

The mandibular part was designed as a removable partial denture. The support and retention of the device relied mainly on its adaptation to the mucous membrane of edentulous parts to avoid overloads on the remaining teeth. The maxillary and mandibular parts were fixed at 70% of the maximum protrusion of the mandible.

Results. During treatment, the patient reported a favorable sleeping pattern, but he signaled initially pain caused by sores in the upper anterior region solved with denture adhesive pads. Snoring, wake gasping, and choking were reduced drastically and she also reported improved sleep at night without apneas and his daytime drowsiness had diminished considerably. After a follow up period of 54 months, AHI was decreased from 30,5 to 5,6 with device. Significant decrease of AHI, changing in the oxygen desaturation index (from 29,5 to 5,5) and modification in lowest oxygen saturation (from 71 to 81) were recognized during device use with an overnight polysomnography.

Conclusion. This clinical report describes the technique of fabricating and results of oral device for an edentulous patient. The patient was satisfied with the modified device. The significant decrease in the AHI and the increase in minimum pulse oximetric saturation show that the oral appliance described in this case report can be a useful treatment modality in OSA patients with insufficient number of teeth in their dental arches.

Gnathological virtual plaques

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Aim. Development of new methods for a project whose aim is to get know a new technic: CAD CAM. Our needs in the future will be to fast, to organize and to computerize. Our research shows the progress determined by the digitalization and allows a better control, reducing mistakes and inaccuracies during the diagnosis and the treatment instead of traditional technics. More over it allows us to reduce working timing since it is more precise and we have plenty control during all the work process. CAD CAM has totally revolutionized the working process of the "traditional laboratory " just replacing the hands of the dental by the simple click of computer's mouse.It is a virtual challenge, between technical and mechanical ability. The computer graphics allows us to reproduce images always more and more similar to "reality". Thanks to the new technic CAD CAM, we can find different applications and benefits in the use of this method. Throught diagnostic investigations, it is possible the beginning, the process and the final result of our intervention. The 3D virtual programmation, let us identify and solve the case, in different ways, like the virtual gnatologic plaques design, with which it is possible to rehabilitate a correct therapy.

Methods. The gnathologic plaque is a mobile device prepared with togh resin, inserted on the occlusal and incisal surface of the teeth of the opponent arcade. Virtual plaque design:

a) Done teethprints of the dental arcades using irreversible hydrocolloid;

b) Analysis of the mastication with 2 waxes 3mm thick, the first one to determine the correct vertical dimension and to simulate the future gnatologic plaque's thicknees, the second one is taken in maximum cuspidated;

c) Intraoral scanner allows us to find immediately the tridimensional prints of the dental arcades, and input them in the software of CAD CAM, allowing the direct production of the individualized artifact.

Then the software reworks the given information, removes double and triple points and creates the tridimensional image of the models.The production of the gnathologic plaque (fase CAM) is built of a small block of rough material of about 20mm thick. It is used polymethyl methacrylate (PMMA). It has good endurance, no porosity and a good friction coefficient. One functional occlusion controls are done, the devices set on articulator for possible corrections. The final phase consists of polishing and try in your mouth by the patient.

Results. This study there were numerous benefits and clinical equipment used, and the technique of construction. For the material, the first advantage is that it requires a complete cure, by pointing out that this technique leads to a very low absorption of water by the material and for that reason it is not affected by pigmentation. Construction technique was possible to realize a product with a minimum thickness of 0.3 mm -0.4 with excellent mechanical characteristics and resistance of the material.

Conclusion. CAD CAM technology has allowed us to achieve the gnatologic plaque, characterized by accuracy, resistance, porosity and thicknesses, with the achievement of excellent biological and aesthetic results. Because PMMA for properties listed is a material that cannot be worked using traditional techniques, CAD-CAM technology, we believe a good clinical support, and its becomes essential since it allows to achieve maximum precision individualized products.

Relation between nail biting and disc displacement in a population of adolescents in northern Italy: a pilot study

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Aim. To evaluate if there is a correlation between nail biting and antero-lateral temporomandibular disc displacement, disc dislocation, retrodiscal lamina and tissues alterations in young asymptomatic patients.

Methods. 100 high school students from Lombardy, between 16 and 19 years of age, were enrolled in this study and assigned to two groups. A total of 227 students were evaluated in order to obtain, after inclusion criteria application, two equal groups of subjects: in the study group (SG) there were 50 subjects affected by nail biting, in the control group (CG) 50 subjects with no nail biting. The subjects belonging to the study group showed the habit of nail biting since at least 8 years. All 100 patients were subjected to a TMJ MRI exam. MRI was realized in both open and closed mouth positions to evaluate all the anatomical structures and the position of the disc. Both groups did not present muscular pain. Neither of two groups had mandibular deviation during mouth opening and closing nor centric relation-to-intercuspal position (CR-to-ICP) slide. Bilateral TMJ palpation was performed to evaluate the presence of clicks or movement limitation. MRI exams evaluation and patients clinical examination were performed by the same expert operator.

Results. 38 cases of anterior unilateral or bilateral disc displacement or dislocation were found in SG after MRI examination; in four of this patients was also present a retrodiscal tissues hyperaemia; two patients presented a dislocation with reduction, while in six cases the dislocation was without reduction. Clinically, there were any limitations in opening or laterality movements, but there were joint clicks. Only four patients in CG had an alteration of retrodiscal tissues with slight hyperaemia that was not attributable to specific clinical conditions.

Conclusion. A positive correlation was found between nail biting and disc displacement in this group of asymptomatic young patients. Data obtained from this pilot study will be utilized to a priori calculate the correct sample size of a future RCT.

Disc herniation and no surgical therapy. The "100 days treatment" by soft collar and michigan bite plate

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Aim. To treat the cervical disc herniation without surgical therapy, but using Michigan bite plate and soft cervical collar.

Materials and methods. Current conventional treatment such as bone fusion and metal plate screw implantation in the spine are the must common treatment for cervical hernia. But they are not physiological and thus not functional treatments of the cervical disc herniation. This work proposes the alternative not surgical therapy for the treatment of cervical hernia. It's named "100 days treatment". 5 patients by cervical disc herniation are treated by soft collar and Michigan bite plate during all day. The night are free from appliances. The treatment was performed without pharmacological therapy and was 100 days long.

Results. The treatment allowed to reduce the disc herniation and the patient avoided the surgical therapy. RM of cervical column was taken before and after the treatment. No relapse of hernia after 5 yrs of treatment occurred. Every patient was affected by cranio mandibular disorders (CMD). The muscle fatigue of masseter muscle was present in 50% of patients. Pain at temporal anterior muscle was present in 80% of patients. At the moment of hernia appearance all patients had clenching of teeth and TMJ problems (click of articular joint during opening of mouth and during chewing). We adviced them to stay relaxed, and to eat soft meal, not to eat hard meal or chew gum. We adviced them to perform the muscle therapy at home every evening: to perform few massages at the masseter and temporal muscles (four cycles of massages of 1 minute each) following by application of hot on the part where pain was present. All patients showed general signs and symptoms of brachial plexus pressure generated by disc herniation. Paraesthesia of omolateral harm was present in 80% of subjects, and that was showed not by surface electromyography, but using profound electromyography by needles in the muscles during its contraction. The first electromyography was performed at the moment of diagnosis of cervical disc herniation. This signs was the last to disappear during the hernia treatment and was the must difficult to accept by patients. The general pain was present in 100% of patients. In particular at the shoulders, in the neck and on harms disappears if the patient put up the omolateral harm (in this manner the patient reduced the pressure of hernia on brachial omolateral plexus. This symptoms was the first to disappear during hernia treatment (that allowed to avoid pharmacological therapy) and this was a reason of absence of drop out in this study.

Conclusion. The application of soft collar allowed to control the position of the head on the space and controlled actively the head posture. It relaxed too the muscle of neck and reduced the pressure of disc herniation on the brachial plexus and reduced the general pain. The bite plate of Michigan reduced the muscle fatigue and controled the clenching of teeth. This match is a valid alternative of surgical treatment of cervical hernia.

How to correct the FH position in the class II DIV 2 adult patient. Case report

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Aim. To evaluated the effects on cervical back bone after II class div 2 treatment therapyin adult patient. Generally the class II malocclusion div 2 was associated to a deep bite and the patient showed signs and symptoms of DCM (cranio mandibular disorders) like muscle pain on masseter muscles and on anterior temporal muscles. The TMJ problems were often associated (click mono lateral or bilateral, transient locking) On the shoulders and on the neck we can have pain and muscle contraction. It is due to the forward head position on the space.

Material and method. We showed a case report of a male patient 34 yrs old with a II skeletal class malocclusion. A deep bite of 7 mm was present. Signs and symptoms of DCM occur. The patient had pain on masseter muscles and anterior temporal muscles too, during chewing and at rest. Pain on the neck and on the shoulders. We planning a treatment of this malocclusion in 2 times. In the first time we used a biomechanic of II class

and a bite like Michigan plate fixed on lower arch. This part of treatment was 8 months long. After we continued the treatment of II class and removed the fixed bite and applied the little bite blocks only on first lower molar. In total the treatment was 24 months long. X-ray were taken before and after treatment.

Results. After first part of treatment the signs and symptoms of cranio mandibular disorder disappearea. The pain on the shoulders and on the neck disappeared too. The patient was more relaxed. The X-ray at the end of treatment showed a change of head position. In fact on the cephalogram of lateral x–ray of head a anticlockwise rotation occurred. In particular the facial axis ant the epistrofeo axis changed its rates. The angle between epistropheo axis and facial axsis at start was 90°, at the end of treatment was 85°. The application of fixed bite plate alloed this rotation.

Conclusion. The patient affected by II skeletal class malocclusion 2 div and deep bite suffer from neck and shoulder pain and have often an HFP who give an uncorrect contraction of muscles. The application of a fixed bite plate for 8 months is a right solution for a cranio mandibular disorders associated to forward head position.

Analysis of the resonance frequency in relation to the torque of insertion

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Aim. The purpose of this study is to report some clinical parameters such insertion torque, bone quality, bone resorption, resonant frequency (RFA, Resonance Frequency Analysis), obtaining the ISQ (Implant Stability Quotiens) in relation to the implant success in the short and long-term.

Methods. We enrolled a total of 30 patients, mean age 58.3 years (58.3 ± 10.27; Mean ± SD): 16 men and 14 women. Were selected all those who had lost their teeth in the posterior region of the mouth is in the mandible than in the maxilla. In no case were used regenerative techniques. Were included a total of 80 plants, all submerged and all had a diameter greater than 3.3 mm and a length of at least 10 mm, rough surface and it is expected a conventional healing period. Follow-up of 2, 4 months before loading and 1 month after prosthetic loading, evaluating the RFA.

Results. The value torque are (Mean±SD): Ossean: 45,4±10,12 N/cm²; Sandblasted: 41±12,27 N/cm²; SLA: 40,5±8,15 N/cm²; ProActive: 33,1±3,69 N/cm². The value ISQ are (Mean±SD): SLA: 79±2,80; ProActive: 75,5±7,55; Sandblasted: 73±8,48; Ossean: 72,17±7,07.

Conclusion. We have not found the relationship between insertion torque and ISQ in edentulous saddles rear. It seems, however, that the ISQ is related to the geometry of the system, in particular the length and bone morphology, as implants inserted into bone "soft" show a progressive increase of the values in the course of the recovery period in particular for some implant surfaces.

Digital device in postextraction implantology: a clinical case presentation

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Aim. The aim of this work is to describe the case of an immediate dental implant placement after the extraction of the upper right first premolar followed by the use of CAD/CAM technology that allows a prompt digital impression of the site through an intraoral scanner (MHT 3D Progress, Verona, Italy).

Methods. A 46-years old patient was diagnosed with a problem caused by a continuous debonding of the prosthesis crown on the first right upper premolar. Clinically there was no evidence and the assessment of the periapical radiograph was suggested by a clear root fracture with the presence of a marked mesial lesion on hard tissue of the tooth and this area radiopalescent was adjacent to its root. It was decided, with the patient's agreement, that the tooth would be extracted and an implant (Primer, Edierre implant system, Genoa, Italy) with diameter of 4.2mm and length of 13mm, placed. During the surgical placement of the prosthetic driven implant, it was necessary to execute a transplant with an organic bovine bone (Bio-Oss 0.5g, Geistlich Pharma AC, Wolhusen, Switzerland) and autogenous bone chips, due to a marginal defect between the implant surface and the inner wall of the extraction socket which exceeded 2mm. After the implant insertion, the abutment was screwed and a scansion was taken using an intraoral scanner (MHT 3D Progress, Verona, Italy). The images got processed through a CAD/CAM software (Exocad DentalCAD, Darmstadt, Germany) and a temporary crown was digitally elaborated (Dental Knowledge, Milan, Italy) and then sent to milling machine to produce an immediate temporary crown, that was immediately positioned on the implant. The provisional rehabilitation was immediately fixed removing maximum intercuspidation contacts to ensure the osteointegration.

Results. After 4 months, as osteointegration had reached, it was not necessary to take another dental impression and it was possible to digitally draw the custom titanium framework with an anatomic shape and a shoulder placed around the abutment head, which hid the titanium. After it was digitally designed, the framework was veneered with feldspathic porcelain for aesthetics and definitive shape and it was possible to screw the definitive crown.

Conclusion. CAD/CAM technology applied to implant surgery allows the production of high resistance and high density crowns and also the manufacture of implant abutments and surgical guides. In particular, this technology is extremely useful in post-extractive implants for aesthetic rehabilitation because it is possible to fix immediately a temporary crown anatomical-shape that allows a great recovery for the tissues. Moreover, no need to use the healing abutment and impressions as well, makes it possible the reduction of the chairtime, the treatment cost (no need for impression copings or implant analogous) and an improvement for the patient. Nevertheless it's still necessary to experience scientific studies of this procedures to enhance the accuracy the reliability and the reproducibility of the results.

A one year follow-up of implant prosthetic rehabilitation in controlled hivpositive patients: the role of CD4 level, smoking habits and oral hygiene

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Aim. The purpose of this study was therefore to investigate the associations between variables related to the survival of implant-prosthesis treatment (implant failures, prosthetic failures, biological complication, marginal bone level change - MBLC -) and systemic CD4+ level, smoking habits, and oral hygiene. In recent data about implantprosthetic rehabilitation in well controlled HIV patients, it appears that – although a proper oral hygiene

and a professional maintenance protocol – these patients show slight worse result than an healthy population; implant failure occurred in 7.9% of fixtures (15 fixtures out of 190). They were early implant failures due to primary infection (5 fixtures out of 190: 2.6%) and to perimplantitis (10 fixtures out of 190: 5.2%). A possible explanation is their systemic disease (whose state is indicated by the CD4+ level), although other factors as cigarette smoking and oral hygiene can affect implant infections.

Methods. This one-year follow-up mono-centric study (IRCCS San Raffaele Hospital in Milan, Italy) included 66 well controlled Hiv-patients (22 females and 44 males), treated with implant rehabilitation, with good oral hygiene. Each patient received at least one dental implant (totally 190 fixtures) and an appropriate prosthesis after 90 days in the upper jaw and 60 days in the lower jaw.

Results. There was no significant difference between patients with CD4+ ≤749.5 and patients with CD4+ >749.5, in any of the outcome variables. Patients who smoked > 10 cigarettes/day suffered a statistically significant greater number of implant failures respect to no/light smokers ($p<0.005$); had a statistically significant greater number of perimplantitis ($p<0.001$), greater frequency distribution of pus ($p<0.007$), greater frequency distribution of reported pain ($p<0.009$) respect to no/light smokers.

Conclusion. The number of implant failures, prosthetic failures, the MBLC, and number and type of complications (perimplantitis, pus, pain, paraesthesia) were evaluated on the base of the level of CD4+ in the blood, and the smoking habits and correlated with the level of periodontal health (PI, BI, and PPD). Implant failures, prosthetic failures, complications, or MBLC were not significantly associated to the level of CD4+ in the blood. But HIV-positive heavy smokers (>10 cigarettes/day) demonstrate an increased risk of early implant failure, of peri implantitis and self reported pain. The number of implant failures, prosthetic failures, perimplantitis, episodes of pus and pain did not correlate with bleeding or oral higiene or probing (BE, PI or PPD).

Implant prosthetic rehabilitation in controlled HIV-positive patients: a prospective longitudinal study with one-year follow-up

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Aim. This prospective longitudinal clinical trial aim ed to evaluate survival of implantprosthetic rehabilitation in controlled HIV-positive patients.

Methods. This mono-centric study (IRCCS San Raffaele Hospital in Milan, Italy) included Hiv-patients with a stable disease, requiring implant rehabilitation (total or partial), with good oral hygiene. Each patient received at least one dental implant. After 90 days in the upper jaw and 60 days in the lower jaw, the appropriate prosthesis was delivered. One year follow-up after implant insertion was considered. Survival criteria for implant are presence of implant stability, absence of radiolucent zone around the implants, no mucosal suppuration, and no pain. (Buser e Albrektsson). Primary outcome measures were prosthetic failures, implant failures, peri-implant marginal bone level changes (MBLC) and biological and prosthetic complications (perimplantitis, pus, pain, paresthesia in the lower jaw, implant fracture). Data were recorded immediately after the insertion of the fixture (T0), and 6 (T1) and 12 months (T2) after.

Results. Implants were positioned in 68 patients (22 females and 46 males) (194 implants). Two drop outs occurred for exacerbation of the disease before the six month of follow-up, and 66 patients (with 190 implants) completed the study. Forty-eight patients (70.6%) received total removable dentures (among them 30 subjects received the upper dental arch, and 18 patients received the lower dental arch); 11 patients (16.2%) received partial prosthesis and 9 patients (13.2%) received single elements rehabilitations. Implant failure occurred in 9 patients (15 fixtures out of 190). They were early implant failures due to primary infection (5 fixtures out of 190: 2.6%) and to perimplantitis (10 fixtures out of 190: 5.2%). Prosthetic failure was registered in 2 patients (3% of patients) due to the loss of all the fixtures. Pus and pain were observed in 4/7 and 3/7 patients with perimplantitis, respectively. In three patients with serious perimplantitis, pus and pain were observed together. No fractures of fixtures or paresthesia were registered. At T2, in 66 patient with 190 fixtures, the mean perimplant MBLC was -1.19±0.87 mm.

Conclusion. Within its limitations, the study showed that in a well-controlled population of HIV patients who maintained proper oral hygiene and accepted to follow a proper professional maintenance protocol, implant rehabilitation can be a suitable options with results. slightly worse to those obtained in normal population. An higher incidence of peri implant infections in the first six months, probably linked to immunological conditions, was present pointing to the need of a proper protocol for infection control.

Pulsed electromagnetic fields effects on swelling and pain after implant surgery: a double-blind, randomized study

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Aim. The purpose of this split-mouth, double-blind, randomized study is to evaluate if pulsed electromagnetic fields treatment can improve swelling and pain management after a fullarch immediate loading implant surgery.

Methods. 11 patients were selected for the study. Each patient received four implants in the upper or lower jaw using distal tilted implants and underwent a full-arch immediate loading rehabilitation. After surgery, two pulsed electromagnetic fields (PEMF) devices were applied on the right and the left cheek of each patient. Randomly one PEMF device was switched on (test side), applying the other one as a placebo (control side). 48 hours after surgery, clinicians estimated the postoperative swelling through photographic documentation, comparing the condition prior and after surgery, while pain was assessed using a verbal rating scale. Patient's comfort degree in relation to PEMF devices was analyzed by questionnaires using a numerical rating scale.

Results. No statistically significant differences were

observed between the test side and the control one as regards to swelling and pain (p>0.05). Most of patients did not present swelling or pain 48 hours after surgery, without distinction between PEMF device activated and not. Variable outcomes emerged from comfort evaluation.

Conclusion. Within the limits of this study, PEMF treatment does not reduce postoperative swelling and pain after immediate loading implant surgery.

Dimensional alterations of the grafted area at sites undergone transcrestal sinus floor elevation in combination with deproteinized bovine bone mineral or a synthetic hydroxyapatite in a collagen matrix: a 24-month radiographic evaluation

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Aim. To radiographically evaluate the dimensional alterations of the grafted area at 24 months following transcrestal sinus floor elevation (tSFE) with a bovine-derived xenograft (DBBM) or a synthetic hydroxyapatite in a collagen matrix (S-HA).

Methods. 19 implant sites in 19 patients consecutively undergone tSFE with a minimally invasive technique (namely, Smart Lift) in combination with DBBM (n=10) or S-HA (n=9) were included. On digitized radiographs related to post-surgery and 24-month visit, the extent of sinus lift (SL), the height of the graft apical to the implant apex (aGH) and the radiopaque area over the sinus floor (AREA) were measured.

Results. Immediately after surgery, SL and aGH were 6.3±1.6 mm and 2.3±1.0 mm, respectively, in DBBM group, while were 6.8±1.8 mm and 2.6±1.3 mm, respectively, in S-HA group. No significant differences in post-surgery SL, aGH and AREA were observed between groups. At 24 months, both groups showed a significant reduction in AREA (p< 0.01) and a slight, non-significant reduction in aGH (DBBM group: -0.7±0.9 mm; S-HA group: -0.4±1.0 mm) compared to post-surgery, without inter-group differences.

Conclusion. Over a 24-month follow-up period following tSFE with the Smart Lift technique, sites grafted with DBBM and S-HA similarly showed a significant reduction in the grafted area. This reduction was partly explained by a reduction in graft height over the implant apex.

Accuracy of different dental implant impression techniques comparing different impression materials and digital impression

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Aim. The aim of this in vitro study is to evaluate the accuracy of 8 different implant impression techniques for fabrication of multiple-implant prostheses. Splinted and unsplinted techniques, different impression materials and digital impression were compared.

Materials and methods. A master cast was used which represented a jaw in which 4 implants were inserted at the level of the canines and of the first molars. Impressions of the master cast were taken using different materials and techniques: 1) Snap-on impression technique using polieter #1 (Impregum Penta, 3M ESPE, St Paul, MN) (CTI) 2) Pick-up impression technique using polieter #1 (Impregum Penta, 3M) (OTI) 3) Pick-up impression technique using polieter #1 (Impregum Penta, 3M) plus a splint of the impression copings using acrylic resin (OTIS) 4) Snap-on impression technique using polieter #2 (Ramitec Penta, 3M) (CTR) 5) Pick-up impression technique using polieter #2 (Ramitec Penta, 3M) (OTR) 6) Pick-up impression technique using polieter #2 (Ramitec Penta, 3M) plus a splint of the impression copings using acrylic resin (OTRS) 7) Pick-up impression technique using impression plaster (BF Plaster, Dental Torino, Italy) (GESSO) 8) Digital impression (True Definition Scanner, 3M) For each of these techniques 5 impressions of the master cast were taken. A special device was used to standardize the direction of the impression tray and the force exerted during standard impressions. Casts were realized from the traditional impressions. A three-dimensional CMM (Coordinate Measurement Machine Crysta-Apex S, Mitutoyo America Corporation, Aurora, IL) was used in a specialized laboratory (Createch Medical S.L., Mendaro, Spain) to measure the master model in order to obtain the actual data of the three-dimensional position of the implants. Distances among the implants and angle values for each implant in the casts derived from traditional impressions were calculated thanks to the CMM. These data and STL files from the digital impressions were compared with the data of the three-dimensional position of the implants in the master cast as obtained by the CMM. The best and the worst impressions made with traditional techniques as well as the best and the worst impressions made with digital impression (as assessed by the CMM) were selected in order to fabricate 4 milled titanium bars. The accuracy of the frameworks was evaluated by the "one screw test" or Sheffield's test, screwing the metal frameworks on the master cast. An optical microscope (SmartScope MVP) with a 120x magnification was used to measure the accuracy of the interface between the abutment analogues incorporated in the cast and the metal frameworks. For each framework 8 measurements were taken: 4 screwing the framework at the level of the implant in position 26 and 4 screwing the framework at the level of the implant in position 16.

Results. Significant differences in accuracy were found comparing the different impression techniques on the base of CMM measurements. Digital impression performed the best, followed by plaster impression. These techniques also revealed the lowest variation. Traditional impression techniques revealed a greater variability in the results. Sheffield's test revealed a medium gap of 0.015 mm (range: 0.000-0.038 mm) and 0.019 mm (range: 0.000-0.039 mm) for the best and worst digital impression respectively, and of 0.026 mm (range: 0.000-0.077 mm) and 0.076 mm (range: 0.000-

0.186 mm) for the best and the worst traditional impression respectively.

Conclusion. Digital impression showed the best accuracy among the tested techniques and seems a viable alternative to traditional impression materials for fabrication of full-arch implant-supported prostheses. Dealing with traditional impressions, the open tray technique using rigid materials exhibited the greatest accuracy.

The use of PRGF and CTX marker to prevent BRONJ in post-extraction implant therapy

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Aim. Several clinical protocols have been suggested to reduce the risk of bisphosphonatesrelated osteonecrosis of the jaws (BRONJ) and the use of blood derivates has already shown good results in its therapy. The aim of this case report is to show results of post-extraction implants to rehabilitate an atrophic mandible in association with a CTX-based records and use of Plasma Rich in Growth Factor (PRGF) in order to prevent BRONJ in a patient assuming bisphosphonates and corticosteroid therapy.

Methods. A 65-year-old male affected by rheumatoid arthritis who was a chronic consumer of bisphosphonates and methylprednisolone was referred to the authors seeking restoration of his mandible with a full-arch prosthesis. Clinical and radiographic examinations revealed unfauvorable prognosis of anterior residual teeth and severe bone atrophy of posterior regions, a rehabilitation supported by 4 implants was proposed. A post-extraction immediate implant approach was chosen to limit the surgical interventions and thus reduce the risk of BRONJ caused by exposure of the bone.

As suggested by Marx (2007), bisphosphonates were suspended and marker for bone turnover CTX (C-terminal cross-linking telopeptide) was recorded every 3 months until it gradually got over 150 pg/mL, which is the threshold to minimize BRONJ risk.

Under local anesthesia, a crestal incision was performed, a full thickness buccal flap was raised and all teeth were extracted in a non-traumatic manner. Two axial implants and two tilted implants were placed in the intra-foraminal region to avoid mental foramens. Implants were inserted 1 mm under bone ridge and pretapping was performed for all sites to prevent excessive bone compression. A PRGF solution was applied to all the implant sites and implant surfaces to enhance the osseointegration process and PRGF clot membranes were positioned above the alveolar ridge and under the surgical flaps before they were sutured with 4-0 resorbable sutures.

After an uneventful period of 4 months, the patient underwent re-entry surgery. A custommade bar was screwed to the implants and a removable overdenture prosthesis was delivered to the patient in order to achieve the mandibular rehabilitation.

Results. No complications occurred during healing period and no signs or symptoms of BRONJ were detected. Both clinical and radiographic examinations showed bone-tissue healing of the extraction sites and the implants.

Conclusion. The previously-described protocol and the use of PRGF permitted to prevent BRONJ in a patient assuming bisphosphonates and corticosteroids. This technique can be suggested as a viable approach to rehabilitate atrophic jaws with implant-supported prosthesis in patients with high risk of BRONJ.

Patient satisfaction and comfort after a full-arch immediate loading rehabilitation: a preliminary study

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Aim. To evaluate the changes in quality of life and the satisfaction of patients rehabilitated with an immediate loading full-arch prosthesis (Columbus Bridge Protocol, CBP).

Methods. The study included 21 patients rehabilitated with CBP between September 2012 and July 2014 of one or both dental arches. Each patient answered an anonymous 26questions questionnaire at a pre-surgical appointment (T0), 1 week after surgery (T1) and 2 months (T2) after surgery. The questionnaires were inspired by statement of Oral Health Impact Profile (OHIP). The questions were related to: pain, chewing ability, phonetics, aesthetics, home dental hygiene procedures, patient satisfaction. Only questions common to all questionnaires were considered for statistical analysis. For categorical variables differences in the scores at the 3 time points were assessed by Cochran's test. If a statistically significant difference was found, post-hoc pair wise comparisons were performed by McNemar test. Multinomial data differences in the scores were evaluated with Marginal Homogeneity test, comparing each pair individually. A $p \leq 0.05$ was considered statistically significant.

Results. No statistically significant differences between the 3 time points were noticed for variables regarding smoking, tense, avoiding smiling, difficulty in relating to others, instruments used for oral hygiene and difficulties to use them. A statistically significant improvement was observed for the variables regarding satisfaction as regards ability to chew; about satisfaction with the aesthetic results; about pain during chewing; about breaks during chewing; a significant increase in phonetic difficulty was found. All the patients were pleased with support received by the clinicians and they felt that CBP was an effective therapy for their oral problems.

Conclusion. On the base of this preliminary evaluation, patients treated with CBP reported a better chewing ability and a greater satisfaction with their aesthetic appearance compared to pre-treatment assessments. However further investigation on a larger number of patients is needed to confirm these results.

Rehabilitation of the atrophic jaws: calvarial bone graft *versus* all-on-four technique. A retrospective analysis

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Aim. Tooth loss represents a serious and disabling condition, which requires an appropriate therapeutic intervention. The development of implant dentistry has allowed therefore appropriate rehabilitation in edentulous patients with volumetric contraction and severe atrophy of the jaws.

Thanks to pre-implant reconstructive surgery these problems can be solved today in order to restore proper alveolar morphology. Indeed, in the severe atrophies of the jaws, autologous bone has been recognized as the first choice as a graft material meanwhile the all-on-four technique has been proposed as a less-invasive alternative.

The aim of this study is to compare the implant survival and complications rate in patients with severe jaws atrophy that underwent reconstructive surgery with calvarial grafts or minimally invasive surgery according to the "all-on-four technique".

Methods. Patients from the Department of Dentistry, San Raffaele Hospital, Milan, Italy, were retrospectively enrolled in the present study. The following inclusion criteria were adopted: absence of systemic diseases, completely edentulous jaws or presence of teeth with an unfavorable prognosis, severe jaws atrophy (class IV-VI according to Cawood and Howell), implant-prosthetic rehabilitation according to the "all-on-four" technique or by calvarial bone grafts, a minimum follow-up of five years from definitive prosthesis. Forty patients were enrolled, twenty rehabilitated according to the all-on-four technique, twenty that underwent calvarial bone grafts. The following parameters were considered: implant survival, implant success, prosthetic complications, prosthesic success, graft survival and post-operative complications. For each parameter, the averages of the two groups were statistically compared.

Results. Patients involved in the study reported a mean follow-up period of 70.38 ± 11.23 months. For calvarial group: A graft survival percentage of 97.22% was observed. Postoperative complications occurred in 15.19% of cases; 8.29% of patients suffered from inflammatory complications. The most frequent complication was dehiscence of the surgical wound (incidence 9.42%). 168 fixtures were positioned. The implant survival rate was 97.10%. The prosthetic complications observed reached a value of 13.45%

In the all-on-four group, 112 fixtures were inserted in the 20 patients with minimally invasive rehabilitation. No tilted implants were lost; the implant survival rate was 98.22%. The prosthetic complication rate reached a value of 12.77%.

Conclusion. Comparing the two different protocols, no statistically significant differences were found between groups values over time ($p > .05$), suggesting that preimplant surgery and minimally invasive procedures may ensure similar results.

Preliminary results of a 5-years prospective study evaluating the conditions of short sintered porous surface implants placed in posterior areas of maxilla and mandible

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Aim. The aim of this prospective study is to evaluate the cumulative survival rate (CSR) and the crown-to-implant ratio (C/I) of short sintered porous surface implants in posterior regions of maxilla and mandible after 5 years of loading.

Materials and methods. This study reports the preliminary results of a prospective cohort study. The sample was composed of 50 patients affected by partially edentulism of posterior maxilla and mandible with history of periodontitis. All patients were treated with at least one 5-to-9-mm-long sintered porous surface implant (Endopore® Dental System Innova Corporation, Toronto, Ontario, Canada). Five years after prosthetic loading, patients were recalled to obtain a periapical radiograph, in which the entire crown and implant were visible. The crown height and the peri-implant bone levels were measured using a software program (Rasband, W.S., ImageJ, U.S. National Institutes of Health, Bethesda, Maryland, USA) measuring tool in conjunction with a magnification tool. The crown height was measured from the most occlusal point to the implant-abutment interface (IAI).The outcome variables were implant failure and peri-implant bone levels in relation to the crown-toimplant ratio after five years of prosthetic loading. Descriptive statistics were utilized to report the feature of the failed implants. Statistical analyses with analysis of variance (univariate ANOVA) were used to identify possible correlations between crown-to-implant ratio and peri-implant bone levels.

Results. 120 short sintered porous implants reached five years of loading time. Sixty-one implants were placed in the posterior upper maxilla, while fifty-nine implants were placed in the posterior mandible. Ten implants failed in the posterior maxilla and five implant failures were observed in the posterior mandible, giving a cumulative survival rate (CSR) of 87.5% (83.6% for the posterior maxilla and 91.5% for posterior mandible). On the 105 survived implants, only 47 implants were evaluated at the recall visit at this phase of the study. For these implants, the average peri-implant bone level after 5 years of loading was -1,59±0,73 mm, with an average bone level of -1.93±0.75 mm in the posterior maxilla and -1.35±0,63 mm in the posterior mandible. The mean crown-to-implant ratio (C/I) was 1,51±0,42 in the survived implants and the C/I was 1.50±0.35 in failed implants. No statistically significant relationship was observed between crown-to-implant ratio and peri-implant bone levels ($P = .60$).

Conclusion. This preliminary results demonstrates that, despite the crown-to-implant ratio was unfavorable, this variable does not seem to be relevant on the peri-implant bone levels. The cumulative survival rate (CSR) was higher in the posterior mandible than the posterior maxilla. However, further studies are necessary to confirm these results.

Digital planning and surgery with RealGUIDE™ workflow: the ultimate image based procedure for a successful immediate loading rehabilitation

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Aim. More than 20 programs offers today methods for virtual implant planning on TC images. The great diffusion of CBCT exam enables the 3D diagnosis on most of the patients due to its low radiation exposure compared to the standard CT, giving the doctors the possibility to integrate the standard bidimensional diagnosis with a digital 3D reconstruction and implant planning.

Computer-assisted implanto-prosthetic planning allows the morphological, functional and aesthetic study of teeth and maxillofacial bones, with the aim of planning an implantsupported dentoalveolar prosthesis. The scientific literature reports many studies about different methods and their accuracy in computer guided surgery techniques, explaining the possible errors occouring in the workflow.

Most of the digital prosthetics planning techniques anyway are based on high level technologies that are generally owned by the Industry, giving the surgeons and laboratories just a partial control over the full process. The scope of this article is to illustrate a procedure that uses the most advanced technologies, both for planning and manufacturing, but differently from the others it can be fully managed in a seamless workflow between the doctor and the laboratory. In the following paragraphs the technique, as well as the application on two real surgical cases will be illustrated.

Methods. The "RealGUIDE" procedure (3DIEMME, Italy) is described:

1. PATIENT DIAGNOSIS AND PROSTHETIC PLANNING: considered as a guideline for the final rehabilitation, can be developed through conventional stone models into articulation or by modern dental laboratory software.

2. RADIOLOGIC GUIDE SET-UP: the correct teeth position obtained with the previous step is clinically checked with a diagnostic prosthesis and transferred to a radiologic guide that the patient should wear during the CBTC exam.

3. OPTICAL SCANNING AND CT/CBCT EXAM:the patient is scanned wearing the radiologic guide with a single scan protocol with the 3DMarker in the acquisition volume. The results are exported in standard DICOM format.

4. DATA FUSION: all the files are imported in the medical imaging software (3Diagnosys 4.0, 3DIEMME, Italy) that is able to match optical STL and Dicom files.

5. IMPLANT PLANNING: implant position is performed using the library, also the prosthetic connection is completed for a real prosthetic guided implantology.

6. SURGICAL GUIDE MODELLING: the project is exported into the guide modelling software, then it's possible to generate automatically both the surgical guide and the real model.

7. PROSTHESIS MODELLING AND MANUFACTURING: after design, the prosthesis is made with CAD/CAM technology for an immediate loading.

Results. The proposed method, as reported in the case studies presented, aims to demonstrate how the digital workflow in dentistry can be employed in a seamless procedure between the surgery and the laboratory environments. The use of an open system enables the project exchange between different software packages and the resulting objects manufacturing with any CAD/CAM or RP machine. In particular the use of the stereolithographic technology used for manufacturing (DWS, Italy), thanks to the possibility of using different materials on the same machine, enables the laboratory to produce all the objects needed (models, guides and provisionals) directly in-house with very low time and cost for production.

Conclusion. The use of diagnostic softwares and stereolithographic technology enables the laboratory to produce models, surgical guides and provisionals directly in-house, and plan a mininvasive surgery for the immediate loading protocol on.

Gastric and chewing performances in full-arch immediate loading rehabilitated patients

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Aim. Immediate loading full-arch implant rehabilitations provide patients with compromised dentition an effective treatment to improve their esthetic and function. The aim of this prospective cohort study is to investigate the correlation between masticatory efficiency and gastric emptying rates among these patients.

Methods. Ten subjects (5 male 5 females) with compromised dentition were tested in two occasions: before treatment and 30 days after the immediate loading rehabilitation. Masticatory performance was evaluated using the sieves test and the gastric half emptying time ($T_{1/2}$) was assessed by means of the ^{13}C octanoic acid breath test.

Results. A statistically significant increment ($p<0.005$) in the chewing ability only in reference to the particles less than or equal to 4.75 mm was found; whereas the gastric emptying rate showed a statistically significant reduction between pre- and post-treatment ($p=0.003$). A strong negative correlation (rho = 0.64, $p=0.048$) between the percentage change of chewing ability and the percentage change of gastric emptying rate was evidenced.

Conclusion. Patients with compromised dentition rehabilitated with full-arch immediate implant prostheses present a significant improvement of the gastric process.

Radiographic evaluation of peri-implant marginal bone and implant stability quotient (ISQ) in single-tooth rehabilitation through prime sm implants: case series

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Aim. The present study Case Series, observational and prospective, aims to assess the maintenance of the peri-implant marginal bone level and the values of ISQ (implant stability quotient) in patients treated with implants Prodent Prime SM in monoedentulias.

Methods. Ten patients (10 implants)with monoedentulia were enrolled in the present study and candidate for the insertion of implants with a minimum length of 8.5 mm and a minimum diameter of 3.8 mm in ridges cured

from 3 months at least, where no type of regeneration and preservation of the socket have been performed. The surgical technique of implant placing was in 2 stages. For each patient the level of bone resorption was evaluated by intraoral x-rays with standardized RIIN centering in the mesial and distal aspects of each implant. The evaluation was performed upon implant placement, reopening and at six (6) and twelve (12) months after delivery of the final implant, according to occlusal loading. ISQ data were taken upon implant placement and reopening.

Results. Every patient completed the follow-up. Five (5) implants were placed in the upper premolar, four (4) in the lower molar and one (1) in the lower canine. ISQ average in the treated cases was 68.3±4.49 at the time of placement of the implant and 75.5±5.25 upon reopening. In the premolar, ISQ average was 65.6±4.3 upon implant placement and 72.4±4.4 upon reopening. In the molar, ISQ average was 69.7±0.5 upon implant placement and 78.5±3.94 upon reopening. For the canine, ISQ value was 76 upon implant placement and 80 upon reopening. In the implants, from the time of placement until unveiling, the changes to the marginal bone level were on an average of 0.021±0.01 mm in the mesial portion and on an average of 0.026±0.01 mm in the distal portion. From the time of implant placement to six (6) months after the occlusal loading, the changes to the marginal bone level were on an average of 0.06±0.05 mm in the mesial portion and on an average of 0.09±0.08 mm in the distal portion. At twelve (12) months from the loading, the changes to the marginal bone level in the mesial portion, compared to the level existing at the time of implant placement, were equal to 0.1±0.05 mm and to 0.12±0.08 mm in the distal portion.

Conclusion. Within the limits of this study, the assessment through ISQ shows normal values at the time of placement of the implant and an increase upon reopening due to the osseointegration process. Reading this value in relation to the implant placement seat and implant length and diameter is a factor that can help the decision making in relation to the loading timing, but a greater number of samples would be required in order to allow a more accurate assessment. The changes in the marginal bone level, although taken in the mesial and distal aspect only, show, at one year after functional loading, proper maintenance of the bone level. Also for this data, the increase in samples number, a longer follow-up as well as a three-dimensional assessment of the marginal bone profile would be required to obtain higher accuracy in reading the data.

Clinical efficacy of using plasma-argon treated versus steam-cleaned or chlorexidine-disinfected abutments: preliminary results from a triple-blind randomized trial

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Aim. Previous studies suggested the inflammatory response at the implant-abutment interface as a possible cause of bone remodeling around implants. Some authors focused on the importance of abutment sterilization because its surface touches hard and soft tissues.

Different methods can be used to clean and sterilize abutments, such as steam cleaning, chlorexidine and plasma treatment. Our study aimed to evaluate if the placement of Argon-Plasma treated abutments can influence bone remodeling or peri-implant clinical parameters compared to the placement of steam-cleaned or chlorexidine-disinfected abutments.

Methods. The present study is a preliminary report of a monocentric (IRCCS San Raffaele Hospital, Milan, Italy), triple-blind, randomized and controlled clinical trial. It included patients who needed an implant-prosthetic rehabilitation of one or more elements in the mandible or maxilla, on which it was possible to make a bridge with at least one intermediate element between two abutments. All patients were older than 18 years, not affected by systemic diseases, without pathological periodontal pockets. They didn't smoke, or smoked less than 10 cigarettes per day. Their alveolar bone volume allowed the insertion of one implant with a diameter of 3.8 mm and a minimum length of 8.5 mm. Patients pregnant or breast-feeding, taking biphosphonates, with acute infections in progress or requiring bone regeneration were all excluded. For each patient, in an edentulous site (at least 3 months from extraction) one or more implants separated by an intermediate element were placed and a biphasic protocol was applied. After the reopening (which toke place at 3 months from implant positioning), the abutments were placed, and prosthetic rehabilitation was performed according to the "one-abutment one-time" protocol. We considered three groups of patients: in the first group abutments were steam-cleaned, in the second one sterilized with chlorexidine, while in the last one were treated with Plasma Argon system. A blind operator, after the placement of the abutment, estimated radiologically the periimplant bone remodeling and clinically the following periodontal parameters: Keratinized Mucosa height (KM), modified Bleeding Index (mBI), modified Plaque Index (mPI), Probing Depth (PD) at 6 months, 1 year and 2 years from implant placement.

Results. Sixteen patients were initially considered to be included in our study. A total of twenty dental implants were inserted. No implant failed and no complications occurred. No significant differences in radiographic bone remodeling and peri-implant tissues between the three groups of patients were found from these preliminary results.

Conclusion. Our preliminary clinical and radiographical results suggest no significant differences among the three groups of patients. However, the small sample size and the short follow-up considered didn't allow a valid examination of the relationship between abutments' different treatments, bone remodeling and peri-implant tissues' health.

Implant rehabilitation following a severe childhood trauma: a case report

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Aim. Bone defects of the alveolar ridge, due to atrophy, periodontal disease and trauma sequelae, may provide insufficient bone volume or unfavorable interarch relationship, which may render implant placement

impossible or incorrect from a functional and esthetic point of view. Here is presented an implant-prosthetic rehabilitation on bone graft, following a mandibular ramus sample taking, in a 20 year old patient, who went through a trauma at the age of 12. The aim of the treatment was to reestablish correct function and good esthetics by means of a fixed prosthetic rehabilitation.

Materials and methods. Following the trauma, the patient lost 1.2, 1.1, 2.1 and the relative alveolar process , 2.2 partially intruded in the nasal floor and the right condile was fractured. The patient came to our observation 8 years after the trauma: in the meatime she underwent an orthodontic treatment aiming to treat the mandibular fracture and to actively extrude 2.2. Radiographic examinations, that is panoramic and cbct, showed the reduction of the horizontal bone dimension available to insert implants. Therefore, it was decided to proceed with a bone graft in correspondence to 1.2 and 1.1 by means of a mandibular ramus sample taking in order to re-establish a correct bone volume. Four months after the bone graft, 2.2 was extracted, since a radicular fracture was diagnosed, and two implants were inserted in correspondence to 1.2 and 2.2, keeping in situ the provisional restoration on bands. After 6 months from implant insertion second surgical time was performed, and following the healing time a fixed provisional on implants was placed. Three months later, the definitive metal-ceramic screw retained prosthesis was made.

Results. Follow up sittings were scheduled once a month for six months. The patient was satisfied with the rehabilitation and the esthetic outcome. A good oral hygiene level was maintained, without signs of peri-implant inflammation.

Conclusion. Fixed rehabilitation on implants allowed the patient to obtain a satisfying esthetic and functional result, which was made possible by the multidisciplinary approach, both surgical, orthodontical and prosthetic, and by treatment modalities able to respect the young age and the previous traumatic pathology of the patient.

Digital aesthetic preview in implantology

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Digital Smile Design (DSD) is a computer programme for the projection of clinical cases which allows us to work on photographs and videos of patients. Modern digital technology, combined with experience and the aesthetic awareness of the dentist is fundamental in the success of DSD, offering more predictable final aesthetic results as well as procedures. DSD is therefore a tool that improves communication with the patient, considering the fact that through the use of elaborate images, it is possible to see the before and after photographs on a digital monitor, the predictability index and an element of discussion with the patient directly. DSD can be used in aesthetic dentistry such as; prostheses, orthodontics, and parodontology. Current guidelines require the acquisition of images of the patient through digital photographs and videos that enable the identification of the various dynamics of the smile (mimetics, phonetics, and dental-labial relationship). Importing this information should complement the medical history as an integral part of the intra- and extra-oral examination. Following the acquisition of images, the next step is that of virtual planning, or the elaboration of the images, which is then followed by the digital and analogue diagnostic wax-up, provisory mock-up and definitive restoration. The clinical case presented shows how the virtual programming of the treatment plan is a useful tool even in the most complex of cases both for the dentist who is able to transmit clearer and more detailed information to the dental technician and for the patient who can have a more accurate idea of the operational timing and the final results of the treatment he/she will undergo, interacting more clearly with the dentist. The final aesthetic result obtained, in the clinical case in question, can be superimposed onto the initial virtual project, showing therefore that DSD is a valid tool even in dental implantology.

Biological and mechanical characterisation of carbon fibre frameworks for dental implant applications

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Aim. The aim of the present study was to investigate the biocompatibility and mechanical characteristics of dental implant frameworks made of carbon fibre-reinforced composite.

Methods. The biocompatibility of intact samples and of fragments of carbon fibre composite was evaluated by cell count and MTT test according to EN-ISO 10993-5:2009 directions.

Destructive and non-destructive mechanical tests were performed in order to evaluate: porosity, wettability, static and dynamic elastic modulus of carbon fibre samples. These tests were conducted on different batches of samples manufactured by two different dental technicians (Group A: 26 samples; Group B: 6 samples). The samples presented a parallelepiped shape with standardized dimensions. Intact and fractured samples were evaluated by optical microscope and by scanning electron microscope (SEM).

Two identical full-arch screw-retained prostheses supported by 4 implants were manufactured. One was provided with a gold-alloy framework, the other with a carbon fibre framework. The veneering material was acrylic resin. A compression test was performed to compare the yield strength of the two prostheses using an Instron machine.

Results. Carbon fibre intact and fragmented samples showed optimal biocompatibility with no differences compared to the negative control.

Manufacture technique strongly influenced the mechanical characteristics of fibrereinforced composite materials and the samples realized by the two different dental technicians exhibited different mechanical properties. In particular, samples A presented irregular shapes, air bubbles and a not homogeneous distribution of carbon fibre layers and resin. These defects compromised samples A mechanical characteristics. In contrast, samples B exhibited regular shapes, no air bubbles and

the arrangement of carbon fibre layers and resin appeared more balanced and uniform. Samples B showed less porosity, greater wettability, and greater static and dynamic elastic modulus compared to samples A. During the compression test, the implant-supported full-arch fixed denture provided with a carbon fibre framework showed a degree of flexion comparable to the implant-supported full-arch fixed denture provided with a metal framework. Moreover it showed a more elastic behavior, while the prosthesis provided with the metal framework had more plastic deformation.

Conclusion. Carbon fibre-reinforced composites demonstrated optimal biocompatibility and mechanical characteristics. They appear suitable for the fabrication of frameworks for implant-supported full-arch dentures. Great attention must be paid to manufacture technique as it strongly affects the material mechanical characteristics.

Predictable sequence of treatment for severely atrophic maxilla in the anterior region

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Aim. The purpose of this case report is to present a 10-year follow-up of a 6-unit restoration on implants after bone regeneration in the aesthetic area. This report will discuss on the utilization of narrow diameter implants as a solution to support a fixed interim restoration and the definitive prostheses.

Materials and methods. A 30 year-old male patient was referred to the Ashman Department of Periodontology and Implant Dentistry of New York University College of Dentistry in 2004. The patient was non-smoker and the medical history was unremarkable. Two years earlier a severe trauma to the anterior maxilla had caused the loss of teeth #12, 11, 21, 22, 23 and 24, and the loss of part of the supporting bone and the soft tissues. The CT scan revealed inadequate amount of bucco-lingual crestal bone and the need of a bone regeneration procedure prior to the implant placement.

The treatment plan was to first provide the patient with a fixed provisional restoration that is important to protect and maintain stable the graft. It was chosen to use four narrow diameter implant (NDI), which can be placed in the atrophic ridge, to support an acrylic prostheses. The placement of the NDI (1.8 x 14mm) was guided by a CAD/CAM surgical template and performed without flap elevation. The primary stability was achieved, and patient's provisional was connected to the four implants on the same day.

After 2 months the bone regeneration procedure was performed. Due to the large dimension of the horizontal defect, both allogeneic bone block graft and autogenous bone block graft, harvested from the right ascending mandibular ramus, were used. The empty spaces between the blocks were fulfilled with particulate allogeneic graft to obtain a homogenous surface. The grafted area was, then, covered with two resorbable collagen membranes. Tension-free suture was obtained and to ensure no pressure on tissues the buccal flange of the provisional was trimmed. The healing was uneventful.

Five months later the two narrow diameter implant placed in the middle were removed and replaced with three standard diameter implants (3.5 x 13mm).

After four months, a new provisional, supported by all the five implants, was delivered and, once the proper contour of the soft tissues was achieved, the final restoration was delivered.

Results. Ten years after, the patient returned to our department for follow-up. The radiographic evaluation demonstrated implant integration and no bone resorption around the standard diameter implants and the narrow diameter implants. Clinically, no sign of soft tissue inflammation was noted and the patient was fully satisfied.

Conclusion. Atrophic maxilla represents a challenge for the surgeon and a correct treatment plan is crucial to reach long-term success and satisfy patient's expectation. A fixed interim restoration protects the augmented site and represents a more comfortable and accepted solution for the patient than a removable denture. Narrow diameter implants are a valid opportunity to support a fixed provisional and do not require the adjacent teeth to be prepared. Furthermore these implants can obtain a good osseintegration on the long-term and can be used to support the definitive prostheses when splinted to standard diameter implants.

Two different silicon nitride surface modification as bone interfaces

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Aim. Silicon nitride (Si_3N_4) is a ceramic material developed for industrial applications, endowed with most favorable mechanical features and excellent biocompatibility. However, up to now Si_3N_4 has been only used as an orthopedic biomaterial. This preliminary study is focused on comparing the effect of two different surface modifications of silicon nitride in terms of early cell response and osteogenic proprieties.

Methods. Silicon nitride was prepared and shaped as 10 mm diameter discs, according to a manufacturing process previously described. Surface roughness was modulated through electrochemical erosion so that a smooth surface and a rough surface were produced.

To characterize *in vitro* the biological response, a pre-osteoblastic murine cell line MC3T3E1 (ECACC) was used. Cells were kept in Alpha MEM supplemented with 10% FBS, 50 µg/mL gentamicin. MC3T3 were seeded on the samples and stained with RodaminePhalloidin/Dapi in order to examine the cellular adhesion and morphology. Quantification of the cell spreading was performed with ImageJ software. MC3T3 cells were differentiated by supplementing the culture medium with 10mM ß-glycerophosphate and 50ng/ml Ascorbic Acid. The calcification of the extracellular matrix deposed on surfaces was quantified colorimetrically through the Alizarin Red Stain.

Data were analysed by GraphPad Prism6. Each experiment was repeated at least three times. Statistical analysis was performed by using the nonparametric unpaired WilcoxonMann-Whitney test. A p value of <0.05 was considered significant.

Results. MC3T3 cells displayed normal growth on silicon nitride samples with a significantly higher spreading level if compared to the control condition (glass). Notably, the rougher the surface the higher was the cell spreading.

The osteogenic differentiation level was measured by evaluating the deposition of bone matrix on ceramic structures. Our data demonstrated that MC3T3 produce a greater amount of bone matrix on the ceramic Si_3N_4 compared to control condition. Also, MC3T3 cells grown on rough Si_3N_4 surfaces produced more bone matrix with respect to the smooth surface condition.

Conclusion. This work highlights the promising properties of silicon nitride as a dental implant material, owing to its high biocompatibility and pro-osteogenic features. Finally, the rough surface topography seemed particularly suitable to elicit a favorable osteoblastic response.

Surface modification for dental applications: amorphous silicon-based thin film coatings

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Aim. Biomaterials may be changed at their surface by the deposition of suitable thin film coatings to achieve a range of desired characteristics such as antibacterial effects, barrier properties against the diffusion of potentially harmful elements from the bulk materials, or improved resistance to the action of chemical agents. This work aimed at investigating the osteogenic proprieties of hydrogenated amorphous silicon coatings on titanium samples.

Methods. Hydrogenated a-SiOx films of about 2 µm thickness were grown on the dental materials by a radio frequency-plasma enhanced chemical vapor deposition (RF-PECVD) reactor, using silane (SiH_4) and nitrous oxide (N_2O) as silicon and oxygen precursors, respectively. The reactor and the growth conditions were described elsewhere (Mandracci et al. 2008).

A human osteoblastic cell line Saos-2 (ATCC) was employed. Cells were kept in McCoy'5A medium supplemented with 15% FBS and 1% penicillin–streptomycin. Saos-2 were seeded on the samples and images were acquired using a SEM microscope in order to examine the cellular adhesion and morphology. Viability and proliferation rate of Saos-2 cells were studied using the colorimetric MTT assay, at 24, 48 and 72 hours. Osteocalcin protein level was assessed through ELISA assay.

Data were analyzed with GraphPad Prism6. Each experiment was repeated at least three times. Statistical analysis was performed using the nonparametric unpaired Wilcoxon-Mann-Whitney test. A p value of <0.05 was considered significant.

Results. The morphology of human osteoblastic cells seeded on hydrogenated a-SiOx coatings and on titanium samples was analyzed: Saos-2 cells were more able to spread on unmodified titanium than on the coatings. Although the viability assay did not evidence any cytotoxic effects of the thin film coatings, still cell proliferation rate was decreased if compared to that achieved on the titanium surfaces. The in vitro osteogenic differentation of the osteoblasts was determined by measuring the production of osteocalcin. Saos-2 cells released more of this protein when seeded on the coated samples.

Conclusion. The potential of newly formulated thin films was tested as a possible additive surface modification for dental implants. In spite of reducing the proliferation rate of the osteoblasts studied, hydrogenated amorphous silicon coatings seemed to promote the realease of osteocalcin, thus having a moderate osteoinductive capacity.

Immediate fixed implant supported rehabilitation in an edentulous atrophic maxilla with extensive sinus pneumatization: V-II-V modified approach

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Aim. To report a new surgical approach for the immediate fixed implant supported rehabilitation of an edentulous atrophic maxilla with extensive sinus pneumatization using a modified V-II-V protocol.

Materials and methods. A 69 years old non-smoker female patient with maxillary complete edentulism came to our attention asking for a fixed rehabilitation in the upper jaw.

Pre-operative radiographic evaluation with OPG and CT scan revealed a thin ridge in the pre-maxilla, extensive anterior pneumatization of the sinus cavities and residual bone in both pterygo-maxillary regions.

A full-arch implant rehabilitation according to the V-II-V technique with a trans-sinus tilted implant has been proposed to the patient and subsequently performed.

A mid-crestal incision was made starting from the pterygomaxillary region and a full thickness flap was raised exposing the vestibolary bony wall in order to identify the anterior and lateral walls of the maxillary sinus bilaterally. On the left side a bony window osteotomy was created with piezoelectric inserts and the mesial part of the Schneiderian membrane was reflected posteriorly. A 25 mm implant, NobelSpeedy Groovy (NobelBiocare, Sweden) was inserted finding coronal anchorage in the residual crestal bone and apical stabilization in the lateral wall of the nasal cavity. The sinus cavity was filled with autogenous bone in order to completely surround the implant surface. On the same side an other implant was placed following the lateral wall of the sinus, with a 30 degrees mesial inclination. On the right side, two fixtures were tilted inserted following the anterior and the lateral wall of the sinus and two additional implants were placed axially in the pre-maxilla. All fixtures reached at least 30 Newton of final torque, allowing immediate loading.

Straight multi-unit abutments were positioned over the anterior implants and 30-degrees abutments were connected on tilted fixtures. Two hours after the surgery a screw-retained acrylic resin prosthesis was delivered and it was substituted after 6 months by a final

restoration made with a titanium CAD-CAM framework and composite teeth (Phonares II, Ivoclar Vivadent). Follow-ups were scheduled every six months. At each visit plaque and bleeding scores were assessed, radiographic evaluations were made and patient satisfaction was recorded.

Results. All implants have been followed up for 20 months and no failure has been reported. No implants were lost. Bone loss averaged 0,2mm for axial and tilted fixtures, reporting 100% implant and prosthetic success rates. After 8 months radiographic evidence of new bone formation around trans-sinus tilted implant occurred. Plaque and bleeding scores decreased over time and aesthetic, phonetics and masticatory function were judged as excellent during all follow-ups.

Conclusion. The modified V-II-V protocol proposed in this poster allowed an optimal distribution of the implant platforms along the alveolar process even in case of extensive pneumatization of the sinus cavities. In this case, in order to have two platforms in the left posterior side, a trans-sinus tilted implant has been inserted. Thanks to the engagement of four cortical layers (crestal bone, floor and anterior wall of the sinus cavity and lateral wall of the nose) high level of primary stability has been achieved and the trans-sinus implant could be included in the immediate prosthesis.

Nanoporous alumina: a biological evaluation

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Aim. The aim of the present study was two-fold: a) to evaluate the biocompatibility of nanoporous alumina through cell morphology determination and focal adhesion quantification; b) to assess putative osteogenic features of nanoporous alumina under proper differentiation condition compared to non-nanostructured standard surfaces.

Methods. Nanoporous alumina was prepared and shaped as 10 mm diameter discs, according to a proprietary anodization process (patent under submission) by Eltek (Casale Monferrato, Italy).

Murine pre-osteoblastic cells (MC3T3-E1) were purchased from ECACC. Cells were kept in Alpha Minimum Essential Medium and supplemented with 10% FBS, 50 µg/mL gentamicin. To examine the cellular adhesion and morphology, MC3T3-E1 cells were seeded on the samples and stained with Rodamine-Phalloidin/Dapi (to mark actin cytoskeleton and cell nucleus respectively). Focal adhesions were specifically detected recurring to an antipaxillin antibody. At selected time points (3, 5, 24 h), images were acquired with a Nikon Eclipse Ti-E microscope using a Nikon Plan 10X/0,10; Nikon Plan Fluor 40X/0,75; Nikon Plan Apo VC 60X/1,40. Cell spreading and focal adhesion density were quantified with ImageJ software.

MC3T3 cells were differentiated by supplementing the culture medium with 10mM ßglycerophosphate and 50ng/ml Ascorbic Acid. The calcification of the extracellular matrix deposed on the nanoporous alumina discs was quantified colorimetrically through the Alizarin Red Stain. Briefly, at day 21, MC3T3 cells were first incubated in a solution of 40mM Alizarin Red (pH 4.2) and subsequently lysed with Acetic Acid. Absorbance of the lysates was finally measured at 560 nm.

Data were analysed with Kaleidagraph. Each experiment was repeated at least three times. Statistical analysis was performed using the nonparametric unpaired Wilcoxon-Mann-Whitney test. A p value of <0.05 was considered significant.

Results. As depicted by fluorescence microscopy, MC3T3-E1 cells were more spread and showed a higher number of Focal Adhesions (showing a particular dendritic morphology) when grown on the alumina samples than on the control condition. Also, the calcium deposition (a paramount marker of late in vitro osteogenesis) was increased in the nanoporous alumina samples vs. the control condition.

Conclusion. Cell adhesion, proliferation and differentiation were excellent suggesting that the nanometric topography of nanoporous alumina is able to modulate cell function. Based on these preliminary data, nanoporous alumina may be considered a promising material to be used at the bone-implant interface.

Micro-invasive laser dental implant surgery

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Aim. Use of the erbium laser in support of the preparation of the implant site during the surgical procedures.

Methods. Er,Cr:YSGG was used with a photon emission at 2780 nm wavelength and pulse duration of 140 microseconds. The power output for alveolar bone is 6 W 20 Hz, for gingival tissue is 3.50 W 40 Hz. During surgical procedures, the tip is on the target tissue in constant motion, contactless and under the control of magnifying systems.

Results. The hydrophotonic energy performs the osteotomy of the surgical site for the insertion of tapered implants. The site is under-sized due to have high torque for immediate or early loading.

Conclusion. The erbium laser allows precise site preparation (10-15µ) with excellent cutting control, reducing the trauma on tissues and improving post-operative course and implant integration.

Gingival hyperplasia around dental implants in jaws reconstructed with free vascularized flaps: a case series report

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Aim. Vascularized free flaps are nowadays the gold standard for reconstruction of the facial skeleton after surgical ablation of pathologies, or in cases with im-

portant atrophy of the jaws. A recurring complication during prosthetic rehabilitation following reconstruction by means of vascularized free flaps is the onset of hyperplastic granulomatous reactive tissue around the prosthetic abutment of the implant. In this paper the Authors want to share the experience gained in the rehabilitation of this kind of patient, describing 7 cases, treated by cold scalpel blade and electric cautery and in one case by laser-therapy.

Materials and methods. Following 40 patients we have rehabilitated with implant-supported restoration, placed on revascularized free flaps, we noticed the onset of this particular kind of complication on 7 of them. To remove the gingival hyperplasia we used:

- at an initial phase traditional cold scalpel blade to obtain histological specimens;
- in case of recurrence (after 3/4 weeks) electric cautery;
- in case of further recurrence laser-therapy (CO_2 laser for its action on the fibrous component and diode laser for its coagulative action) was applied.

Results. The appearance of the hyperplasia was observed close to uncovering of the implants, but also after the set of the definitive restoration and recurrences were noted at both short and long term follow-up. We noted that gingival hyperplasia appears more frequently in patients with poor oral hygiene and that it is not influenced by the type of dental implants used. We only had to remove one implant, after a follow-up of 7 years because of the onset of a periimplantitis supported by the presence of hyperplasia, which prevented adequate oral hygiene around the implant but was not caused by it.

The hyperplasia did not damage the peri-implant bone and we had no reaction of bone resorption around implants when the lesions were removed soon after their appearance.

Conclusion. We had the same results in all of histological examinations : histological examination of the specimens showed oral with parakeratosis, papillomatosis and acanthosis, with normal maturation of the squamous epithelium. The typical feature of this lesion was the aspect of the submucosa characterized by an inflammatory lymphoplasmacytic and neutrophilic infiltrate and a vascular proliferation which resembles granulation tissue.

The onset of the hyperplasia has not been influenced by the different kind of vascularized free flap used to reconstruct the facial skeleton. The behavior of the gingival hyperplasia has not been influenced by the characteristics of the implantary fixtures used, in fact we had the onset of the hyperplasia in patients rehabilitated with six different dental implant brands.

The number of recurrences is strictly related to the quality of oral hygiene in the patients treated. The onset of gingival hyperplasia is not influenced by the kind of prosthetic rehabilitation, provisional or definitive, screwed or cemented. This particular complication does not cause the resorption of the peri-implant bone by itself, but can contribute to keep poor oral hygiene, causing the onset of periimplantitis The main idea to underline is that such patients need a continuous follow-up throughout the years, proper regard for good oral hygiene and of the conditions of the prosthetic rehabilitations in order to avoid the onset of such complication.

In-vitro osteogenic properties of ß-TCP and Chitosan scaffolds functionalized with BMP-2

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Aim. Beta tricalcium phosphate (ß-TCP) has been extensively used as a bone substitute, however its performance may be greatly enhanced by the incorporation of bioactive agents and materials. Chitosan is a well known biocompatible, biodegradable material enhancing bone formation and bone morphogenetic protein-2 (BMP-2) is a powerful osteoinductive factor. The aim of this work was to compare the osteblastic cell response to chitosan coated ß-TCP scaffolds either functionalized with BMP-2 or not functionalized.

Methods. Chitosan coated ß-TCP disks with a diameter of 5 to 10 mm were prepared as reported earlier. The samples were studied by X-ray diffraction, scanning electron microscopy, and energy dispersive X-ray analysis (EDX). A layer by layer deposition allowed for the incorporation of BMP-2. BMP-2 release was determined in simulated bodily fluids for the functionalized samples.

A mouse pre-osteoblastic cell line, MC3T3-E1, was purchased from ECACC. Cells were kept in Alpha MEM supplemented with 10% FBS, 50 µg/mL gentamicin. To examine the cellular adhesion and morphology, MC3T3-E1 cells were seeded on the samples and stained with Rodamine-Phalloidin/Dapi. Viability and proliferation rate of MC3T3-E1 cells were studied using the colorimetric MTS.

MC3T3 cells were differentiated by supplementing the culture medium with 10mM ßglycerophosphate and 50ng/ml Ascorbic Acid. The differentiation was measured analyzing the Alkaline Phosphatase activity and the osteo-inductive properties were measured using ELISA assay.

Data were analyzed with GraphPad Prism6. Each experiment was repeated at least three times. Statistical analysis was performed by using the nonparametric unpaired Wilcoxon-Mann-Whitney test. A p value of <0.05 was considered significant.

Results. We evaluated the morphology of the MC3T3-E1 cells seeded on ß-TCP scaffolds and BMP-2 functionalized ones and in both cases the cells were able to properly spread. These data are in agreement with the viability assay, which did not show any significative difference among samples. Besides, cell differentiation was assessed through Alkaline Phosphatase activity assay and the results showed higher level of activity in the cells grown on the BMP-2-functionalized ß-TCP scaffolds. Finally, we found higher Osteocalcin production by cells seeded on BMP-2-functionalized ß-TCP scaffolds compared to ß-TCP scaffolds.

Conclusion. In conclusion our data suggest that BMP-2-functionalized ß-TCP scaffolds display high osteo-inductive properties and could have future implications in dentistry.

Clinical efficacy of porous tantalum trabecular metal-enhanced titanium dental implants

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Aim. Compared to all other dental disciplines, implant dentistry has rapidly evolved, with progressive innovations, mainly in terms of development of new implant systems and the introduction of new surgical techniques. Formation of a direct bone to implant contact is the main success criteria in implant dentistry.

Porous surface coating should enhance integration, by allowing bone growth inside the pores; however, the number and size of the pores that can be obtained on the surface of the implant determine the quality and quantity of the bone growth. Histological studies showed that while a pore size of ~100 µm is adequate for bone ingrowth, osteon formation inside a porous material needs ~150 µm pores, while pores greater than ~300 µm are required to support vascularized bone ingrowth.

Difficulties, however, were encountered in trying to get regular pores of predetermined dimensions. To overcome this obstacle, orthopedic researchers developed a highly porous tantalum trabecular material (PTTM) (Trabecular Metal Material, Zimmer TMT, Parsippany, NJ, USA) that simulated the trabecular structure and more closely resembled the elastic modulus (2.5-3.9 GPa) of both cancellous (6.8 GPa) and cortical (13-17 GPa) bone than titanium (106-115 GPa), cobalt chromium (210 GPa), or stainless steel (230 GPa) surgical metals used for orthopedic implants. PTTM showed a bone-like three dimensional architecture, interconnected porosity up to 80% and osteoconductive properties. The porosity of Trabecular Metal Material not only significantly increases the surface available for bone formation, but also allows angiogenesis and bone formation inside the pores.

The aim of the present study is to compare osteointegration and marginal bone loss of immediately loaded Trabecular Metal® and Tapered Screw-Vent® Dental Implants (Zimmer Dental Inc., Carlsbad, CA, USA).

Methods. The Authors selected eighty-seven (87) patients, aged from 24 to 72 years (mean age 51), and randomly divided them into Group A (study group) and Group B (control group). Twenty-seven (27) patients, aged from 24 to 68 years, with an average of 49 years old, were enrolled in Group A, and were rehabilitated using Zimmer Trabecular Metal Dental Implants. Each patient was treated with one implant. Sixty-one (61) patients, aged from 26 to 72 (mean age 54) were enrolled in Group B, and were rehabilitated using Zimmer Tapered Screw-Vent Dental Implants. Each patient was treated with one implant.

Results. The mean value of marginal bone loss after one year was 0.44+0.40 mm for Group A and 0.95+0.62 mm for Group B ($p<.003$). Mean marginal bone loss after 18 months was 0.46+0.42 mm for group A and 0.97+0.65 mm for group B ($p<.003$). No TM implant was lost (Group A), whereas one TSV implant (Group B) was lost before osseointegration and was not included in the statistical analysis.

Conclusion. Both Trabecular Metal and Tapered Screw-Vent dental implants showed satisfying levels of osteointegration and marginal bone loss; however, statistical analysis revealed a value significantly lower of marginal bone loss for TM. Thus, it may be deduced that when implants are immediately loaded, the average loss of marginal bone around the TM implants is lower than that of the Tapered Screw-Vent implants. Within the limitations of this study, it is possible to assert that immediate loading of Zimmer TM implants gives satisfying results in terms of success and marginal bone loss.

Preliminary in vitro biological assessment of four ceramic dental implant surfaces

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Aim. The authors' aim was to assess the in-vitro biocompatibility of four different ceramic dental implant surfaces with particular interest in their osteogenic proprieties.

Methods. High purity powders were used to produce respectively planar Zirconia toughened Alumina (ZTA) and Alumina toughened Zirconia (ATZ) samples: Taimei Al2O3–16 wt%ZrO2 (Taimicron) and Tosoh ZrO2–20 wt%Al2O3 (TZ-3Y20AB), in form of ready to press powders. Green samples were obtained by linear pressuring at 80 MPa followed by Cold Isostatic Pressing under 200 MPa. The optimized sintering conditions are reported elsewhere (Faga MG et al. 2012). All the specimens were mirror polished and ultrasonically washed in acetone, ethanol and deionized water. Then half of ATZ and ZTA samples underwent a patented hydrothermal treatment. Thus four types of surfaces were obtained: treated ATZ, untreated ATZ, treated ZTA, untreated ZTA.

A mouse pre-osteoblastic cell line, MC3T3-E1, was purchased from ECACC. Cells were kept in Alpha MEM supplemented with 10% FBS, 50 µg/mL gentamicin. To examine the cellular adhesion and morphology, MC3T3-E1 cells were seeded on the samples and stained with Rodamine-Phalloidin/Dapi, at different time points (3;5;24h). Quantification of the cell spreading was performed with ImagJ software. Viability and proliferation rate of MC3T3-E1 cells were studied using the colorimetric MTS, at 24, 48 and 72 hours.

MC3T3 cells were differentiated by supplementing the culture medium with 10mM ßglycerophosphate and 50ng/ml Ascorbic Acid. The calcification of the extracellular matrix deposed on surfaces was quantified colorimetrically through the Alizarin Red Stain.

Data were analysed by GraphPad Prism6. Each experiment was repeated at least three times. Statistical analysis was performed by using the nonparametric unpaired WilcoxonMann-Whitney test. A p value of <0.05 was considered significant.

Results. MC3T3-E1 cells were able to properly spread without any significant difference among the four experimental conditions. The proliferation rate was similar in the four conditions considered and consistent with the trend of biocompatible materials. ATZ treated sample were able to induce an enhanced production of bone materials on the samples.

Conclusion. For the first time, the behavior of osteoblasts cultured on ATZ and ZTA that underwent a patented hydrothermal treatment, is reported. The ceramic materials either treated or not with orto-phosphoric acid properly sustained cell growth and proliferation showing high biocompatibility. Moreover ATZ treated samples seem to be more suitable for use in the prosthetic field.

Using of platelet-rich plasma (PRP) associated with bovine bone in regenerative dental surgery: simultaneous sinus floor elevation and positioning of dental implants. Assessment of the effects in healing and bone tissue regeneration

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Aim. The purpose of this work is to show how the application of platelet-rich plasma (PRP) in regenerative dental surgery as graft material associated with bovine bone in sinus floor elevation before positioning of dental implants, is a valid alternative to traditional technique. This method allows a better quality hard and soft tissues healing and less post operative discomforts thanks to the properties of platelet preparation.

Methods. A total of 20 patients, with maxillary partially edentulous and posterolateral atrophy requiring sinus floor elevation with the aim of an implant rehabilitative therapy, were enrolled in a follow-up study plan based on clinical and radiological criteria. This work was performed with the use of platelet-rich plasma and bovine bone as sinus graft materials associated with positioning of dental implants. Platelet-rich plasma is an autologous product that is derived from whole blood through the process of gradient density centrifugation. The proposed value of this product in dental implantology and in bone augmentation procedures lies in the ability to incorporate high concentrations of the growth factors PDGF, TGF and IGF, as well as fibrin, into the graft mixture. A total of 28 implants were placed. At the end of implant surgery and followup implant stability was assessed with ISQ index, that is an objective method. The implant stability quotient (ISQ) is the value on a scale that indicates the level of stability and osseointegration in dental implants. The scale ranges from 1 to 100 and is measured by implant stability meters instruments using resonance frequency analysis (RFA) technique.

Results. No dental injuries or tears of Schneider's membrane were noted during the procedures. No adverse events were recorded during the healing period in any of the patients, with no signs of infection. Few patients referred post operative pain and swelling. No implants failed before loading due to lack of osseointegration. No statistically significant differences were found between simultaneous and delayed implant placement. Few patients referred post operative pain and swelling. In all cases primary implant stability was over 55 using ISQ index, proving the efficacy of such method.

Conclusion. Sinus lift procedures have allowed implants to be placed in a posterolateral atrophic maxilla with high success rates. The composite graft (bovine bone and PRP) used in this study showed a 100% overall implant success rate and a 100% implant success rate after 18 months. PRP enhanced the graft-handling capacity via its fibrin capacity, thus making it easier for placement of the bone graft into the sinus chamber. Finally, bovine bone and PRP mixture is indicated for use as a successful bone graft regime for sinus augmentation.

Jaws reconstruction for implant rehabilitation: a retrospective study of patient satisfaction

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Aim. The aim of this study was to retrospectively evaluate the satisfaction of patients that underwent reconstruction of atrophic jaws with autologous bone grafts from the calvarium, prior to implant rehabilitation.

Materials and methods. Thirty-seven patients, who in the last ten years underwent to calvarial bone grafting for implant rehabilitation, were retrospectively evaluated for the present study. They were interviewed by phone and email, to answer a questionnaire regarding their experience related to the intervention. We used a scale ranging from 0 to 100 corresponding to total satisfaction and to complete dissatisfaction respectively. Specific questions analyzed: 1. the degree of concern prior to intervention 2. the level of pain and discomfort in both the harvesting and 3. grafting site and satisfaction in terms of intervention costs 4. agreement between expectations prior to intervention and results of intervention 5. post-intervention complications as perceived by patient 6. approval on surgeon communicative approach. Moreover, information on age, scholastic education and personal motivation of intervention were collected.

Results. Nineteen out of thirty-seven contacted patients completed the questionnaire. For these patients, mean elapsed time after intervention was 4.18 (±2.65) years. Overall mean age was 57.4 (± 14.39) years. Preoperative concern resulted in a mean of 40.36 (±35.33), postoperative pain and discomfort in 16.82 (±18.29) for the harvesting site and 30 (±23.97) for the grafting site and overall mean pain and discomfort was scored 36 (±27.44). Agreement between prior expectation and post-operative results was estimated 90.5 (±15.97), acceptability of intervention costs resulted in a mean of 62.75 (±22.49) and postintervention complications were rated 12.36 (±15.57). Finally, surgeon communicative capacity was estimated with a mean of 94.3 (±16.61).

Conclusion. Within the limits of this retrospective study, results demonstrate that patient satisfaction and acceptability to intervention was high due to limited postoperative inconvenience. The fact that harvesting of calvarial bone seems to be a well tolerated intervention should be considered as an additional advantage with this technique.

Implants and unilateral cleft lip and palate (UCLP): a case report

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Aim. The aim of this report is to present a clinical case about an unilateral cleft lip and palate (UCLP) patient who presented upper left lateral incisor agenesis, midface deficiency and microdontia of the elements 1.2, 1.1 and 2.1.

Case presentation. D.P. was born with left unilateral cleft-lip and palate; he underwent a chelorhynoplasty at 6 months of age, hard palate closure and early Secondary Gengivo-alveoloplasty at 2years of age. When the patient was 6 years old, he showed this characteristics: midface deficiency (sagittal and transverse diameter of the maxilla) with a premature contact between upper and lower incisors that guided the mandible in more forward position; familiar growing pattern of "third" class; 2.2 agenesis; palatal displacement of the upper left segment of the maxilla (the affected one). The orthognatic treatment of this patient started with rapid palatal expander followed by face mask; it continued with fixed orthodontics to align both the arches and help 2.3 to reach the occlusal plane through the cleft area. When he was 16 years old, a new fixed orthodontic therapy prepared the patient to the orthognatic surgery, specifically an upper jaw LeFort I, that will be performed at 18 years old. In UCLP patients it's not simple to reach a good simmetry of the anterior upper frontal teeth because of the agenesis of one or more of them and the different shapes and/or severe enamel defects of the other teeth. Because of all these matters the equipe decided to replace the missing 2.2 with a dental implant and to reshape the other frontal teeth with direct composite restorations. When the patient was 19 years old a single osseo-integrated dental implant (Osseospeed® Astratech 3,0x13mm) was inserted in the edentulous area (upper left incisor) under a prosthetic guide; orthodontic fixed appliance was still in place. After six months, the second stage surgery was performed, the fixed appliance was removed and an Essix retainer with a temporary resin crown (2.2) was given to the patient. Three weeks after second-stage surgery, the implant was loaded with a temporary all-resin dental crown, replaced two months later with a porcelain-fused-to-metal one. A reshape of 1.2, 1.1 and 2.1 with direct composite restorations was performed.

Results. After a 5 years follow up the patient still have stable function and esthetics.

Conclusion. Working on CLP patient is a real challenge because most of the normal parameters are not respected. One of the most difficult aspects that we have to deal with is the ossification of the cleft area. The case we described is not simple from an orthodontic point of view because of the skeletal and familiar growing pattern and because of the scars due to CLP surgical treatment. In the cleft area a good ossification, due to the orthodontic-guided eruption of the upper left canine, gave us the opportunity to perform a single unit prosthetic rehabilitation on an osseointegrated dental implant. The treatment gave to the patient a function, an esthetics and a stability that he never had before: that's why working with a complete and well trained team is always the best choice to reach good therapeutic results.

Evaluation of angiogenic capability of autologous calvaria bone graft used in oral rehabilitations: a literature survey

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Aim. The aim of this literature survey was to investigate the angiogenic capability of autologous bone graft from calvaria used for oral rehabilitations prior implant placement in patients with severe jaw bone defects. The attention was focused on the expression of Vascular Endothelial Growth Factor (VEGF), a molecule involved in initial bone remodeling phases through inducing the growth and supporting the formation of new blood vessels in the site of grafting, which is a fundamental phase for graft integration.

Methods. A literature scan was performed online on MEDLINE-PUBMED by using as searching criteria the following key words: "calvaria, oral, bone, graft, vegf" and limiting the time span to the last 10 years. The relevant publications were identified and full texts of these articles were obtained and discussed in this survey.

Results. A total of 18 articles were found out through the key words used. The subsequent abstract investigation revealed 7 articles for full-text reading and discussion.

Conclusion. The initial angiogenic boost of autologous bone graft calvaria allow, together with the high cortical component which assure low degree of resorption, allow to assess that, both biologically and clinically, autoLogous bone graft from calvaria could represent the gold standard for oral rehabilitations prior implant placement in patients with severe jaw bone defects.

The use of Ti-mesh and PRGF for maxillary sinus lift and immediate implants in alveolar bone atrophy. A one-stage approach

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Aim. The aim of this report is to describe a surgical approach to immediately stabilize implants and to improve healing process by means of use of titanium mesh (Ti-mesh) and plasma rich in growth factors (PRGF) when implants are placed contextually to maxillary sinus lift with residual bone height <3mm.

Case presentation. A 65-year-old male with a non-contributory medical history was referred for an implant-prosthetic rehabilitation. Clinical and radiographic examinations were accomplished. Cone-Beam Computerized Tomography (CBCT) showed insufficient bone height in left maxilla, that was 9 mm, 1 mm and 3 mm in second premolar, first and second molar region, respectively. In order to shorten treatment time and to reduce patient's discomfort, the authors decided to make a 1-step surgical approach based on maxillary sinus lift and implants placed simultaneously. A Ti-mesh was used to stabilize the implants and PRGF was used to fasten osseointegration process.After local anesthesia, a mid-crestal incision and a full thickness buccal flap was raised exposing the vestibular bony wall to identify the walls of the maxillary sinus. A round bony window was prepared with piezoeletric device, isolating circumflex artery, ramus of maxillary artery, to avoid bleeding. Schneiderian membrane was elevated carefully, creating a space for bone augmentation. After preparation of implant sites, bone graft material was prepared with heterologous bone and PRGF solution and was gently packed into maxillary sinus. The implants were embedded with PRGF and then inserted in corresponding sites. Since insertion torque values were 45 Ncm, 5 Ncm and 10 Ncm, the 3 implants were connected together using a rigid Ti-mesh with thickness of 0.2 mm, fixed to the bone by means of osteosynthesis mini-screws. Finally, PRGF membranes were placed above the Ti-mesh and underneath the surgical flaps, before first healing closure with 4/0 resorbable suture.6 months after implant surgery, Ti-mesh was removed, reverse torque was checked until 30 Ncm, and healing abutments were screwed on implants. After 3 months, a definitive metal-ceramics fixed bridge was delivered to patient to rehabilitate the posterior region.

Results. No complications occurred during healing period. After 1-year follow-up, clinical examintation showed soft tissue contours with no significant changes and radiographic examination revealed stable bone levels around implants, without remarkable peri-implant bone loss.

Conclusion. This case report showed good clinical results when using a Ti-mesh to stabilize implants placed in grafted sinus in order to enhance primary stability. Rigid fixations permitted to avoid micromovements that could compromise osseointegration. The use of PRGF seems to give support to cellular adhesion and bone formation, fastening the healing process of bone and soft tissue. This technique could be considered a viable option in order to reduce the number of surgeries and to shorten overall treatment time.

The benefits of guided surgery for the clinician and the patient

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Aim. Guided surgery for implant placement can be divided into three basic phases. In diagnostic phase, taking advantage of patient data, dental technician creates a diagnostic template, used to transfer those data on TC exam. In planning phase, software transforms TC data in 3D images that will be necessary to the clinician to plan guided treatment. Implant layout will be sent to dental technician who'll build up a surgical guide, used in the last phase. Finally, in surgical phase, the clinician places oral implants using that surgical guide, containing those data. The purpose of this article is to demostrate advantages gained with guided implant placement, concerning patient discomfort during and after surgery with reduction of swelling and postoperative pain due to flapless technique, reduction of treatment duration and bone loss during the preparation of implant site. Also, the use of guided surgery, makes it possible to insert implants safely and accurately.

Methods. A case-control study lasting 12 months was carried out. Case group consisted of 16 patients subjected to 23 oral implants placement with guided surgery and flapless technique. Control group consisted of 16 patients with the placement of 27 implants using the conventional technique. Each patient scored postoperative swelling and pain by means of a visual analog scale (VAS). The Primary implant stability (ISQ) has been evaluated by means of the device Osstell ISQ.

Results. 16 operations were carried out in each group. Immediate aesthetics were established for all implants of the study group. 2 implant failed in each group. Maximum pain was recorded after 6 hours in both groups (mean VAS score 4,3 and 5,2 in the study and control group, respectively). Maximum swelling was recorded after 24 hours (mean VAS score 2.8) in the study group and on the second day (mean VAS score 3.9) in the control group. In guided surgery ISQ values range from 66 to 72, compared with traditional dental implant surgery, in which they range from 63 to 70.

Conclusion. In the study, guided surgery for implant placement with the flapless technique reduced pain and swelling, compared to traditional implant surgery. The values of ISQ in guided surgery for implant placement were superior about 3 unit compared to traditional implant surgery. The implant with guided surgery and instant functional load is a predictable method, provided that patients selection and the surgery technique are acceptable, and offers a lower postoperative morbidity, and a greater gratification of the patient, because of an instant restoring of aesthetics and functionality.

Ridge dimensions of the edentulous mandible in posterior sextants: an observational study on cone beam CT analysis

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Aim. To evaluate the ridge dimensions of edentulous mandibular posterior sextants by the use of CBCT radiographs.

Methods. Cone beam computerized tomography

(CBCT) scans of totally edentulous mandibles from 136 patients (69 males; mean age: 67.4 years, range 27 ÷ 92 years) were retrospectively included for analysis. At sites corresponding to the second premolar (site a) and the mesial and distal root of first molar (sites b and c, respectively), bone height (BH) was measured as the distance between the alveolar canal and the bone crest, and bucco-lingual bone width (BW) was measured at 1, 3, and 5 mm from the most coronal point of the bone crest.

Results. Bone height (BH) decreased from site a (11.2 ± 4.0) to site c (10.3 ± 3.3) ($p<0.001$). Males showed a significantly higher BH compared to females at all sites ($p<0.001$), the mean difference being 2.79 mm. No significant impact of age on BH was found. BW increased from coronal to apical at all points ($BW_{5mm}>BW_{3mm}>BW_{1mm}$). At all height levels (1, 3 and 5 mm), BW increased from mesial to distal ($BW>BW_b>BW$). No significant impact of age and gender on BW was found.

Conclusion. In the posterior sextant of edentulous mandibles, BH decreased from mesial to distal, while BW showed an increase. Gender had a significant impact on BH, with males showing greater BH values compared to females.

Bacterial adhesion to grade 4 and grade 5 turned and mildly acid-etched titanium implant surfaces

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Aim. In the present study the bacterial adhesion to transmucosal titanium implant surfaces, different for composition, i.e. titanium purity, and topographic features, due to the surface treatment received, was investigated.

Methods. Grade 4 and grade 5 turned (T-4, T-5,) and mildly acid-etched (MA-4, MA-5) titanium surfaces in form of 6x1mm disks (Leader Italia s.r.l, Milano, Italia) were used. Scanning electronic microscopy (SEM) and 3D profilometry were used to qualitatively and quantitatively characterize their topographic features. Height (Sa), spatial (Sds) and hybrid (Sdr) roughness parameters with proper Gauss filtering were measured. The chemical composition of titanium samples were defined by energy dispersive x-ray spectrometry (EDS). Bacterial cultures (Aggregatibacter actinomycetemcomitans) were seeded on implant surfaces and after 2 and 6 hours adherent bacteria were detached and quantified by counting of the colony forming units (CFUs). Moreover, 6 periodontally healthy volunteers wear customized resin stents with titanium samples exposed to the oral environment and, after 12 hours, the formed biofilm was evaluated by total bacteria counting. Data were summarized by using medians, interquartile ranges (25th–75th percentile) and minimum/maximum values. Intergroup differences were tested by the by the Kruskal–Wallis rank analysis of variance with the level of significance set at $p<0.05$. Calculations were done with statistical software SPSS 15.0 for Windows (SPSS Corp. Chicago, IL, USA).

Results. Both T and MA surfaces showed roughness values in the "smooth" category ($Sa<0.5$ µm), although MA surfaces were significantly rougher in terms of Sa. No topographical difference between grade 4 and grade 5 disks was detected. Significantly higher in vitro bacterial adhesion for MA vs T disks was showed at 2 and 6 hours. The 12 hour-ex vivo test showed significantly higher values of CFU counting for MA vs T surfaces and for grade 5 *vs* grade 4 disks.

Conclusion. Bacterial adhesion, particularly when tested ex vivo, showed to be sensitive to both titanium surface topography and composition. Also slight differences in the surface roughness of two smooth titanium surfaces showed to have significant effect on the bacterial adhesion. Furthermore, titanium purity showed to have a possible role in the attitude of implant surfaces to limit the oral biofilm formation and to maintain peri-implant soft tissue health.

Marginal peri-implant bone loss associated with conical and straigth implant collars: a prospective simmetrical split mouth study

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Aim. The purpose of this paper is to evaluate the influence of straight and conical implant collar designs on marginal peri-implant bone loss, implant success rate and implant survival rate, in two implant fixtures provided with identical implant surfaces, prosthetic connections, diameters and lengths.

Materials and methods. From 2008 to 2010, ten patients presenting with single tooth symmetric bounded edentulous spaces in the posterior maxilla or mandible, were treated with the insertion of a straight collar implant in one site (OsseoSpeed™ TX 5.0 S Astra Tech Implant System™), and a conical collar implant in the symmetric contralateral one (OsseoSpeed™ TX 5.0, Astra Tech Implant System™). All edentulous sites did not require bone regeneration in order to place 5mm implants with a minimum length of 9mm, as the inclusion criteria required a minimum residual bone height of 12mm and a minimum residual bone width of 7mm per site. All patients received implants with matching lengths in the two symmetric sites. All patients were followed-up for 36 months after prosthetic finalization to evaluate the following parameters: full mouth plaque score (FMPS) and bleeding score (FMBS), peri-implant bone resorption, periimplant probing depth (PD) and bleeding on probing (BOP), implant survival and success rates according to Albrektsson et al. criteria (1986).

Results. All patients were evaluated at their last recall with a clinical evaluation and a periapical radiograph, standardized through the customization of a Rinn's film holder. No implant failed to osteointegrate or required to be removed. All patients maintained adequate plaque and bleeding on probing indexes during the follow-up period. The evaluation conducted on the periapical radiographs through an image processing and analysis software (Image J®) revealed a marginal peri-implant bone loss ranged from 0 to 0.5 mm in 80% of cases and from 0.5 to 1 mm in 15%. In a single implant, a 1.9 mm vertical bone resorption was observed. The survival and success rates according to Albrektsson et al. criteria were 100% and 95%, respectively. No significant differences were observed between the two sites, with respect to peri-implant probing depth (PD) and bleed-

ing on probing (BOP), peri-implant bone loss, implant success rate, and implant survival rate.

Conclusion. Despite the short follow-up period, preliminary results from this study suggest that large diameter implants with a straight or conical implant collar macrostructure are equally reliable in the rehabilitation of single tooth posterior edentulous spaces.

Non surgical treatment of implants with peri-implant disease: a case report

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Aim. To evaluate the healing at 6 months of two implants affected by peri-implant disease.

Methods. In one patient partially edentulous and presenting 5 implants, two of those (#31 and #41) were diagnosed for peri-implant disease induced by plaque accumulation. No trauma of occlusion, malposition or cementum remnants were assessed. Implants had been placed about 10 years ago after bone regenerative procedure. At the clinical evaluation were observed bleeding on probing and suppuration. Implants were treated with debridement performed with ultrasonic device and curettes, and washes with hydrogen peroxide. After treatment, systemic antibiotic therapy (Amoxicillin+clavulanic acid 1gr twice for 6 days) was prescribed. Visits of control were performed until 6 months. Radiographs were performed before treatment and at 6 months.

Results. After therapy probing depth was strongly reduced for #31 and #41, and recession of peri-implant mucosa appeared. No bleeding on probing and suppuration was assessed. At the radiographic evaluation, partial re-mineralization of the defect was observed.

Conclusion. Treatment of implants affected by peri-implantitis with debridement, hydrogen peroxide and systemic antibiotic therapy may re-establish clinically healthy peri-implant condition. At 6 months this results can be maintained and partial re-mineralization of the defect can be observed.

Human dental pulp stem cells in vitro proliferation and osteogenic differentiation: the role of vascular endothelial growth factor

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The angiogenesis process have a critical role during tissue growth in physiological and pathological condition, indicating increased demands for blood in the lower differentiated tissues. The VEGF protein action was considerate an important mediators of angiogenesis processes during physiological dental tissues development. In this research the Vascular Endothelia Growth Factor (VEGF) expression, was evaluated in human dental pulp stem cells during in vitro proliferation and osteogenic differentiation.

Mesenchymal stem cells (MSC), isolated from human dental tissues, are largely studied for future application in regenerative dentistry. In this study, we used MSC obtained from human dental pulp (DPSC) of normal impacted third molars that, when cultured in lineagespecific inducing media, differentiate into osteoblasts and adipocytes (evaluated by Alizarin Red S and Red Oil O stainings, respectively), thus showing a multipotency. We confirmed that DPSC, grown under undifferentiating conditions, are negative for hematopoietic (CD45, CD31, CD34, CD144) and positive for mesenchymal (CD29, CD90, CD105, CD166, CD146, STRO-1) markers, that underwent down-regulation when cells were grown in osteogenic medium for 3 weeks. In this condition, they also exhibit an increase in the expression of osteogenic markers (RUNX-2, alkaline phosphatase) and extracellular calcium deposition, whereas the expression of receptors (VEGFR-1 and -2) for vascular endothelial growth factors (VEGF) and related VEGF binding proteins was similar to that found in undifferentiated DPSC. Exposure of DPSC growing under undifferentiating or osteogenic conditions to VEGF-A165 peptide (10-40 ng/ml) for 8 days dose- and time-dependently increased the number of proliferating cells without inducing differentiation towards endothelial lineage, as evaluated by the lack of expression of specific markers (CD31, CD34, CD144). Additionally, exposure of DPSC cultured in osteogenic medium to VEGF-A165 for a similar period enhanced cell differentiation towards osteoblasts as evaluated after 14 and 21 days by Alizarin Red S staining and alkaline phosphatase activity quantification. These findings may have clinical implications possibly facilitating tissue repair and remodeling.

The angiogenesis plays a crucial role in many human physiological and pathological processes during tissue development and growth. However in according to the results obteined, the VEGF factor would seem to play a very important role in the processes of proliferation and differentiation of reprogrammed mesenchymal stem cells derived from human dental pulp, towards speeding bone differentiation processes. Again new researchs may be needed to better understand the mechanisms of these processes during bone growth, however, VEGF factor would seem to play an important action to promote the bone regeneration, useful in all methods of clinical application in regenerative medicine

Socket grafting and behaviour of soft tissues healing around single immediate post-extractive implant. A clinical trial

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Aim. Immediate post-extractive implants allow for faster implant rehabilitation procedures. However the clinical outcome of fresh socket implant placement in the aesthetic region remains a challenging and unpredictable procedure. The residual buccal plate, even if still present and undamaged at the time of tooth extraction, will undergo a bone remodelling phase whose final outcome is difficult to predict due to great individual variability. The aim of the work is to evaluate the behaviour of soft- and hard-tissue surrounding immediately placed single implants, to understand whether the adjunctive use of a resorbable collagen matrix could improve the aesthetic tissues outcome. A clinical trial was designed to test the

insertion of a bone graft, followed to the application of a resorbable collagen matrix to fill and seal the residual bone-to-implant gap after implant placement in fresh sockets. This study presents preliminary results from a 12 months pilot clinical study of 10 cases of immediately loaded implant placed in fresh extraction socket.

Methods. Ten healthy non smoker patients, 3 male 7 female, aging from 28 to 65 years, showing thick gingival biotype, with a total of 10 anterior maxillary teeth scheduled for extractions were enrolled. Following extraction, implants were immediately positioned. Once the implant was placed, the space between the buccal wall and the implant surface was filled using a bone substitute (Bio Oss®), and a resorbable bovine collagen matrix (Mucograft® Geistlich Pharma AG Wolhusen Switzerland) was shaped and adapted to cover the bone graft. Finally a provisional screwed crown was inserted out of bite. Documentation consisted in peri-apical radiographs taken: before treatment; at the time of implant placement; at the time of prosthetic rehabilitation and 12 months after the start of prosthetic function. Clinical data, collected using an image processing software, were: wound healing features; presence/absence of inter-proximal papilla; inter-implant-tooth distance (ITD); distance from the base of the crown contact-point to the inter-dental bone crest (CPB); and buccalgingival tissue modifications.

Results. The healing period was uneventful. At week 2 postoperatively, the wound exhibited minimal alterations with reduced edema and erythema. At week 4, the gingival color, texture, and contour of the treated area appeared identical to the adjacent soft tissues. After 12 months of prosthetic function, a 100% of implant survival rate was observed. The presence of the mesial and distal papillae was more correlated with the mean CPB values than ITD distances. A significant buccal gingival tissue manteinance was registered in all patients.

Conclusion. The preliminary results of this pilot clinical study suggest that the use of a resorbable collagen matrix after filling the residual socket with bone grafting can be useful to improve peri-implant hard tissue stability and soft tissue aesthetical outcome. This procedure would provide, in one surgical time, adequate volume for bone tissue augmentation and thickness of keratinized soft tissue adjacent to implant-prosthetic restoration, minimizing postsurgical morbidity.

Immediate *vs.* delayed single implant treatment: a retrospective aesthetic evaluation using the PES/WES score

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Aim. The single restoration in the anterior maxilla is the most challanging treatment for the clinician in implant therapy. Infact the clinicians have to consider the high esthetic impact of this area. There are some evidences that the implant placement in fresh sockets might lead to a better esthetic results. The aim of this study is to compare the esthetic outcomes of single-implants placed in the anterior maxilla with the immediate and delayed procedure. The results were analyzed using the pink esthetic score and the white esthetic score (PES/WES).

Materials and methods. 103 patients treated in five different centers with an immediate or a delayed single implant placement in the anterior maxilla have been retrospective analyzed during a period of 2 years in order to evaluate the esthetic outcomes. Only sites with the presence of both mesial and distal natural tooth were evaluated. An important exclusion criteria was the presence of a very thin gengival biotype. All implant crowns (central, lateral incisors, cuspids and first premolars) were photographed with a digital camera and a 105 mm lens with a ring flash. For assessing anterior tooth replacements, the reference controlateral tooth had to be completely and symmetrically represented, in order to ensure comparability. For central, lateral incisors and cuspids the photographs were centered at the midline, which was primarily based on symmetry. For the first premolars the approach was modified and a picture including the second premolar and the cuspid was taken, with these serving as references. Two independent calibrated examiners applied the PES/WES index.

Results. No implant failures were registered. No implant loosing were showed in our study. All the 103 cases were conformed to the success criteria and were associated to a success value of 100% for both implant and prosthetic analysis. In fact all the implants had a perfect osteointegration without signs of pain or suppuration, no clinical mobility, no radiolucency around the implant and a DIB<1.5 during the first year of loading. Furthermore absence of prosthetics complicance were showed at the implant-abutment interface. The mean value for the PES was 7.8 (SD 1.8) and 7.4 (SD 1.8) respectively for immediate and conventional implants. The mean value for the WES was 8.6 (SD 1.7) and 7.8 (SD 2.1) for immediate and conventional implants. 33 single implants (32%), 18 inserted with immediate protocol (42.8%) and 15 placed with conventional protocol (24.5%) on an overall of 103 implants showed an almost perfect esthetic result with PES/WES values ≥18. Sixteen implants (15.5%) of 103 single implants (4 with immediate protocol 9.5%; 12 with conventional protocol, 19.7%) have demonstrated a score of PES/WES ≤12, so estheticaly unexcaptable.

Conclusion. Regarding our results we can conclude that both immediate and conventional single implant treatment can produce satisfactory esthetic outcomes. Althought in patients younger that 30 years old and in patients that underwent the bone countouring and the connective tissue graft tecnique, the immediate single implant procedure seems to be releated to better esthetic results.

Edentulous patients rehabilitated according to the "all-on-four" procedure with prefabricated bar system

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Aim. the aim of this clinical study was to evaluate a new type of prefabricated bar system, supported by

axial and tilted implants in patients with completely edentulous jaws at 1year follow-up.

Methods. Patients edentulous in one or both jaws, with severe atrophy of the mandible or maxilla in posterior regions, were randomly selected for this study. Complete-arch immediately loaded prostheses supported by 4 implants (2 axial and 2 tilted) were placed. After the surgical procedure, according to the "all-on-four" protocol, angulated abutments (Extreme Abutment, EA® Winsix, Biosafin, Ancona, Italy) were set at either 17° for anterior implants and, at 30° those for posterior implants, to compensate for the lack of parallelism. Pickup impressions of the implants were made at the conclusion of the surgery, an interocclusal registration was performed using the prefabricated prosthesis.

On master cast, Clip Abutment Bar adapters (CAB®, Winsix, Biosafin, Ancona, Italy) were connected to each fixture analog and the inter-implant distance was measured. The height of the adapters was 3 mm and 1 mm, respectively parallel with occlusal plane. The tube bar was then inserted into the cutting tool and cut to correct length using the cutting disc. The bar assembly was then connected to the implant adapters and torqued into place. No soldering were performed, the universal nature of the ball joint allows the tube bar to be located in the horizontal plane in a truly stress free alignment.

Follow-up visits were performed at 3, 6, and 12 months after implant insertion. Radiographic assessments were made using panoramic radiographs obtained immediately after surgery and at each follow-up visit. Bone level measurements were reported at 6 and 12 months, and bone loss around the upright and tilted implants was compared by means of a Student t test.

Results. Thirty patients were randomly selected for this study. They were treated with immediately loaded 34 complete-arch prostheses (13 maxillary and 21 mandibular region) supported by 4 implants (in total 136 implants). The 12-month overall implant survival rate was 100% for axially positioned implants and 97.95% for tilted implants. The implant survival rates were 100% in the maxilla and 97.92% in the mandible. None of the 34 fixed prostheses were lost during the observation period, representing a prosthetic survival rate of 100%. No statistically significant differences (P>0.05) in crestal bone loss between tilted and upright implants was detected at 6 and 12-month follow-up evaluation in either jaw.

Conclusion. This clinical study bear the risk of implant failure is therefore significantly reduced for prefabricated bar "all on four" immediate prosthetic rehabilitation, however more long-term prospective clinical trials are needed to affirm the effectiveness of the surgical-prosthetic protocol

Implant placement in fresh extraction sockets and simultaneous osteotome sinus floor elevation with electric mallet

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Aim. The aim of this clinical study was to compare the use of hand mallet versus electric mallet in osteotome-assisted surgery for fresh socket implants and sinus floor elevation in premolar regions.

Methods. Forty patients were included in this prospective study. The following inclusion criteria were adopted: good general health, no chronic systemic diseases. All subjects included in this study needed to have one or two maxillary premolar extraction for deep decay or vertical root fracture.

Sixty teeth were extracted. The patients were divided in two groups: in one group (20 patients, control group) sinus floor elevation was performed with osteotome pushed by hand mallet, in the second group (20 patients, test group) sinus floor elevation was prepared with the use of an electric mallet. The Magnetic Mallet is a magneto-dynamical device assembled into an handpiece which is energized by a power control defining forces and timing of application. The point is to connect osteotomes to the handpiece sending a shock wave on their tip. The magnetic wave and the subsequent shock wave is calibrated regarding the timing of application of the force, and induces axial and radial movements applied on the tip of osteotome, with a fast force of 90 daN/8μs.

The Magnetic mallet induced to osteotomes a longitudinal movement along central axis, moving up and down toward pilot bone hole, providing a driving mechanism of longitudinal movements.

Such sequence of engaged surface progressively act upon and force internal wall of initial hole radially outward with respect to central axis to create high density bone tissue along substantial portion of length of bore wall.

Sixty dental implants were positioned immediately in fresh extraction sockets. Intraoral digital radiographic examinations were made at baseline, 70 days (temporary prosthesis placement), 12 and 24 months after implant placement and gained alveolar bone height was measured and reported at 70 days, 12 and 24 months.

Results. After 24 months follow-up, a survival rate of 100% was reported. In control group two patients developed benign paroxysmal positional vertigo (BPPV), no symptoms in test group. The alveolar bone gain following 70 days from implant placement (temporary prosthesis placement) resulted in a mean value of 3.08 ± 1.45 mm for control group and 2.81 ± 1.22 mm for test groups. Successively, after 12 months, the bone height incremented in both groups and, at 24 months, was stable (4.34 ± 1.98 mm control group and 4.67 ± 1.71 mm test group). Statistical analysis reported not statistically significant differences.

Conclusion. The use of electric mallet provided some essential advantages during surgical procedure in comparison with hand mallet.

Interdisciplinary treatment approach for post traumatic management of the aesthetic zone: a case report

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Aim. It has been widely reported that sport activity increases the risk of dental injury. Indeed, sports were

found to be responsible for 13% of overall oral trauma. The maxillary central incisors are the most commonly injured teeth, especially in case of pronounced overjet. This case report shows how tooth replantation combined with dental implant could be suitable treatments to manage teeth loss after traumatic injury affecting the anterior maxilla. This case report illustrates the rehabilitation of a 41-year-old male with 9-mm overjet after dental trauma and reports one-year follow-up results.

Methods. A 41-year-old male was hit during a football match. Intraoral preliminary examination at the place of accident revealed that central-maxillary incisor (1.1) was avulsed. The tooth was found intact, therefore briefly washed and placed in a glass filled with 0.9% sodium chloride solution and the patient was immediately taken to his private dentist. As too long a time had meanwhile passed for early replantation, as per current Dental Trauma Guidelines, the tooth received extra oral endodontic treatment and a delayed replantation was performed under local anesthesia. Gingival and lip lacerations were sutured and systemic antibiotics (1 g of Amoxicillin and clavulanic acid/ 8 h) were administered. The normal position of the replanted tooth was clinically and radiographically verified. Eventually, an emergency dental splint was placed using a semirigid wire for 3 weeks. Nevertheless, an abnormal mobility of the contralateral incisor (2.1) was detected after splint removal. Periapical radiographs revealed oblique root fracture and the tooth was decided to be extracted as it was judged hopeless. Alginate impressions were taken before surgery. An immediately post-extraction implant (4.3 x 13 mm) was inserted after full thickness flap elevation without vertical incisions and a bone substitute (anorganic bovine bone) was grafted to help maintain buccal hard tissues. Implant position was recorded by means of a resin jig to transfer the precise implant position in a previously developed cast. Immediate functionalization was performed within 24 hours by means of a temporary acrylic crown which was taken out of any functional occlusal contacts both in centric occlusion and during excursive mandibular movements. Five months later, when a satisfactory visual appearance of soft tissues was reached, impressions were taken and a screwed full-ceramic lithium disilicate crown was placed.

Results. After more than 1-year follow up the implant-crown restoration appeared functionally and aesthetically well-integrated. Effectively, the soft tissue colour and texture were harmoniously integrated with the adjacent natural teeth at the buccal aspect and interdental papillae completely filled the embrasure spaces up to the contact points. The Replanted tooth was properly integrated. Radiographs showed no signs of complications like root resorption or ankylosis. Additionally, patient reported outcomes on the whole treatment were positive.

Conclusion. This case report may be considered an example of interdisciplinary treatment in which the effectiveness of Dental Trauma Guidelines is shown in combination with anterior maxillary single-tooth implant replacement by means of immediate implant placement and immediate functionalization. The proper application of these therapeutic options seems to be a viable way to maintain aesthetics and function, with good patient's satisfaction and cost reduction.

Comparison of self-etching and self-adhesive resin cement systems on the tensile bond strength to lithium disilicate ceramic and dentin

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Aim. the purpose of this study was to investigate the tensile bond strength, the morphology of interfacial structure of self-adhesive and sself-etching resin cements to dentin and lithium disilicate ceramics.

Methods and materials. Two groups of eight human caries free third molars were selected. Teeth were cleaned, embadded in acrylic resin and sectioned across the main axis, to expose a flat dentine surface. Lithium disilicate ceramic cubes were milled by CAD/CAM to carve a cylinder of 5 mm diameter. The ceramics were heat-treated to get their definitive structure and than etched with 9,6% HF for 10 seconds. HF was washed with water and silane was applied on the surfaces for 60 seconds. The two groups were ready for the luting process. The first group of teeth was luted by a self-adhesive resin cement (SA), so no prior treatment was required on dentine surface. The resin was applied on the ceramics surfaces, specimens were luted and light cured for 20 seconds in each direction. The second group of teeth was luted by a self-etching resin cement (SE), after application of a self-etching primer on the dentine surface.

The resin cement was applied and cured with the same procedures as the former group. To test the tensile bond strength, specimens were debonded with a testing machine ("Material Test System"). Means and standard deviations of bond strength were calculated. Interfacial structure were then analyzed with the Environmental Scanning Electron Microscope (ESEM). Differences were analysed by t-test statistics.

Results. Tensile bond test showed a better performance of SE, with a mean failure load of 451N, compared to 194N for the SA group. ESEM analysis confirmed cohesive fracture in the SE group and adhesive fracture with SA. ESEM also revealed that self-adhesive technique did not substantially alter dentine structure. Noticeably, the self-etching primer used for SE luting exposed dentin tubules.

Conclusion. taken together our data indicate thet self etching resin cement had higher adhesion to lithium disilicate ceramics and dentin then self-adhesive cement, both by tensile bond strength and ESEM analysis.

Local delivery of stanozolol enhances new bone formation in rat calvarial critical-size defects

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Aim. The aim of this in vivo study was to assess the effects of locally delivered ST in rat calvarial critical-size defects.

Methods. Behind approval of the local Ethics Committee, 10 male, Wistar rats aged 4 months were included in the study. Surgical flaps were gently raised and a standardized critical size defect was created bilaterally on each parietal by means of a trephine burr of

5.0 mm external diameter (Biomet 3i, USA) attached to a ATR 3000 Plus motor (Simit, Italia) 800 rpm, under abundant irrigation with sterile saline. A blinded surgeon filled the defect on one side with DBBM+ST (test side) and the controlateral with DBBM (control side). A 2-layers suture (Vycril 5-0, Ethicon, Johnson & Johnson, Netherlands; Prolene 3-0, Ethicon, Johnson & Johnson, Netherlands) was carried out to allow primary intention wound healing. All surgeries were performed by the same trained operator. At 1 month, animals were sacrificed and a rectangular panel was containing the original surgical defect area and the surrounding tissues was surgically removed. Samples were embedded in paraffin and serial slices were obtained with a rotative microtome in a plane parallel to the sagittal suture. Sections were stained with hematoxylin and eosin. Images were captured with a binocular optical microscope connected with digital camera. New bone formation (NB), fibrous tissue (FT) and residual biomaterial (RB) were quantified by a single trained operator. Data were analyzed by image analysis software (Image Pro-plus 4.0, Media Cybernetics, USA). Differences between groups were evaluated using Student's t test.

Results. Histomorphometry revealed a significantly higher NB in DBBM+ST compared to DBBM specimens (25.9% ± 8.63% vs. 16.19% ± 8.65%, $p<0.05$). FT was significantly lower DBBM+ST compared to DBBM group (45,54% ± 14,99% vs 60,60% ± 8,68%, $p<0.01$). RB was not significantly different between groups (DBBM+ST: 31.84% ± 6.44 vs. DBBM: 27.15% ± 10.13%, $p>0.05$).

Conclusion. Standing to our results, local delivery of ST enhances new bone formation at 1 month in rat calvarial critical-size defects. The lower FT rate found in DBBM+ST compared to DBBM specimens is consistent with a more mature tissue pattern. Thus, we may hypothesize that ST played an anabolic action which fastened bone remodeling at 1 month of healing. The lower FT rate found in DBBM+ST compared to DBBM specimens is consistent with a more mature tissue pattern.

Decision support software proposal to help the choice between restorative versus implant-prosthetic treatment

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Aim. Conservative approach and tooth replacement with a dental implant are possible treatments to solve many clinical situations. Even if clinical and technological evolution in implantology offers a variety of solutions, all due consideration on conservative treatments should be taken into account, before the extraction and the replacement of compromised teeth. In order to achieve the most correct therapeutic choice in every case, a careful analysis of the strategic importance of involved teeth is required. In the same way, an evaluation of many presurgical, endosurgical and postsurgical factors, that can influence the prognosis, is needed too.

Analyzing all parameters and considering all possible psycho-social and economic consequences for every patient, a choice between possible different treatments can be made. In order to make a rational decision among the several therapeutic options and to reach the goal of an optimal therapy, we have decided to develop a decision support software (DSS) that could be of some help for user, analyzing the achievable success rate for every treatment.

Methods. Our software (patent pending), represents the coding of an algorithm for the choice of an optimal therapy in a high-level programming language. C# is the programming language we have chosen. C# is a multi-paradigm, general purpose, object-oriented programming language which allowed us to easily develop a user-friendly graphic interface.

Our software can be logically divided into 3 moduli. The first modulus manages input from user and memorizes options in an XML (eXtensible Markup Language) file. The second modulus reads the options written in the XML file, interacts with an extern database in which all possible treatments are recorded, chooses some notable therapies for the case in question, calculates the success rate for these therapies and sends the results to the third modulus. The third modulus receives the results sent by the second one and displays the output through a graphic interface.

Treatments database, populated with data from literature, is accessed through OLE DB (Object Linking and Embedding, Database), a set of routines, protocols and tools designed to provide applications with uniform access to data stored in diverse information sources.

Results. Run-time execution of our software allows the visualization of success rate according to the algorithm used. The software quickly displays an optimal therapy, the success rate of every therapy and makes a comparison among alternative treatments.

Conclusion. DSS cannot and must not replace professional competence in evaluating a case. Nevertheless, DSS can represent a valid help for a therapeutic option to be supported by scientific evidence, particularly, when the choice is influenced by multidisciplinary competencies.

Nanofilled packable and flowable composite resins *versus* microhybrid ones: a microhardness analysis

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Aim. The filler formulation of composite resin has evolved substantially from traditional composite resins. One of the most recent innovations in this field is the application of nanotechnology for the development of sub-micron, nanofilled and nanohybrid materials with filler particles smaller than 100 nm. New materials are launched on the market and are claimed by manufacturers to benefit from better surface qualities thanks to their filler formulation, but little is known about their long-term clinical performance. Microhardness is an essential property of a restorative material for the determination of its clinical longevity and esthetic success. The aim of the present study is to compare the microhardness of recent flowable and packable nanofilled composite resins with traditional hybrid composite resins.

Methods. Thirty disc-shaped specimens per material were obtained by pouring it into silicon molds that were 2 mm high and 4 mm wide. The uncured resin was covered with a Mylar strip and subjected to 60 s light cure with a halogen lamp at 600 mW/cm^2. The top surface of the specimens was polished with abrasive discs. The following experimental groups were defined: group 1, hybrid packable composite resin (Filtek Z250, 3M ESPE); group 2, hybrid flowable composite resin (Filtek Supreme Flow, 3M ESPE); group 3, nanofilled packable composite resin (AP+, Sweden & Martina); group 4, nanofilled flowable composite (AP+ Flow, Sweden & Martina). Vickers microhardness was measured thrice on randomly selected spots on the polished surface of the specimens (100g, 10s). The mean of the readings was calculated and regarded as statistical unit. Data were statistically analyzed by means of one-way ANOVA and post hoc analysis (α=0.05).

Results. The mean microhardness values and standard deviations (expressed in HV) were: group 1, 94.7±3.0; group 2, 40.9±1.2; group 3, 85.3±17.4; group 4, 44.1±6.4. Packable composites were significantly harder than flowable composites ($p<0.001$), with the latter exhibiting similar hardness in hybrid and nanofilled formulations. The microhybrid packable composite resin presented slightly but significantly greater hardness than the nanofilled one ($p<0.005$).

Conclusion. The microhardness of two modern nanofilled resins was found to be equal or slightly inferior to traditional hybrid resins, with regard to materials with the same viscosity. Thus, their use in the clinical settings appears to be sufficiently safe; however, clinical studies are needed to assess their long-term success. Moreover, the present study confirmed that flowable materials have lower surface microhardness than packable composite resins, with values that are about the half of their packable counterparts. For this reason, even in nanofilled formulations, their use exposed to the oral environment should be limited by specific indications, such as the restoration of small defects not subjected to occlusal loads.

Performance of CAD/CAM-fabricated fiber posts into the oval-shaped root canals

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Aim. The study compared push-out strength and cement layer thickness of CAD/CAM-fabricated fiber reinforced compsite (CF) posts, prefabricated fiber (PF) posts and cast metal (CM) posts cemented into the oval-shaped root canals.

Methods. Eighteen single-rooted premolars were endodontically treated and decoronated. Then, oval-shaped post spaces were prepared. Roots were randomly assigned to three groups (n=6), which differed by the type of the post to be inserted:
– Group 1: Prefabricated fiber post (RTD);
– Group 2: Cast metal post;
– Group 3: CAD/CAM-fabricated fiber post (RTD).

In Group 2, metal posts were fused from the post space replicas obtained with pattern acrylic resin (GC) and plastic pins (Henry Schein Krugg). In Group 3, post spaces were sprayed with scan powder (VITA), scanned with inEos 4.2 scanner (Sirona) and fiber posts were milled from the experimental fiber-reinforced composite blocks (RTD) using inLab MC XL CAD/CAM milling unit (Sirona). All posts were cemented using Gradia Core cement (GC).

After 24 hours, posted roots were transversally cut into 1 mm-thick slices for the thin-slice push-out testing.

All specimens were photographed with a digital microscope (Nikon Shuttle Pix) to measure cement thickness around the posts by Digimizer software (MedCalc). The push-out strength data as well as cement thickness data were not normally distributed, thus Kruskal Wallis Analyses of Variance, followed by Dunn's Multiple Range test for post-hoc comparisons was applied to assess if post type was a significant factor for each measured variable.

In addition, root level factor significance within each group, ether for push-out strength or cement thickness was tested using One-Way Analyses of Variance or Kruskal Wallis Analyses of Variance depending on whether or not the data met normality distribution and homogeneity of group variances criteria.

Results. The descriptive statistics are presented below in the Tables I, II and III: PF posts obtained significantly lower retention than CF posts and CM posts ($p<0.05$), which showed comparable results (Table I). Significantly thinner cement layer was observed around CM posts, followed by CF posts and PF posts ($p<0.05$) (Table II). Root level significantly affected only cement layer thickness in the PF posts, the cement thickness increased in apical-coronal direction ($p<0.05$) (Table III).

Conclusion. In the oval-shaped root canals significantly lower retention was achieved with prefabricated fiber posts compared to CAD/CAM-fabricated fiber posts and cast metal posts ($p<0.05$), which showed comparable retention. Significantly thinner cement layer was observed around cast metal posts, followed by CAD/CAM-fabricated fiber posts and prefabricated fiber posts ($p<0.05$). Root level only affected cement layer thickness in prefabricated fiber post group. The cement thickness was increased in apical-coronal direction around prefabricated fiber posts ($p<0.05$).

TABLE I.—*Push-out strength by group in megapascals (MPa).*

Post type	N.	Mean	Standard deviation	Median	25%	75%	Significance P<0.05
Prefabricated fiber post	36	8.19	3.62	8.36	5.88	9.98	B
CAD-CAM fiber post	36	17.12	7.73	16.83	11.38	24.53	A
Cast metal post	31	26.41	18.77	25.51	10.64	38.30	A

TABLE II.—*Cement thickness by group in micrometres (μm)*

	N.	Mean	Standard deviation	Mean	25%	75%	Significance P<0.05
Prefabricated fiber post	36	654	225	623	432	821	C
CAD-CAM fiber post	36	162	24	163	148	180	B
Cast metal post	31	106	53	97	59	140	A

TABLE III.—*Cement thickness in micrometres (μm) by root level in the PF post group.*

	N.	Mean	Standar deviation	Significance P<0.05
Coronal	12	861	145	C
Middle	12	636	168	B
Apical	12	465	159	A

Effectiveness of a dentin collagen cross-linking agent (EDC) after chewing simulation

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Aim. Aim of the study was to evaluate the ability of 1-ethyl-3-(3dimethylaminopropyl)-carbodiimide-hydrochloride (EDC) pre-treatment to improve dentin collagen stability over time when submitted to cyclic occlusal forces by assaying the amount of telopeptide release. The hypotheses tested were that EDC pre-treatment and chewing simulation (CS) does not affect telopeptide release over time.

Methods. Dentin slabs (1.0±0.1 mm thickness) were obtained from human teeth and completely demineralized in 10 wt% H_3PO_4 (pH=1) for 24h at 25°C. After demineralization, specimens were cut in disks (diameter 6.0±0.2 mm) using a surgical biopsy punch. Collagen disks were then equally and randomly assigned to four treatment groups (N=4): Group 1: specimens were immersed in 0.5 mL of artificial saliva (KCl 12.92 mM, KSCN 1.95 mM, $Na_2SO_4 \cdot 10H_2O$ 2.37 mM, NH_4Cl 3.33 mM, $CaCl_2 \cdot 2H_2O$ 1.55 mM, $NaHCO_3$ 7.51 mM, $ZnCl_2$ 0.02 mM, HEPES 5 mM, pH=7.4) and stored at 37°C for 30 days (static conditions). Group 2: specimens were treated with 0.5 M EDC pH=6.3 for 60 s, rinsed with distilled water for 10 min, then stored as in Group 1 (static conditions). Group 3: specimens were submitted to CS (37°C in 0.5 mL artificial saliva, 50 N occlusal load, 30 s occlusal time plus 30 s with no load, 1 Hz, up to 30 days). Group 4: specimens were treated with 0.5 M EDC as for Group 2 and submitted to CS as in Group 3. Collagen degradation was assessed after 30 days using ICTP and CTX ELISA kits through the quantification of collagen fragments released during the aging process (Static or CS). Data were analyzed using two-way ANOVA.

Results. Significant differences were observed in the total amount of both fragments released over the 30-day aging period for all EDC pre-treated specimens compared to nontreated ones, since ICTP and CTX fragments were hardly detectable in Group 2 and Group 4. When static and CS groups were compared, no significant difference was observed in the total amount of ICTP fragments released over the 30-day aging period by specimens from Group 1 (43.3±7.9 ng ICTP/mg dry dentin) and Group 3 (47.4±5.8 ng ICTP/mg dry dentin). CTX fragment release was at least one order of magnitude lower than ICTP release. The total amount of CTX telopeptide fragments released over the 30-day period was statistically higher in specimens aged under static conditions than specimens aged with CS (Group 1 = 3.4±1.3 ng CTX/mg dry dentin vs. Group 3 =1.3±0.3 ng CTX/mg dry dentin).

Conclusion. The results of the present study showed that EDC pre-treatment significantly reduced the release of both ICTP and CTX fragments in demineralized dentin collagen matrices that were aged under static conditions of cyclic loading. Thus, the tested hypotheses were rejected since significant differences were observed in the ICTP and CTX release in relation to the EDC pre-treatment and CS procedure. Supported, in part, by grants: FIRB RBAP1095CR from miur cytotoxicity evaluation of five different dual-cured resin sealers used for fiber posts cementation.

Cytotoxicity evaluation of five different dual-cured resin sealers used for fiber posts cementation

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Aim. The purpose of this study was to determine the degree of cytotoxicity of five different dual cured sealer (Biscem, C&B, Duolink, Virage Plus and Virage dual) used for fiber posts cementation. Cytotoxicity has been evaluated on MG-63 osteoblasts-like cells through two different.

Methods. MTT ([3-4,5-dimethylthiazol-2-yl]2,5-diphenyltetrazolium bromide succinate) assay in order to test mitochondrial enzyme activity and xCELLigence® system in order to evalue the cell adhesion kinetics. For each sealer was performed a double evaluation: the first on dry samples and the second on eluates resulting from cements. Materials and methods MG63 osteoblast-like cells, originally isolated from a human osteosarcoma, were used. Cells were trypsinized and then seeded, for the following assays, on material disks in 96-well plates at a density of 4·104 cell per 150µl. The following materials were tested: Biscem, C&B, Duolink (Bisco Inc., Schaumburg, USA); Virage Plus and Virage dual (Sweden & Martina, Padova, IT). The materials were prepared according to the manufacturer's instructions under aseptic conditions. Confluent MG63 were counted using a hematocytometer (4x104 cell) seeded onto 96 well plate and incubated with the supernatant of each cements and for each time-points. The cytotoxic effects of each materials were assessed by measuring the reduction in cell metabolic activity using MTT assay and xCELLigence® system. After 1, 2, 3 and 7 days of growth of MG63 cells on the cement disk surfaces and so the cells were analyzed. Unexposed control cultures were maintained under the same conditions.

Results. The cell viability of human osteosarcoma cells in contact with the dishes was evaluated by means of MTT assay. Cytotoxicity assays are the initial screening tests used to evaluate the biocompatibility of materials. The combination of these tests with genotoxicity, mutagenicity, carcinogenicity and microbial analysis allow to obtain parameters that characterize biocompatibility. The aim of this study was to evaluate the cytotoxicity activity of five dual-cured sealers used for fiber posts cementation through two different tests: MTT and xCELLigence® assays. We evaluated the rate of cytotoxicity of Dual Virage, Virage Plus, Biscem, C&B and Duolink on MG63 osteoblasts-like cells both on dry samples of cements (set group) and on the eluates derived from them (fresh group). At 24h, results from set group revealed a low rates of cytotoxicity for all sealers except Duolink. However, this rate tended quickly to decrease and after 48h all sealers results highly biocompatibility. Furthermore, the cytotoxicity remained low even after a week of contact with cells. Trials on eluates, with MTT and xCELLigence® revealed a very low rate of cytotoxicity for Virage and Virage Plus dual, whereas C&B, Biscem and Duolink seemed to be more cytotoxic. Results appeared to be steady after a week of observation.

Conclusions. Virage Dual and Virage Plus revealed very low cytotoxicity, but further studies needs to understand effects of these cements on different types of cells culture.

Degree of conversion and micro-hardness of a light-curing cement under lithium-disilicate and composite discs

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Aim. Ceramic system technology has advanced quickly in recent years, and has become a valid option in the restoration of anterior and posterior teeth that require indirect prosthetic rehabilitations. Composite CAD-CAM were recently introduced to represent an alternative material for indirect adhesive restorations. The aim of this in vitro study was evaluating the conversion degree (DC) and the micro-hardness (MH) of light curing cement under lithium disilicate and composite discs of different thicknesses. The null hypothesis were that (1) thickness and (2) material do not influenced resin cement DC and MH.

Methods. 15 lithium-disilicate discs (E-Max CAD) 2cm of diameter, A2 shade LT and 15 composite discs (LavaUltimate 3M), A2 shade LT, were prepared and divided into three groups (n=5) according to the thickness: A) 0.6 mm; B) 1mm; C) 1.5mm. Adhesive procedures were performed on a single surface of each disc following manufacturer instruction and Choice2 light-curing cement (Bisco) was applied. Curing was performed with a multiLED polywave lamp (Valo) for 60sec at 1700 mW/cm^2 with the lamp in slight contact with the opposite surface towards the cement layer. DC% of the cement was evaluated with ATR FT-IR spectrophotometer (Thermo Scientific Nicolet IS10) both for the ceramic and the composite discs. The surface analysis was performed in ATR mode, in which the IR beam penetrated 1 µm into the material. The FT-IR spectra of the curing process were recorded every 2 s with a range between 4000-525 cm^{-1} and a resolution of 6 cm^{-1}. The spectra recorded immediately before activation of the poly wave LED lamp and 10 min after light exposure were fitted and used to evaluate the degree of conversion (DC) of the two tested materials. To determine the percentage of the remaining unreacted double bonds, the DC was assessed as the variation of the absorbance intensities peak height ratio of the methacrylate carbon double bond (peak 1634 cm^{-1}) related to an internal standard of aromatic carbon–carbon double bonds (peak 1608 cm^{-1}) before and after curing of the specimen. Once the DC was established, a Vickers Test was performed on the cement with a micro-indentometer. Three indentations were performed on each sample and the mean value was considered for statistical analysis. ANOVA test was performed to evaluate the influence of thickness and material on DC% and MH.

Results. ANOVA showed that DC% were not dependent on material and thickness while MH values were affected by both thickness and material ($p<0.05$).

Conclusion. Null hypothesis (1) and (2) were not rejected since only MH values were influenced by thickness and material when a light curing cement is used for cementation.

An *in vitro* comparison of bonding effectiveness of different adhesive strategies on erbium: yttrium-alluminum-garnet laser irradiated dentin

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Aim. The bond strengths to lased tooth substrates reported in the literature are often confusing and even contradictory. To the best of our knowledge, no investigation has simultaneously compared the bond strength of etch-and-rinse adhesive, self-etch adhesive, self-adhesive resin composites and glass-ionomer cement to lased dentin. The aim of this in-vitro study is to compare the bond strength of an etch and rinse and a self etch adhesive system combined with a resin composite, a self-adhesive resin composite and a glassionomer cement to laser and silicon carbide (SiC) paper-prepared human dentin by means of micro shear bond strength (µSBS) test. The tested null hypothesis was that there is no difference between the bond strength of the tested materials when applied on dentin treated with laser or on dentin treated with SiC paper.

Methods. Twenty-eight human molars were sectioned to obtain a 2 mm-thick slab of midcoronal dentin. The occlusal surface of each slab was polished by P600 grit silicon carbide abrasive paper under running water using a lapping machine for 10 s to create a homogenous smear layer on the dentin. Then an half part of dentin slab was randomly selected for receiving treatment with Er:YAg laser while on the other half part no laser treatment was performed and the surface maintains the characteristics obtained by SiC-paper abrasion. The marked areas were irradiated with the Er:YAG laser with a wavelength of 2.94 µm and a contact tip with a repetition rate of 10 Hz/100 mJ (1W) and pulse duration of 230 µs under water cooling spray (water pressure level maximum). The laser beam spot size was 1 mm and was moved by hand in a sweeping fashion. The laser exposure time was 40 seconds for each specimen. Dentin slabs were randomly divided into four groups (n=7). Nine conical frustum-shaped build-ups were constructed on the occlusal surface of each dentin slab using bonding agent (Optibond Solo Plus, Kerr Group 1; OptiBond All-in-One, Kerr Group 2) combined with resin composite (Premise Flow, Kerr), self-adhesive resin composites (Vertise Flow, Kerr Group 3) and a glass-ionomer cement (Ketac-Fil, 3M ESPE Group 4). Specimens were subjected to µSBS test. Data were statistically analyzed.

Results. Measured bond strengths were (mean ± standard deviation): 21.3±5.3 MPa (laser treatment) and 16.2±4.4 MPa (SiC paper) for Group 1, 19.2±5.2 MPa (laser treatment) and 13.9±4.5 MPa (SiC paper) for Group 2, 7.7±2.6 MPa (laser treatment) and 4.2±2.0 MPa (SiC paper) for Group 3, 4.5±2.0 MPa (laser treatment) and 2.5±1.2 MPa (SiC paper) for Group 4. The statistical analysis showed that the dentin laser treatment significantly affected the bond strength ($p<0.001$). In particular, for all Groups, the bond strengths recorded for build-ups constructed on dentin treated with laser were significantly higher than those recorded for build-ups constructed on dentin treated with SiC paper.

Conclusion. Laser treatment significantly affected the bond strength of all adhesive materials tested on dentin.

Conventional *versus* digital impression in implant-prosthetic rehabilitations according to the "all-on-four" protocol: a pilot prospective study

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Aim. the aim of this study was to compare the accuracy of conventional and digital impressions for "all-on-four" implant rehabilitation.

Methods. Patients in good health and edentulous in one or both jaws, with severe atrophy of the mandible or maxilla in posterior regions, were randomly selected for this study. The diagnosis was made clinically and with radiographic assessments (pre-operative panoramic radiograph and CT scan). Complete-arch immediately loaded prostheses, supported by 4 implants (2 axial and 2 tilted), were screwed. After implant placements the patients were divided in two groups, in control group conventional pickup impressions (CIG) and in test group digital impressions (DIG) were performed. All prostheses were positioned and screwed onto dental implants within 24 hours from implants placement. The efficiency of both impression techniques was evaluated by measuring the total treatment time and the number of retakes/rescan needed to obtain an acceptable outcome according to the accepting criteria. Intraoral digital x-ray examinations were performed to evaluate accuracy and to check the presence of voids at bar-implant connection. Follow-up visits were performed at 3, 6 and 12 months after implant insertion.

Results. Twenty patients were treated with immediately loaded "all-on-four" prostheses (8 maxillary and 14 mandibular region) supported by 4 implants (in total 88 implants), 2 patients were treated with both maxilla and mandibular prosthetic rehabilitations (1 patient in CIG and 1 patient in DIG). No implant drop-out occurred. The implant survival rate was 100% for all positioned implants. All prostheses were screwed onto the dental implants and intraoral digital x-ray examinations revealed the presence of voids at barimplant connection only in control group. The prosthetic survival rate was 100% too, because of none of all fixed prostheses were lost during the observation period. About bone level by follow-up evaluation, detected at 6 and 12-month in either jaw: no statistically significant differences (P>0.05) in crestal bone loss between tilted and upright implants; likewise no statistically significant differences were found between CIG and DIG. About time: digital impression needed more rescans than conventional impression retakes, but the time for a rescan was far less than retake time. Therefore less time was spent to perform digital impression procedure than conventional one and the difference was statistically significant (P<0.001).

Conclusion. This clinical study demonstrated that it was possible to fabricate CAD–CAM cromo-cobalt full arch rehabilitations with satisfactory accuracy following a digital impression technique.

Precision of a microscopy confocal laser oral scanner: a pilot study

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Aim. The aim of this study was to evaluate the precision of an intraoral impression device based on microscopy confocal laser scanning technology.

Methods. One plaster abutment of a natural teeth was selected as a test object. In order to achieve an adequate statistical power, 40 scans has to be obtained with a standardized procedure. Scanner was placed in a fixed position and the abutment was fixed on a holder: each scan started from the same position and angulation; the abutment completed four turns at 0°, 30°, 60° and 90°. Every four scans the scanner was cooled down for 5 minutes, shut down and restarted. Scans were imported in an engineering software and superimposed with a best-fit algorithm first and then with a global registration function. They were trimmed with planes intersected on the models, in order to obtain the same surface extension. The same 3-dimensional grid was created and loaded on each 3D scan. The software created control points defined by x, y, z coordinates were the grid intersected 3D-models. Coordinates were exported, converted in their absolute values and summed together for comparison.

Results. 44 scans were needed in order to obtain 40 good scans. Four scans were discarded before saving the file because of macroscopical flaws. During model analysis, one scan has to be discarded because one hole, undetected during the scanning process, was found: 39 scans were then analyzed. The 3-dimensional grid intersected the models in 69 locations (L1-L69). The mean range and the mean SD measured for each location were 0,078 mm (min 0,008 mm, max 0,253 mm; SD 0,056mm) and 0,017 mm (min 0,002 mm, max 0,050 mm).

Conclusion. To our knowledge this is the first study that evaluated defined locations between scans instead of an overall 3D comparison of the volumes; furthermore it is the first study that has good statistical power. Within the limits of this pilot study, the tested device was considered accurate for a clinical practice.

Cervical margin relocation of CAD/CAM lithium disilicate crowns

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Aim. Aim of this study was to evaluate the marginal quality of the cervical margin relocation (CMR) with resin composite in CAD/CAM lithium disilicate crowns, before and after thermo-mechanical loading. The null-hypothesis was that the CMR with resin composite or flowable composite would have no influence on the marginal quality of lithium disilicate crowns before and after thermo-mechanical loading.

Methods. Standard crown preparations were created in twenty human molars. Margins were located in enamel, except for the mesial proximal box (4mm width), where the cervical margin was placed 2 mm below the cement-enamel junction. The CMR technique was performed by applying 2 mm thick layers of composite (Filtek Supreme XTE, 3M ESPE) (Group 1, N=10) or flowable composite (Filtek Supreme Flow XTE) (Group 2, N=10) into the mesial box bonded with Optibond FL (KERR). Twenty standardized crowns were prepared with the CEREC CAD/CAM system (Cerec Software, Sirona Dental Systems GmbH) using CAD/CAM resin blocks (IPS e.max CAD, Ivoclar-Vivadent). (Fig 2). All the specimens were fitted with a crown of standardized thickness with an average thickness of 1.5 mm at the central groove, a maximum of 2 mm at the cusp (measured with a caliper after milling and polishing), and a standardized occlusal anatomy (third molar maxillary by using the design tools of the Cerec Software (4.2.4, Sirona Dental Systems). The crowns surfaces were cleaned with a steam cleaner and etched with 5% hydrofluoric acid (IPS Ceramic Etching; Ivoclar-Vivadent) for 20 s, rinsed, cleaned in distilled water in an ultrasonic bath for 1 min and then silanized (Monobond Plus, Ivoclar Vivadent). Teeth were etched (15 s) with 37% phosphoric acid and rinsed with water. Tooth surfaces were conditioned with Optibond FL primer and adhesive without polymerization according to the manufacturer's instructions.

Restorations were then luted with a dual-adhesive cement (RelyX Ultimate, 3M ESPE). Marginal quality and the CMR-crown interfaces were analyzed under a SEM using epoxy resin replicas before and after thermo-mechanical loading (240,000 mechanical cycles x 50N and 7800 thermo-cycles between 5° and 55C° using a chewing simulator -CS4, Mechatronik-). Data were statistically analyzed by two-way ANOVA and Tukey's post-hoc test ($\alpha = 0.05$).

Results. The null hypothesis was accepted since no significant statistical differences were found in marginal quality before and after thermo-mechanical cycling ($p > 0.05$) in both groups.

Conclusion. The marginal quality of cervical margins with CMR with composite or flowable composite before and after thermo-mechanical cycling showed no significant statistical differences. Further clinical research is essential to confirm that CMR is a valid procedure for the adhesive luting of lithium disilicate crowns in deep proximal boxes. This study was supported by FIRB RBAP1095CR.

Study of the mechanical and thermal properties of copper-nickel-titanium wires

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Aim. The aim of this study is to analyze the mechanical, physical and microstructural characteristics of a specific orthodontic arch made of an alloy of copper, nickel and titanium.

Methods. Different types of CuNiTi wires, diameter .019x.025 inch (Ormco, Glendora, California), were tested to show the mechanical behavior, the thermal properties, the micro-structural characteristics and the chemical composition. We used non-thermally-activated wires and thermally-activated wires; the latter were used with three different transition temperatures 27 °C, 35 °C and 40 °C.

The tests are:

— mechanical tests (that produces stress-strain and Young's modulus graphs);
— DSC measurements (that determines the different transition temperatures);
— investigation with SEM (to study the material surface);
— investigation with EDXS (for the chemical analysis of the alloy).

Results. The direct relationship between stress-strain stops at the point of about 0.3%, where the stress induced martensitic transformation (Ms). At this point it is possible to observe a progressive increase of the stress to a constant strain level (140 ± 7 MPa). Then, the curve has a plateau up to 5% of the deformation, at the end of plateau the alloy is transformed into the martensitic phase. An addition of stress determines a characteristic gradient and the materials undergo a plastic deformation. Removing stress there is a recovery of the total strain only of 1-2%. It is not shown a pseudo-elastic behavior.

Comparing the thermographics obtained for each type of CuNiTi wire, is possible to determine the different temperatures of transition between the martensitic and the austenitic phase.

The surface analysis by SEM shows that there are significant differences between the three types of thermally-activated CuNiTi wires; however, all the three samples have some large irregularities on the surface.

The chemical analysis of the alloy, using the technique EDXS, evidences a typical spectrum with the characteristic peaks of nickel and titanium and copper.

Conclusion. The wires that have not received a final heat treatment to impart the shape, do not show a pseudo-elastic behavior: therefore there is a permanent plastic deformation and the wire does not recover the initial shape.

It is well known that the quality of the surface of an orthodontic wire is a very important feature. An imperfect surface of the wire can cause problems related to its sliding in the slot with a decrease of the force applied to the teeth. It can be assumed that the circular and oval irregularities of the surface may be related to the manufacture of the alloy. These defects do not appear to be wide enough to promote a corrosion process.

The little concentration of elements found with the SEM presupposes that they are due to the different manufacturing processes of the orthodontic wire. These minimal inclusions do not affect the clinical use.

Bacterial adhesion on different types of composite resin materials

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Aim. The aim of this study was to examine the bacterial adhesion on different types of composite resin ma-

terials. Restorative composite materials with low bacterial adhesion would be ideal to prevent the spread of caries after completion of tooth restoration and restoration failure.

Methods. 5 different types of direct composite resin: 1) Venus Diamond (Heraeus Kultzer); 2) Adonis (Sweden Martina); 3) Optifil (IDS Dental); 4) Enamel plus HRi (Micerium); 5) Clearfil Majesty (Kuraray) and 3 different types of indirect composite resin: 6) Gradia (GC) 7) Estenia (Kuraray); 8) Signum (Heraeus Kultzer) were studied. 23 discshaped test specimens with a diameter of 2 mm and a height of 2 mm were fabricated out of each material. Fabrication of test specimens were obtained for each composite using a steel mold. It were inserted in the mold and then covered with a Mylar strip to minimize the formation of the oxygen-inhibited layer. Each sample of the direct composite group (1, 2, 3, 4, 5) was then polymerized for 40 s through the strip with a chair-side light-curing unit (Valo, Ultradent) at a standard power level of 1000 mW/cm² to ensure a high degree of conversion of the materials. After polymerization the samples were polished with high gloss polisher system (Heraeus Kultzer). For the indirect composite groups (6, 7, 8) the samples were polymerized in the laboratory oven (Labolight LV-III GC) for 2 minutes and then polished according to the laboratory tecniques. Then the samples were introduced again in the oven for 5 minutes for the final high gloss. The surfaces of samples was then polished in order to achieve surface characteristics similar to those obtained in clinical situations. Unstimulated saliva was collected from 23 healthy subject who gave informed consent to participate in the study, Microorganisms 23 different saliva samples were grown aerobically in Brain Heart Infusion (BHI) for 24 hours at 37° C. The broth culture of each saliva sample was divided in 8 tubes of 0,5 ml according to the different composite material to be tested. The composite disc specimen were handled sterile. The "menisco" of the broth culture was absorbed using sterile tissue paper not to alterate the bacterial concentration of the adhesive biofilm. From each composite disc specimen the biofilm was removed with tubes with a known quantity of BHI (sterile) and submitted to Vortex agitation for 3 minutes in order to separate the bacterial cells embedded in the biofilm. (Vortex, USA). Each resulting solution was analyzed to calculate the amount of bacterial cells (n° u.f.c/cm²).Parametric tests with descriptive mean and variance statistics for quantitative variables were used in this test by one-way analysis of variance (ANOVA) with a post hoc test (Sheffè) for multiple comparisons. A probability of equal or less than 0.05 for similarity of distribution was considered to be significantly different.

Results. Indirect composite resin material showed less bacterial adhesion when compare to direct composite resin material ($p \leq 0.05$). No significant difference was noted on the amount of bacterial adhesion within direct composite resin groups (groups: 1, 2, 3, 4, 5) and within indirect composite resin groups (groups: 6, 7, 8).

Conclusions. Indirect composite resin materials showed significantly less bacterial adhesion when compare to direct composite resin materials. Surface roughness and degree of conversion of the resin may play an important role in determining the differences in bacterial adhesion.

Treatment of oral hamartomas in a pediatric patient with Cowden's Syndrome: a case report

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Aim. Cowden's Syndrome (CS) is an autosomal dominant disorder associated with mutations in PTEN (Phosphatase and TENsin homolog), a tumor suppressor gene, that cause the PTEN protein not to work properly. The incidence of CS is around 1/200 000 subjects. Since many of the clinical features of CS are common in the general population (e.g. fibrocystic breast disease, uterine fibroids), this condition is probably under-diagnosed and it could have a higher incidence.

Methods. A 14-year-old child came to the attention of the Operative and Paediatric Dentistry unit of the Department of surgical sciences for head and neck diseases – Polyclinic "Agostino Gemelli", "University of Sacred Heart" of Rome complaining of several pedunculated lesions of the lips, which had been recently traumatized and sensitive to palpation. Considering the notable features of his previous medical history (medulloblastoma, multiple intestinal hamartomas, multiple thyroid nodules and mucogengival lesions) besides his uncooperative attitude towards medical staff (odontophobia and anxiety disorder) the clinicians decided to treat him under general anesthesia. Intraoral mucosal examination revealed geographic and fissured tongue and multiple, confluent, asymptomatic oral papillomatous papules, ranging from 1 to 3 mm in diameter, localized on the tongue, lips, angles of the mouth, buccal mucosa and attached gingiva. Dental examination revealed poor oral hygiene (generalized chronic periodontal disease and multiple carious lesions) and dental malposition with premature loss of teeth. Basing on the clinical features, particularly the presence of multiple muco-cutaneous nodules, a working diagnosis of Cowden's syndrome was made.

The clinical management of the patient included the surgical excision of the multiple papules affecting the upper and lower lip. The excised lesion were fixed with 10% buffered formalin and sent for microscopical examination. Histological examination of the polyps revealed these to be hyperplastic and adenomatous confirming the working Cowden's syndrome diagnosis.

No recurrence has been seen at the 3 months clinical follow-up.

Discussion. Cowden's syndrome, or multiple hamartoma syndrome, was first described in 1940 by Costello in a 27-years old Mexican female. In 1963, Lloyd and Dennis defined and named this pathology by their patient, Rachel Cowden, a 20-year-old female with adenoid facies, high-arched palate, hypoplasia of the soft palate and uvula, papillomatosis of the lips and oropharynx, scrotal tongue, thyroid lesions, hypertrophy and fibrocystic disease of the breast, scoliosis, and lesions of the bones and liver.

Although CS is mainly associated with benign tumors, the prevalence of malignancies, especially breast and thyroid carcinomas, in affected patients is greater than in general population.

In view of this, it is essential to request a histological examination of the excised lesions in patients for whom a preliminary diagnosis of CS is made.

Conclusion. The dentist thus should be aware of the clinical features and possible developments of the CS because he can be the first health care professional who identifies it in its early stages; in such a case the clinician must alert the patient to do medical checks for preventing the formation of a neoplasia or its metastatic development.

A novel clinic-therapeutic approach to reduce anterior open bite in children aged between three to five years: a preliminary controlled study

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Aim. The aim of this study was to compare two different approaches to reduce the Anterior Open Bite (AOB) in children aged between 3 to 5 years with the habit of pacifier sucking.

Methods. A parallel controlled study was designed. As a preliminary study 20 patients were recruited. Inclusion criteria were: children with pacifiers sucking habit and anterior open bite between 2 and 5 mm as measured between incisors; use of pacifiers of different brands with an isthmus thickness ranging between 4 and 8 mm; age between 3 and 5 years. Children were assigned to two different groups (N=10): children in Group 1 (G1, control group) interrupted sucking habit immediately; children in Group 2 (G2, study group) were treated with a novel gradual therapeutic approach, substituting their pacifier with a 2-mm thick isthmus pacifier for 6 months before interruption. AOB was measured (in mm) by different operators unaware of the treatment provided using a Bolt gauge from the incisal edges. Measurements were repeated at the first visit (T0), after three (T3) and six months (T6). Mean values were analyzed with the Paired Difference t Test.

Results. All the 20 patients were followed up for 6 months. After 3 months G1 showed no signs of reduction of the AOB ($P>0,05$), whereas in G2 there was a reduction of AOB, which was statistically significant ($P<0,05$; $P=0,014$). At the second visit (T6) improvements of the AOB were evident in both groups with a significant difference both in the control ($p<0,001$) and the study group ($P<0,05$; $P=0,002$). In addition, the difference between T3 and T6 was statistically significant both in group 1 ($p<0.001$) and in group 2 ($p<0.001$).

Conclusion. These results led the authors to hypothesize that the proposed gradual clinical-therapeutic approach might be able to reduce the AOB three months in advance compared to other therapies and this is clinically relevant. The ultimate indispensable goal remains the elimination of the pacifier and for several reasons

a gradual clinical approach can be considered a better method than an abrupt stopping. The risk of onset of tongue thrusting could be reduced with this approach and, furthermore, the compliance of both the young patient and parents might also be increased by offering the child a substitute rather than a break off. When the interruption is refused, an initial proposal of the pacifier replacement, to obtain the appropriate cooperation from both the child and parents, could result in an easier and more effective therapeutic approach. The purpose of this preliminary study was to examine the effectiveness of a more gradual therapeutic approach to correct AOB in children with habits of pacifier sucking after 6 months. The results confirmed that a pacifier with 2 mm thickness isthmus facilitates the reduction of AOB at 3 months in comparison with the complete removal of the pacifier. Larger randomized controlled trial studies are needed to prove the efficacy of this novel technique.

Obesity and periodontal diseases in children: is there a real correlation?

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Aim. The association between obesity and periodontitis has been extensively investigated in adults but not in young people. The aim of this study was to examine the association between overweight-obesity and periodontal disease in pediatric subjects who attended the Department of Oral and Maxillo Facial Sciences, Division of Pediatric Dentistry, Rome, Italy.

Methods. Controlled cross-sectional study involving 100 children of both gender between 6 and 12 years of age. Two groups were formed: overweight-obese and control. Body Mass Index and diet intake by a questionnaire were recorded. The following clinical parameters were evaluated: plaque score (PS), probing depth (PPD), bleeding on probing (BOP), and gingivitis.

Results. The group test had an average BMI value of 26.38 ± 1.42 kg/m², with values ranging from 25 (36% of the sample) to a maximum value of 30 (20% of the total). The children in this group had a mean age of 9.26 ± 1.62 years. The control group included children defined as normal weight based on the classification of the World Health Organization (WHO) with an average BMI of 18,79 ± 2,52 kg/m². The mean age in this group was 9.36 ± 1.78 years.

Regarding the questionnaire the majority of subjects in both groups reported that recently went to the dentist for a control visit (51% of test group and 70% of control sample). The 85% of overweight/obese children reported to brush your teeth with less than 2 minutes and 75% to change their brush only when it breaks. The test group have also shown a worse predisposition in oral hygiene procedures when compared with those of normal weight, evidence that could justify the apparent gingival inflammation of overweight/obese patients.

Regarding the frequency and quantity of food consumption, the percentage of obese patients who do not follow a balanced diet deviates widely from that of normal-weight patients (70% test group versus 20% of normal weight).

A clinical examination of the state of periodontal health in the control group was detected FMPS of 21.86% against 50.08% in the group of patients overweight / obese; FMBS recorded in the group of normal-weight patients amounted to 12.7% against 26.24% of patients overweight/obese. No patient in either group included in the study presented a CAL ≥3, so was not found a significant difference regarding this parameter.

Conclusion. These results emphasize the negative impact of obesity on gingival health in young subjects. This correlation is probably due to a combination of metabolic factors and inflammatory profiles and it is the result of a careless attitude towards hygiene procedures, balance diet and respect for periodic visit to the dentist

The oral cavity: a careful sentinel

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Aim. The aim of the work is to present the preliminary results (pilot study of 400 subjects) of a larger Research Project (about 4000 partecipants) – entitled "The oral cavity: a careful sentinel" – partnership between the IRCCS San Raffaele Hospital and the Municipality of Segrate. The aims were: (a) early diagnosis of celiac disease in children with atypical aspects of the oral cavity (case-finding); (b) implementation of oral health prevention programs, through education and motivation to professional oral hygiene and home care for children of pre-schools, primary and secondary schools; (c) education to the relationship between diet and oral health.

Methods. The project involves the participation of about 4,000 children who will be visited in the schools of the City of Segrate; to them will be addressed a classroom instruction about oral hygiene, and a memorandum of nutrition education for the maintenance of oral health. Children will then receive a preliminary dental examination at school. Those patients with mucosal lesions and enamel hypoplasia - after a confirmation of the suspect through a proper visit at the Division of Dentistry, San Raffaele Hospital, will be invited to perform immunological analyzes to confirm the suspicion of celiac disease. Patients with confirmed celiac disease (case-finding) will be sent to specialized centers and will benefit greatly from early diagnosis obtained by observation of the oral cavity. Data will be collected in order to establish the accuracy of the dental visit as a routine method in the early diagnosis of celiac disease.

Results. The results obtained in the initial pilot sample of 400 patients will be exposed.

Conclusion. The dental hygienist and the dentist are figure that more than others can put the suspected diagnosis of celiac disease, even (and especially) in mild illness and atypical disease. The celiac disease is an extremely common disease with a prevalence ranging from 1:100 to 1:200 in the general population. It has a very heterogeneous clinical presentation both as regards age and symptoms of onset, both for the presence of extraintestinal symptoms, that often constitute the only clinical expression of the disease. To perform an early diagnosis is very important to prevent the onset of diseases associated, resulting in damage to the medium and long term. The oral cavity seems a privileged window to put the suspected diagnosis of celiac disease.

Global functional orthodontic treatment with spatial organization of the mouth (OSB) method: a case report

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Aim. The aim of the OSB orthodontic method is to achieve mouth balance in three spatial dimensions (vertical, anteroposterior, transversal), and to correct the altered physiologic functions (chewing, swallow, nasal breathing, phonation). The basic OSB principle is the concept of "Shape and Function": altered functions modify mouth shape; malocclusion and dysmorphoses of the mouth maintain the functions altered. The main tools used in the OSB method are: Soulet and Besombes' plurifunctional activators (APF, particular soft removable appliances); occlusal composite additions; Planas' tracks plaques.

Case report. An 8-year-old child came to the attention of the Operative and Paediatric Dentistry unit of the Department of surgical sciences for head and neck diseases – Polyclinic "Agostino Gemelli", "University of Sacred Heart" of Rome. The clinical examination revealed increased overjet and overbite, class II malocclusion, rotation of 2.2, right mandibular deviation, rounded dental arches. The treatment plan consisted in using a plurifunctional activator ("Conformer n.5" in elastomer) and in occlusal additions on the deciduous molar teeth. After a year of treatment these devices led to an increase of the vertical dimension, correction of tongue position, stimulation of the nasal breathing and mandibular releasing and repositioning. Dysmorphoses of the mouth have been corrected in accordance to the OSB balance criteria. The case remained stable after a 5-years posttreatment retention period with a plurifunctional activator "Rounded Expander E1A" in staminalene.

Discussion. OSB method is an orthodontic technique especially spread in France and Italy. In the 1950s two French dentists, Dr. Soulet and Dr. Besombes, invented the first rudimental rubber activator in order to correct malocclusion and dysmorphoses of the mouth. In the 1980s activators are discovered by Dr. Mathieu, who elaborated the OSB method, integrating Soulet and Besombes discoveries with Dr. Planas' Neuro Occlusal Rehabilitation.

The use of OSB method refers these advantages: great stability of the results (relapse is one of the most important problems in traditional orthodontics); possibility of palatal and mandibular expansion also in adult subjects; no need of teeth extractions, mandibular surgery, extraoral tractions, rapid palatal expanders or fixed appliances; general well acceptance of the patient, even few weeks after the beginning of the treatment.

Conclusion. Since there is not enough scientific literature which can demonstrate these clinical observations, more clinical trials and scientific works are needed for better evaluating the OSB method.

Comparison of Carisolv system *vs.* traditional rotating instruments for caries removal in the primary dentition: a systematic review and meta-analysis

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Aim. The purpose of this systematic review and Meta-analysis was to evaluate the reliability of the Carisolv system respect to drilling regarding the fully remove of decayed hard tissues in primary dentition.

Methods. A systematic review of the literature was conducted to identify controlled trails, randomized controlled trials and clinical trials that compared the Carisolv system respect to the traditional mechanical caries removal in paediatric patients. For the identification of studies to evaluate for this review, a unique search strategy to be applied for each database research was developed. The main relevant databases were searched: MEDLINE via PUBMED, Web of Science and SCOPUS. The following key words were used: Carisolv and Chemo mechanical Caries Removal. Complete caries removal, length of working time and need of local anaesthesia were the outcomes evaluated. To compare dichotomous data, a calculation of the Odd Ratio (OR) along with 95% Confidence Intervals (CIs) was used, whereas for continuous data, the Mean Difference (MD) with 99% Confidence Intervals (CIs) was calculated. Also, for each comparison Z-test was used. Analysis was performed using Review Manager 5.3 software provided by the Cochrane Collaboration.

Results. A total of 195 studies were identified and completely analysis of twenty-eight studies was performed; finally, ten papers were included. The trials included involved a total of 348 patients for 532 treated teeth. There was no significant difference in terms of clinical efficacy between the Carisolv and the rotary instrument ($z=0.68$ $p=0.50$) whereas the treatment with Carisolv was significantly longer in terms of time respect to the rotary instruments ($z=10.49$ $p<0.01$). The chemo mechanical technique reduces the need for local anaesthesia with a difference between two types of treatment near to statistically significance ($z=1.91$ $p=0.06$).

Conclusions. This systematic review indicates that the clinical efficacy of chemo mechanical removal with Carisolv seems as reliable as the rotary instruments. Data analysis suggests that the difference in terms of time taken was statistically significant: the Carisolv system takes more time than traditional method to remove dental caries. Regarding patient's comfort, this systematic review indicates that the Carisolv system can reduce the use of local anaesthesia.

However, the results should be interpreted cautiously due to the heterogeneity among study designs and to the shortage of available data. Further large-scale, well-designed randomized controlled trials are needed.

Keratocystic odontogenic tumors as first clinical manifestation of nevoid basal cell carcinoma syndrome in pediatric age: our microinvasive surgical approach

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Aim. Nevoid Basal Cell Carcinoma Syndrome (NBCCS) is a rare genetic condition involving multiple organs; Keratocystic Odontogenic Tumors (KCOTs) are often the first clinical manifestation in pediatric age. The aim of this study was to describe the clinical and histopathological features of KCOTs as first clinical sign of NBCCS in pediatric patients allowing an early diagnosis, and their treatment with conservative microinvasive piezosurgery.

Methods. Twenty pediatric patients affected by NBCCS showing 60 KCOTs came to our attention at the Complex Operating Unit of Odontostomatology, Policlinic of Bari, from 1996 to 2014.

After clinical examination, OPT and computed tomography analysis, all patients underwent conservative micro-invasive surgical treatment under general anesthesia, consisting in enucleation of KCOTs, cavity ostectomy and osteoplasty with conventional rotative instruments and piezoelectric tools in order to remove damaged bone, epithelial remnants and satellite cysts with maximal teeth preservation in consideration of the young age of the patients, and to possibly minimize the recurrence risk. A sterile gel formulation of sodium hyaluronate and amino acids (Gly-Pro-Leu-Lys) was put into the bone defect, allowing for faster bone regeneration and healing of the surgical site.

All the surgical specimens were sent for histopathological examination. The patients underwent clinical and radiological (OPT) follow-up after 7, 15 and 30 days, 2, 3, 6 and 12 months, and, then, once a year. The follow-up time ranged from 18 months to 8 years.

Results. There were 10 males and 10 females, with an average age of 10,6 years. At the initial evaluation, 13 patients showed swelling, teeth agenesis, and dental inclusions or dislocations as first clinical manifestation of their disease; in the remaining cases, KCOTs were asymptomatic. Among the 20 patients, 11 had been previously diagnosed with NBCCS because of familiarity or presence of characteristic features of the syndrome, while KCOTs were the first clinical sign of NBCCS for the remaining 9 patients without familial history of the syndrome; subsequently, the genetic analysis showing PTCH1 mutations confirmed the diagnosis.

60 KCOTs were totally identified: 39 lesions were located in the mandible and 21 lesions were located on the upper jaw. The histopathological analyses highlighted thin connective tissue walls covered by para- and orthokeratotic stratified squamous epithelium, usually about 5-8 cell layers thick, around cystic lumens filled with desquamated keratin, thus confirming the diagnosis of KCOT. The epithelial lining included a well-defined, palisading basal layer of cuboidal to small columnar cells and a superficial layer with corrugated appearance. Satellite cysts could also be seen due to tissue budding of the basal cell layers into the adjacent connective tissue.

The clinico-radiological follow-up of 53 lesions showed progressively decreased radiolucent areas up to complete healing within 12 months from the surgical treatment. Differently, OPT disclosed lack of decreasing radiolucency of 7 lesions after 12 months suggesting KCOTs recurrence, that is more frequent in syndromic KCOTs than in sporadic ones due to their higher dimensions and to the involvement of nobile structures such as teeth which should be preserved in these young patients as much as possible.

Conclusion. KCOTs in pediatric patients require conservative approaches for permanent teeth preservation. While conventional enucleation leads up to 60% recurrence rates, cavity ostectomy with piezoelectric tools significantly reduced the recurrence risk allowing the preservation of permanent teeth.

Salivary proteome modifications in pediatric oncological patients

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Aim. The human salivary proteome characterization wants to identify proteins, in order to associate their presence (or absence) and their different level of expression to different physiological conditions or to a particular disease. The purpose of this work is to evaluate the salivary proteome modifications that occur in children with oncologic diseases, undergoing chemo or radiotherapy, comparing them to healthy pediatric patients salivary peptides. Some proteins, in particular, were quantified in order to evaluate their possible role as disease and/or inflammation biomarkers and their possible use in early diagnosis, prognosis, therapeutic monitoring and response to anticancer treatment.

Methods. To investigate if oncological children salivary proteome differs from that of healthy children, and in order to understand how it evolves during the subsequent cycles of anticancer therapy, the acidic soluble fraction of whole saliva of 12 children with cancer (8 females and 4 males) was analyzed by RP-HPLC-ESI-MS and compared to 12 controlsubjects (8 females and 4 males), all aged between 0 and 14 years. Healthy children were subjected to only one sample, differently from oncological children who were subjected to a variable number of samples: the first one at the diagnosis, the others after each treatment cycle, in order to define the changes in salivary proteome during the different stages of anticancer therapy. The proteins we analyzed were, in particular, defensins (α1, α2, α3 e α4), cystatin A and cystatin B (unmodified, Sglutathionyl, S-cysteinyl). All proteins, although not primarily glandular, represent a potential index of localized or diffuse tumors, being widely recognized for them a role in the immune system. The protein concentration trend of each sample was compared in this way: first it was observed, for each oncologic patient, how the concentration of each protein is modified during the treatment, by relating the different samples from the same child; then these same patients were compared to the control group (healthy children).

Results. Protein and peptide quantification based on the area of the RP-HPLC-ESI-MS extracted ion cur-

rent peak evidenced in particular that: I) there is a little quantity of α-defensins and cystatins in healthy children; II) α-defensins 1, 2, 3 are significantly increased in oncological patients (P<0,005), compared with healthy subjects, at the moment of the diagnosis; III) the concentration of these proteins decreases to the control-level, after the treatment.

Conclusion. The most significant data is the important difference between healthy and ill subjects for α-defensins 1, 2 and 3, which makes them potential biomarkers of localized or diffuse cancer. The high levels of these peptides might be a sign of their involvement in innate immune response, especially in the earliest stages of tumor development, as a product of local inflammatory response (linked to the proliferative-necrotic and antigenic activity of tumor cells) and as well as a systemic effect of homeostasis change in the whole organism. α-defensins reduction, which was observed after radio-chemotherapy, could be due to the effect of the direct cytotoxic treatment on epithelial cells, which is able to reduce the secretory activity, or to its immunosuppressant and immuno-modulator effects on cell recruitment from the innate immune system, as well as to a combination of both described mechanisms. As these proteins decrease already in the first cycle of treatment and reach control-similar values, they may play an important role in cancer therapeutic monitoring.

Oral and functional orthopaedic appliances for the treatment of obstructive sleep apnoea syndrome in children. A systematic literature review

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Aim. The aim of this systematic review was to evaluate the effectiveness of oral and orthopaedic appliances for the treatment of obstructive sleep apnoea syndrome (OSAS) in children. For this objective the authors selected only randomized or quasi-randomized clinical trials (RCTs) assessing the use of all types of oral and functional appliances for treating OSAS compared to placebo or no treatment in children of 15 years old or younger. The primary outcome was the reduction of the frequence of apnoeahypoapnoea episodes. Secondary outcomes were: skeletal relationship and pharyngeal parameters (lenght and area), daytime parameters (sleepiness, irritability, morning headache, oral breathing) and night-time parameters (snoring and nightmares).

Methods. A literature search was performed in the following databases: the Cochrane Central Register of Controlled Trials (CENTRAL) and PubMed. Last search was done on February 2nd, 2015. The search aimed to identify all relevant studies written in english language. Grey literature was excluded. Risk of bias was assessed through the "Cochrane Collaboration's tool for assessing risk of bias".

Results. The PubMed search yielded 869 titles and the CENTRAL search yielded 149 titles. Based upon abstract screening and discarding duplicates from both searches, 95 full-text articles were obtained and subjected to additional evaluation. No further publications were included basing on the manual search. The selection process resulted in the final sample of 2 studies regarding the primary outcome. Data provided in the published reports did not answer all the questions from this review but some of them were. All included studies were assessed as at high level of risk of bias. Due to the disomogeneity of presenting results and a very low number of included studies a quantitative analysis was not possibile. Only qualitative analysis was made.

Conclusion. Considering the high level of risk of bias of the included studies there is no sufficient evidence to state that oral or functional orthopaedic appliances are effective in the treatment of OSAS in children. Oral appliances or functional orthopaedic appliances may be helpful in the treatment of children with craniofacial anomalies which are risk factors for apnoea but more studies without limitations of evidence are necessary for better evaluating their usefulness.

The use of magnetic resonance imaging in the evaluation of upper airway structures of pediatric obstructive sleep apnoea syndrome. A systematic literature review

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Aim. The aim of this systematic review was to assess the effectiveness of magnetic resonance imaging (MRI) for the evaluation of upper airway structures in children affected by obstructive sleep apnoea syndrome (OSAS). For this objective the authors selected clinical trials assessing the use of MRI integrated with traditional polysomnography in OSAS children of 15 years old or younger for evaluating upper airway parameters. The primary outcome was the upper airway total volume. Secondary outcomes were: upper airway cross-sectional area (CSA) in the regions adjacent to adenoids and tonsils, adenoid and tonsils volume, soft tissue and maxillofacial bone parameters (midsagittal CSA and volume of the tongue and soft palate, midsagittal CSA of hard palate and mandibular volume).

Methods. A literature search was performed in the following databases: the Cochrane Central Register of Controlled Trials (CENTRAL) and PubMed. Last search was done on February 2nd, 2015. The searchaimed to identify all relevant studies written in english language. Grey literature was excluded. Risk of bias was assessed through the "Cochrane Collaboration's tool for assessing risk of bias".

Results. The PubMed search yielded 479 titles and the CENTRAL search yielded 526 titles. Based upon abstract screening and discarding duplicates from both

searches, 66 full-text articles were obtained and subjected to additional evaluation. Two further publications were included basing on the manual search. The selection process resulted in the final sample of 3 studies regarding the primary outcome. Data provided in the published reports did not answer all the questions from this review but some of them were. All included studies were assessed as at high level of risk of bias. Due to the disomogeneity of presenting results and a very low number of included studies a quantitative analysis was not possibile. Only qualitative analysis was made.

Conclusion. Considering the high level of risk of bias of the included studies and the limited number of subjects enrolled there is no sufficient evidence to state that MRI is effective in the evaluation of upper airway structures in children affected by OSAS. The MRI application for the evaluated outcome must be verified by further studies.

Bruxism in children: a literature review about need of treatment

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Aim. "Bruxism" is a disease affecting the oro-facial district, generating a so-called parafunctional behavior causing overload intemporo-mandibular joint and masticatory muscles. There are no fully trusted data yet about the incidence of bruxism in children and adolescents. According to the literature this has a prevalence between 5-15% in children under the age of 14 years and it regresses in advanced age. Bruxism seems to be a physiological phenomenon during dental eruption likely because of the changes of occlusal contacts during the development of permanent dentition. The purpose of our work is to obtain a systematic review about treatment of bruxism in paediatric age, and clarify the strong debate among the authors.

Materials and methods. Pubmed has been used to search for the various articles concerning the treatment of such patients. Only the articles in English language have been considered.

Conclusion. In this review we can deduce how the treatment of bruxism in children is very controversial among the authors. Many authors believe the parafunction to be physiological in deciduous dentition, considering then unnecessary to implement any type of treatment. On the other hand, different authors consider it is very important to start the treatment in children and teen patients as soon as possible, because a balanced oral function would determine a correct development of the same.The most used treatments in literature are the psychological and the occlusal ones. The former considers bruxism as a problem related to stress and anxiety of the children, and therefore tries to reduce it with a psychological approach. The latter, on the other hand, uses a night bite, with the main purpose to prevent the tooth wear. Considering there are no scientifically recognized guidelines, during our practice at the Unit of Pediatric Dentistry, Department of Oral and Maxillo-facial Sciences, Sapienza University of Rome, the attitude toward those patients in pediatric age is waiting and making follow-up. Whereas the clinical study and cephalometric investigation revealed a need for orthodontic treatment and there is a coexisting of bruxism, the use of elastodontic devices may represent a useful solution both as early treatment of the malocclusion, both as "therapy bite" for the control of the bruxism.

Therefore, data emerging from this review show a lack of consensus about the treatment of pediatric patients suffering bruxism, suggesting therefore the need of new and exhaustive studies in order to have evidence based guidelines for the treatment of these patients.

Occurrence of oro-facial malformations in a tertiary center hospital of Southern Italy: retrospective study on ten thousand newborns

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Aim. Congenital anomalies (CA) are one of the major cause of infant mortality and childhood morbitity, affecting 2-3% of all babies. Approximately 1% of these newborns have syndromes or multiple anomalies; Cranio-facial anomalies are often a component part of these pathologies. Several newborns with cranio-facial anomalies are affected by syndromes composed of multiple malformations thought to be etiologically and/or pathogenetically related. One of the most frequent sign of these syndromes is the cleft lip and/or cleft palate. It is estimated that 30% of cleft cases are syndromic and conversely, therefore, approximately 70% are non-syndromic. Oral clefts are among the most widely known and common craniofacial anomalies, occurring in approximately 1 in every 700 live births. Craniofacial anomalies include jaw deformities, malformed or missing teeth, defects in the ossification of facial or cranial bones, and facial asymmetries. Many factors contribute to cleft conditions, among them being heredity, pre-natal nutrition, drug exposure, and other environmental factors (WHO, 2002). The present study was aimed at evaluating the incidence of fetal oro-facial malformations in a tertiary center hospital of Southern Italy.

Methods. Clinical data of newborns affected by oro-facial malformations were retrieved from records of infants born between 2001 and 2003 in a hospital of Barletta-Andria-Trani province. Particular attention was given to potential risk factors such as smoke, alcohol, infections and drugs.

Results. Among 10 thousands newborns, 10 oro-facial malformations were found: 7 were cleft lip and palate and 3 were cleft palate, one of whom was associated with macrophthalmia, cataracts and congenital heart disease. Age range was 19-38 years for mothers and 28-36 years for fathers. In three cases a positive family history was present. In four cases, mothers reported to drink alcohol on a regular basis and two of them were also smokers. Three other mothers reported to be smok-

ers. In one case, rubella occurred in the second month of pregnancy. No association was found with any drug.

Conclusion. Epidemiology of oro-facial malformations within this study seems to be similar to other reported statistics. The potential role of alcohol, smoke and infections (rubella in the particular case of our series) seems to be confirmed. Accurate dissemination actions about the causative role of such factors should be performed in order to minimize risk for the reported malformations.

Elastodontic therapy in a growing patient affected by dentinogenesis imperfecta

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Aim. Dentinogenesis imperfecta (DI) is an autosomal dominant disorder of tooth development. This clinic condition can be associated with osteogenesis imperfecta. At first clinical examination, these patients have short roots and crowns, hypoplastic dentin, sane enamel which tends to deteriorate due to supporting lack and a larger breadth of the pulp chamber with respect to average. Moreover, the Dentinogenesis imperfecta (DI) is also associated with different degrees of discoloration, on a color spectrum from gray to yellow-brown.

From a radiographic point of view, teeth affected from DI are called "specter teeth" because of the emptiness appeareance, as it is possible to observe only the polished outlines.

We used an elastodontic therapy along patient growth from the deciduous dentition to permanent one, with second class malocclusion, deep bite and lower arch crowding.

Materials and methods. Elastodontic braces are devices which allow through light forces use to carry out an eruptive guide for dental elements, improve deep bite and second class malocclusion through a preformed bite construction based on a mandibular advancement. Eventually, performing the so-called "lip bumper effect".

Initially, the patient, who was five and a half years old, was treated with an elastodontic brace "Nite-Guide", which was carried both at night and on daylight (two hours per day) performing exercises aimed to activate facial muscles and facilitate the deep bite reopening.

At a later stage, when the patient was 7 years old, during her first permanent molars and incisors eruption, following best practices, it has been placed a clogged-o-Guide Series G, which is usually utilized as a brace in case of mixed dentition.

At 9 years with deep bite resolution, it was reported to the patient to use the occluded-o-Guide only at night to hold down previous results and sustain patient's dental growth.

At 11 years old, after successful teeth switching, it was prescribed an occluded-o-Guide Series N, which is functional for permanent dentition and guaranteed an eruptive guide for last dental elements.

Results. The patient has corrected optimally her second class malocclusion, deep bite, and dental misalignment. The elastodontic devices have allowed a proper eruptive guide for all teeth in various commuting stages.

Conclusion. This clinic case could be considered an exemplificative approach for all those patients with systemic and/or dental diseases that disallow adequate dental retention, which is necessary for most orthodontic appliances, whereas elastodontic devices do not require adequate dental retention thus result as the proper solution.

Assessing risk factors for dental caries: a statistical models

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Background. Considering the complex etiology of dental caries, from the methodological side, a rich set of statistical models is currently available to analyze dental caries indices. These models have been applied in several studies to investigate the impact of different risk factors on the cumulative severity of dental caries experience and in most of the cases: (i) these studies focus on a very specific subset of these risk factors, which increases the risk of bias in the statistical analysis due to the presence of confounding variables not included in the modeling strategy; (ii) in the statistical modeling only few candidate models are considered and model selection is at best only marginally addressed. As a result, our understanding of the robustness of the statistical inferences with respect to the choice of the model is very limited, and the richness of the set of statistical models available for analysis in only marginally exploited.

Aim. In this paper we argue that these limitations can be overcome considering a very general class of candidate models and carefully exploring the model space using standard model selection criteria and a rich set of a measures of global fit and predictive performance of the candidate models.

Methods. We use data on 558 children between 2 and 9 years old from the province of Caserta. In our illustration, caries severity is measured as a sum of the Decayed, Missing or Filled Teeth Index in both the permanent dentition (DMFT) and in the deciduous teeth (dmft). We pay special attention to the choice of the best model to address the research question considering a total of more than 2.6 millions of models obtained combining standard classes of models for caries data with different choices of the set of explanatory variables to be included in the model. These choices correspond to all possible subsets of a rich set of risk factors which includes (i) socio-demographic attributes of the child and his/her parents; (ii) habits and perceptions that are potentially relevant for caries experience; (iii) premature delivery, and breast-feeding; and (iv) risk factors specific of the oral environment of the patient. The wide array of potential caries determinants included in the study allows us to assess the impact of a large number of risk factors on DMFT properly taking into account and eliminating the effect of other confounding variables. Model selection is performed using two standard procedures: the Akaike's criterion (AIC) and the Schwartz criterion (BIC). Relative strengths of the best AIC and BIC models are addressed taking into account a very rich set

of measures of global fit and predictive performance using bootstrap and cross validation as internal validation procedures to "correct for optimism". The robustness of the results with respect to the model choice is also addressed comparing the results of the best model by model type.

Results. According to our analysis age and low motivation are significant risk factors for DMFT. Other significant risk factors are slow minor salivary gland functions, low buffering capacity, saliva consistency, number of between snacks, and premature delivery. Once we correct for optimism, however, the inclusion of these additional risk factors only slightly improve the global fit and predictive performance of the model.

Use of modified RPE with miniscrews in a patient affected by ectodermal dysplasia

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Aim. There are several types of Ectodermal Dysplasia that are genetic conditions with one or more structure abnormalities of ectoderma such as: hair, teeth, nails, sweat glands, cranio-facial strcture and fingers.

Worldwide around 7,000 people have been diagnosed with an Ectodermal Dysplasia condition. Some ED conditions are only present in single family units and derive from very recent mutations. Ectodermal Dysplasias can occur in any race but are much more prevalent in Caucasians than any other group and especially in fair Caucasians. The extraoral exam of these patients is characterized by: a few weak hair, projecting forehead, prominent chin, enlarged nose and the abnormal formation of some parts of the eye.

Regarding the teeth, there are often some problems related to agenesis in primary and secondary dentition, defects of the enamel and abnormalities of shape.

These patients are treated with a both medical and dental approach.

Our aim was to use and test the effectiveness of a rapid maxillary expander in titanium with miniscrews in a 8 years old patient affected by Ectodermal Dysplasia (hypohidrotic type) with contraction of the maxilla and a third class inclination.

Materials and Methods. Because of both oligodontia of primary and secondary dentition and no good retention and anchoring, we decided to devise a hybrid modified rapid palatal expander (RPE): dental anchoring with two bands on first upper molars and skeletal anchoring with two miniscrews in the anterior palate.

In order to produce the orthodontic appliance we made a vacuum-formed template with two palatal holes overstuffed with gutta percha which was put on by the patient in order to execute a CBTC for the available quantity of bone. Then he also used the vacuum-formed template during the operation as a guide for the addition of miniscrews.

So we placed O-Cap and then we produced a precise dental impression made of silicone.

We have embedded RPE with glassionomer cement on bands along the first upper molars; the procedure consisted of two activations a day for 12 days.

Results. The procedure has succeeded and the patient has solved the expansion in few days, so RPE has been embedded throughout 6 months in order to develop the bone at the median suture.

Conclusion. This case report has been considered as a valid example for the approach for patients affected by Ectodermal Dysplasia with multiple agenesis and palatal contraction because of the difficult retention.

Multidisciplinary management in patient with dental anomalies and class I malocclusion

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Aim. Dental anomalies are alterations of the external, internal structure and topography of one or more teeth, deciduous or permanent and may be genetically determined, congenital or acquired (infectious diseases, endocrine and/or metabolic disorders, surgery on maxillary, dental-basal inharmonies, trauma of deciduous, bad habits, etc.). Often they are an expression of a syndromic diseases. Anomalies of number, structure, seat, development and volume are recognized. In both primary and permanent dentitions, they may cause functional, aesthetic, periodontal, orthodontic and caries problems.

They represent a challenge for clinicians because they require, in most cases, a multidisciplinary approach to achieve success and patient satisfaction. The present case report describes the treatment of a patient who presented deficit of cognitive development, Class I malocclusion and various dental abnormalities (macrodontia, dental fusion and agenesis) treated in our Reference Center for Rare Diseases, Dental Clinic of Bari.

Case presentation. An 8-year-old boy G.S. with dysmorphic facial features, contraction of upper jaw, upper and lower crowding, macrodontia of 1.2, fusion of dental elements 2.1-2.2 and agenesis of 3.5 was brought to our observation and he underwent a complete clinical examination, biochemical and radiological exams. After cephalometric study, orthopedic treatment with rapid maxillary expansion was carried out. Then fixed orthodontic treatment for the dental leveling and alignment, laser-assisted gingivectomy of upper and lower incisors, direct reconstruction of 1.1, remodeling of 1.2, 2.1-2.2 and 2.3 was performed.

Results. Orthopedic-orthodontic treatment has solved posterior cross-bite and dental crowding, has improved the skeletal and dental relationship. Dental remodeling has restored the morphology and and size ratios of anterior dental elements. The laser-assisted gingivectomy has resulted in adequate gingival scalloping needfull for the maintenance of periodontal health. Overall, the combination of these interventions led to a satisfactory aesthetic restoration with psychological rehabilitation of the patient, improving self-esteem and social life.

Conclusion. The etiological factors of dental anomalies can be general or local and the type is determined by the time of dental development in which intervenes the pathogenic noxa.

The etiology of dental fusion is unknown (genetics, pressure or physical forces producing close contact be-

tween two developing teeth, close contact between two tooth germs that leads to necrosis of intervening tissue, allowing the enamel organ and the dental papilla to connect each other, trauma, environmental factors such as thalidomide, embryopathy, fetal alcohol exposure or hypervitaminosis).

The prevalence of tooth fusion is estimated to be 0.5% to 2.5% in the primary dentition, whereas prevalence in the permanent dentition seems to be lower (0.1% to 1%). Its simultaneous presence with an abnormality of the number and volume in a patient with cognitive impairment is very rare and it promotes to investigate the presence of a rare disease. The therapy requires a careful anamesis, early intervention, careful dental-periodontal evaluation and multidisciplinary approach (orthodontic, restorative and periodontal treatment). The ability to perform these treatments in patients with rare diseases is an important result which allows to establish treatment protocols and improve the social life of these patients

Self-adjusting file (SAF): managment in pediatric endodontic dentistry

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Aim. The aim of this study was to demonstrate the efficacy of a new endodontic system instrumentation through the presentation of clinical cases performed on deciduous elements and immature permanent.

Methods. The Self-Adjusting File (ReDent-Nova, Raanana, Israel) is a new system of cleaning, shaping and irrigation in the root canals treatment. The SAF is the first hollow file cylindrical, made of a nickel-titanium lattice with a rough external surface, compressible, that adapts itself to the shape of the canal. The SAF is used as a single instrument to achieve complete 3D root canal cleaning and shaping in a minimally invasive way. Its hollow shape allows for the continuous flow of irrigant through its lumen to achieve superior disinfection. The SAF compresses to adapt to the root canal anatomy. Its attempt to re-expand shapes the canal by applying light continuous pressure along the entire circumference of the root canal wall. Thanks to a vibration in the vertical direction associated with a rotation without torque allows us to obtain uniform removal of a layer of dentine from the surface of canal. The SAF's abrasive surface acts similarly to sandpaper by scrubbing uniformly and gradually enlarging the root canal circumferentially. The SAF is extremely flexible and compressible. It does not impose its shape on the canal, but rather adapts to the canal's original shape. This is true both circumferentially and longitudinally, thus keeping the long axis of the canal in its original position.

In our study we selected elements of the series deciduous and permanent with a wide open apex. In all cases, the elements presented periapical lesion. After making an preoperative x-ray, an endodontic access cavity was prepared in each tooth, was determined the working length and the root canal was negotiated using a size 15 K-file. A glide path was established by manual instrumentation up to a size 20 K-file using 5.25% sodium hypochlorite. In our study SAFs (diameters of 1.5 mm and 2.0 mm) was used for cleaning and shaping the root canal using an in-and-out vibrating handpiece. The hollow SAF allowed for continuous irrigation throughout the procedure. After treatment clinical and radiographic controls were obtained.

Results. The use of this innovative system guarantees the three-dimensional cleaning and shaping of oval and curved canals, an effective disinfection, uniform layer dentin removal without varying the thickness of the remaining walls and respecting the physiological root canal anatomy, the three-dimensional obturation of canals. Clinical and radiographic controls showed a regression of the periapical lesion and a progressive closure of the root apex.

Conclusion. When SAFs are used in root canals which are substantially narrower than the thickness of the SAF, the file is compressed and the attempt of the file to get back to its original, non-compressed form generate the light pressure that allows the removal of a thin uniform layer of dentin all around the perimeter of the canal. When the SAF is inserted into a wide canal the compression of the file is smaller and the pressure on the walls is limited.

Consequently, removal of dentin stops to be effective, even when the SAF is intimately adapted to and touching the canal walls. This phenomenon may be useful in cleaning the walls of immature teeth.

Protocol of immediate replantation of 1.1. with composite splinting after traumatic avulsion performed by dental students

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Background. Permanent teeth avulsion is one of the main emergencies in dentistry and represents a range between 0.5% and 3% of all dental injuries. The immediate replantation of avulsed teeth is the best treatment solution if performed immediately after the accident. An alternative way consists in the replantation by preserving avulsed teeth in osmolality-balanced medium. Revascularization of the pulp is the goal in case of immature teeth in children, otherwise canal treatment may follow replantation.

Prognosis is influenced by the rapidity of the treatment, the knowledge and ability of dentists and the maintenance of optimal condition of oral hygiene. Nevertheless avulsedreplanted tooth prognosis is uncertain.

The management of the avulsed permanent teeth is reported in the IADT (International Association for Dental Traumatology) guidelines.

Aim. The object of this study is to show how dentistry students of University of Verona during their 6th year of studies are able to manage this clinical emergency with the support of a tutor and with the idea of suggesting smartphones as accurate devices to document and follow up patients from a distance.

Methods. A 6-year-old female patient came to our dental clinic, Policlinico G.B. Rossi of Verona, after the traumatic avulsion of 1.1. with immature apex. It was preserved in milk and the mother of the patient reported that trauma occurred 45 minutes before. The tooth was undamaged and intraoral radiography did not

reveal alveolar fracture. According to the IADT guidelines the tooth was replanted and all the procedure was documented with pictures.

Results. This case report illustrates how dental students of the University of Verona supported by a tutor treat a traumatic dental avulsion in emergency following the International guidelines.

Despite the distance (the patient was on holiday in Verona but she actually lives in Genova), it has been possible to get the follow up photographic documentation sent by smartphone. 1.1. element was checked by a dentist in Genova and he performed canal treatment.

Conclusion. The importance of a correct diagnosis and initial assessment permit an effective urgent intervention in order to obtain the aesthetic and functional recovery of the traumatic element.

The success of this treatment is closely related to the adequate hygiene practices to promote the tissues healing and to prevent infections. Smartphones' photos can be useful to permit the transmission of images in case of long distance patients in order to obtain information about the progression of the treatment, important for students to follow the evolution of the clinical case.

Sleep breathing disorders in orthodontic patients: a preliminary study

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Aim. The aim of this study is to investigate the presence of sleep breathing disorders (SBD) in orthodontic patients in order to analyze the possible correlations with skeletal and occlusal factors.

Methods. Parents of 55 children attending first orthodontic consultation filled in the Sleep Disturbance Scale for Children (SDSC), a questionnaire for the risk assessment of developing sleep disturbance and respiratory disorders in school aged children. The study group was formed by 17 males and 38 females, aged between 5 and 16 years (median age 11,054 years). For the correlation with orthodontic factors were investigated skeletal (SC) and occlusal classes (OC) of each patient, and their type of breathing (mouth, nasal or mixed).

Results. 21,8% of parent report disturbances because of tonsils and/or adenoids. 9.09% of children have been already underwent to adenoidectomy or tonsilloadenoidectomy. In the risk assessment, all kinds of sleep disturbances showed a prevalence of 20%, 9,09% of these had a high risk. SBD showed a prevalence of 12,7%, 21,8% of these had a co-morbid with clenching and/or bruxism. Among patients with a high risk of developing SBD, 71,43% present II OC and 28,6% I OC; 57,1% present II SC and 42,8% I SC. 42,8% of the same patients present mouth or mixed breathing, and 14,3% nasal breathing.

Conclusion. The use of a specific questionnaire could help the orthodontist to screen sleep and breathing disorders, that it's well known related to cranio-facial morphology. The limit of this preliminary study would need a greater number of patients to be able to identify a specific correlation between SBD and orthodontic problems. The data emerging from this research seem to indicate a significant prevalence of the risk of sleep and breathing problems in a population of young orthodontic patients, therefore it seems advisable that the orthodontist apply this screening m,ethods to evaluate this possibility during the baseline visit. The main limitation of this preliminary study is the low number of patients investigated, the authors are continuing to administer the above questionnaire to increase the sample in order to deepen a specific correlations between SBD and orthodontic problems.

Piezoelectric orthodontic microsurgery in reducing orthodontic treatment time

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Piezoelectric Orthodontic Microsurgery in reducing orthodontic treatment time. Over the past 20 years the demand for orthodontic treatment by adult patients has considerally increased. Traditional orthodontic treatment represents the "gold standard" of tooth movement, but it often results in protracted treatment time to allay periodontal tissue concern in adult patients.

To overcome these limitations, simplification of the traditional orthodontic movement with bone surgery has been proposed by several authors. The introduction of Piezoelectric Orthodontic Microsurgery represents a breakthrough in the approach to adult patient, improving orthodontic movements and reducing treatment time.

This study aimed to investigate the predictability of results and the reduction in treatment time using low friction technique associated with Piezoelectric Orthodontic Microsurgery.

5 patients at the end of growth presenting dental crowding and bilateral cross-bite associated with skeletal II and III class malocclusion were enrolled in the study. Clinical follow- up confirmed that the Piezoelectric Orthodontic Microsurgery is a reliable and effective technique to reduce orthodontic treatment time in adult patients.

Evaluation of the thickness of condylar cortical bone in patients with different vertical facial dimensions using cone-beam computed tomography: a retrospective study

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Aim. The goal of this study was to evaluate differences in cortical plate thickness of condyle in patients with different vertical facial dimensions.

Methods. A total of 55 computed tomography cone beam exams were selected from the archive of a private practice. The inclusion criteria were: age ranged from 17 to 45 years old, both sexes, complete dentition with or without third molars, all sagittal class of skeletal and dental malocclusion were included. Exclusion criteria were remaining deciduous teeth and symmetric mandibles. For each patient a volume rendering was executed by means of a specific software (Mimics®: Materialise's Interactive Medical Images Control System, Materialise BV, Leuven, Belgium). Applying transparency to the volume rendering conventional latero-lateral cephalometric projections volume-derived were obtained and the conventional Frankfurt-mandibular plane angle was calculated. The exams were randomly selected and assigned to 3 different groups according to the values of the Frankfurt-mandibular plane angle. The following rules were used for the sub-group facial type division: patients with an angle greater than 27° were included in the high angle facial group, patients with an angle ranged from 27° to 19° were included to the normal angle group, with an angle smaller than 19° were included to the low angle group. Thus, the final sample 21 subjects (12 female subjects' ad 9 male subjects) included seven subjects for each facial vertical type.

The cortical bone thickness of condyles of the final sample were measured. The measurement was executed by means of Mimics software at the level of the lateral pole, medial pole and at the level of the highest point of the condyle. Descriptive and inferential statistics of cephalometric characteristics and cortical condyle thickness were executed for each sub-group facial type. Correlation coefficient was calculated between the Frankfurtmandibular plane angle and each considered cortical bone thickness.

Results. The results of the study showed: that on average the cortical bone thickness of iperdivergent patients is thicker than normodivergent patients and ipodivergent patients; that the cortical bone thickness of normodivergent patients is thicker than ipodivergent patients. All the differences were statistically significant ($p<0.05$). A strong positive correlation was found between the condyle cortical bone and Frankfurt-mandibular plane angle ($p=0.78$).

Conclusion. The results oof this study indicate that patients with a high angle facial biotype present a ticker thickness of condyle cortical bone if compared with patients with low angle facial biotype.

Functional orthopedic therapy in class ii malocclusion due to mandibular retrusion

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Background. Second class malocclusion due to mandibular retrusion affects one third of the population; their main characteristics are: molar and canine relationship of the second class, overjet greater than 4 mm, ANB> 4°, SNB < 78°, transversely contract upper jaw, often in the correct relationship with the skull base, retruded lower jaw, short mandibular body, skin profile convex and retracted position of the pogonion. Treatment of Class II malocclusion is done with orthopedic-functional therapy during the peak pubertal growth before acting on the vertical plane, then on the transverse plane and finally on the sagittal one. Significant corrections can be obtained in patients with cephalometric values such as: closed mandibular angle (CoGnMe <125 °) and marked mandibular retrusion (Pg-NPerp> 7mm)

The devices used can be divided into: fixed devices (Herbst with possible reduction in overjet of 12.0 mm in 9 months), semi-elastic devices (Twin Force Bite Corrector with reduction in overjet of 7.0 mm in 4-6 months), functional devices such as Andresen which usually corrects the class II in 18-24 months.

Aim. The aim of our work is to evaluate the clinical changes, skeletal, aesthetic and cephalometric in patients with II class malocclusion due to mandibular retrusion who used a Orthopaedic Corrector with Class II elastics (COCES). This one is characterized by: transpalatal (BTP) solidarised to upper 0,018x0,025-inch rectangular stainless steel archwire, lingual arch, class II elastics (4,5 oz on each side) used for 24hours.

Case presentation. We present two case reports of patients in evolutive age with II class occlusion due to skeletal retrusion mandibular, skeletal deep-bite treated with orthopedic-orthodontic therapy (COCES). We analyzed these cephalometric values: SNA, SNB, ANB, Co-Gn, Go-Me, Co-Go, the position of the upper incisors to the SNP-SNA plane, to SNA and to the turning point, the position of the lower incisors to the Go-Me plane and to Pg.

Results. Skeletal variations were obtained in load of bone bases with improved maxillomandibular relation: reduction of ANB, increase in SNB, in the total length of the jaw (Co-Gn), in the mandibular body (Go-Me), correction of dental relationship, overjet and overbite. Duration of therapy has been 9-10 months.

Conclusion. Using our Orthopaedic Corrector with Class II elastics (COCES) resulted into the normalization of cephalometric values, the correction of skeletal maxillo-mandibular discrepancies, a shorter duration of treatment and a better compliance for the patient than traditional therapy.

Evaluation of different magnetic fields on human perypheral lymphocytes for orthodontic applications

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Aim. Traditional force delivery systems in orthodontics include the use of wires, springs and elastics which present disadvantages such as friction and material fatigue. Alternately, magnetic forces can be used to generate the force for tooth movement and orthopaedic treatment. In fact magnetic system permits good force control at short distances and besides forces release can be calculated from specific force-distance diagrams. The aim of this work was to evaluate how static magnetic fields, with different magnetic force (19.61 N and 1.37 N), affect DNA and cell viability by immersing them in human peripheral lymphocyte cultures.

Methods. A total of 30 neodymium iron boron magnets of varying dimensions were used in this investigations.

The NdFeB magnets are produced by conventional sintering method and were nickel plated.

Rectangular magnets having 19.61 N and 1.37 N of magnetic force were chosen.

Three culture dishes were piled:

— one magnet of the attraction poles couple was fixed in the centre of the first dish,
— the second magnet was placed in the centre of third dish,
— in the middle of the column between the magnetic poles, the second dish was filled with cultured human lymphocyte cells.

Cell death was detected by cytofluorimetric analysis of propidium iodide (PI)-stained cells. In addition, Comet assay was used to evaluate the genotoxic effects of exposing the human lymphocyte cells for 48 hours to the static magnetic field of permanent magnets under attraction mode.

Results. Significant differences ($p< 0.01$) were observed in comparison to controls. Lymphocytes incubated in presence of magnets with 1.37 newton of magnetic force (this value is included in biological forces range for tooth movement) did not show significant differences in comparison to controls. The exposure to magnets

(19.61N) show evident changes as DNA fragmentation in comparison to controls. On the contrary, under exposure to magnets (1.37 N), slight changes in comparison to controls were observed. The tails length of lymphocytic cells exposed to magnets of 19.61N appear longer than that of the control and in addition the cells were adherent to the dish. Instead the same modifications were not reported in lymphocytes exposed to a magnetic force of 1.37 N, which appeared with a rounded morphology and in suspension as the control cells.

Conclusion. Biocompatibility tests highlight how the use of a magnetic force equal to 1.37 N, that is the biological force established to obtain tooth movement, doesn't affect significantly both the cell viability and the DNA.

The acquired data should be deepened to model a magnetic forces system that allows to implement magnets resized in ceramic brackets supports which will be able to produce tooth movement.

The role of temporomandibular joint ultrasound in children and young patients with juvenile idiopathic arthritis

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Aim. The purpose of this study was to show our experience in using ultrasonography for the detection of temporomandibular joint (TMJ) changes in children with Juvenile Idiopathic Arthritis (JIA).

Methods. Between June 2013 and December 2014 we investigated prospectively 70 patients (55 female and 15 male; mean age 9.11 years, range 2-18years) with diagnosis of JIA. Examinations were performed with 11-18 MHz array transducers according on patients size. Each joint was analyzed with regard to condylar irregularity, capsular thickness (effusion/synovial thickness), condylar disk dislocation, vascular increasing on Color-Doppler examination and symmetry in condylar translation between open- and closed mouth position.

Results. 24 out of 70 patients (34%) had normal US appearance on both side. Irregularities of the bony surface were found in 67 joints (48%) whereas capsular thickness in 49 ones (35%). Vascular signal was increased in 5 joints and always associated with other abnormalities, the same as disk dislocation (3 joints). Translational asymmetry between open and closed mouth position was found in 11 joints and could not be evaluated just 3 patients, the youngest ones (2-3 years).

Conclusion. Ultrasonography could be a helpful screening method for the detection of TMJ involvement in children with JIA. It can be used and well tolerated even in very young children (2 years) without sedation or radiation risk. US identifies the patients that need further investigations and it can be used for monitoring the progression of TMJ involvement and its response to therapy even if not all parts of the TMJ are visible for ultrasonography. Highresolution ultrasonography is a valuable tool through in particular situations: (i) when MRI examination is not available; (ii) when children are afraid of MRI examination; (iii) in more advanced stages of JIA.

Two-year follow-up evaluation of chewing pattern in unilateral cross-bite patients

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Aim. Cross-bite is a common malocclusion developing at an early stage of growth. It may involve the anterior and/or the posterior regions of the dental arches. The posterior unilateral cross-bite has been defined as "a malocclusion in which one or more deciduous or permanent posterior upper teeth occlude in an abnormal buccal–palatal relationship with their corresponding lower teeth" (Daskalogiannakis and Miotti, 2001). It has been classified by Bjork considering different regions of the occlusion and has been defined as "a malocclusion in the canine, premolar, and molar regions, characterized by the buccal cusps of the maxillary teeth occluding lingually to the buccal cusps of the corresponding mandibular teeth" (Björk *et al.*, 1964). The largest part of studies concerning unilateral posterior cross-bite had taken in consideration patients with more than one tooth in cross-bite. As it is well established, patients with this malocclusion exhibit reverse-sequencing chewing patterns when chewing on the affected side. The aim of this research is to evaluate the prevalence of reverse-sequencing chewing cycles in patients with unilateral posterior cross bite involving more then one tooth, during chewing on the cross-bite side before terapy, after six moths of correction and at 2 years of follow up, in order to evaluate the role of this malocclusion on masticatory function and the stability of crossbite correction obtained with function generating bite.

Methods. Thirty patients (11 boys, 19 girls) with unilateral posterior cross bite, were included in the study.

Masticatory cycles were recorded during chewing a soft (chewing-gum) and a hard (winegum) bolus with a Myotronics K7-I kinesiograph, before therapy, after correction with functional appliance and at two years follow up.

The kinematic signals were analysed using custom-made software. The chewing cycles were divided in to non-reverse and reverse, based on the vectorial direction of closure.

Results. The results showed a high prevalence of reverse-sequencing chewing cycles in patients with posterior unilateral cross-bite before therapy (mean of reverse cicles 78.50%) when chewing with hard bolus on the cross-bite side. This percentage significantly decreased after correction with function generating bite (mean 21%). At two years follow up, this percentage decreased ulteriorly (mean 12.30%). Using the Anova test for correlated samples, the change of the prevalence of reverse-sequencing chewing cycles in this group of patiente results statisticaly significant ($P<0.0001$).

Conclusion. Patients with unilateral posterior cross-bite corrected with function generating bite improved masticatory function and showed stability at two years follow up. These results are likely to be due to the fact that, with function generating bite therapy, the central nervous system has time to reprogram the motor control, using the appliance as retention during the night.

Surgical-orthodontic assessment of the lower third molar: germectomy *vs.* non germectomy

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Aim. The aim of this work is to present the germectony's indications and general overview of the different surgical techniques used for the germectomy of the lower third molars and of the possible post-surgical complications.

Methods. The germectomy is a surgical treatment defined as the removal of a tooth at the beginning of its development, when it has no contacts with the surrounding anatomical structures.

Results. the different techniques are different depending on the surgical access to the germ: all methods are valid if they're selected considering the different clinical-anatomical conditions of the patients. The post-surgical course is usually good: the complications that a patient have to face after a germectomy are similar to the ones that could follow a difficult tooth extraction, for example: pain, swelling, trisma, haematoma, fever, dysphagia.

Conclusion. The germectomy of lower third molar is an elective surgical treatment in case of morphological-structural or topographic alterations of the tooth germ or in the event of dysplastic alterations of the third molar. Germectomy is a convenient, rapid, atraumatic technique without important post-surgical side effects. It's executable in local anesthesia and it's much less invasive than the traditional surgery of the third molar.

Biomechanical efficiency increase in upper incisors torque control with double vector statically determined system: a case report

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Aim. Upper incisors torque control is an important but also critical phase of orthodontic treatment in Straight Wire Technique.

The most difficult challenge for orthodontists is to obtain a perfect torque control, minimizing collateral effects on the other teeth.

The play between wire and slot, the need of bend reactivations and the difficulties in controlling the right degree of activation complicate clinicians work.

The advantages of this clinical purpose are a more continuous release of momentum, needed for torque expression, and a higher constancy of force levels during deactivation process and a reduction of reaction forces on anchorage unit.

We want to describe, showing a clinical case, a different approach for anterior upper incisors torque control.

Methods. The patient has been treated before with four premolars extraction and consequent severe anterior torque loss and mandibular retroposition. In this case we wanted to chieve a normal anterior overjet, encourage the mandible to rotate counterclockwise and create dental conditions to relieve TMJ syntomatology.

In this case we used a double vector mechanics- a statically determinate system - for anterior upper incisors torque control in a patient with temporomandibular discorders, who was already treated in the past.

The force system is based on two different cantilevers. The fist one is inserted in the front teeth and generates root torque, incisors extrusion and molar intrusion. The second one is inserted in the molar region and generates incisors intrusion and molar extrusion. Vertical forces cancel reciprocally.

The resultant of those forces and moments is the torque and a moderate proclination of upper incisors and minimal collateral effects on the stiff anchorage unit.

Consequently to the new position of upper incisors, the mandible can rotate counterclockwise and reduce compressive effects on both TMJs thus creating occlusal conditions to relieve patient's pain.

This tecnique led us to perfectly control anterior torque without collateral effects on the rigid anchorage unit.

Results. We achieved a correct upper incisors torque. Consequently, the mandible rotated counterclockwise and compressive effects on both TMJs were solved and the remission of patient's TMJs symptoms were achieved.

Conclusion. This technique led to release a more extended momentum, use costant force levels and minimize undesired side effects on the anchorage unit, avoiding creation of precontacts.

This mechanic was effective and efficient to obtain our orthodontic and gnathological goals, with inappreciable reaction forces on anchorage unit.

Increase of leveling phase efficiency and effectiveness in straight wire technique according to University of Turin

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Aim. Aim of the study is to describe a method for leveling the lower curve of Spee, which is regularly used at the School of Turin, Italy. This method bases its principles on the Biomechanics, and aims to reduce the duration of one of the longest phases of an orthodontic treatment: "leveling".

Alignment and leveling phase is the initial part of every orthodontic treatment in Straight Wire Technique and it allows to intrude the incisors and/or to extrude the posterior teeth, according to care plan, in order to flatten the lower curve of Spee.

Flattening the lower curve of Spee, it's possible to correct increased overbite.

Intrusion is one of the most difficult orthodontic movement and requires low forces and periodontal health.

Methods. The technique involves the combined usage of two arches: the main one for leveling and align, and a second one for leveling. The main arch is a superelastic alloy arch, with a diameter and a section established considering the clinical conditions; this arch is inserted into all brackets. A second auxiliary arch works

in addition to the main arch; it is made of steel, with a diameter of 0.018 inch, bent 45 ° downward mesial to the lower molars and with a "Sigma" shape to minimize the Bauschinger effect (the yield strength of a metal decreases when the direction of strain is changed). The auxiliary arch is inserted on the molars and ligated to the main arch in the inter-bracket spaces among central and lateral incisors.

The combined effects of frontal intrusion and the posterior extrusion accelerates the leveling of the lower curve of Spee, thus increasing treatment efficiency.

Results. The frontal intrusion and posterior extrusion movements are accelerated. This method allows a dramatical reduction of the time needed for leveling the lower curve of Spee.

Conclusion. The method is efficient, effective and easily reproducible. It does not require the use of special items (0.018 inch diameter steel arch) and requires only regular technical skills of the operator, which can be easily learnt.

The duration of orthodontic can be reduced thanks to this simple method.

The combined usage of the two arches for leveling the curve of Spee is regularly followed in the Orthodontic department of the University of Turin.

Rapid maxillary expansion borne on deciduous teeth: when upper first permanent molar does not correct crossbite position. Biomechanical solution according to the University of Turin

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Aim. Maxillary hypoplasia and space deficiency in the upper arch often require an early treatment by means of rapid maxillary expander. Midpalatal suture in the maxilla might be split by rapid maxillary expansion (RME), a method first described in 1860. Many studies based on linear and angular analyses confirm the dentoalveolar and skeletal changes induced by this procedure. Increased maxillary transverse dimension is key not only to achieve space gain for teeth alignment, but also to improve stomatognathic functions, such as nasal cavity enlargement, and favor better tongue position. When compared to normal arches, patients with maxillary constriction have their tongue in a lower position. Expansion of mandibular arch widths is also observed after RME. In these cases, altered dental contacts could incline posterior mandibular teeth buccally. In literature there are data that support the use of expanders fully anchored on deciduous teeth. However, regardless of the expansion, there is a 20% risk that the first upper molars erupt into crossbite or don't follow the correction of the crossbite.

Methods. The University of Turin suggests, in case of persistence of molar crossbite despite rapid expansion, the use of a biomechanical auxiliary represented by a 0.018" stainless steel archwire with a toe-in bend located at the one-third position between first molar and primary canine. Toe-in bend results in two sections of a off-center bend. Long section points in the direction of the force produced, while the short section points opposite in direction to the force produced. At molar bracket a moment develops. At the opposite bracket the moment is smaller, but in the same direction. It is essential, in order to establish an off-center bend, that primary molar brackets are not placed.

Results. The placement of a toe-in bend results in both upper molar distal rotation and buccal movement, thus correcting crossbite.

Conclusion. It's well established that rapid maxillary expander is a valid appliance for the correction of cross bite malocclusion. On the other hand, biomechanical knowledge results necessary in certain cases when the correction of the permanent first molar cross bite is not achieved completely with maxillary rapid expander on deciduous teeth. This biomechanical system adopted at university of Turin, is simple and predictable.

Rapid maxillary expansion in mixed dentition: design of the appliance according to the School of Turin

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Aim. Midpalatal suture in the maxilla might be split by rapid maxillary expansion (RME), a method first described in 1860. Many studies based on linear. Increased maxillary transverse dimension is key not only to achieve space gain for teeth alignment, but also to improve stomatognathic functions, such as nasal cavity enlargement, and favor better tongue position. When compared to normal arches, patients with maxillary constriction have their tongue in a lower position. Expansion of mandibular arch widths is also observed after RME. In these cases, altered dental contacts could incline posterior mandibular teeth buccally. Patients with a maxillary transverse deficit, during deciduous or early mixed dentition, can take advantage from a maxillary expansion. In these cases, lateral maxillary incisors often erupt high in the vestibulum or even in anterior crossbite. The aim of this study is to describe the characteristics of the rapid maxillary expander according to the University of Turin used in the Department of Orthodontics at Dental School.

Methods. Turin School recommends – for expansion in deciduous or early mixed dentition – a rapid palatal expander born only on deciduous teeth (second molars and canines). The use of four orthodontics bands makes the expander resistant and solid and reduce oral hygienic problems that can appear easily with other kind of appliances. Leone 621 screw, with its reduced size, can be used even in smallest palates and doesn't interfere with correct tongue function. A slow or semi-slow activation protocol is recommended in order to gain an orthopaedic and dental expansion, and also to avoid side effects as discomfort or midline space opening. Moreover, brackets welded on deciduous canines and molar bands allow to correct anterior cross bites and to easily manage the space created by expansion.

Results. This appliance with its characteristics, solid and reliable, allows a good level of oral hygiene and is

well tolerated by young patients. Brackets on canines and deciduous second molars bands, facilitate correction at an early stage (during roots formations) of anterior dental problems, that reduces relapse risk.

Conclusion. The expander described is reliable, hygienic, well tolerated and adaptable. It allows to correct early anterior dental problems, improving efficiency and stability of interceptive phase.

The Turin Shroud face: the evidence of maxillo-facial trauma

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The Turin Shroud (TS) is a linen cloth commonly associated with Jesus Christ, his crucifixion and burial. Several medical specialists have debated the injuries of the TS man, nevertheless there are no detailed and quantitative data about the anatomy of the TS face.

The aim of this study was to analyze the cephalometric measurements of the face image of the TS. The TS face image was acquired and processed using a cephalometric software. The image of the soft tissue was acquired by a picture and processed in order to obtain skeletal points. The cephalometric analysis of the soft and skeletal tissues was performed.

From our data, there are evidences that the face of the TS man, who probably had a complete dentition, underwent a maxillo-facial trauma. In particular, we found a left displacement of the mandible, possibly due to temporo-mandibular joint lesions.

Individual mechanics for a coronal-root control of an impacted lower canine, "alio loco" tractioned, with a previous canine's lack of control

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Aim. The orthodontic treatment of impacted canine remains a challenge to today's clinicians. The treatment of this clinical entity usually involves surgical exposure of the impacted tooth, followed by orthodontic traction to guide and align it into the dental arch. Bone loss, root resorption, and gengival recession around the treated teeth are some of the most common and unwanted complications. Early diagnosis and intervention could save time, expense, and more complex treatment in the permanent dentition. Tooth impaction can be defined as the infraosseous position of the tooth after the expected time of eruption.With early detection, timely interception and well-managed surgical and orthodontic treatment, impacted canines can be allowed to erupt and be guided to an appropriate location in the dental arch.

The goal and purpose of this paper is to describe a custom mechanics for the recovery and readjustment of the mandibular canine inclination lost during a traction treatment which was begun elsewhere. The patient has been sent to the attention of Turin Department of Orthodontics when loss of control was already developed. In order to obtain and recover the canine inclination it was necessary to design a complex mechanics based on the combined use of statistically defined and undefined systems in addition to an individual anchorage realized in dental laboratory.

Methods. This technique is based on the combined use of two lever arms: the first one in TMA has been used for the uprighting and the distoinclination of the canine root and the second lever arm in TMA has been used for the lingualization of the canine root, that was necessary to bring it back in its correct bone structure. We used an individual anchorage composed by a welded inferior arch with bands for 3.4, 4.4, 3.6, 4.6, a double tube bracket soldered to the molars and a welded connection as an anchorage to a mini screw placed between 4.4 and 4.5

Results. The management of impacted canines is important in terms of aesthetics and function. Clinicians must formulate treatment plans that are in the best interest of the patient and they must be knowledgeable about the variety of treatment options. When patients are evaluated and treated properly, clinicians can reduce the frequency of ectopic eruption and subsequent impaction of the lower canine.

Conclusion. The technique shown allowed to obtain good root inclination and good root angulation and to recover the position of the impacted lower canine which was out of control after a previous treatment. This method has proved to be efficient and effective but not easily repeatable. Finally, specialized technical devices and high technical skills are required by the operators.

Individual appliance for the treatment of the maxillary canine's crossbite by bodily movement

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Aim. One of the biggest responsibilities for the dental practitioner is to intercept adverse patterns of dental eruption in the patient. Among the developmental problems frequently seen in the mixed dentition there is the anterior crossbite. Crossbites of dental origin must be distinguished from those of skeletal origin. In the simple anterior dental crossbite the patient should display a normal skeletal pattern, with abnormalities presenting in the axial inclination of the affected teeth only. The anterior crossbite may be the result of one or a combination of several etiologic factors, including a traumatic injuries to the primary dentition that cause a lingual displacement of the permanent tooth; an overretained

primary tooth; a labially situated supernumerary tooth; a sclerosed bony or fibrous tissue barrier caused by losing a primary tooth prematurely; an inadequacy of arch length causing the lingual deflection of the permanent tooth during eruption or a repaired cleft lip.

In the orthodontic clinical practice, crossbite canine correction and modification due to bodily vestibular movement of upper canine is really difficult to obtain. Root length is a key factor and subsequently long distance between center of resistance and bracket highly predispose to tipping movements. The anatomy of vestibulum preclude the possibility of using vestibular power-arms.

Methods. University of Turin suggests the adoption of a fixed custom appliance that exploits the anatomy of the palatal vault and the law of transmissibility of forces to bring the line of action of the force close to the center of resistance of the upper canine, that has a vital importance. This appliance consists in a stainless steel stiff structure welded to three or four bands which form the anchorage unit. Canine is pushed by the action of a Ni-Ti coil spring open. The line of action of the force is brought close to the center of resistance of the canine by a well done stiff power-arm. Occasionally it is necessary to disclude temporarily upper and lower arches using composite build-ups that can be either smooth or cuspated, that depends on anchorage needs.

Conclusion. In conclusion movement speed is similar to the traditional methods one, but principally the bodily movement reduces in an effective way need of torque control after crown movement. That means in a reduction of total treatment time.

Assessment of Air-Aligners biocompatibility: an *in vitro* study

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Aim. Clear aligners have been introduced in orthodontics as a potential alternative to the conventional treatment, even though the efficiency of this system has yet to be validated.

Each aligner is designed to move the teeth a 5 maximum of about 0.1 to 0.3 mm over a 2-week period, and is worn in a specific sequence.

Since the patient has to wear this appliance for about 22 hours per day, biocompatibility of aligners has been a concern. To be used in the oral cavity, a material should be biocompatible, then able to be installed into living tissues and perform with a specific application, without having toxic or injurious effects on the biological systems.

Although even aged aligners were found not to release traceable monomers or bioproducts after immersion in an ethanol-water solvent, the aging pattern of these appliances intraorally involves abrasive wear arising from mastication, and, thus, no definitive consensus on their reactivity and biological properties can yet be established.

The aim of this study was to evaluate the in-vitro biocompatibility of the Air-Aligners (NIVOL S.R.L., Pisa, Italy).

Methods. Human gingival fibroblasts (HGF) were developed from healthy young donors and were grown in Dulbecco's Minimal Essential Medium (DMEM).

The aligners were provided by NIVOL S.R.L., and were immersed in colture medium with a ratio between the sample weight and the volume of extraction solution of 0,1 mg/ml. HGFs were exposed to eluates and cell viability was measured by MTT assay and was compared to untreated cells. Moreover, the estrogenic activity was monitored evaluating the proliferative activity on estrogen-sensitive MCF-7 and estrogen insestitive MDA-MB-31 human breast adenocarcinoma cells. Data from four independent experiments were statistically analyzed (Mann-Whitney U-test, $p<0.05$).

Results. The viability of gingival fibroblasts was not impaired by the exposure to aligners eluates. Moreover, the aligners eluates showed a lack of an estrogenic activity, because were not able to stimulate an increase of the proliferation of MCF-7 cells.

Conclusion. In the experimental condition of this *in vitro* study, there was no cytotoxic and estrogenic activity of the Air-Aligners. Two reasons might contribute to this effect: the short time frame (although it was longer than in actual clinical conditions) and the stability of the aligners, which are basically polyurethane-derived products.

Clear aligner operating protocols for the treatment of mild crowding relapse post-orthodontic

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Aim. The CA® CLEAR-ALIGNER protocol is based on progressive aligners which are realized every 4 weeks out of dental impressions and a plaster model. The treatment phase foresees the realisation of a set-up of the plaster model, 3 aligners (Soft, Medium and Hard), modeled exerting pressure on this plaster model, and a report of the movements performed in the set-up. This requires a month of treatment divided into 3 main phases with the aim of treating mild crowding relapse post-orthodontic respecting also the aesthetic needs of the patient.

Methods. The aligners used are:
— Soft Aligner 0.5 mm;
— Medium Aligner 0.625 mm;
— Hard Aligner 0.75 mm.

They will be used respectively in the first, second and third week of the 3 phases. After the third week of each phase, the patient will have to go back to the dentist in order to detect new dental impressions and he will have to use a new Hard aligner in the fourth week waiting for the lab to prepare the next phase.

During the first phase of treatment , a tooth movement of 0.5 mm gets done while in the later stages, the set-up provides a tooth movement of 1 mm; the activation produces areas of absorption and bone apposition. Upon the achievement of the target treatments, the patient will have to use aligner having a thickness of 1 mm, which is a CA-aligner Retention, which has the purpose of maintaining the tooth in the end position.

Results and conclusion. The Clear Aligner is indicated in case of:
— Diastema closure up to 4 mm
— Correction of crowding up to 4-6 mm
— Correction of the rotation of the front teeth
— Deep overbite of anterior teeth
— Correction of cross bite with negative inclination coronal (torque)
— Straightening molar (maximum 10°)

— Application of the aligner for teething transient
— Treatment relapse.
The limitations are:
— Diastema closure greater than 4 mm
— Correction of crowding greater than 4-6 mm
— Correction of rotations of posterior teeth
— Treatment of extraction
— Treatments class II
— Treatments class III.
Contraindications:
— Bruxism
— Disorders of the temporomandibular joints
— Habits such as nail biting, lip biting or chewing objects.

In addition to that, it's worth to underline that if the patient does not use the aligner 17 hours a day as per protocol and does not go back to the dentist for the detection of new dental impressions and planning the next steps, the tooth will be back in its original position. The patient should then use the aligner for at least 6 months, although it is advised to use a device of a fixed-type permanent retention in order to prevent recurrence.

Aesthetic archwires: a literature review

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Aim. The demand for orthodontic treatment with a very low aesthetic impact has greatly increased in the recent years. Aesthetic orthodontic archwires are a component of clear labial orthodontic appliances together with aesthetic brackets. Currently, the scientific literature is highly focusing on the properties of these archwires. Hence, the aim of this study was to perform a review of the literature to get an insight into the physical and mechanical properties of the aesthetic orthodontic archwires.

Methods. A literature research was conducted on Medline (Entrez PubMed) and Web of Knowledge. The research was independently conducted by two authors, from the beginning of each database, up to October 2014. All the studies focusing on physical and mechanical properties of the aesthetic orthodontic archwires were included.

Results. The research resulted into 106 references of which 33 focused on the topic of interest of the current review. Most of the authors focused their attention on the Teflon coated, ion implanted and composite archewires. Teflon-coated archwires displayed good springback property. Coated NiTi wires presented lower dimensional section as compared to the nominal size, in order to compensate the thickness of the coating layer and this leads to a reduction in forces released by these wires. Round and rectangular coated and ion-implanted as-received NiTi archwires showed lower friction than the uncoated wires, even if controversies are reported. Indeed, some authors found no differences using small round coated wires, while other authors pointed out highest friction for coated archwires. Some studies reported that TMA treated with ion implantation shows no differences in Young's modulus as compared to untreated TMA, and the loading and unloading forces were similar between these two wires. Also the resistance to fracture, the ductility and the recovery rate of the surface of treated TMA were reported to be better than that of classic TMA. Composite archwires are very aesthetic but their use in orthodontics is very limited and they still need to be developed. For example, it was pointed out that water exposure might make translucent wires more prone to crack/craze during bending and to change their mechanical properties. Typically, epoxy-resin, Teflon coated or ion-implanted as-received archwires showed lower surface roughness as compared to the respective metal wires; however, controversies are reported also on this point.

Conclusion. Aesthetic orthodontic archwires are improving their properties since their introduction in orthodontics, but still they do not have the same physical and mechanical properties of the metallic archwires. More studies are needed to increase the physical and mechanical characteristics of aesthetic archwires, especially focusing on the prevention of their degradation in the oral cavity.

Biocompatibily of fixed orthodontic appliances: evidence from the current literature

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Aim. The aim of the present study was to perform a comprehensive systematic review of literature on "*in vivo*" metal ions release from fixed orthodontic appliances, in order to answer the question: "Does the orthodontic fixed appliances release metal ions during the treatment?"

The secondary aim of this study was to evaluate if, in case of presence of ion release from orthodontic appliance, the ion levels have to be considered dangerous or toxic for the human body.

Methods. A literature search was conducted through different databases (PubMed, Scielo, Lilacs, Web of Knowledge, Scopus). An additional hand-search was performed on several impacted orthodontic journals (European Journal of Orthodontics, the Angle Orthodontist, American Journal of Orthodontics and Dentofacial Orthopaedics). The research was conducted from the beginning of each database or digital orthodontic journal, up to June 2014. All the "*in vivo*" studies performed on human, focusing on the metal ion release from orthodontic fixed appliances were included. Moreover, the methodological quality of each paper was assessed by means of a custom checklist based on: clear definition of the aim of the study, presence of a control (non-exposed) group, match between treated and control group, clear definition of the methodology, control of confounders, exposition time, adequacy of the statistics, presence of a power analysis and conflict of interest statement. Study selection, data extraction and quality assessment were independently conducted by two operators.

Results. The initial search resulted in 730 papers. Reading all titles and abstracts 36 references were selected. After full-text reading, 27 papers completely fulfilled the inclusion criteria. The most frequently measured ion was Nickel (26 references), followed by Chromium (15 references). The most studied sample was saliva. The results on the statistical significance increase of ions level

in biological fluids, oral mucosa cells and hairs were very controversial. The quality of the include studies was extremely variable (between low and high). The major weaknesses of the included papers concern inadequate sample match and absence of conflict of interest statement. Moreover, most of the studies analysed ion concentration only in the short-term (within one or two months from the beginning of the orthodontic treatment).

Conclusion. The controversial results make it impossible to provide a definite conclusion on the significance of the ion level increase in biological fluids, hairs and oral mucosa cells. Even when a statistically significant increase was reported, the concentrations reached were always lower than the average daily dietary intakes never reach toxic levels. Nevertheless, these findings do not preclude that even low concentration could induce acute hypersensitivity or chronic sub-toxic disease, increasing the inflammation caused by the plaque.

Reproducibility of the Fränkel maneuver for the evaluation of sagittal skeletal discrepancies in class II individuals

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Aim. The validity of the cephalometric criteria for the evaluation of sagittal skeletal discrepancies in class II individuals is highly questionable. The Fränkel maneuver allows an easy clinical evaluation of the sagittal relationship of the upper and lower jaw in class II individuals. Nonetheless data concerning its reproducibility are not available. The aim of this study is to evaluate the intra-observer and inter-observer reproducibility of this maneuver and to assess the influence of the level of clinical experience on its reproducibility.

Methods. One hundred individuals aged between 10 and 13 years, seeking for an orthodontic consultation, with Angle class II malocclusion were recruited. Two lateral photographs, one at rest position, and the other with the mandible postured forward until a class I molar relationship was achieved (Fränkel maneuver), were collected (T0). The records were evaluated by 6 orthodontists, divided into two groups according to their clinical experience: the first group included examiners with less than 5 years of clinical experience; the second group consisted of examiners with clinical experience of over 10 years. The outcome measure was dichotomous: each examiner was asked whether the facial profile of each patient worsen or not with the manouver. In order to assess the intra-observer reproducibility, the above described test was repeated after two weeks interval (T1) with a different presentation sequence for each examiner. Intra-observer agreement was evaluated by computing the Cohen's K.

Results. The agreement (K values) between observations (T0 vs T1) for each examiner ranged from

0.49 to 0.72. The overall agreement between the two observations was K = 0.65±0.05 (95% CI= 0.54-0.75). The agreement in the group with <5 years clinical experience was K=0.61±0.08 (95% CI =0.46 - 0.76), while in the group >10 years was 0.68±0.08 (95% CI=0.53-0.83).

The amount of clinical experience did not affect the intra-observer agreement (p=0.50)

Conclusion. According to our results we can support the hypothesis that Fränkel maneuver is reproducible since substantial intra-observer and inter-observer agreement were found.

We can also conclude that the reproducibility of this maneuver is not influenced by the level of clinical experience.

New studies should be carried out to validate this clinical maneuver.

Breastfeeding and craniofacial growth: a review of the literature

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Aim. Exclusive breastfeeding (EBF) during the first months of life exerts positive influences on newborns' nutritional, immune, emotional statuses and thus represents a crucial factor for babies' health, with important implications also for the health of their mothers. EBF has been also reported as a determining factor for correct craniofacial development, since it promotes intense exercise of the orofacial muscles, favoring the balance between the internal and external restraint forces of the face musculature. In addition, EBF stimulates breathing, swallowing, mastication and phonation. The lack of EBF has been associated to the underdevelopment of the masticatory complex and to the onset of mixed or mouth breathing.

Therefore, it can be hypothesized that prolonged duration of the EBF limits the possibility to establish oral bad habits and so reduces the chances of developing skeletal and dental malocclusion in childhood.

The aim of this study was to perform a review of the scientific literature with the intent to evaluate the effects of bottle-feeding and breastfeeding on craniofacial development.

Methods. The search has been conducted using Medline (Entrez PubMed), from January 1989 to January 2015 to identify all peer-reviewed papers potentially relevant to the review topic. The search strategy included the following keywords: (1) exclusive breastfeeding, (2) bottle-feeding, (3) craniofacial development, (3) craniofacial growth, (4) malocclusion, combined according to different algorithms. Studies assessing the relationship between breastfeeding or bottle-feeding and the development of skeletal and dental disorders of the upper and lower jaws have been evaluated.

Results. Our search resulted into 112 studies. Posterior crossbite and Class II malocclusion are reported with a higher frequency among children who used bottle-feeding. Also anterior open-bite has been reported with significantly greater frequency for nonbreastfed children in comparison with those breastfed for periods longer than 12 months. In addition, there is enough accordance in current literature that breast-feeding can prevent the development of sucking habits in children in their first 18 months of life. Indeed, starting from the premise that bottles-feedings and pacifiers use can be obstacles to successful breast-feeding, also the World Health Organization (WHO), in conjunction with UNICEF, recommended not using bottles or pacifiers in maternity units with breast-fed children.

Conclusion. Exclusive breastfeeding seems to have several positive effects on craniofacial and dental development.

Therefore, activities to promote exclusive breastfeeding and accurate instructions for correct breastfeeding techniques should be intensified for adolescent mothers, in order to reinforce the avoidance of the ill effects of pacifiers.

A contemporary approach to orthodontic retention

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Aim. Following orthodontic movement, teeth have a tendency to return to their initial positions. Therefore retention phase is considered a real part of the orthodontic treatment.

However there is no agreement among orthodontists about the best approach that must be adopted in each individual case during the retention. The purpose of this work is to make a critical analysis of the existing studies and identify guidelines to be followed during the clinical practice.

Methods. The following electronic databases were searched: PubMed, EMBASE, MEDLINE, the Cochrane Library. There were no restrictions regarding language or date of publication. Research was carried out using the keywords "orthodontic retainers", "retention protocols", "relapse", "orthodontic fixed retainer", "vacuum retainers" and "Hawley retainer". Studies from international orthodontic journals have been selected and data were extracted and classified. The survey focused on which retainers are the most used on the effectiveness and the long-term success of the different adopted strategies.

Results. A variety of results were reported by individual studies in different countries. They concern the kind of retention used and the instructions given to patients. The most common retention protocols involve a removable appliance in the maxillary dentition. The use of the Hawley retainer has recently decreased while the use of vacuum-formed retainers has increased. Essix retainers have proved to be equally effective in preventing relapse, more cost-effective and preferred by patients when compared to Hawley retainers. Fixed lingual retainer is the most common retainer used in the lower arch. An additional mandibular overlay removable retainer (acrylic/wire-type or thermoplastic) has been shown to increase effectiveness in maintaining alignment . It retains those teeth not included in the fixed retention and it works as a backup retainer in case of failure of the fixed retainer. Many factors should be considered when deciding what type is to be given to of retainer each patient. Orthodontists seem to consider the following factors in descending order of frequency: pretreatment situation, interdigitation after treatment, oral hygiene, end result, periodontal tissue, patient motivation and patient age. Despite these evaluations 10 years after the completion of orthodontic treatment, only 30% to 50% of orthodontic patients effectively retain the satisfactory alignment initially obtained. After 20 years, satisfactory alignment reduces to 10%.

Conclusion. Although the choice of the correct retainer concerns the most of orthodontic patients, systematic literature reviews have revealed insufficient research data on which to base our clinical practice. Because of long follow up period, retention studies are multifaceted and require a great deal of planning and resources to carry out. Nowadays patients compliance and their consistency over time appear to be the factors that contribute most to avoid relapse and postorthodontic tooth movement. Retainers must be accepted and used as long as possible.

Changes of the inflammatory cytokines in the gingival crevicular fluid during dental movement produced by orthodontic forces

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Aim. The protracted application of a force on a tooth causes a variable shift of the tooth itself through changes in the periodontal ligament, reshaping of the surrounding alveolar bone, of the cementum and of the gum. Many studies revealed significant changes in the levels of different inflamation markers during dental movement due to orthodontic braces. In particular, it has been demonstrated an increased expression of inflammatory cytokines in the periodontium adjacent to the dental elements which were stressed by orthodontic forces.

The aim of this work is to further evaluate the trends of different concentrations of inflammatory cytokines during orthodontic movements.

Methods. The study took into account 10 patients (6 males, 4 females) between 10 and 16 years old who needed an orthodontic therapy providing for the corporal movement of one or more dental elements. Samples of the GCF were taken six times from the traction and pressure site of every dental element; the first one was taken seven days before the application of the orthodontic force, the second one the day in which the force was applied (time 0), the third after an hour, the fourth after 24 hours, the fifth after two weeks and the sixth after three weeks.

The levels of the inflammatory cytokines in the samples were evaluated using the ELISA test (Enzyme-Linked ImmunoSorbent Assay). Data were analyzed using non-parametric statistical methods.

Results. The values of the different analyzed cytokines varied over time in a non-linear way. For some cytokines changes over time are statistically significant at the pressure site with $p < 0.05$, showing similar profiles of changes in time, while did not show statistically significant variations in the traction site. On the contrary, other cytokines did not display statistically significant changes nor in the pressure nor in the tension site at no time.

Conclusion. As already demonstrated by several studies, the orthodontic movements confirm themselves as useful models for the comprehension of the mechanisms that govern bone remodeling induced by mechanical loads, and mechanical force influences the expression of different inflammatory cytokines in the tissue and might alter the expected periodontal remodeling rate.

Variations in the cytokines levels testify fluctuations in

the immunoenzymatic balance of the tissues undergoing mechanical forces and reflect an inflammatory state of the periodontium adjacent to the dental elements subjected to orthodontic forces.

Further studies are needed in order to link the changes in concentration of the different cytokines and the different phases of the orthodontic tooth movement.

Facial characteristics of Down's syndrome patients described using a stereophotogrammetric system

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Aim. Many genetic conditions involve characteristic facial features that are the first clue to a diagnosis. Three-dimensional (3D) models of facial morphology are showing potential in syndrome delineation and discrimination, in analysing individual dysmorphology, and in contributing to multi-disciplinary studies of genotype–phenotype correlations. Threedimensional surface imaging systems have the potential to compensate for inadequacies of 2D imaging by capturing an image that can be inspected from any desired viewpoint (measurements derived directly from a single 2D image are adversely affected by projection distortion and pose). The stereophotogrammetric system is one of the most useful, because allows an easy image acquisition combined without any radiation exposure. That method uses three or more synchronized cameras that shoot photos at the same time; some softwares are used to combine these photos to create measurable 3D facies. The aim of the present study was to obtain quantitative information concerning the three dimensional (3D) arrangement of the facial soft tissues of subjects with Down's syndrome, comparing them with data obtained by non-syndromic people of the same age and sex resulting from our previous study (3D Mediterranean female face norms: a preliminary study) in which we defined the Mediterranean norm.

Methods. Four female subjects with Down's syndrome (20-25 years old) were imaged using a stereophotogrammetric system. 8 anthropometric landmarks were identified on these images. Through the use of a specific software, 3D measurements were calculated among the landmarks. This study analyzed only three parameters defined as descriptive of the face: the distance Ex'r-Ex'l (upper facial width) and two angles T'r-Prn-T'l (nasal angle) and Pg-Se-Ls (intermaxillary angle). The values obtained from this analysis were compared with those resulting from the analysis of 55 non-syndromic subjects with similar age, gender and race considered the Mediterranean norm.

Results. The values obtained from the facial analysis of the subjects with Down's syndrome were found outside of the standard values resulting from the analysis of the sample. In particular, three subjects presented the middle face flat (angle T'r-Prn-T'l increased compared to the norm). Three patients presented a reduction in interorbital distance (Ex'rEx'l); only one patient presented a profile more concave than the norm (angle Pg-Se-Ls increased), instead the others three patients presented a normal profile (angle Pg-Se-Ls normal).

Conclusion. The study confirmed that subjects with Down's syndrome presented distinctive facial features, which can be defined more effectively by the 3D method. Are necessary, therefore, further studies to compare the syndromic population with the standard values in order to evaluate the influence of genetics on individual manifestations.

Bracketless fixed orthodontics and the "Social Six"

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Aim. To show the advantages of using Bracketless Fixed Orthodontics technique to resolve "Social Six" soft malocclusions.

The alignment of the anterior teeth is called "Social Six" treatment. Buccal brackets, lingual techniques, custom-made aligners, and bracketless technique, applied from cuspid to cuspid or from 1st bicuspid to 1st bicuspid, allow to solve in a predictable and efficient way soft and moderate malalignment.

Patients who don't present severe malocclusions, functional disorders or patients with posterior dental prosthesis (crowns, bridges, implants), find the perfect solution in an orthodontic treatment involving only the anterior sector. On the average The "Social Six" treatment lasts from 4 to 6 months; at the end of treatment a life-long retainer will be applied.

Methods. we present two young adults asking for an aesthetic treatment to resolve the malalignment of the incisors/canines. In agreement with both patients Bracketless Fixed Orthodontics technique was used.

The Bracketless Fixed Orthodontics (BFO) is a technique made up of wires and resin. It comes from the observation of the instable position of frontal teeth still bonded to a fixed retainer and from a period of nine years of clinical experimentation on a way to preactivate a wire to obtain wished dental movements without brackets. It can be used to levelling teeth, as in case of relapse, or to remove the brackets before the end of the therapy. But it can be used also in more complicated clinical cases in patient that never have been treated with orthodontic therapy, alone or associated to other appliances.

The main objectives of this technique are: crowding resolution, torque alteration resolution and closing diastema.

Results. Both the cases were solved in six months and had a life-long fixed retainer.

Conclusion. Due to the "invisible" orthodontic techniques improvement, a large number of adult patients asks for an orthodontic treatment to improve their smile appearance. "Social Six" perfectly fits this contest, being applied exclusively to the anterior teeth, achieving satisfying results and reducing considerably both the treatment time and the patient discomfort.

BFO technique for "Social Six" treatment, either applied to buccal or lingual surface, offers many advantages: good teeth movement control (also for root movements) and good deal with phonetics and oral hygiene. The lingual application of this technique offers also an optimal aesthetic performance during all the treatment, improving patients' compliance.

Evaluation of dimensional differences between plaster models and digital models

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Aim. The object of the present study was to analyse the dimensional variations between the old technique with plaster models and the new trend of digital models realized with an intraoral scanner to show if there were significant changes in the measurements results, because the fast and continuous advances in computer science have resulted in increased usage of new technologies in all levels of dentistry and their potential is huge.

Methods. 20 patients (12 males and 8 females) with a mean age of 13 years old were randomly selected without any fixed criteria. For each subject was taken an initial dental cast of the lower and upper arch by using Orthoprint alginate. In the same date was also realized a digital scanning of their lower and upper arch with a 3Shape Trios scanner (high accuracy <20 µm).

After the realization of the plaster models and the digital models, forty orthodontic dental casts of permanent and deciduous dentitions were selected, and we started with the measurement procedures by using two different types of caliper (manual and digital) and repeating these process twice for each distance, obtaining in this way a better precision.

The error of the method was assessed using measurements on the models cast and digital models with the method error values calculated using the formula described by Dahlberg.

In addition systematic error and the coefficient of reliability were determined as suggested by Houston. The method errors were normally less than 0.5 mm. Huston's coefficient of reliability was greater than 90% for all the measurements.

A line joining the midpoints of the mesial margins of the first permanent molars (A1), and a line joining the cusp tips of the canines (A2) were measured.

All the obtained data were evaluated and analysed using a Microsoft Excel paperwork, and significant differences were tested with the Student t-test ($p < 0.05$).

Results. The values of the length's lines (A1 and A2) showed a non-significant difference between the two techniques and it was also a no statistically significant difference between manual and digital caliper. Despite the previous statements, we discovered a minimal expansion in the plaster models, probably because of the plaster's technical aspects.

The average variation of A1 was 0.0915 mm and the average variation of A2 was 0.05325 mm.

Conclusion. Digital scanners and procedures allow a more precise and faster model than the plaster ones.

This is not so relevant for Orthodontics, but it is an important demonstration for the future of all dental fields.

Clinical and epidemiological evaluation of 84 patients with cleft lip and palate

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Background. Cleft of the lip and palate (CLP) is the most common human congenital deformity affecting the facial region. CLP occurs at the time of early embryogenesis as result of impaired differentiation of the primordial cell layer. Such an abnormality seems to be associated with genetic and environmental factors. The most severe type of defect is the complete cleft of the lip, alveolar process and palate, which can be either unilateral (UCLP) or bilateral (BCLP). The most common therapeutic approach includes the surgical reconnection of the cleft anatomical structures, followed by their development to obtain proper appearance, occlusion and speech. Maxillary growth in operated CLP patients is often decreased in the three dimensions. The most important cause of such a growth inhibition seems to be the iatrogenic effect of surgical intervention and the subsequent constriction induced by scar tissue; however some authors attribute such a deficiency to the congenital hypoplasia of both the alveolar and palatal soft and hard tissues, as well as to functional factors. The maxillary growth deficiency affects the dental arches relationship on the vertical, sagittal and transverse planes, frequently resulting in anterior and/or posterior crossbite occurring already in the early dentition.

Aim. The aim of this retrospective study is to report a clinical and epidemiological evaluation of 84 patients with CLP, referred to the Orthodontic Unit of the University of Parma, and surgically treated in different Hospitals, between 2004 and 2014.

Methods. Clinical and epidemiological data of patients with a diagnosis of CLP referred at the Orthodontic Unit of the University of Parma between 2004 and 2014 were retrieved and analysed. Data recorded and evaluated included age, gender, type of CLP, surgical treatment, maxillary arch constriction and inter-arch discrepancy. CLP has been subclassified as follows: 1) Unilateral CLP (UCLP); 2) Bilateral CLP (BCLP); 3) Cleft Palate (CP); Cleft soft palate (CSP); 5) Lip cleft alone or alveolar cleft alone (other types: OT). Maxillary arch constriction and inter-arch discrepancy were measured on patients dental study models as obtained before the orthodontic treatment, through a numerical scoring system (modified Huddart/Bodenham, HB).

Results. Among the 84 patients selected for the present evaluation, 59 (70.2%) were males and 25 (29.8%) females; female to male ratio (F:M) was 1:2.4. Age at the time of the beginning of orthodontic treatment ranged from 2,5 to 28,9 years (mean age: 7,4 years; mean age males: 7,5 years; mean age females: 7,4 years). According to the CLP type, patients were subclassifed as follows: UCLP: 54 (64%) cases; BCLP: 16 (19%) cases; CP: 5 (6%) cases; CSP: 6 (7%) cases; OT: 3 (4%) cases. The mean HB score was negative for all dental arch segments, showing a tendency toward a crossbite.

Conclusion. The gender distribution observed in our evaluation is very similar to that reported in the literature, confirming a higher prevalence of CLP among males.

Conversely, no agreement exists on the most appropriate timing of treatment in these patients. In the present study, the age at the time of beginning of orthodontic treatment ranged from 2,5 to 28,9 years. It seems worthy to mention here that the vast majority of patients with CLP have a UCLP. The inter-arch discrepancy was found in the deciduous, mixed, and permanent dentition.

Non extraction treatment of severe dental crowding in adult patients: a case report

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Aim. Severe dental crowding in adult patients has negative influences on the dentomaxillary system because this clinical condition can causes an esthetic problem which is the main factor motivating the patient to ask for dental treatment. Dental crowding can also cause other functional problems which can constitute favorizing factors for the onset and evolution of periodontal disease. In adult patients, in which scheletal expansion is not possible to obtain, a terapeutich option to solve dental crowding can be the increase of the arch size by dental expansion.

The purpose of this study is to demonstrate and confirm the possibility to solve, in selected cases, severe dental crowding in adult patients with an orthodontic approach and without extractions.

Methods. The patient is a male, he is 16 years old and he is at the end of growth. He has a permanent dentition and he shows a severe dental crowding in superior and inferior arch and he has a lateral left crossbite. He also has non coincident midline.

In a first step the metallic Damon brackets were bonded. Leveling and aligning were undertaken with 0.13" CuNiTi (10 weeks) and 0.16" CuNiTi (10 weeks) in both arches. Finishing and detailing was done using 14x25 Cu NiTi (8 weeks), 18 x 25 Cu NiTi (8 weeks), and 19x25" TMA (9 weeks) in both arches.

The treatment duration was about 12 months. This was followed in a second step by a permanent retention using fixed lingual bonded retainers in both arches associated with a removable retainer appliance.

Results. The final treatment result was satisfactory. Proper over- bite and over jet, facial balance and good occlusion were achieved The alignment were obtained and dental extraction were not done. At the end of treatment both archs were expanded without gengival recessions and periodontal tissues were healty with the evidence of formation of new alveolar bone.

Conclusion. The passive property of the bracket system, applying extremely light forces due to the use of superelastic wires, allowing for a slow expansion of the dental arches, in many cases eliminating the need for a much more invasive surgical procedure like rapid expansion, especially surgically assisted for the maxilla or dental extractions.

Correlation between malocclusions and orofacial dysfunctions in pediatric age

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Aim. The aim of this study was to analize a pool of patients referred to the Pediatric Dental Department of the Dental School of Turin to identify the patients that could really benefit from interceptive orthodontics. We evaluated the occurrence of malocclusions in decidous and mixed dentition and the relationships between malocclusions and orofacial dysfunctions. The timing of orthodontic intervention is controversial and in literature there is a poor scientific evidence that supports the efficacy of early interceptive orthodontics. In the last years this discussion has increased a lot as some long term studies evidenced that certain malocclusions in decidous or mixed dentition can resolve spontaneously while others can worsen over time, depending on their association with dynamic or static orofacial dysfunctions.

Methods. We selected 50 random healthy patients, 28 males and 32 females, referred to the Pediatric Dental Department for dental evaluation. The patients included in the study were aged from 3 to 11 years; 11of them were in decidous dentition (mean age 5 years) and 39 in mixed dentition (mean age 8 years). A single examiner made an intraoral visit recording dental formula, dental class, overbite, overjet, presence of crowding, cross bite and scissor bite. For each patients intra and extraoral photographs were taken and mouth casts were made. All the patients, with the help of their parents, were asked to answer a questionnaire about orofacial dysfunctions and bad oral habits.

Results. The most frequent malocclusion recorded in our investigation was a second dental class with an increased overbite, which was observed in 17 patients (34%). A posterior cross bite affected 15 patients (30%), while an anterior openbite was detected 4 patients (8%); a third dental class with a negative overjet was observed only in 3 patients (6%) .

Among the active/dynamic orofacial dysfunctions atipical swallowing was observed in the 82% of the cases (41 patients) , mouth breathing in the 54% of the cases (27 patients) and finger sucking in the 6% of the cases (3 patients). As far as passive orofacial dysfunction were concerned, 10 subjects (20%) showed a low tongue posture.

24% of the patients (12 patients) presented a normal occlusion without any orofacial dysfunction. 42% (21 patients) of the patients presented a malocclusion associated with 2 dynamic dysfuction , 18% of the subjects included in the study (9 patients) presented a malocclusion with one dynamic dysfuction while in 22% of the cases (11 patients) a malocclusion with a static dysfunction was observed.

Only 6% (3 patients) of the patients presented a malocclusion with no association with orofacial dysfunctions.

Conclusion. 12 patients (24%) included in our study showed a malocclusion that didn't need an interceptive orthodontics treatment because according

to the data of the literature it could resolve spontaneously. 64% of the cases (32 patients) exhibited a malocclusion associated to at least two dynamic or one static dysfunction which could really benefit from an early interceptive orthodontic treatment associated to speech therapy.

Pediatric dentists need to be aware of the importance to carefully investigate orofacial dysfunctions from the beginning. Orofacial dysfunctions can be considered crucial in worsening malocclusion; they are important to identify the patients that could really benefit from interceptive orthodontics in order to schedule proper follow up program and an adequate treatment plan. The choice of the right time for intervention is very important to obtain more stable results and avoid overtreatments.

Early orthodontic treatment with elastodontics

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Background. Orthodontic problems in the early age are mainly dysfunctions such as oral breathing, atypical swallowing, perioral muscles's activity alteration, long-term non-nutritive sucking habits, masticatory problems and temporomandibular disorders (TMD). Functional problems can impair the cranio-maxillo-facial development and exert a negative influence on the genetic model. A new approach to early interceptive treatment is Elastodontics, that is a particular type of orthodontic treatment using removable appliances made of silicon elastomer. The appliances are simple in construction, easy to use and safe. The elastomeric appliances combined characteristics of a functional device and an eruption guidance appliance: they promotes correction of dysfunctional habits, induces sagittal and vertical dento-skeletal effects together with achieving minor tooth movement as a result of the head-to-head bite construction and the elastomeric material.

Aim. The aim of present study is to evaluate the role of Elastodontics in the early orthodontic treatment in deciduous and early mixed dentition and to assess patient's compliance to such appliances.

Methods. The sample consisted of seven patients aged 3-to-6 years showing at least one of the following malocclusion: posterior crossbite, Class II/III relationships, teeth spacing, openbite and deepbite. All patients were in deciduous or early mixed dentition, with central inferior incisors erupting. The sample underwent early orthodontic therapy with the prefabricated orthodontic appliances EFline®. Patients were instructed to wear the appliance night-time and 2 hours day-time. This 2 hours were divided into four periods of half an hour. In each period the patients had to bite into the appliance and swallow, keeping the lips in contact. The patients were evaluated after 6 months of active treatment.

Results. Adequate levels of cooperation were achieved and elastodontic appliances were extremely efficient: all patients has shown improvement within the first five month of active treatment using the device no more than 8-10 hours each day.

The most significant results were achieved in Class III malocclusion and posterior crossbite: this could be explained by the fact that the appliance removes occlusal interference that frequently cause such type of malocclusion in young patients. This allows the relocation of the mandible toward a Class I molar relationships with ideal overjet and overbite if unfavourable growth patterns are not present.

Conclusion. The findings suggests that early orthodontic treatment performed with Elastodontics is a good treatment option in deciduous and mixed dentition. Patient's compliance is high since the appliance is extremely comfortable and safe. Significant outcomes can be achieved within the first months of treatment, improving patient's and their parent's satisfaction and, besides, making further treatment needed more acceptable.

Orthodontic treatment in disabled patients

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Background. Many patients with disability often presents a delayed tooth eruption and malocclusion, some of which are strictly related to their medical condition (i.e. Class III malocclusion and Down Syndrome). Orthodontic treatment is limited by functional and anatomical conditions related to the disability itself and by patient's cooperation. Nevertheless it is common to be frequently asked from patient's parents seeking orthodontic treatment to achieve adequate oral function and, above all, acceptable aesthetic appearance, with the expectation that this could improve the child's quality of life. It's not easy to deal with such requests: clinical and ethical dilemmas are involved. From this point of view Elastodontics could be a good treatment option for disabled patients, since there are few side effects and contraindications: elastomeric device are removable, safe and easy to use.

Aim. The present study illustrates orthodontic treatment in disabled patients. The sample was selected from patients enrolled in DAMA project (Disable Advanced Medical Assistance) of San Paolo Hospital in Milan, that is a reference centre for oral care of people with disabilities.

Methods. Patients were selected according to the following criteria: presence of at least one anomaly of tooth eruption or functional problems such as atypical swallowing, tongue thrust, oral breathing, perioral muscle's activity alteration; adequate cooperation during the last periodic dental Check-Ups. Patients in permanent dentition were treated with traditional fixed pre-adjusted multi-brackets appliance; patients in deciduous or mixed dentition were treated with elastomeric appliances.

Results. Patients treated with fixed orthodontic appliances showed higher level of cooperation, regarding keeping good oral hygiene and regular check-ups, than those treated with the elastomeric appliance. This could be explained by the fact that orthodontic treatment with fixed appliances requires more frequent periodic check, usually every 15-30 days, than those required during functional therapy. Another reason is the fact that treat-

ment outcome is not related to active patient's compliance when using fixed appliances.

However Elastodontics demonstrated to be effective in improving relationships between patients, their family and the orthodontist: give to the patient a chance, though not successfully, seems to be better than completely refuse to begin the treatment.

Conclusion. Orthodontic treatment with fixed appliances can be efficiently conducted in disabled patients, but strictly selection criteria must be taken into account, regarding patient's and their parent's cooperation as well as their general medical condition. Elastodontics seems to be a valid approach to young disabled patients and an adequate answer to parent's requests, that could improve their cooperation in the future.

Surgical orthodontic disimpaction of second mandibular premolar: a case report

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Aim. Impaction of mandibular premolars can poses a functional problem. Treatment options might include the extraction of the impacted tooth with following prosthetic rehabilitation or a surgical orthodontic management that can allow the recovery of the involved tooth.

The purpose of this work is to demonstrate and confirm the possibility and the relative simplicity, in selected cases, of conservative treatment (surgical–orthodontic disimpaction) in patients suffering from dental impaction.

Methods. The patient is a female, she's 16 years old, clinical examination revealed that all primary teeth, excluding 8.4, had exfoliated. Radiographs shows that the mandibuar right firt premolar was transversely impacted.

In a first step all maxillary and mandibular teeth, except 8.4 were bonding with an aesthetic fixed orthodontic appliance (MBT system). Later the extraction of retained deciduous molar and the surgical exposition of 4.4. was carried out with vestibular approach, at the same time an orthodontic eyelet was bonded to the surgically exposed permanent premolar.

Disimpaction time is about 8 months.

When sufficient crown length of 4.4 was exposed the eyelet bonded to 4.4 at the time of surgery was replaced without complication with a conventional orthodontic bracket and the following alignment of impacted premolar was performed with this sequence of orthodontic archs: 0,16 NiTi, (3 months), 16x22 NiTi (3 months), 19x25 NiTi (3 months), 19x25 SS (3 months).

At the end of treatmen removable retention appliance was planned.

Results. After 8 months the recovery of right second mandibular premolar is performed. The clinical examination shows that 4.4 is visible in the oral cavity. The radiographic images confirm the clinical situation and shows that the roots parallelism is acceptable. The following alignment of impacted premolar was completed without complication and without gengival recessions.

Conclusion. Treatment for dental impaction is a complex procedure and the main difficulty is to make a precise and early diagnosis and an adequate treatment plan. Surgical-orthodontic disimpaction in such situations provides a solution to an otherwise long-term esthetic and functional problem and it can be an excellent therapeutic choice to recover an impacted tooth in selected cases.

This technique requires a multi-disciplinary intervention and a close collaboration between orthodontists and surgeons.

However, regular follow-up and long term retention are required to maintain the quality of results achieved.

Gnatological virtual bites

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Aim. To evaluate the occlusal bites built with CAD/CAM system for the treatment of patients with temporomandibular dysfunctions.

Methods. In the first phase an intraoral scanning with a scanner of reduced size is carried out. There are different types of digital acquisition available: laser triangulation scanners, structured light and contact scanning. The contact scanning is the most accurate, equipped with a feeler which scans the object, and analyzes each point of the element producing the 3D image. The use of the CBCT, useful for programming and diagnosis, requires a second digitization that allows to properly interface the three-dimensional image of the dental arches on which we proceed to the design of the device. From the clinical and technical point of view it is important to establish the vertical size determined by the therapeutic purpose of the device and to assess the posteroanterior guides (calculated using the condylar slope). If you have CBCT, you can refer to this diagnostic tool to determine the position of the bone bases in the three planes of space. The CAD method allows to program the position of the contact points and freedom in centric determined by the clinician. The realization of the gnathological plaque is constructed by a block of raw material of about 20 mm of thickness. The material used is polymethylmethacrylate (PMMA). The machine automatically performs roughing, semi-finishing and finishing with cutters made of alloy steel with a diameter that progressively decreases from 6 mm for the roughing to 0.1 mm for the finishing. They are exactly guided by computer. The device is mounted on plaster models, mounted on the articulator, and functional and occlusal checks are performed with traditional procedure (paper articulation) for any corrections. The final steps of production consist on polishing and chairside tests for possible adjustments and corrections.

Results. The CAD/CAM technology allowed to realize the D-Bite, characterized by fine details, strength, no porosity and minimum thickness (property of PMMA), with the achievement of excellent biological and aesthetic results.

Conclusion. The computerized design system enables to accurately assess the design of the occlusal bite without edges; to control the position of the contact points with the opposing arch; to design the space of freedom in centric position and also the length and the angles of the guides with great precision. Finally, thanks to the stability of the materials and the software design, a device without hooks can be created because designing undercuts before the acquisition phase, you can define the area of friction.

Orthodontic treatment with high aesthetic value: patient preferences and analysis of WTP index

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Aim. To assess the degree of acceptance of three different orthodontic appliances with high aesthetic value, seeking the strength of preference of a population of adult patients, expressed by the method WTP (willingness to pay), in respect of these three possible types of treatment of malocclusion.

Methods. The study was conducted using a computerized questionnaire, designed and offered to the subjects with the help of a web platform dedicated to the creation of online surveys. The questionnaire was offered to 83 patients who went for the first time to a dental hospital structure (Italian Stomatologic Institute, Milan), for one month. Adult age and a good comprehension ability were the requirements to participate in the survey. The web questionnaire has not provided a default limit of time, giving to the patient the possibility to think about the answers.

The following three devices were proposed:

— fixed appliance with white attacks positioned on the outer surfaces of the teeth

— fixed appliance positioned on the inner surfaces of the teeth

— Transparent removable aligner.

For each device 4 standardized images have been proposed to the patient in dental-labial and intraoral pictures figuring the equipment described.

Patients were asked to express a preference for treatment based on the previous information and those received on-line in the interactive phase. A free field of writing could be completed on a voluntary basis, enabling patients to specify the reasons for its choice. It was proposed a fixed cost independent of equipment choice of € 3000/year and each patient was then invited to raise or lower with the starting price of € 100 units.

Results. Just over half of the patients (54.2%) wanted to deepen the knowledge of the three appliances with high aesthetic value offered by the questionnaire, requesting additional informations and accessing all interactive area. The most requested information was about the limitations and complications of the three methods (31%), followed by explanations concerning the treatment times (21%) and the discomfort (13%). Orthodontic treatments selected by the patients were, in descending order of preference, the transparent aligner (51.2%), the fixed appliance with lingual brackets (28.8%), and the fixed vestibular attacks with white ceramic (20%). The median WTP values recorded were, in descending order, of € 3,500, € 3,000 and € 2,000 respectively for the fixed appliance with vestibular attacks, the transparent aligner and the lingual appliance.

The WTP values have a tendency to increase going from people who earn € 15,000 to those who earn over € 30,000 for both the vestibular appliance and the removable aligner, and also independently of the choice of treatment.

Conclusion. Patients of the surveyed population expressed a strong preference for transparent aligner, if the malocclusion was treatable with any of the proposed devices. However, the WTP values assigned to the removable aligner and to the lingual disposal were lower, and not statistically different from those assigned to the vestibular device.

Despite of the limits of this study, if we consider the aligners and lingual equipment superior technologies from a biomimetic point to vestibular ceramic brackets, and although they are often preferred, patients do not appear willing to sacrifice more money for them.

Planning and application of new brackets with individualized prescription

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Aim. To compare the peel bond strength between customized brackets made of Titanium grade 5 and "control" brackets already in commerce and widespread.

Methods. 30 "control" brackets for upper premolars were used. A light curing composite (Transbond™ PLUS Color Change of 3M Unitek) was used. Data were collected with a Lyoyd Instruments dynamometer called LR 30K PLUS. Brackets of upper premolars were used because premolars are the teeth with the most anatomical abnomalities and make more difficult the adhesion of the bracket to the enamel. Composite was placed on the bases of 2 brackets at a time, the bases of the brackets were adhered with a slight pression and then the composite was light cured. The amount of force used to adhere the bases of the two brackets was considered irrelevant for experimental because it is totally operator-dependent (both *in vitro* and *in vivo*) and irreproducible. Subsequently, the two brackets were linked with a classic long metal ligature so that the ligature-bracket interface wasn' t loosen. Then, the pair of brackets, linked by composite, was put between the 2 clamps of the dynamometer LR30K PLUS. The dynamometer pulled the two clamps at the speed of 0,5mm/min in order to leave to the load cell the time to receive as much data as possible; there was a preload of 2 Newton and the test ended at the breaking-point, at the detachment between the two brackets. Graphics and values of the detachment tests were analyzed.

Results. Data of load values of the two types of brackets were collected, and then the means of these values were made and compared. The mean of the customized brackets made of Titanium was 100 Newton, the mean of the control bracket was 43 Newton. From

graphics the control brackets result to reach first the breaking point for time, distance between clamps and Newton.

Conclusion. From the study of these values we can say that the customized brackets made of titanium have a greater adherence to the composite than the control brackets. This ratio is 2,3 : 1. The breaking point achievement of the customized brackets is more linear and costant, so that the detachment of the bracket-enamel interface is less traumatic but it occurs with forces higher than the average recorded in the literature, increasing the enamel "crack" after debonding. An higher force for the detachment of the bracket- enamel interface could cause microfractures of the enamel, it' always better that a slight layer of composite remains on the enamel surface so that it can be removed manually in a conservative way. From this experiment we can deduce that the chemical bonds between Titanium grade 5, the micro-filled resin and the grooves of the base-mesh give an excessive force between bracket and composite, increasing significantly the probability of micro-fractures of the enamel during debonding.

The orthodontic microsurgery technique for the treatment of dental ankylosis: case report

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Aim. To describe the clinical case of a patient in whom three dental elements ankylosed were repositioned by piezosurgery.

Methods. A patient aged 26 years comes to observation for the evaluation of three teeth incorrectly erupted in the arch (3.4 - 3.5 - 3.6). On the basis of clinical and radiographic examinations the three mandibular elements result to be ankylosed. An orthodontic treatment associated with surgical intervention was decided. The surgery was performed under general anesthesia because of poor cooperation of the patient; after running a fullthickness flap with paramarginal incision, vertical and horizontal corticotomies of about 2 mm deep on the vestibular side were carried. The horizontal corticotomies were performed at about 4 mm from root apex. The piezoelectric device Piezosurgery Medical II were used.

A single oral antibiotic therapy (amoxicillin + clavulanic acid) was given for 7 days. The sutures were removed after two weeks from the surgery.

The dislocation of the cortical bone and ligament distraction were performed with devices multibracket consisting of attacks, bands and nickel-titanium orthodontic wires. Biomechanical strength was applied before the surgery.

Results. The desired movement of the teeth was obtained in about 60 days. The postoperative course was favorable, with no significant complications, such as infection, wound dehiscence, bleeding. There was only a slight edema of the soft tissues of the face , especially in the area of the mandible underwent corticotomy. Radiographs and periodontal examination confirmed that the corticotomic technique does not damage significantly periodontal tissues.

Conclusion. In the conventional orthodontic therapy the dental movement occurs through the resorption of the bone crest. The plasticity of the periodontal ligament is the key of all orthodontic trips. In ankylosed teeth, there is a fusion of the bone tissue with the dental tissue so that there isn't interposition of the periodontal ligament; traditional orthodontic movement is thus prevented.

Often, in attempting to remove a ankylosed tooth with conventional orthodontic techniques, we obtained the undesirable effect of moving the tooth used as an anchorage. The technique of orthodontic piezoelectric microsurgery, based on the simultaneous displacement of the root and the cortical bone without compression of the periodontal ligament and the consequent bone resorption, simplifies the orthodontic treatment of adult patients with teeth on ankylosis and allows to move the ankylosed teeth in a relatively short period, without involving nearby teeth. The piezoelectric device allows to run corticotomies with great precision and with maximum surgical control thanks to the presence of micro-vibrations and to a intraoperative field virtually bloodless, allowing to maintain more easily the integrity of the root.

Third molar germectomy during orthodontic therapy: efficiency of volumetric analysis with cone beam CT and MRI

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Aim. Germectomy of third molars represents the elective surgery in case of morphostructural or topographic alterations of the dental germ or in case of dysplastic changes in the germ, such as follicular cysts and tumours. CBCT (cone beam computed tomography) revolutionized radiological diagnosis by rendering 3D reconstructions of anatomical structures. Mandibular nerve is radiolucent in CBCT and it can be detected by locating mandibular canal, which is radiopaque. RM signals depend on the amount of free hydrogen nuclei in detected tissue; the mandibular nerve is hyperintense, whereas the mandibular canal and teeth are hypointensive. MRI can be used in dentistry and in oral surgery when anatomical structures are not completely clear on panoramic radiograph or computed tomography and to reduce radiation dose to patients. Aims of this survey conducted with the help of CB3D were: 1) determining of the best stage of age when germectomy can be performed; 2) establishing the correlation between third molars volume and patients bone stage.

Methods. We evaluated 92 patients who underwent CBCT scan: 42 males (84) and 50 females, divided in 6 groups from 9 years. We had 84 images for males and 99 for females. Image acquisition was performed with the software Mimics (Materialise, Leuven, Belgium). By using "Masks", each patient's dental elements 3.8 and 4.8 were segmented by separating them from bone structures and adjacent teeth, then "3D objects" were generated and their volume was calculated in cubic millimetres. Only mineralized parts of the teeth were considered, excluding all areas constituted by dental elements capsules.

Results. Results can be summarized as follows:

— age group 9-10 years; average element 3.8 volume: 163,34 mm (males) and 202,27 mm (females); average element 4.8 volume: 156,49 mm (males) and 170.29 (females);
— age group 11-12 years; average element 3.8 volume: 327.75 mm (males) and 284,46 mm (females); average element 4.8 volume: 350,71 mm (males) and 300,56 mm (females);
— age group 13-14 years; average element 3.8 volume: 327,75 mm (males) and 442,91 mm (females); average element 4.8 volume: 378.7 mm (males) and 420,19 mm (females).
— age group 15-16 years; average element 3.8 volume: 682.32 mm (males) and 559,28 mm (females); average element 4.8 volume: 631.98 mm (males) and 577,68 mm (females);
— age group 17-18; average element 3.8 volume: 808.8 mm (males) and 645,28 mm (females); average element 4.8 volume: 786.12 mm and 616,74 mm (females);
— age group 19-20 years; average element 3.8 volume: 1091.5 mm (males) and 783,7 mm (females); average element 4.8 volume: 1119.33 mm (males) and 810,88 mm (females).

Conclusion. These results showed that performing germectomy is more efficient in females and in age groups 11-12 and 13-14 years. In these two age groups, volumes slightly exceed 400 mm and interventions would be less demanding for the operator and for patients compliance.

Clinical use of TSME: transversal sagittal maxillary expander

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Aim. The aim of this study was to demonstrate the clinical effectiveness of TSME (transversal sagittal maxillary expander) in treating skeletal class III malocclusions due to upper maxillary hypoplasia.

Methods. 22 patients (17 females and 5 males), aged from 6 to 15 years, with maxillary hypoplasia, posterior and anterior crossbites, skeletal and dental class III, skeletal deepbite or normovertibite were selected. All patients were treated with TSME, a variation of Hyrax type expander, modified with the addition of 2 sagittal screws to the transversal screw; TSME has also the peculiarity of inducing vestibular inclination of the frontal superior group. The protocol adopted was based on 2 phases: the first phase consisted of rapid activation by half screw rotation/die, until adequate maxillary transverse diameter was achieved; the second phase consisted of slow activation of sagittal screws by ¼ rotation every 15 days to achieve upper dento-alveolar process displacement towards posteroanterior direction, until hypercorrection for restoring physiological values of overjet and overbite was reached. TSME was then kept in situ for 2 months to maintain gained results.

Results. All patients showed an increase of these cephalometric values: SNA (from 79.4° to 80.8°), SNB (from 77.2° to 78.1°), ANB (from 2.2° to 2.6°); linear value SNP-A increased 2.26mm; overjet increased 3.6mm and overbite increased 1.1mm.

Conclusion. TSME was demonstrated to be an efficient expander and to reposition the upper jaw dento-alveolar complex into posteroanterior direction. Significant alterations were found in the antero-posterior position of the maxillary alveolar process. This is a result of opening of the mid-palatal suture, bending and movement of the alveolar process anteriorly, and tipping of the incisors. It was a valid therapeutic alternative to Delaire mask in III skeletal class slight cases due to upper jaw hypoplasia. The nonsignificant increase in the anterior vertical dimension observed indicates that the TSME may be advantageous in patients with an anterior open bite. Furthermore, TSME has some advantages:

— it is easy to use for application and activation simple procedures;
— it is comfortable for patients because it is an intraoral appliance;
— it only requires patients compliance during the active phase of therapy.

Herbst appliance and TADs: a case report

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Aim. The purpose of this case report is to show how a modified Herbst appliance in association with temporary anchorage devices (TADs) is successful in reducing the excessive lower incisor proclination during the treatment of skeletal class II malocclusion.

Methods. A 13-year-old male patient with Class II malocclusion, severe overjet (8 mm),retrusive chin and a left displaced mandible was selected for this study. Before starting treatment, IMPA and ANB were measured on the lateral headfilms by experienced operators (IMPA = 110°; ANB = 6°).

After having placed the Herbst appliance, two miniscrews (thread length 6.0 mm, diameter 1.5 mm) were fixed on the lower buccal cortex between the roots of the first and second premolars bilaterally. using local anesthesia. Then, TADs were linked to customized hooks on the Herbst appliance with a 0.12 mm stainless steel ligature. These ligatures at end of power arm provide an indirect anchorage parallel to the Herbst appliance line of action, thus, eliminating torsional moments which could foster incisor proclination. The Herbst was kept in place for 9 months. At each control, during which incisors were not in edge-to-edge position, the appliance was activated and the ligatures were changed every four weeks.

At the end of treatment, the final inclination of the lower incisors (L1/Go-Me) and the ANB were measured on the lateral headfilms by the same operators.

The Herbst phase was followed by a fixed appliance (total treatment time about 18 months) with the Damon system (the bracket prescription was modified according to the clinical conditions: a standard torque was used for the upper incisors and a low one for the lower incisors).

During this phase of the treatment, miniscrews were used to anchor intermaxillary elastics to optimize skeletal and dental correction of II malocclusion.

Results. At the end of the Herbst phase, reduction of ANB (ANB = 2°) proves a good skeletal response and betters facial profile aesthetics. Increase in lower incisor inclination was 2° (IMPA = 112°).

After the first steps of the fixed appliance (levelling and alignment) the patient reveals good occlusion (class I canine and molar relationships, tigh intercuspation).

Conclusion. The combination of TADs with Herbst appliance and intermaxillary elastics was efficient in the treatment of this case of II malocclusion; by reducing the dentoalveolar compensations in the mandibular arch during treatment, a greater skeletal effect could be achieved.

In order to prevent further anterior anchorage loss, this treatment should be advised especially to those patients whose lower incisors already show a compensatory proclination at the start of treatment.

Correlations between speech disorders and malocclusions

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Aim. The purpose of this study is to evaluate the correlations between speech disorders and malocclusions.

Methods. An orthodontic and phoniatric interdisciplinary study was conducted by the staff of the Orthognatodontic Department of Sapienza, University of Rome in its facilities. 88 patients were recruited, whose mean age was 9.8 years old and of whom 41 were female (46.6%) and 47 male (53.4%). Initially, specific medical charts were designed and filled in to record orthodontic and phonetic data. Subsequently, each patient completed a questionnaire concerning her/his medical history. Finally, an extra and intra oral orthodontic examination was carried out by experienced operators. Speech analysis was performed at the Speech Department of Sapienza, University of Rome and the Fanzago test, which consists of 22 tables with 117 pictures referring to words combining consonants and vowels of the Italian language, was used to assess articulation. In addition, the χ^2 (a non-parametric test) was employed in order to detect a statistically significant correlation between speech difficulties and malocclusions.

Results. Analysis of compiled data revealed that 25 patients (28.4%) reported no speech defects, while 63 patients (71.6%) showed presence of substitutions, omissions and distortions of one or more sounds of the Italian language. Of the 63 patients who presented speech disorders, 24 patients (38.0%) displayed a defect in one sound, while 39 patients (62.0%) in more than one sound. In detail, 62 patients (59.0%) showed the defect in the pronunciation of /s/, /z/, /ɳ/ /ʎ/; 39 patients, (37.1%) of the /t/ and /d/ sound. Phonetic articulation disorders of the /g/ and /c/ sound were found in 3 (2.9%) patients. The /f/ and /v/ sound was normally articulated. No relation between speech disorder and dentition, molar class, overjet and overbite was found. However, the correlation between atypical swallowing and an altered articulation of /s/, /z/, /ɳ/ /ʎ/ is statistically evident (p. value 0.0007).

Conclusion. Atypical swallowing is strongly associated with altered pronunciation of /s/, /z/, /ɳ/ /ʎ/. This close correlation might be due to the fact that the articulation of these sounds engages the same oral and masticatory system of deglutition, as well as the same areas hit by the tongue. Finally, a multidisciplinary approach including orthodontics and speech therapy is highly recommended. Hence, cooperation between phoniatrists and orthodontists in determining the priorities and the timing of treatment is essential to solve such clinical conditions.

Instrumental evaluation of TMJ and masticatory function in deep bite patients before and after correction with function generating bite

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Aim. The purpose of this study was to evaluate the change of condylar paths and the masticatory cycles in Deep-Bite patients before and after therapy with Function Generating Bite.

Methods. 23 patients with deep-bite were selected from patients referred to the Department of Orthodontics, University of Turin, Italy. The inclusion criteria were as follows: a Deep Bite (overbite>5mm), no signs or symptoms of dental or myofacial disorders, no periodontal damages and no previous orthodontic therapy. Each patient was treated with a functional appliance: the 'Function Generating Bite'.

Temporomandibular joint functional border movements were recorded by computerized axiography before and after therapy with FGB functional appliances. Border condylar movements were measured with the Cadiax® Diagnostic axiograph and Gamma Dental Software. The Cadiax® Diagnostic axiograph is connected with a Condylograph face bow and interfaces with a computer for data storage and subsequent analysis. Were performed in a standard way the same movements that included protrusion, lateral left/right and openness. Repetitions were performed for each movement once, and then three times in a row.

A K7-I kynesiograph (Myotronics Inc, Seattle WAS-USA) was used to record the masticatory pattern and the EMG activity of the masseter and anterior temporalis muscles.

The examination protocol entailed deliberate chewing on the right side and on the left side, followed by free chewing. Each modality was repeated three times, first with a soft bolus (chewing gum) and then with a hard bolus (wine-gum). The subject was invited to maintain an upright seated position and to look at a point about 1 m in front of him. The electrodes were positioned on the belly of the muscle to avoid interferences with the areas of muscular innervation. The kinesiograph was interfaced with a computer for data storage and subsequent analysis. The raw data were analysed using a customised program developed at the University of Turin. Statistical Analysis was performed by means of Student's t test (quantitative data analysis) and the test of χ^2 (qualitative data analysis).

Results. The axiografic results showed an improvement of extension of the tracks ($p<0,05$), an improve-

ment of asymmetries, an improvement of the morphology ($p<0,05$), the reduction of the overlap and repeatability of the tracks, the reduction of the percentage of traces with the presence of intersections ($p<0,05$) and an improvement of the functionality of the TMJ. The results during chewing hard and soft bolus showed a decrease of the closure angle, an improvement of chewing speed and an important decrease of the EMG activity of masseter and anterior temporalis muscles ($p<0,05$). In all patients was not detected any signs or symptoms of worsening after functional therapy ($p<0,05$).

Conclusion. The treatment of deep-bite malocclusion, leads to significant improvements with regard to the morphology, the overlap, the repeatability of the tracks and to an increase of their symmetry. Concurrently the reduction of muscular activity during chewing is a clinical relevance for a better bone growth, avoiding excessive muscular forces which overload both the skeletal and the dentoalveolar structures. The orthodontic treatment should consider not only the repositioning of teeth within the dental arches, but also the effects on function, especially when the malocclusion involves muscular and skeletal structures as in the case of deep bite. The respect of physiological and biological growth is confirmed by the total absence of functional worsening after therapy in the analyzed sample.

Skeletal and dentoalveolar effects of the Twin Block appliance: a case report

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Aim. The aim of this case report is to evaluate the skeletal and dentoalveolar effects of the Twin Block appliance in II class malocclusion.

Methods. The study reports the case of a male patient referred to orthodontic treatment at the age of 13. The extra-oral analysis showed a brachi-face features and facial convexity. The intra-oral exam revealed a bilateral II class molar and canine relationship, 10 mm OVJ and 7 mm OVB, increased depth of the mandibular Spee curve and maxillary transverse deficiency. Furthermore, the upper arch was slightly crowded and the upper and lower incisors were proclined (1^ PF = 120°; IMPA = 108°). Cephalometric data outlined a class II skeletal pattern (ANB = 7°) protrusion of the maxilla (SNA = 83°; Nperp-A = 3.5mm) and mandibular retrusion (SNB = 76°, ANB = 7°, Nperp-Pg = 3 mm). The analysis of vertical parameters showed a mandibular hypodivergence (ML^NSL= 28°) with counter-clockwise growth (Σ= 388) and a reduced arGoMe angle (arGoMe = 125°).

The patient was at the best growth stage to start the treatment, as determined through the cervical vertebral maturation method (CS3).

Treatment objectives include: replacement of the mandible and correction of skeletal and dental disharmonies, adjustment of maxillary transverse deficiency, balance of vertical parameters with levelling of the inferior Spee curve and correction of 1.2 malposition.

A two-phase orthodontic treatment plan was chosen. In the active phase of the treatment (12 months) a modified Twin Block appliance was used. This appliance utilised acrylic inter-occlusal blocks cut in order to made a 70° angle at the second premolar area. The upper bite block also included a Z coil in the acrylic at the 1.2 and an upper midline expansion screw. The lower bite block presented an acrylic capping over the lower incisors. The second phase of the treatment (12 months) was carried out using a removable superior appliance with an acrylic anterior bite plate that holds the incisors in the correct position until a proper posterior occlusion is achieved.

Results. The dental assessments revealed the normalisation of the occlusal inter/intra arch parameters: bilateral I class molar and canine relationship, OVJ and OVB within standard, levelling of the mandibular arch, compensation of maxillary transverse deficiency, correction of crowding and proclination of superior arch (1^ PF = 110°) and improvement of the inferior dentoalveolar protrusion (IMPA = 105°). Several skeletal changes were achieved: the mandible shifted forward (SNA = 83.5°, SNB = 81°, ANB = 2.5°, NperA = 3.5 mm, Nperp-Pg = 1.5 mm) and the vertical parameters improved (ML^NSL= 31°, Σ = 391°).

Conclusion. This case report shows how a correct management of the Twin Block appliance, in a patient at the best growth stage, is greatly effective in producing both skeletal and dentoalveolar improvements, thus solving class II malocclusion.

Treatment of a severe maxillary canine impaction in an adolescent patient: case report

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Aim. The purpose of this study was to evaluate the reposition of an impacted maxillary canine placed vestibularly in the palate, using a combined orthodontic-surgical therapy with a segmented arch technique.

Methods. This case report describes the treatment of a 13 year – old adolescent patient who had impacted maxillary left canine, with the crown completely overlapping the root of the lateral incisor, and insufficient space. In order to assess the treatment risk, a study of orthopanthomography, CT and study models was made. The OPT showed an alpha angle which was almost equal to 10°, being the long axis of the canine almost parallel to the occlusal plane. The CT showed a vestibular position of the maxillary left canine, and this situation caused a partial root resorption of the maxillary left incisor. We used the study models in order to evaluate the arch dimension and crowding of the maxillary arch. We used these diagnostic methods to plan the most adequate treatment.

Results. We performed treatment following various steps: the first phase was characterized by the use of a trans–palatal bar with a palatal Nance button linked to two anchorage arms: one placed on the maxillary right premolar, the other one positioned in the eruption space of the left canine; the last one was used during the subsequent phase. Treatment was planned in a way that could avoid the complete root resorption of the lateral incisor; this was possible according to the surgeon who made the surgical exposure of the tooth. After the surgical phase, the orthodontist used the lever arm of the trans-palatal bar to move the maxillary canine far from the maxillary

incisor. The third phase was about the definitive recovery of the impacted canine in the dental arch; this was possible for the use of a segmented arch technique. During this period a radiographic assessment was made and there was an effective change of the position of the tooth. The segmented arch technique was performed using a 16x22 TMA wire which promoted the vertical extrusion of the impacted tooth. Once the tooth extruded, the last stage of the treatment could be done, performing an orthodontic leveling and refining. Given the harmonic dental arch, we decided to continue to use the segmented arch technique; using a T - loop, the canine was distalized the inclination of his root was controlled, placing it in the dental arch in his right position.

Conclusion. Thanks to this study, we demonstrated in which way it is possible to disclude a canine with a severe impaction, covering a reasonable therapeutic time (2 years). This aim can be reached thanks to a good treatment plan and an orthodontic - surgical team that, despite the difficult case, showed how to reach the target using simple but effective measures.

Multiple supernumerary late and recurrence in a non-syndromic patient

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Aim. Supernumerary teeth are defined as teeth that exceed the normal dental formula, regardless of their location and morphology. Usually, multiple supernumerary teeth appear to develop more often in patients with complex syndromes, in fact, there are few cases published in literature of multiple supernumerary teeth in non-syndrome patients, in particular, supernumerary teeth that to develop late and recurrence. The etiology of this developmental dental anomaly is still unknown and many theories have been carried out, such as atavism, tooth germ dichotomy, hyperactivity of the dental lamina, genetics, familiar traits, molecular alterations and environmental factors. This study is a review of literature on multiple supernumerary teeth that develop late and recurrence.

Methods. The purpose of this report was to review cases published in dental literature since 2000 to 2015 of multiple supernumerary late and recurrence in a non-syndromic patient. The key words utilized for the research are multiple supernumerary teeth, late and recurrence; we obtained 21 articles but only 4 articles corresponded to our inclusions criteria so were included in the study.

Results. Regular follow-up for late forming supernumeraries is crucial for a early diagnosis of recidive; this review showed as multiple supernumerary late and recurrence in a nonsyndrome patient are a very uncommon argument present in literature, but really, it is a very uncommon clinic case of the clinic practice.

Conclusion. Orthodontists should be aware that late development of supernumeraries can occur any time in the course of orthodontic treatment or after its completion. Although it is not a routine practice to screen for the late development of teeth during or after orthodontic treatment, possibility of their complications should always be taken into consideration. This study aims to raise awareness the orthodontist to evaluate the risk of relapsing supernumerary teeth, furthermore, radiographic monitoring of the patient is very important in some cases.

Failure in the treatment of impacted maxillary canines: why? A review of the literature

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Aim. The purpose of this study is to present a review of the literature about the reasons for failure of orthodontic treatment of impacted maxillary canines.

Methods. A literature survey was performed by applying the Medline Database (Entrez PubMed) covering the period from 1985 to 2014 e and using the following key words: “impacted maxillay canines”, ”traction” and “failure”. Articles referring to craniofacial anomalies and syndromes were excluded. The search strategy resulted in 4 articles, of which 2 met the inclusion criteria.

Results. There are many aspects involved in the treatment of impacted maxillary canines that, singly or together, can lead to failure of the treatment. Becker *et al.* classified the reasons for the failure of orthodontic traction at dependent factors of the patient, of the orthodontist, and of the surgeon . Patient-dependent factors are abnormal morphology of the impacted tooth, age, pathology of the impacted tooth, grossly ectopic tooth, resorption of the root of an adjacent tooth, and lack of compliance. Orthodontistdependent factors can be identified as misdiagnosis of tooth position, improper directional force, missed diagnosis of resorption of the root of an adjacent tooth, poor anchorage, inefficient appliance and inadequate torque. Surgeon-dependent factors include the misdiagnosis of tooth position, exposing the wrong side, damage on the impacted tooth, injury to an adjacent tooth, soft-tissue damage and surgery without orthodontic planning.

The major reasons for failure were inadequate anchorage (48.6%), mistaken location and directional traction (40.5%), and ankylosis (32.4%). The ankylosis of the displaced teeth can be a consequence of the action of the low-speed drill during the surgery, chemical injury, and cervical periodontal ligament trauma by the magnitude and direction of orthodontic force. In several patients, there was more than one possible reason for failure.Extensive surgery can be an additional factor compromising the cervical root area and promoting root resorption. The gaps formed by resorption are difficult to identify radiographically, and if the region is not repaired by cementoblasts, the bone can be deposited at the site, causing a lack of response to extrusive traction.

Conclusion. Apart from the patient-dependent factors of failure, a wrong treatment can be prevented by an accurate overview of the specific situation by the clinicians: indeed, inaccurate 3-dimensional diagnosis of location and orientation of impacted teeth and failure to appreciate anchorage demands were the major reasons for failure in the treatment of impacted canines. Only two articles focuses on the failure of the treatment of impacted upper canines so, our conclusion is to incite researchers to investigate the causes more accurately.

Orofacial pain and global proprioceptive resonance: effects on neuromuscular and postural systems

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Aim. The purpose of this study was to investigate the effects of the Global Proprioceptive Resonance (GPR) by MFV on muscle performance and body balance in healthy subjects and in orofacial pain patients. The application of Mechanical Multifocal Vibration (MFV) at targeted frequencies and short duration produce positive effects on bone structure, muscles and joints regulating neuromuscular response.

Methods. Sixty volunteers (26 males - 24 females, 19-25 years) underwent, in a randomized order, both the electromyography- electrognatography (EMG-EGN) and stabilometry before the GPR and immediately after it. GPR was the ergonomic structure used in this protocol: it gives a psyco-physical release thanks to multifocal vibrations. 30 patients (16 males - 14 females, 18-32 years) with orofacial pain were studied too.

Results. The effects of GPR on the stomatognathic muscles induced statistically significant change ($p<0.01$). The results showed a significant improvement in the neuromuscular activity. From a postural point of view, there was an improvement in the loads distribution and in the position of the barycenter. There were effects in body balance tests, too ($p<0.01$). Patients have improved their orofacial pain and temporomandibular disorders after GPR applications ($p<0.01$).

Conclusion. In this preliminary study it was concluded that the GPR induced changes both in neuromuscular and in postural tests. Further and future studies should focus on evaluating the effects on temporomandibular disease and orofacial pain patients, as well as the long term effects.

Herbst appliance in juvenile idiopathic arthritis patients: mandibular and condylar growth effects

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Aim. This work shows the application of a Herbst appliance produced with CAD-CAM titanium alloy (D-Ti Herbst) in a case of Juvenile Idiopathic Arthritis (JIA) and evaluate the growth effects on TMJ.

Methods. The use of CAD-CAM is growing exponentially in dentistry, since its introduction in the field of prosthetics in the 80s. It also finds application in the orthodontic field, it can be produced with this technology palatal expanders, Michigan plates, guide masks for presurgical orthodontics. The JIA patient, aged 14, is investigated by Cone Beam CT (CBCT).The left TMJ has a marked erosion of a round shape in the central portion of the head of the condyle. And there is slight lateral deviation during opening movement with Class II malocclusion and deep bite. Herbst equipment has applied to bring the jaw forward. The models are scanned with scanners and structured light so you get the digital models. Using CAD software is designed the structure of the apparatus, which is then produced with the use of a numerically controlled milling machine. The Herbst is made and cemented, tried in the mouth with a cement-based resin. After removal of the equipment, 1 year later, you run a new CBCT scan to verify the results obtained.

Results. The Herbst is a fixed functional appliance developed. The skeletal effects arising from the application of this apparatus is mostly during the peak of growth: in particular at the level of the jaw one can obtain a growth beyond the 3mm for the dislocation of the condyle in the glenoid fossa and stimulation of new bone apposition especially in the portion top and back of the condyle. The analysis shows that the new CT at the level of the condyle there was bone remodeling and neoformation that has bridged the gap between right and left condyle erosion caused this previously.

Conclusion. The CAD/CAM applied to the materials from the aerospace industry such as titanium grade 5 make the design and implementation of the D-Ti Herbst simpler than traditional Herbst. The application in patients with JIA has so far shown promising results but requires a study with a larger number of patients.

Rational use of a functional appliance: a literature review

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Aim. To conduct a review of the literature on Petrovic's studies on craniofacial growth in order to establish a rational in dentofacial orthopedics and in the use of a functional orthodontic appliance.

Methods. A search was performed using Medline (Entrez PubMed) by appling specific MeSH terms and keywords. We described the theory of the servo system and the auxological growth categories as proposed by Petrovic and synthesized all the articles that applied the concepts cybernetics to craniofacial growth.

Results. According to Petrovic's servo system theory, the upper teeth are considered as a constant reference input while the lower arch is the controlled variable. The physiological adaptation of the length of the jaw occurs through a change in the magnitude and direction of the growth of the condylar cartilage. The growth of the condylar cartilage is guaranteed by two essential parameters of the servo system: one consistes of "peripheral comparator' and' 'amplifier' (represented by the activity of the lateral pterygoid muscle and retro-disc ligament), and the other is the magnitude and direction of condylar cartilage cell multiplication. Any factor able to determine a significant change in the sagittal intermaxillary relationship can produce a signal that alters the activity of the lateral pterygoid, allowing

the jaw to achieve a different occlusal position. The occlusal pattern (Class I, II or III) is determined by a series of random "bifurcation-type" alterations, which are conditions of discontinual action of the peripheral comparator. Once defined, the occlusal pattern remains relatively stable. The control of the growth of the condylar cartilage includes also, a central comparator. It is represented by a sensorial memory of the activity of the postural mastication muscles, corresponding to a normal sagittal position of the mandible.

Petrovic has staged the growth potential and the responsiveness at the tissue level of the jaw to a functional treatment in 6 auxologic categories, 11 rotational cephalometric types and 33 rotational groups. Thus, multiple rotational types can be associated to a certain category of biological growth. The identification of the rotational group is assigned according to three features:

— Posterior (P), neutral (R) or anterior (A) growth rotation

— Discrepancy in mandibular-maxillary growth potential (1, 2, 3)

— Distal (D), normal (N), mesial (M) Intermaxillary Sagittal Relationship In order to assess the vertical dimension, every type of rotation is further divided in openbite (OB), normal-bite (NB), deep-bite (DB). On average, the degree of subperiosteal ossification (which correspondes to the extent of condylar cartilage growth) and the alveolar bone turn-over are higher in counter-clockwise growth pattern. Therefore, patients with these characteristics should be considered as "good responders" for orthopedic-functional treatment.

Conclusion. According to the results on mitotic index of the subperiosteal layer and speed of the alveolar bone turnover, additional growth of the lower jaw induced by functional appliance is closely related to the auxological category, showing genetic and hormonal basis. It is likely to conclude that the higher the auxological category, the better the effect of the treatment.

The ortodontic extrusions: bibliographic review and case report

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Aim. Aim of the present study is to evaluate clinical indications and technical procedures related to slow orthodontic extrusion.

Methods. Through a careful bibliographic review and supported by a case report (clinician: Dr. G. Fiorillo, DDS, MS Orth., Rome), we have compared clinical outcomes of orthodontic extrusion in mandibular anterior teeth with similar bone grafting procedures as described in the literature. An electronic MEDLINE search was conducted by two independent reviewers to identify English-language articles, published in dental journals between January 1986 and February 2015, reporting on single-implant site development accomplished by orthodontic forced eruption of nonrestorable teeth or by bone grafting procedures. The search terms were categorized into four groups comprising a PICO (problem, intervention, comparison, outcome) question. Supplementary manual searches of published full-text articles and related reviews were also performed. Furthermore, we report at the end of the review a complete list of indications, contraindications, benefits, risks, and warning of slow orthodontic extrusion, especially with regard to patients undergoing implantation.

Results. Despite the variations in treatment protocols followed during the orthodontic phase of treatment, we were able to establish several general clinical guidelines for this phase of treatment based on orthodontic treatment-planning patterns identified in the literature. These guidelines are following: 1) Light, constant, extrusive forces are recommended: 15g for anterior theet to 50gr for posterior theet. 2) The extrusion rate is to be maintained at a slow and steady state of no more then 2.0mm per month. 3) A buccal root torque component may be applied concomitantly to increase the buccolingual bulk of alveolar bone. 4) A retention and stabilization period of no less than 1 month for every month of active extrusion is recommended prior the extraction. 5) Overlay wires (anchorage wires) are recommended to reinforce anchorage and avoid tipping of adjacent theet toward the tooth undergoing active extrusion.

Conclusion. There are no clinical trials that have directly compared the two-step procedures (i.e. slow orthodontic extrusion and bone graft procedures). Nevertheless, it seems to be verified that alveolar bone development can be effectively regenerated through orthodontic extrusion alone. Bone quality and volume, along with interproximal papillary height can also be expected, in the same way of a surgical approach. According to the reviewed literature, it appears that both methods of implant site development are effective and neither of the two methods is any superior to the other. Multicenter studies and randomized clinical trials are needed to further evaluate the efficacy of these two techniques.

Comparison between plaque index, gingival index and bleeding index in patients with self-ligating and traditional orthodontic fixed appliances

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Aim. The purpose of our clinical study is to compare patients with traditional appliance and patients with self-ligating appliance from the point of view of gingival inflammation, to see if there are differences in terms of oral hygiene between the two techniques.

Methods. 45 patients with fixed orthodontic appliances including 22 patients with traditional bracket (Victory series 3M) and 23 patients with self-ligating bracket (Damon 3MX). The patients age is between 12 and 18 and they are all treated at the Dental Clinic of the Hospital San Paolo in Milan.

For each patient is reported:

— sex

— age

— bracket used (traditional or self-ligating)
— month of treatment
— if the patient is left-handed or right-handed.

With the use of a millimeter standardized periodontal probe are evaluated all the upper teeth from15 to 25 and lower teeth from 35 to 45, by measuring the plaque index and the gingival index of Silness and Loe and the papillary bleeding index of Saxer and Mühlemann.

Results. For the traditional group the average values of the plaque index is 1.57, the bleeding index is 0.81 and the gingival index is 1.41.

While for the self-ligating group the average values of the IP is 0.99, that of PBI is 0.51 and that of the IG is 0.96. Then comparing the two techniques for all three periodontal indices examined in our study, the lowest values were found in patients with self-ligating appliance.

The months of treatment are divided into semesters, the average values of the indices show that in subjects with traditional appliance, the values of IP, PBI, IG are lower in the initial phases of treatment, but increased slightly in the final phases. It is also possible to denote that the average value for the period for patients with self ligating appliance are lower than those of patients with conventional appliance. Although, a widespread tendency, on both study groups, to a decrease in motivation of oral hygiene in the final part of orthodontic treatment.

Considering the age variable, the graphics confirm the fact that the average values of the indices for self ligating patients tend to be lower than the average values for patients with traditional appliance. In addition, there are higher average values, both for younger subjects and for older.

Finally, left-handed or ambidextrous subjects are poorly represented in the population, so it is not possible to make significant considerations about this variable.

Conclusion. Oral hygiene is better in subjects presenting a self ligating device than those with traditional appliance, in fact, the mean values of IP, IG and PBI turn out to be significantly lower in the first group of patients. The indices of gingival infiammation tend to increase with both methods in the last months of treatment, showing lower values for patients with self-ligating bracket. As regards the age variable, the average values of the indices for self ligating patients are tending to be lower than the average values for patients with traditional appliance. The variable left-handed / right-handed does not seem to be significant in this study.

Prevalence of malocclusion: a review of the literature

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Aim. From the early 1900s, when Angle established the classification of occlusion based on the molar relationship, the purpose of orthodontics became the correction of malocclusion, so the aim of the present study is to review the scientific literature about the prevalence of malocclusions.

Methods. A detailed research was carried out through the MEDLINE database using the following key words: "epidemiology" or "prevalence" and "malocclusion". Among the 650 identified articles, 38 articles met the following inclusion criteria: literature reviews, clinical articles published in the last ten years, studies on humans, full text available. The studies on dental anomalies, trauma and craniofacial deformities where excluded.

Results. The prevalence of malocclusions in modern population is about 60% to 80% but there is the need to investigate the distribution of the occlusal traits and the prevalence of occlusal anomalies. On the basis of Angle Classification, class I malocclusion constitutes the major proportion of malocclusion which is found in the 43-93,6% of the population, while the prevalence of class II ranges from 4,4% to 39,7%, and class III malocclusions has a prevalence of 2-22,6%. Normal overjet exhibits a range of prevalence from 32,1% to 94,1%. An increased overjet is more common (prevalence of 5,3-50%) than a reduced overjet (prevalence of 0,3- 14,1%). With respect to overbite we can confirm that normal overbite is the most frequent, with a prevalence that ranges from 53,5% to 96,2%. Prevalence of deep-bite and open-bite malocclusions were found to be 2,2-36,6%, and 1,3-17% respectively. Posterior crossbite is more frequent than anterior cross-bite. The occurrence of a posterior cross-bite has been reported in 8,8-31% of subjects, while the prevalence of anterior crossbite is 0,6-20,8%. Crowding is the most common occlusal anomaly. Maxillary crowding has a prevalence that ranges from 7,1% to 75,2% while the prevalence of mandibular crowding is 4,6-73,7%. Spacing is less common than crowding but both are more frequent in the maxilla than in the mandible. Some studies investigate malocclusion using the index of orthodontic treatment need (IOTN). IOTN grades 4 and 5, range from 12,6% to 62%, while IOTN grades 1 and 2 range from 9,9% to 52%. The prevalence of malocclusion also depends on the type of dentition. Increased overjet, anterior open-bite and posterior cross-bite are more common in the deciduous dentition as they are related to non-nutritive sucking habits.

Conclusion. Occlusal variation differs numerically among different ethnicities. The Angle class II is more frequent in Caucasian population while Angle class III is predominant in Asian and Negroid population. However, the occlusal variation follows a universal general distributional pattern for most world populations. Specifically, this pattern is arranged in the following descending order: Angle class I, Angle class II and Angle class III. In addition, increased overjet and deep-bite are more common than reduced overjet and open-bite, respectively. The cross-bite is not very common in the general population, instead crowding is the most common malocclusal trait. Due to multiple discrepancies observed among the classifications published on the malocclusal traits, we believe a universal classification is needed, in order to compare their prevalence among different studies. In the primary dentition the prevalence of malocclusion results to be elevated. However some dental anomalies resolve spontaneously in the early mixed dentition. This clearly supports clinical guidelines recommending deferral of orthodontic treatment of malocclusion diagnosed in the primary dentition until transition to the mixed dentition stage.

Digital impression in orthodontics: impact on patient's comfort and expectations

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Aim. The aim of this study was to evaluate orthodontic patients' comfort during impression phase, adopting digital intraoral scanning devices, related to the traditional impression techniques. In addition, this study evaluated if the utilization of digital techniques can influence the patient's acceptance of the treatment plan, the perception of the quality of the dental office, and if the use of digital impression scanners can justify an increase in the cost of the therapy.

Methods. Since September 2014, a sample of 20 patients was enrolled from the patients visited for an orthodontic therapy in the "Rossini" Dental Office (Monguzzo – CO - Italy). Patients underwent a digital impression procedure of the dental arches, using an intraoral scanner (3M™ True Definition Scanner, 3M ESPE, St. Paul, MN, USA) with the aid of a contrast powder (3M™ High-Resolution Scanning Spray, 3M ESPE, St. Paul, MN, USA).

After the procedure, patients filled out an assessment questionnaire, consisting in 13 questions.

Results. The 77,77% (n= 14) of patients became aware of the existence of digital technologies able to substitute the traditional impression techniques by the dentist. The 46,44% (n=7) of patients who had undergone a traditional impression technique, considered it awful (in a four point scale: awful – endurable – comfortable – very comfortable), and the 53,33% (n=8) endurable. The 80% (n=16) of patients considered digital technologies applied to impression more accurate than traditional ones, while none considered traditional technologies still more accurate. The 20% (n=4) couldn't give an answer. The 35% (n=7) of patients considered that digital technologies applied to impression could decrease the time spent in the dental clinic, while the 65% (n=13) couldn't give an answer. In a four point scale (awful – endurable – comfortable – very comfortable), the 60% (n=12) of patients considered the new digital scanning technique comfortable, the 30% (n=6) very comfortable, and the 10% (n=1) endurable. In a four point scale (insufficient – sufficient – good – excellent) the 55% (n=11) of patients perceived the quality of digital impression technique as good, while the 45% (n=9) as excellent. The 70% of patients (n=14) would undergo the digital impression technique again, while the 30% (n=6) only if necessary. The 100% of patients (n=20) would suggest the digital impression technique to family or friends. The 100% (n=20) of patients think that is right to choose dentists who provide well-advanced technologies and high quality services. Finally, the 35% (n=7) of patients think justifiable an increase of the costs of fees related to high quality services such as digital impression devices – while the 15% (n=3) didn't think so. The 50% (n=10) of patients couldn't give an answer.

Conclusion. Based on these results, we can conclude that digital impression technology applied to orthodontics can be perceived by patients as a high quality device, which is more comfortable, faster, more accurate than traditional impression methods. In addition, patients appear to be prepared to choose dentists who provide well-advanced technologies and high quality services.

Segmental osteotomy for the management of an ankylosed permanent tooth: a case report

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Aim. The aim of this case report is to describe a method to treat a young patient with an ankylosed and infraoccluded tooth.

Ankylosed teeth in young patients sometimes lead to infraocclusion and cause a defect in the alveolar process because of the arrested development of the alveolar ridge.

Lack of sufficient alveolar bone may compromise future prosthetic solutions and may necessitate regenerative procedures in order to provide sufficient bone to support a dental implant.

The treatment intention is to maintain the alveolar bone ridge width, height and continuity, to facilitate the future rehabilitation.

Methods. This case report presents a single tooth dento-osseous osteotomy performed by piezoelectric surgery, in a maxillary right central incisor of a 13-year-old patient. The permanent incisor, diagnosed as ankylosed and infraoccluded, was avulsed and replanted at age 8. Segmental osteotomy is a technique that involves the transposition of the dento-alveolar segment to a more coronal position. After the mobilization of the ankylosed tooth, a preshaped steel archwire with a 2,5 mm step-down bend was placed in the brackets of the repositioned tooth. The dento-alveolar segment was moved coronally by engaging the archwire. This technique allows to preserve the alveolar bone until the final treatment, that will be performed at the end of the growth.

Results. Short term evaluation (1 week) revealed good soft tissue healing. The patient reported a little edema and moderate post-treatment pain. There was no complications after the surgical intevention, as: soft or hard tissues dehiscences, fractures or root resorption, ankylosis or loss of vitality of the teeth near the osteotomic lines. After 6 months there is no evidence of relapse of the position of the tooth. The posttreatment panoramic radiograph shows good bone regeneration around the dento-alveolar segment.

Discussion. Dental trauma is a common injury with a prevalence between 6% to 34% in children aged 8 to 15 years old.

One of the most severe dento-alveolar injuries is avulsion where the tooth or teeth are completely knocked out of the mouth and this injury accounts for 0.5% to 3% of dentoalveolar trauma to permanent teeth.

Avulsed teeth stored extraorally in a dry environment for more than 60 min generally develop root resorption or ankylosis after their replantation due to the absence of vital periodontal ligament on their root surface. Ankylosis in children causes the local arrest of alveolar bone development. An ankylosed tooth should be treated before the changes become so pronounced that they compromise future prosthetic treatment.

The treatment options may involve: extraction of the ankylotic tooth and esthetic solution until more conclusive treatment is provided; surgically repositioning of the ankylosed tooth; orthodontic space closure after extraction; single tooth osteotomy and immediate repositioning of the dentoalveolar structures; surgical luxations followed by orthodontic traction; extraction of the ankylotic tooth, followed with immediate ridge augmentation; decoronation and esthetic space maintenance until more definitive treatment is provided.

Conclusion. This case report illustrates an orthodontics and surgery plan to treat a growing patient with an ankylosed and infraoccluded tooth. Single-tooth osteotomy seems to be a predictable and successful procedure, associated with a low post-operative morbidity, that allows to reposition a dento-alveolar segment into a favourable position. The treatment intention is to maintain the alveolar bone ridge width, height and continuity, to facilitate the future rehabilitation.

Oral appliances for the treatment of obstructive sleep apnea

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Aim. Obstructive sleep apnea syndrome (OSAS) is characterized by recurrent events of upper airway obstruction during sleep associated with clinical signs and symptoms. OSAS is an independent risk factor for cardiovascular complications and can be associated with a relatively high morbidity and mortality. Continuous positive airway pressure (CPAP) is regarded as the gold standard treatment for OSAS. The aim of this prospective study was to evaluate 20 OSAS patients who refused CPAP use, and for that reason, treated with oral appliances (OA).

Methods. All patients enrolled in the present study, were diagnosed with OSAS based on a recent polysomnography, with an apnea–hypopnea index (AHI) of greater than 5 events/h of sleep. A standard ear, nose, and throat (ENT) clinical examination was performed in all patients and included a detailed clinical history, clinical exploration of ear, nose, and throat with examination of pharyngeal and laryngeal findings (webbing, size of uvula, soft palate, and tonsils). On the basis of this ENT examination, the patient was considered a suitable candidate for OA treatment and for this clinical study. Patients were then referred to the dental sleep professional, who made a full dental examination including cephalometry. A total of 20 polysomnography tests were studied (at baseline and after the use of a OA). The following variables were assessed: AHI, mean oxyhemoglobin saturation, percentage of REM sleep, and sleep efficiency, changing in cephalometric parameters.

Results. The baseline patient characteristics and polysomnography and rhinopharyngeal findings were analysed. A favourable outcome was obtained in 11 patients (responders) but not in 9 patients (non-responders). Reductions in AHI were observed after OA use. All other indexes did not show statistically significant difference and showed quite a difference between patients. Pharyngeal morphology, age, sex and nasal resistance did not differ between the groups.

Conclusion. The AHI showed a decline in the mean value with OA device use. Among the OSAS patients, responders had wider retroglossal spaces than non-responders. In the current investigation, findings were concordant with literature observations. This highlights the importance of dental professionals to identify and refer patients with OSAS.

Electromyographic evaluation of patients in orthodontic treatment with Invisalign

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Aim. To evaluate electromyographically if orthodontic treatment with Invisalign has some gnathological repercussions on patient.

Methods. The sample surveyed consisted of 11 adult patients (9 women and 2 men) between 18 and 32 years (mean age 20 years), with slight-moderate dental malocclusions. The sample was chosen by considering only those who, having completed the growth, showed the therapeutic indications to orthodontic treatment, without limits regarding the etiology of dysmorphia, age and sex.

For each patient all diagnostic procedures were performed: anamnestic investigation, examination, study of photography, examination of the models, radiographic investigations, functional investigations. For each patient was performed a cephalometric tracing on latero-lateral teleradiography by the same operator according to the school of Milan.

The electromyographic examination has planned to submit the musculature of stomatognathic system of each patient, particularly the masseter and anterior temporal, to some electromyographic and kinesiographic tests, interspersed with 45 minutes of TENS. Electroki-

nesiomyographical examinations were conducted before the beginning of orthodontic treatment (T0), after 1 month of treatment (T1), 6 months after the start of treatment (T2) and at 1 year (T3).

These tests have provided for the acquisition of the following tests:

- STEP 1: Analyzes the muscle activity of the muscles considered in habitual resting (scan 9) and analyzes the interocclusal free space (free way space) in habitual resting (scan 3).
- STEP 2: TENS for a period of 45' in order to balance and relax the muscles of the patient.
- STEP 3: evaluation of muscle activity at rest after TENS (scan 10) and evaluation free way space at rest (scan 4).

Results. Starting from the analysis of the degree of the electrical activity, it was observed that at T0 patients had average values that were within the average of the values considered normal (between 1 and 3 microvolts).

Immediately after the action with TENS, there has been a decrease of microvoltage of both masseter and temporal of almost half of the initial values.

Statistically significant differences compared to T0 before TENS were observed at 6 months ($p < 0.05$) for MM dx, and to 1 year for both masseter and temporal.

Statistically significant differences compared to T0 after TENS were observed after 1 month ($p < 0.05$) for MM dx, and after 6 months for both masseter and temporal; not statistically significant differences were observed after 1 year.

Conclusion. Orthodontic treatment using Invisalign induces significant changes in masticatory function in terms of electrical activity and free way space. In particular, it was observed a progressive reduction of the electromyographic values compared to values before the start of TENS. Instead, compared to the values obtained by relaxing under TENS, only the values after 1 year are lower.

In general, these ranges are reduced in the course of therapy, indicating a normalization of the myoelectric signal after one year from starting treatment. It is therefore possible to objectify the presence of an improvement of neuromuscular function in patients undergoing orthodontic protocol using invisalign.

About the free way space, it increases during the course of therapy, and this may be due to an effective muscle relaxation, but also to muscle adaptation to the thickness of the templates.

Orthodontic treatment of teeth periodontally compromise subject to guided tissue regeneration

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Aim. To evaluate the stability of periodontal-orthodontic treatment after the regeneration of periodontal attachment in 14 patients with severe intrabony defects.

Methods. 14 patients have been recruited with the following inclusion criteria:

- Age at least 21 years
- Terms of good general health
- Women not pregnant or breastfeeding
- Non-Smoking
- Presence of severe periodontitis treated with scaling, root planing and oral hygiene instructions
- State of good oral hygiene with plaque index (FMPS) and bleeding index (FMBS) <25% at the beginning of treatment
- Presence of a deep infraosseous defect with pocket depth in the survey (PPD) ≥ 6mm
- Migration and diastema between two teeth resulting from periodontal disease
- Orthodontic treatment need.

Patients were subjected to causal therapy in the presurgical phase, consisting of a complete periodontal examination, multiple sessions of scaling and root planing and oral hygiene instructions. A month after completing the initial causal therapy the revaluation was performed. All patients who presented FMPS and FMBS less than 25% at control were recruited for the study. Intraoral radiographs and records of PPD, CAL and gingival recession were performed.

All patients were then subjected to a regenerative therapy appropriate to the morphology of their soft and hard tissues.

One year after surgery the intraoral radiographs and clinical measurements of PPD, CAL and gingival recession were performed again. Subsequently orthodontic treatment was performed. The patients were subjected to different types of orthodontic movement according to the clinical need to realign dental arch.

The orthodontics was performed with the main objective of obtaining a movement that did not damage the periodontal attachment just regenerated. We used the straight wire technique with thermoactive Nickel-Titanium arches and brackets 3M Victory.

During the treatment, patients have joined a program of maintaining oral hygiene with monthly checkups. At the end of the active phase of orthodontic the clinician has selected an appropriate fixed device of retention to prevent possible relapses.

At the end of orthodontic treatment intraoral radiographs and clinical measurements of PPD, CAL and gingival recession were performed like at the beginning of the treatment. A statistical analysis to compare the data before the surgery (T0), one year after the GTR (T1) and at the end of the orthodontic treatment (T2) was performed. Means and standard deviations before and after surgery were calculated.

Results. From T0 to T1, the average reduction was 5.57 mm ± 1.5 mm, with an average remaining PPD of 2.71 ± 0,82mm; the average gain of CAL was 5.86 ± 1.74 mm, with an average residual CAL of 4.28 ± 1.68 mm. Both of these parameters showed statistically significant changes ($P < 0.001$). Conversely, there were no statistically significant differences between T1 and T2, where there was a reduction of average PPD of 0.07 mm and an average gain of CAL of 0,57mm.

Conclusion. Although the possibility to draw conclusion from this study is limited because of the small number of patients, the combined orthodontico-periodontal treatment protocol has been proven safe and effective. The results obtained show that the orthodontic treatment did not compromise the treatment of periodontal regeneration, thereby leading to an improvement in aesthetic but also in function.

Arthrocentesis: mandibular function restoration

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Aim. The aim of this study was to evaluate effectiveness of arthrocentesis on a group of patients with closed-lock and strong click.

Methods. We selected 16 patients (13 women and 3 men), aged between 19 and 64 years, suffering from temporomandibular dysfunctional pathology, without morphological lesions of bone structures. Inclusion criteria were the following: joint pain had to be unresponsive to drug therapy nor to gnathological treatment and maximum mouth opening didn't have to reach 30 mm. Average opening shown by the sample group was 27.4 mm (SD 3.7).

All patients underwent two-way arthrocentesis, which was performed on the upper articular compartment, according to the protocol proposed by the University of Milan.

After surgery, patients were prescribed with active gymnastic exercises for TMJ (protrusion, laterality and maximum opening, for 5 minutes 5-6 times a day for a month) and with application of a mandibular advancement splint (incisors head to head position).

First check was performed after a week from surgery, then once a month for 4 months, and lately every 2 months up to 1 year after surgery.

Results. After arthrocentesis, an average maximum opening of 38.1 mm (DS 2.8) was reached, with mean increase of 10.7 mm.

An immediate increase in opening was obtained In 13 cases out of 16 and this result tended to become more stable over the years.

There was block recurrence of TMJ in three cases: mouth opening decreased from 37 (1.3) mm which had been previously achieved through the intervention to 33.4 (2.4) mm reached 1 week later. Then, a progressive deterioration during months followed.

Conclusion. Arthrocentesis was proved to be an effective therapy in closed-lock and strong click treatment; block recurrence was caused primarily by patients failure in applying the prescribed gnathological occlusal therapy.

Arthrocentesis has become an integral part of acute articular block clinical therapy: stable and good results in mandibular function restoration and in joint pain treatment can be obtained through this intervention.

Orthognatic surgery: reliability of orthodontic pre-surgical virtual 3D programmation

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Aim. To evaluate the reliability of the virtual pre-surgical orthodontic program practiced at the Department of Orthodontics at University of Milan comparing it with the non-virtual protocol used by the same School.

Methods. The study involved 18 patients undergone to orthognathic surgery treated at the Department of Orthodontics at University of Milan. Patients were selected according to the following inclusion criteria:

— Adult patients with malocclusion of I or II skeletal class
— No implants or prosthesis on implants
— No local or systemic diseases
— No dental abnormalities
— No previous orthodontic treatment.

For 9 patients the pre-surgical planning was carried out according to the virtual protocol, the other 9 patients (control group) were subjected to traditional protocol.

The two methods were compared by evaluating the degree of discrepancy between the situation prospected by the program and the standard treated patients measured at the end of pre-surgical orthodontics in both groups.

Also, the values of the maximum positive and negative deviation, medium and standard deviation were taken under control because they characterize the points of overlap protocol.

Results. An overlap > 75% was obtained for all patients between the scanning of the program made and the scanning of the pre-surgical situation except for 2 strongly asymmetric patients. To determine if the difference between the values observed between the two protocols was statistically significant, a non- parametric test with a reliability degree of 95% for each value was performed.

Conclusion. Both protocols studied show an high reliability. The non-precise overlap between the scanning of the program performed and the scanning of the pre-surgical situation occurred for two patients was due to the presence of an 'important asymmetry which resulted in a neuromuscular influence in orthodontic movements.

From the analysis of the results obtained, regardless of' arch considered, it can be noted that the discrepancies reported for the programming protocol pre-surgical orthodontic virtual are on average lower than those achieved in the group subjected to not virtual program.

However the differences between the values of the variables related to the two study groups were not statistically significant ($p > 0.05$).

The use of digital technologies and methods of CAD / CAM has important advantages:

— Removes some phases of laboratory and thus reduces the operating time and errors related to manual procedures, because it is not necessary to detect the 'face bow or make mounting on articulator; all data can be derived from interface between the TC cone bean and scanning patterns;

— It has a vision not only of the arches of the patient but also of 'whole skull;

— It transmits the information to the patient in a simple and immediate way, with a strong communicative effect;

— It allows the set-up fastly and repeatable because the procedure is standardized and teeth are moved with completely measurable parameters and values;

— Based on the models of the digital set-up, it permits to design a completely preprogrammed and individualized equipment to make a specific movement from a position A to a position B: thanks to CAD/CAM, individual brackets for the needs of the clinician with

conformations, positions and specific information according to the characteristics of the individual dental elements can be realized.

Biomechanics in orthodontic movements using Invisalign method

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Aim. To analyze the predictability of orthodontic movements using Invisalign aligners.

Methods. We have been analyzing patients treated with Invisalign method between January 2013 and January 2015 and we did a systematic review examining every article published on Pubmed between 2008 and 2014 regarding Invisalign biomechanics.

Words searched were: "Invisalign treatment", "Invisalign systematic review", "aligner orthodontic treatment".

Results. The aligners alone were demonstrated to obtain unpredictable movements, though good results have been reached in association with auxiliaries, in particular attachments.

Attachments are small tooth-colored dots of composite placed in precise locations on specific teeth.

The most important kind of attachments are:

— Optimized rotation attachment for derotation movement of upper and lower canines and bicuspid greater than 5° (also preactivated to contrast intrusion, which is a rotation's side effect).

— Optimized extrusion attachment for extrusion of upper and lower incisors and canines greater than 0,5 mm.

— Optimized root control attachment, double attachments for mesio-distal root tip control, to create a moment that is favorable for the movement. They can be used for mesio-distal root tip control of upper incisor and upper or lower canines, when the needed movement is greater than 0,75 mm. They can also be used to move bodily upper and lower canines and bicuspids, which need to be moved more than 0,75 mm.

— Deep bite attachment for improved control of premolar extrusion and anchorage in deep bite patients. They are designed to provide anchorage for anterior intrusion and they can be activated to deliver extrusive forces to the premolars when needed.

Other important SmartForce Features are:

— Power Ridge, to obtain lingual root torque. This feature is a "twist" of the aligner surface designed to maintain a perfect fit of the aligner at the gingival margin, controlling the force couple and effectively spinning the tooth around its center of resistance.

— Lingual pressure area to obtain an improved control of anterior intrusion.

This feature was introduced because the intrusive force from aligners may not always be directed along the long axis of the anterior teeth. A new pressure area on the lingual surface of aligners is designed to re-direct the intrusive force through the long axis of anterior teeth. This feature is available for lower incisors and canines.

Conclusion. Plain aligners have important biomechanical limitations, but using auxiliaries such as attachments we can obtain predictable movements.

Existing studies in literature present methodological errors and the quality of these studies is yet not acceptable.

Difficulty in doing homogeneous and large-scale studies is due to the continuous evolution of materials and auxiliaries.

Anyway, in the daily clinical experience (with patient's compliance) good Results. are achieved, thanks to continuous evolution of Invisalign technique.

Expression of trail and its receptors DR5 and DCR2 in orthodontic tooth movement

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Aim. TRAIL is a transmembrane protein that induces apoptosis in various tissues including alveolar bone. Its *in vitro* expression can be activated by several methods, such as RANKL administration and cell scraping. Expression of TRAIL and its receptors DR5 and DcR2 was examined in osteoclast-like cells to analyze their effects on cell lifespan and to explore their role in orthodontic tooth movement.

Methods. Osteoclast-like cells were differentiated from a mouse hematopoietic cell line by stimulation with RANKL for 24 h (T1), 72 h (T2) or 5 days (T3); some cultures were then scraped with a plastic scraper. Cells were either immediately harvested in SDS-PAGE sample buffer, or allowed to settle and harvested after 1, 3, 6 or 12 h, Immunostaining for TRAIL, DR5 and DcR2 was evaluated by immunocytochemistry and Western blot analysis in control and treated cells. All variables were normally distributed. Comparisons between two means were tested with Student's t test and comparisons among means with ANOVA. P-values <0,01 were considered as statistically significant. All data were analyzed with the SPSS program.

Results. T1 and T3 osteoclast-like cells treated with RANKL and scraping showed significally increased TRAIL expression compared with control cells both on immunocytochemical analysis and on Western blotting. A significantly increased expression of the death receptor DR5 compared with control cells was demonstrated at T3 both by immunocytochemistry and by Western blotting. Also, cells (treated with RANKL) showed an higher expressions of DcR2 at T1. Therefore TRAIL expression peaked at T1 and T3 in correspondence with DcR2 and DR5 maxima, respectively.

Conclusion. This study evaluates the *in vitro* expression of TRAIL and its receptors DR5 and DcR2 in osteoclast-like cells treated with RANKL, exposed to RANKL and scraping, or grown as control cultures. Our results may reflect a different influence of TRAIL on osteoclasts in relation to the time elapsed from the application of mechanical stress (scraping, simulating OTM). At the beginning of force application, i.e. T1, TRAIL might induce cell differentiation and development through its anti-apoptosis receptor DcR2; once this impulse is spent, expression of this decoy receptor would receptor would revert to its normal level. At this point (T3), expression of death receptor DR5 would increase, leading in turn to apoptotic cell death and promoting cell turnover. In synthesis TRAIL would exert modulation and differentiation functions at T1 and induce cell apoptosis at T3. These

data may contribute to a better understanding of the mechanisms regulating tooth movement and to improve the accuracy of orthodontic treatments.

Transmigrated mandibular permanent canine: an orthodontic-surgical management

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Aim. Migration of an impacted tooth across the midline is a phenomenon called transmigration. Transmigration is unusual, however it was reported that canine is the only tooth in both maxillary arches that can migrate across the midline, in opposite side of the arch.

In this study we describe a particular clinical situation where a transmigrated mandibular canine was treated with an orthodontic and surgical approach. This challenging treatment approach is described in detail, including the mechanics used to align the impacted canine.

Methods. A 12.9 year-old boy was referred to our ward in permanent dentition with a dento-skeletal Class II malocclusion. Slightly constricted maxillary arch without crossbite, slight lower midline deviation and mild crowding in both arches were observed. All mandibular teeth were erupted except lower right canine and third molars whereas the right deciduous mandibular canine was still present. The panoramic radiograph showed an impacted transmigrated mandibular right canine, positioned mesio-angularly across the midline, labial to anterior teeth, with the crown portion between the roots of the left incisors.

The treatment objectives were to get the impacted mandibular canine into the arch, achieve bilateral Class I canine and molar relationship, correct the mild crowding and the midline deviation.

The orthodontic treatment plan included extraction of the deciduous canine and surgical exposure and ligation of the permanent one. This option was favoured because it avoided implants or permanent tooth extractions and would result in all teeth being in their correct positions. Eruption was properly guided, and great care was taken to prevent contact between the crown of the canine and roots of the lower incisors.

Results. At the end of the treatment, through the collaborative efforts of an orthodontist and an oral surgeon, an excellent esthetic and functional outcome was achieved.

The occlusion showed a well-aligned dentition with Class I molar and canine relationships.

The patient had a consonant smile arch, the teeth had good interdigitation, and normal overjet and overbite were achieved. The maxillary midline was coincident with the facial midline. The posttreatment panoramic radiograph showed the right mandibular canine into its correct position, assocated with normal bone levels and a vey light root resorption.The tooth responded normally to a vitally test with a minimal gingival recession observed.

The total treatment time was_3 years and 6 months and the final radiographs indicated normal bone levels and no root resorption. The cephalometric analysis at the end of the orthodontic treatment showed a good maxillary and mandibular relationship.

After 1 year-retention, the occlusion was well maintened with minimal gingival recession observed in the mandibular canine.

Conclusion. The precence of a transmigrated mandibular canine is one of the most difficult challenges that an orthodontist has to face. As shown by the aesthetic and functional outcome of this clinical case, early diagnosis and treatment are suggested, albeit this requires a complex and lengthy treatment protocol and a cost-benefit evaluation. Patient motivation and compliance is necessary for the success of the treatment.

The upper canine disinclusion to orthodontic purposes

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Aim. The upper canine disinclusion is a combined technique of different disciplines: surgical, orthodontic and periodontal, conditioned by the location of the item in question in order to recover the tooth in the arch. The upper canines are the more inclusive teeth after the third superior molar to be the last tooth in exchange and because it needs a path physiological longest of all to erupt.

Etiology includes two main groups of factors: local and general.

— Local factors: absence of space in the arch, crowding, presence of supernumerary elements, persistence of the deciduous correspondent, cysts, tumours, embryological factors

— General factors: endocrine, metabolic, Gardner's syndrome, Albers disease.

Methods. Patient female of 22 years had a palatal inclusion of the tooth 1.3 and presence in the arch of the corresponding 5.3, cross bite in 1.5 and 1.6. A BTP (Bar trans-palatal) and multibrackets therapy were applied to recover the molar ratio and an adequate form of arch. Subsequently, we proceeded with the surgical technique to "cloudy" and covering the tooth engaged with the flap performed for exposure. It was necessary also a slight osteotomy to release a portion of the tooth crown indispensable for the anchorage. After surgery, it necessary a system statically determined (cantilever TMA) to obtain the disinclusion which can be used for the extrusion, distalization and vestibular extension in the absolute respect of periodontal tissue support. In this way it is possible to get aesthetic and functional recovery. The deciduous canine was extracted later for aesthetic needs of the patient.

Conclusion. This method was useful for the recovery and the repositioning of the upper right canine in the arch and subsequent stabilization with an excellent functional and aesthetic result.

Interceptive orthodontics of open bite in pre-school children with preformed elastomeric appliances: case reports

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Aim. The Authors present current trends in early orthodontic treatment of open bite in pre-school children. Open bite in the deciduos dentition is often related to prolonged non-nutritive sucking or tongue thrust. It has been suggested that, altough some types of malocclusion might benefit from early treatment, the efficacy of this approach depends on the type of malocclusion. In pre-school children open bite seems to improve following the cessation of the habit. Preformed elastomeric appliances (EF line Orthoplus) feature functional training of oral muscles and tongue, offering the clinicians an opportunity of functional rehabilitation besides the orthodontic correction.

The aim is to present an orthodontic strategy based on the use of preformed appliances to correct open bite in patients in deciduos dentition.

Methods. Inclusion criteria were: deciduos dentition, good general health, negative overbite (> 0 mm) with lack of tooth-to-tooth contact between the incisors. Exclusion criteria were: serious illness, nasal airways obstruction, severe crowding (more than 7 mm in the incisors area). Age range varies from 3 years and 2 months to 4 years and 6 months, (mean age of 3 years and 6 months). Patient records included analysis of tongue position during breathing and swallowing. According to the EF prescription, children were instructed to wear the appliance 1 hour daytime and during the night. The daytime wear follows an exercise schedule, including lips muscles stretching and swallowing exercises, so that the children was focused in swallowing with the tongue in the correct position. The EF Start Evolution appliance was used for the correction of anterior open bite and the appropriate size was determined as recommended by the manufacturer.

Results. In this report only intermediate results are presented. Treatment time was 5-18 months, with a mean treatment time of 10,5 months. Occlusal changes were recorded in all (the) treated children: a reduction of the open bite was found in all cases. The tongue thrust, when present, was no more detected.

Conclusion. The preformed elastomeric appliances are proposed in order to treat many different malocclusion such as II class molar relationship, increased overjet, crowding, deep bite. In this poster we focus on open bite cases. Treatment in deciduos dentition with the EF is proposed in order to restore normal occlusion and correct swallowing. Scientific evidence is limited and a few studies have specifically focused on the early interceptive treatment of open bite, so there is need for further research on this topic.

Level of matrix metalloproteinases 1 and 2 in human gingival crevicular fluid during initial tooth movement

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Aim. During orthodontic treatment, the early response of periodontal tissues to mechanical stress involves several metabolic changes that allow tooth movement. Many studies have evaluated these modifications through the analysis of various metabolites released into gingival crevicular fluid (GCF). The purpose of this investigation was to evaluate matrix metalloproteinase (MMP)-1 and MMP-2 in the GCF of human teeth exposed to orthodontic force on both the tension and compression sides in the initial phase of orthodontic tooth movement.

Methods. GCF samples were obtained from 11 healthy orthodontic patients (8 girls, 3 boys; age, 13-15 years; mean, 13.9 years) who needed their 4 first premolars extracted for orthodontic reasons. In each patient, the left maxillary canine having the fixed orthodontic appliance was used as the test tooth, and its antagonist, with no appliance, was the control tooth. Orthodontic force was applied by using a Sentalloy coil-spring (GAC International, Bohemia, NY) of 150 g. The GCF sampling on the mesiobuccal and distobuccal aspects of each experimental and control tooth was performed at specific times up to 8 hours with paper strips. Processing was carried out with western blot analysis to detect MMP-1 and MMP-2 levels on the compression and tension sides.

Results. Compression force induced a significant increase of MMP-1 protein after 1 hour; the increase lasted until the third hour of force application and disappeared thereafter. The tension force induced significantly increased levels of the MMP-1 protein after just 1 hour of force application. MMP-2 protein was induced by compression and increased significantly in a time-dependent fashion, reaching a peak after 8 hours of force application. On the tension side, MMP-2 was significantly increased after 1 hour but gradually returned to basal levels within 8 hours.

Conclusion. Orthodontic forces affect both MMP-1 and MMP-2 protein levels on the compression and the tension sides, although to different extents, whereas MMP-1 and MMP-2 protein levels change in a time-dependent fashion. (Am J Orthod Dentofacial Orthop 2006;130:568.e11-568.e16)

Aesthetic and no-compliance correction of retroclination of upper central incisors in Class II Division 2

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Aim. The aim of this study is to evaluate the effectiveness of a custom made modified transpalatal arch, TPA (Transpalatal Proclination Arch), to correct the retroclination of upper central incisors in Class II Division 2 malocclusion with a mandibular retrusion. The TPA

appliance shifts forward upper central incisors to allow the use of the Herbst appliance advancing the lower jaw and improving the attractiveness of the impaired facial profile.

Methods. Orthodontic treatment with TPA and functional therapy includes patients recruited on a voluntary basis with written informed consent. From the list of objective problems derived from diagnosis subjects are chosen or not according to the inclusion and exclusion criteria.

Inclusion criteria: Class II Division 2 skeletal malocclusion in permanent dentition; Severe overbite (>10mm) with retroclination of central upper incisors; Retruded convex profile aesthetically impaired; Cephalometric evaluation that highlights mesofacial or brachifacial typology with a sagittal mandibular retrusion.

Exclusion criteria: Patients with deciduous dentition; Malocclusion of Class III; Periodontal disease and tooth mobility.

The treatment plan includes: 1)The correction of the inclination of upper central incisors with TPA proclination spring that advances the upper incisors increasing overjet and allows a forward posture of the mandible with a functional appliance. TPA is an upper fixed modified transpalatal arch with superelastic NiTi coil springs connected to stainless steel push rods extended on the first upper central incisors. The appliance is fixed on reinforced molar bands. 2) Herbst functional appliance corrects Class II and overjet improving the retruded profile. 3) Upper and lower arches multibracketts self-ligating fixed appliance are positioned to alignment, leveling and correction of the malocclusion. 4) The results achieved are maintained by a post-treatment retention with a lower retainer extended from 3.3 to 4.3.

Results. After the treatment we can see the occlusion and the facial profile improved. Molar and canine Class I relationship are achieved with overjet and overbite within the norms. The panoramic radiograph shows a good radicular parallelism and no signs of root resorption. The cephalometric analysis shows an improvement of the sagittal intermaxillary relation and a slight counter clockwise rotation of the mandible. The clinical examination of the masticatory muscles and TMJ doesn't show pathological signs or symptoms. The results achieved are maintained during the retention time with a fixed lingual 3.3-4.3 retainer. After two year of post-treatment controls, occlusal relationship and dental alignment are stable and maxillary and mandibular incisors inclination doesn't show changes. Cephalometric values aren't changed in the post-treatment period.

Conclusion. Frequently patients with skeletal Class II Division 2 present mandibular retrusion that has to be advanced to improve occlusion and profile. The TPA spring appliance puts forward the upper central incisors allowing the mandibular growth. Treatment with TPA and Herbst and multibracketts straightwire fixed appliances has some advantages: TPA and Herbst are fixed no-compliance appliances, important in teenager with low cooperation; TPA is a custom made transpalatal aesthetic arch because the proclination of incisors is obtained without vestibular arch; finally TPA is effective in correcting palatal inclination of upper central incisors.

Oral appliance treatment in patients with obstructive sleep apnea syndrome: a 3D evaluation of the upper airway morphology

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Aim. Obstructive Sleep Apnea Syndrome (OSAS) represents a frequent and common respiratory disease characterized by repeated episodes of complete and/or partial obstruction of upper airways during sleep, normally associated with reduction of oxygen saturation in blood. The oral appliances (OAs) are considered to be an effective treatment modality thanks to the upper airway enlargement. Lateral cephalometry has been used for the two dimensional evaluation of upper airway form with several limits. The aim of this study is to obtain an accurate three-dimensional (3D) volume analyses with CBCT scans in order to confirm the effects of OA on the upper airway in patients with OSAS and therefore an improvement of AHI index (Apnea-Hypopnea Index).

Methods. 10 Italian patients with moderate or severe OSA (3 males and 7 females, 53.4 ± 11.3 years aged and BMI 24.5 ± 2.7), who cannot tolerate CPAP therapy and rejected a surgical approach, were treated with not-adjustable customized OA and evaluated with CBCT and polysonnography. Upper airway form was examined in the presence and absence of OA and the volume were measured and compared in two different areas. Specific planes have been considered to match data and calculate the benefit obtained with therapy through a graphic software (MIMICS®).

Results. Nine out of ten patients showed an improvement of total upper airways volume and an improvement in AHI index. Volume increased both in the posterior soft palate region and in the posterior tongue region. In the inferior area the greater differences have been observed.

Conclusion. 3D image reconstruction accurately confirmed morphological changes in the upper airway during OA therapy. The use of this 3D evaluation is expected to improve the results of OA therapy in the future.

Spontaneous canine eruption after early treatment of a compound odontoma

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Aim. Odontomas are the most common odontogenic tumors and are considered to be hamartomas rather than neoplasms; they are composed of tissues native to teeth. Odontomas generally appear as small, solitary or multiple radio-opaque lesions and can be morphologically subdivided into complex or compound. Their occurrence rate is 22% in the oral cavity. Clinically, the existence of an odontoma can be suspected when a permanent tooth or multiple teeth fail to erupt; the presence of this lesion can actually cause tooth impaction. The canines are the most frequent teeth affected, followed by upper central incisors and third molars. The aim of our case report is to show that early detection of odontomas allows the adoption of a less complex treatment and ensures a better prognosis of the eruption of impacted teeth.

Methods. A panoramic radiograph was taken as a routine examination in a 10-year-old-boy for an orthodontic check-up. The Rx showed a well defined radiopaque mass close to the unerupted left permanent canine. The mass resulted being an odontoma. Surgical excision was performed three months after the diagnosis. The patient was then evaluated orthodontically. The diagnosis was: class I, skeletal biprotrusion, delayed eruption of upper left canine. The patient was therefore treated with a fixed multi-bracket appliance to preserve the space needed for the spontaneous eruption of the canine. The space was maintained with the use of an open spring positioned between teeth 2.2 and 2.4. Intra and extra oral photographs were regularly taken in order to monitor the canine's eruption.

Results. After six months of treatment, the canine spontaneously erupted in the dental arch and reached a good occlusion. No bracket was positioned on the canine to show the complete spontaneous eruption of the tooth.

Conclusion. Our results show the importance of early diagnosis and management of odontomas to avoid later complications such as tooth resorption or failure of eruption of permanent teeth. Early treatment allows the teeth to re-start their physiological path of eruption and can avoid the use of surgical-orthodontic traction. The treatment success was the result of the combined efforts of the orthodontist, the oral surgeon and the patient.

Orthodontic treatment with Herbst miniscope in OSAS: protocol of clinical study in children and adults compared

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Aim. Objective is to evaluate the effectiveness of mandibular advancement device, Herbst miniscope, in OSAS (Obstructive Sleep Apnea Syndrome) in children and adults compared. Herbst treatment is directed to mild and/or moderate OSAS, severe OSAS who refuse surgical treatment, who don't tolerate the CPAP or are not responding to it or they can't use it occasionally.

Methods. Patients, recruited on a voluntary basis with written informed consent, are chosen according to the inclusion/exclusion criteria defined by the study. Inclusion criteria: Adults: AHI>5; BMI=W/H^2≥28 kg/m^2; Neck girth: M≥43cm; F≥41 cm; Rear retro-pharyngeal space ≤8-9 mm; Micrognathia and/or mandibular retrusion.

Children: 6-16 age; AHI>1; Class II malocclusion; Micrognathia and/or mandibular retrusion; Retruded profile convex; Mild transverse maxillary deficiency with posterior cross-bite, high palate or enlarge tonsils; Intercanine deciduous upper range <27mm; Intermolar I deciduous upper range <31mm; Intermolar II deciduous upper range <36mm; BMI>16 kg/m^2. Are included adults and children with mild and/or moderate OSAS, moderate and serious forms that don't respond or don't tolerate CPAP, or occasionally they can't use it and subjects who refuse surgical treatment. Adults show excessive daytime somnolence and obesity, differently children show daytime hyperactivity and thinness linked to retarded growth.

Exclusion criteria: Trouble is due to internistic/neurological diseases; Use of drugs/substances (muscle relaxants, barbiturates, benzodiazepines, alcohol/drugs in adults); Periodontal disease; Tooth mobility; Class III malocclusion; Children with adenotonsillar hypertrophy, craniofacial anomalies and asymmetries (Cleft or Down Syndrome).

Diagnosis includes: first visit, screening tests, laboratory examinations, Polysomnography, OPT, cephalometric examination, dental and orthognatologic visit.

After finding imprints of jaw and bite of construction, Herbst miniscope is assembled with two acrylic resin splint upper and lower linked to telescopic mechanism. In children rapid palatal expansion is performed in 15 days by adapting a rapid maxillary expander at the Herbst appliance. The following step is a multibracket treatment to alignment. Follow-up checks are performed every 3 weeks during which mandible is advanced by thickness and is assessed the effectiveness of the device in the resolution of the syndrome. After 6 months patients repeat Polysomnography.

Results. Results in adults are immediate instead in children are obtained after 12 months. Mandible advances 6.0mm. In children maxillary expansion achieved is 3.19mm increasing the nasal airflow. The length mandibular is increased and also the posterior airway space (3.2mm), the length of the tongue is preserved and the hyoid bone is moved forward. Herbst treatment causes dental movements due to telescope mechanism that directs mesially forces on the mandibular teeth causing extrusion of the lower molars. So in children Hersbt treatment correct OSAS and Class II malocclusion together.

Conclusion. The device allows the mandibular advancement preventing the adhesion of the tongue to the back wall of the pharynx, allowing oropharyngeal area expansion and guaranteeing the passage of air and the proper breathing. Herbst miniscope, compared to using other Mandibular Advancement devices has many benefits in the resolution of the syndrome, reduction of symptoms and Polysomnographic indexes increasing patient comfort. The flexibility of the device allows freedom of movement of the mandible. The device is ease of use and effective during the night in the resolution of snoring, in the forms of mild and moderate OSAS, in patients who refuse the surgical treatment or they don't tolerate the CPAP, or they don't respond to it or occasionally they can't use it. Finally Herbst treatment prevents severe complications (cardiovascular disease and risk of road accidents in adults, retarded growth, cognitive deficit and problems at school in children).

Early treatment of HFMccc: L.A.1 - L.A.2 personalized activator therapy. Case report

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Aim. The pseudo hemimandibular hypoplasia or HFMccc is a kind of mandibular hypoplasia who presents a particular morphology: a condyle – coronoid collapse (ccc) and no soft tissues involvement. The objective of this work is to present a new appliance (L.A.1 – L.A.2 combined appliances) for early functional treatment of HFMccc.

Methods. In the literature different appliances are reported, but protocols and timing of procedure for

treatment of this pathology are controversial. Many works adviced to start treatment after 14 yrs and not before 8 yrs of patient age in general. The kind of appliances used was very different. The most famous are: a Caprioglio's appliance, who must be apply on lower arch and the asymmetrical activator of A. Silvestri (this appliance was applied on upper arch). All appliances had a buccal shield on affected side. The patient in each case must have a mouth closed all day in order to allow the function of appliances. In each cases the treatment was 18 months long for the first time (all day) and was 12 months long for the second part of therapy (application only during the night). In this work we suggests a new protocol in order to treat the HFMccc very early (before age of school) and proposes a personalized activator very easy to wear. The appliance are two: a superior appliances with bite plate on occlusal zone. The contact to lower arch is like a Michigan plate on the normal side, like a Federici bite on affected side. This particular structure increases the vertical lengthening of mandibular ramus of affected side. L.A.2 is a with a buccal shield on affected side. The shield has a buccal inclination in order to correct the inclination of condyle affected. We used this appliance in a children (4 yrs old). Each appliance was used only during the night, and for 8 months each.

Results. The L.A.1 increased the vertical ramus affected and corrected asymmetry clinically. The L.A.2 allowed a surprising changes on morphology of condyle affected and created a new glenoid cavity (who is absent in this kind of patient).

Conclusion. In the HFMccc the L.A.1 – L.A.2 combined treatment allows to correct asymmetry and recreates the function of TMJ. In fact after therapy we observe a new glenoid cavity , a growth of congyle and a changes on morphology of coronoid process. Furthermore these appliances are very easy ro wear then, this treatment can start very early (before age of school). This is a very important aspect for a functional and psychosocial implication.

Rapid maxillary expansion with Haas appliance in primary dentition

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Aim. The aim is to evaluate the effectiveness of Haas RME anchored on deciduous teeth in primary dentition to correct maxillary transverse deficiency without involvement of permanent teeth. Haas appliance corrects maxillary transverse discrepancy separating midpalatal suture and connective tissue by a combination of orthopedic and orthodontic dental movements. Haas RME corrects maxillary arch narrowness with minimum dental movement and maximum skeletal movement.

Methods. Haas is a tooth and tissue borne RME. It consists of an expansion screw with acrylic abutting on alveolar ridge. The flexibility of Haas appliance resulting of the length of the arms from the screw to the acrylic reduces force levels. Diagnosis include: case history, clinical examination, study models, radiographs maxillary occlusal, P.A. cephalogram.

Inclusion criteria: Patients with lateral discrepancies and unilateral or bilateral posterior cross-bites; Class II malocclusion with increased deep bite; Transverse discrepancy ≥4mm with maxillary molars buccally inclined; Maxilla retraction in Class III malocclusion; Cleft lip and palate; Moderate maxillary crowding with no space for permanent lateral incisors eruption.

Exclusion criteria: Patients who have passed the growth spurt; Gingival tissues thin and recession; Anterior open bite; Steep mandibular plane; Convex profile; Poor compliance; Maxillary and mandibular skeletal asymmetry; Metabolic disorders linked with bone metabolism (hyperthyroidism).

Parents should be informed that the upper central incisors diastema that appears during the expansion will close spontaneously in retention period. Parents should be instructed to turn the expansion screw one-quarter turn twice a day for the first 4 to 5 days and then one turn each day (0.25 mm/turn until the expansion screw reaches 10.5mm; 180° daily rotation with turn of 90° both morning and evening). Patients should be reviewed weekly. Active treatment is required for 2-3 weeks. Then a retention period of three months is recommended to allow for bony infilling of separated suture.

Results. Expansion should stop when the maxillary palatal cusps are level with the buccal cusps mandibular teeth. After Haas treatment, maxillary skeletal effects viewed occlusally show that the opening of the midpalatine suture is nonparallel but triangular with maximum opening at incisor region and gradually diminishing towards the posterior part of palate. Viewed frontally, maxillary suture separates supero-inferiorly in nonparallel manner but pyramidal with base located at the oral side of the bone. Maxillary halves and palatal vault are displaced downward and forward. In maxillary anterior teeth occurs a diastema between upper central incisors that will self-corrective. Maxillary posterior teeth are tipped buccally and extruded. The posterior maxilla expands less due to the resistance produced by the zygomatic and pterygoid bones. Mandible swings downward and backward. Width of nasal cavity increases so breathing improves. The resistance to midpalatal suture opening isn't the suture itself but the surrounding structures (sphenoid and zygomatic bones).

Conclusion. When rapid forces, applied to the posterior teeth, exceed the limit for orthodontic tooth movement and sutural resistance, the suture opens while the teeth move minimally. Haas RME, anchored on second deciduous molars, compresses periodontal ligament, bends the alveolar process, tips the anchor teeth and gradually opens the midpalatal suture and all the other maxillary suture. Haas RME induces the posterior crossbite self-correction without involvement of the permanent teeth. It corrects posterior crossbite and dental crowding creating space for maxillary incisor and maxillary canine eruption. Advantages of Haas are rigidity and resistance to rotation, it produces favorable relationship of denture bases in width and anteroposterior plane creating more mobility of the maxilla instead of teeth.

3D cephalometric analysis on TC low/dosage *vs.* MRI high field

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Aim. To determine the viability of the magnetic Resonance Imaging (MRI)' s usage for the 3d cephalometric analysis, using Cone Beam tomography as the reference.

Methods. The sample consisted of eight subject, affected by disturbs of the temporomandibular joint. CBCT and MRI 3T have been performed to the sample. Volumetric data have been then exported in a DICOM file, and processed through the software used to perform the Tridimensional Cephalometric Analysis of the University of Milan. It has been calculated the intra- and inter- examiner ANOVA and ICC's, as well the average and the standard deviation of the difference about CBCT and MRI.

Results. The ANOVA gives no statistically significant difference and all the variables was directly related at ICC. The average and the standard deviation of the difference about CBCT and MRI was 1.92 ± 0.74 mm for linear measurements and 1.43 ± 1.42 for angular measurements.

Conclusion. The image of the skeletal structures in MRI is less clear than CBCT but is more icher of information and certainly sufficient to perform a 3D cephalometric analysis without using any ionizing radiation. The diffusion of scanners with the utilize high field magnets will increase quality of images and will make MRI more reliable even for the analysis of bone structures.

The Invisalign System: a new solution for anterior crowding

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Introduction. Orthodontic treatments are generally not well accepted by adult patients worried for their appearance. In the past treatments were almost exclusively for children but today, more and more adults, ask the orthodontist for an "aesthetic way"to improve their smile. The Invisalign system® allow the clinician to fulfill aesthetic and psychological requirements.

Aim. The aim of this work is to evaluate the effectiveness and predictability of the system for the resolution of anterior dental crowding using Invisalign® Lite, Full and Anterior; to demonstrate the resolution of crowding in the upper and lower anterior arch trough Invisalign aligners; to analyze the accuracy of Invisalign treatment through the ClinCheck measurements.

Methods. A total of 134 patients (94 M, 140 F. mean age 33 years) were evaluated. Invisalign Lite, Full and Anterior were used (4 lite, 49 full, 81 anterior).

Each patient was evaluated at the start (T0) and at the end (T1) of the treatment and after two years from the end of treatment (T2).

Inclusion criteria were upper and lower crowding, uncorrected middle line and needing of aesthetic treatment, while the exclusion criteria were several malocclusion and needing of surgical treatment.

Outcome measures were the correction of the middle line (upper line compared to the lower one) and the resolution of the crowding. The clin check and a virtual grid of 1 mm were used for the measurements. The crowding was expressed in mm as the space available/required ratio.

Results. Upper crowding at T0 was 2,1±1,8 and 0,7±0,9 at T1; lower crowding was 4,0±2,0 at T0 and 1,1±1,0 at T1. The complete resolution of the upper dental crowding was 56% and 32% for the lower. Some patients showed an incomplete resolution of crowding: 56% of cases for the upper arch and 32% for the lower. Middle line at T0 was correct only in 32% of cases while at T1 was 60%.

Results at T1 showed an improvement of the analyzed values of crowding and middle line both.

Patients were evaluated after two years from the end of treatment (T2). The results showed a complete maintenance in 85% of cases. Relapse were present in 15%.

Conclusion. Invisalign system® is effectiveness for the complete resolution of dental arch in 86% (n=116) at T0 for the upper arch and in 80% (n=108) at T1 for the lower arch.

MIM brackets: debonding forces analysis

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Aim. MIM technology was born in the early 90s and later had rapid diffusion also for orthodontic treatment. MIM technique allows to have lots of identical pieces and makes the process efficient and repeatable. Our aim was to compare three types of brackets with a control group to assess their mechanical retention on the enamel, andto analyze the difference between debonding forces traditional and MIM brackets.

Methods. A total of 81 bovine teeth, preserved in Thymol 0,1%, were random divided into 4 groups, each of 20 teeth. After the standard procedures of adhesion, there were applied different brackets for each group: G1: Discovery, G2: Extremo, G3: Mini Dyna-Lock, G4: D.B. (G1, G2, G3 were MIM technologic while G4 was Mesh). Detachment was conducted by Instron Universal Testing Machine and Kruskal Wallis test was used for statistical analysis while ARI for the clinical.

Results. There were statistically significant differences among the three groups and the control one (P<0,05): G4 group produced the highest detachment forces while there were no differences among the MIM groups, whose forces were similar.

Conclusion. Detachment forces of brackets made with MIM technology were significantly lower than those obtained with conventional brackets with mesh.

Third molars and dental crowding: different opinion of orthodontist and oral surgeons

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Aim. The relation between third molars and dental crowding has not been yet clarified aim was to evaluate the current opinion of orthodontists and oral surgeons between the Italian practitioners and to compare opinions of Italian oral surgeons and orthodontists on this topic.

Methods. An on-line research survey was conducted between the member of the Italian Society of Orthodontics and the Italian Society of Oral Surgery.The Pearson's chi-squared test was used.

Results. There were no statistically significant differences between the two groups (P>0,005). Both agree not to believe that third molars create a force responsible of anterior crowding in the upper (82,5% orthodontists, 83,8% surgeons) and in the lower arch (52,6% orthodontists, 63,8% surgeons). Both agree also not to consider the upper (89,7% orthodontists, 82,1% surgeons) and lower (58,8% orthodontists, 63,2% surgeons) third molar extraction useful to prevent crowding.

Conclusion. Italian clinicians have the same opinion on the role of third molar in causing anterior crowding. The role played by the lower teeth is still controversial even if the majority of both groups do not consider their preventive extraction useful.

Correlation between scheletric Class II and temporomandibular joint disorders

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Aim. The temporomandibular joint disorder (Temporomandibular Disorder TMD) is a series of problems that involves the masticatory muscles, the temporomandibular joint and the structures associated with them. Currently is believed that, to define a temporomandibular joint dysfunction, must be present at least one of these symptoms: pain, noise, altered masticatory function. The purpose of this literature review is to evaluate current knowledge about the relationship between Angle II Class malocclusion (especially the second division) with temporomandibular dysfunction (TMD).

Methods. A survey has been conducted through the electronic databases Medline. The keywords used in order to select studies that evaluated the relationship between dysfunction of the temporomandibular joint and the presence of Angle II Class malocclusion were: "temporomandibular disorder and II class malocclusion" using specific inclusion and exclusion criteria. Of the 252 articles resulting from research 23 have been selected that met all the inclusion criteria of this review.

Results. The II Class malocclusion of Angle, in particular the division 2, in the past have been cited as the main occlusal anomaly related to the appearance of the temporomandibular disorders.

The prospective, longitudinal and retrospective analysis does not ultimately support a primary role of occlusion, especially II Class malocclusion second division, in the development of joint problems and also support the hypothesis of a multifactorial origin theory of joint problems.

Conclusion. A critical review of the most recent international literature does not support the primary eHological role of the occlusal factors, in particular, the II class in the TMD.

It can be said that the actual state of knowledge, occlusion is a factor of secondary importance, relevant but not decisive in the development of the temporomandibular disorders. It is therefore impossible to make any provision of proper development of TMD on the basis of the presence or absence of a malocclusion although in some studies the II Class malocclusion has been associated with a higher prevalence of muscle strains problems.

So there is a lack of association with joint disorders (click, locking, dislocations), in the literature II Class malocclusion is related only to the problems of muscular type.

Masticatory apparatus efficiency before and after orthognathic surgery

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Aim. The aim of this study was to measure the electrical activity of anterior temporal muscles and the electrical activity of masseter muscle through electromyography (EMG), in patients with skeletal class II and III before and after orthognathic surgery and then compare the values obtained with those measured in a sample of 10 control subjects with Class I Skeletal and dental.

Methods. 20 subjects (4 males and 16 females), aged between 20 and 46 years, were selected. They underwent surgery for the correction of II and III classorthognatic dysgnathia.

Results. Average increase measured through EMG was 26% (clench 1) between pre and postoperative conditions and 11,09% (clench 2). Average increase of ratio clench 1/ clench 2 between pre and post-operative conditions was 21.05%. The difference between values found between clench 1 and clench 2 was highly significant in the preoperative group and statistically significant in the control group. In the postoperative group this difference was not highly statistically significant. The difference between the mean EMG activity recorded in clench 1 before and after surgery was statistically significant. All of the three groups showed inferior average values in clench 1 than in clench 2, but the only statistically significant difference was found in the control group.

Conclusion. Patients who underwent orthognathic surgery showed an improvement in their masticatory muscles ability to produce strenght during maximum occlusion. Furthermore, the highest increase of EMG values after orthognatic surgery was found in patients who showed lower results of EMG values before surgery.

Preventodontic iter in orthodontic implant treatment

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Aim. The purpose of this study is to check the qualitative and quantitative differences of bacterial plaque and periodontal inflammation levels in a sample of patients undergoing orthodontic-implant therapy during a preventodontic iter.

Methods. Twenty-four patients between 16 and 41 years with problems of malocclusion and incomplete dental formula, after following the preventodontic procedure, were included in orthodontic-implant therapy. At the level of the 44 lingual surface plaque samples were collected and evaluated with quantitative and qualitative methods in the first visit (T1), the day of implant placement (T2), crown positioning (T3), banding (T4), debanding (T5) and after one year from T5 (T6). Furthermore, were monitored plaque (IP Silness and Löe) and the FMBS indexes.

Results. The data collected showed a progressive reduction of the values of IP, of FMBS and the total number of cocci and bacilli both Gram+ and Gram-. The only exception was found in T5, the slight increase in the overall microbial load due to the presence of fixed orthodontic devices that make it more difficult to mechanical control of plaque. Finally, in T6, there was a reduction in the numbers of cocci and bacilli, IP and FMPS indexes (<10%).

Conclusion. The preventodontic iter during the orthodontic-implant therapy is an important tool for therapeutic success.

Protocol for the use of occlusal mouth guards during pre-surgical phase of treatment

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Aim. The purpose of this paper is to describe the new protocol of pre-surgical planning in use at the Dental Clinic of the University of Milan.

Methods. The diagnostic protocol consists of a survey complete medical history (extra and intra-oral photos, study models in centric relation with wax, x-rays) so that they can build on the articulator thermo-printed guards in anticipation of pre-surgical orthodontic setup. In this way it is possible to evaluate the various checkups the results achieved in a simple, accurate and fast. At each visit the templates will be worn on the teeth of the patient, with the progress of the treatment, will go better, reaching the final position of the teeth should ideally have before surgery.

Results. The treatment time is reduced, as well as the expected time for each appointment. They also allow to increase patient compliance subtracting it from the burden of repeatedly detecting dental impression.

Conclusion. Thanks to the simulation of surgery on the models, the movements of the jaws are already programmed in the initial phase of treatment in order to immediately finalize the biomechanical movements. The pre-surgical guards, therefore, can be considered as a valuable aid in the pre-surgical orthodontic treatment.

An observational study to evaluate pain and efficacy of pharmacologic analgesic therapies in rapid maxillary expansion in children

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Aim. Rapid maxillary expansion, the gold standard to correct maxillary hypoplasia, causes an inflammatory response associated to tissue damage that is a consequence of palatine disjunction and resulting in acute pain. A few studies investigated pain and discomfort of patients and efficacy of analgesic therapy in the treatment of pain, furthermore with opposing results.Moreover, recent studies demonstrated that, in this setting, anti-inflammatory drugs have higher efficacy in reducing pain compared to analgesic therapy, such as acetaminophen. The aim of the present study is to investigate prevalence, duration and intensity of pain during active rapid maxillary expansion in children and assess the efficacy of anti-inflammatory therapies commonly used in clinical practice to reduce pain.

Methods. This is a prospective monocentric observational study (RPE-2013) approved by the Ethic Committee of Policlinico hospital, Milan in March 2014 which includes patients between 6 and 14 years old, with maxillary hypoplasia. Following insertion of expander, patients receive analgesics as needed or as a fixed-dose therapy as prescribed in clinical practice. Information about intensity of pain (Facial Expression Scale), pain relief, number of activation/day, drug taken and dosage will be collected.

Respiratory function in surgical-orthodontic patients

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Aim. Instrumental evaluation with rhinomanometer of respiratory function improvements obtained after orthognatic surgical correction.

Methods. The study involved 16 patients of both sexes, aged between 18 and 30 years old, in need of a

mono-or bimaxillary surgical orthodontic treatment. The nasal resistances of the patients were evaluated with rhinomanometer computerized examination before and after orthognathic surgical correction.

Results. Before surgery, 16 of 13 subjects analyzed with RAP 150 Pascal, 11 of 12 with RAP at 75 Pascal and all 12 with RAP 150 Pascal, had an increased nasal resistance according to rhinomanometer examination. Following orthognathic surgical correction, all patients showed a significant decrease in nasal resistance.

Conclusion. The results allow to show and quantify the benefits for respiratory function reached after orthognathic surgery.

Spontaneous eruption of impacted second molars

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Aim. To propose a treatment protocol for the management of impacted second molars.

Methods. Patients were randomly divided into two equal groups (20 patients in each). The patients in the first group underwent a surgical removal of the mucosa covering retained teeth; the second group was the control group and patients were not treated but only observed. The total number of retained teeth considered were 66 (34 in the first group and 32 in the control group). A Chi Squared test has been performed to compare the prevalence of eruption in the two groups. We compared the frequency of eruption for the treatment compared to the control group by calculating the risk ratio (RR) and 95% confidence interval (95% CI).

Results. Eruption occurred in 32 teeth after surgical removal of the mucosa while in the control group only 3 teeth erupted in the considered period. The difference between the two groups showed statistically significant. Among the non erupted teeth, 20 were positioned with a mesial inclination and 12 were positioned vertically.

Conclusion. The results show that the removal of the mucosa covering teeth allows in several cases second molars to erupt. It's a conservative method which doesn't exclude the possibility of a successive different therapy. Therefore it must be considered among the treatment options during treatment planning.

Three-dimensional CT-based cephalometric analysis of low-dose *vs.* high-field magnetic resonance

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Aim. The purpose of this study was to determine the validity of MRI as a support for three-dimensional analysis of the bone structures.

Methods. A sample of nine females, aged between 18 and 53 years and suffering from temporo-mandibular joint (TMJ) disorders was selected. Each patient underwent CBCT and volumetric high field MRI.

Results. In order to validate the cephalometric method on MRI the mean and standard deviation and variance of the values obtained by the operator F and M by the operator to the times T1 and T2 were calculated. In intra operator M evaluation 23 measurements with strong correlation, 12 with moderate correlation and only one with weak correlation were found. In intra operator F evaluation 20 measurements with strong correlation, and 15 with moderate correlation with only one with weak correlation were found. In inter operatores evaluation 14 measurements with strong correlation, 15 with moderate correlation and 7 with weak correlation were detected. For each patient, the difference for each measurement of the obtained values from CT and from MRI was calculated, then the mean and standard deviation of the differences were calculated, always making distinction between linear and angular measurements.

Conclusion. The obtained results showed that MRI can be considered a valuable tool for the analysis of cephalometric orthodontic patients.

Verification inter and intra operatores in the two-dimensional and three-dimensional cephalometric practice

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Aim. In this study we compared the precision with which some cephalometric distances depending on the method used are measured by different operators, or at different times by the same operator, either two- or three-dimensional.

Methods. We have used 20 Cone Beam CT and 20 correspondents latero-lateral teleradiographies of the head.

The two-dimensional measurements were performed with the Cephalometric Protractor Unitek which has a resolution of 1 mm and 1 degree.

The 6 linear measurements choices are:
- S-N: length of the skull base;
- SNP-A: sagittal dimension of the maxilla;
- GO-ME: sagittal dimension of the jaw;
- N-SNA: upper anterior vertical dimension;
- SNA-ME: lower anterior vertical dimension;
- N-ME: total anterior vertical dimension;

During the initial period (T1) the 5 operators (A, B, C, D, E) have performed a cephalometric tracing according with Milan University for each of 20 radiographies and measured 6 linear values. At the same time, they also track the correspondents 20 Cone Beam CT according to the three-dimensional cephalometric school of Milan and after 2 months the same cephalometric analysis were repeated (T2) in two-and three-dimensional technique resuming for each of the 6 chosen measures.

For each measurement Student's statistical t test for $p < 0.05$ was carried out.

Results. From the examination of the series of the measurements collected by 5 operators we noted that none of them provides values consistently above or below the average but indiscriminately they overestimated or underestimated a measurement.

About the control of the points and linear measurements on the cephalometric tracing repeated after 2 months, it was found that each operator tends to give the same values with negligible differences both in the traditional cephalometric tracing that in the three-dimensional technique, both the first and the second time.

The comparison of the data obtained from the cephalometric tracing with 2D and 3D technique showed that certain measurements were statistically significant differences. The measurement of the value of GO-ME is always statistically significant, this difference is justified by the fact that the 2D measurement evaluates a projection of points that in reality are on different planes, while the 3D technique allows to measure accurately even segments that are in an oblique plane. This result is obtained because the 3D cephalometric tracing is based on real and not prospective measurements. The actual measurement in the three-dimensional technique is an oblique line median sagittal axis, while in the two-dimensional technique that measure is represented by its projection, so that the 3D measurement is less than the 2D.

The other values in which there was a statistically significant change between the two methods are all those values in which you must identify the anterior nasal spine (SNA) or the posterior nasal spine (PNS); in fact, these points are difficult to identify in 2D technique because of the many anatomical superpositions, which by definition are not executed in 3D technique.

Conclusion. It can be observed that the 3D technique allows to achieve better results, and with considerable advantages compared to the conventional technique in terms of the actual representation of reality, fewer opportunities for error due to human intervention, the absence of superposition of anatomical structures.

Long term craniofacial and dental changes in adults with obstructive sleep apnea treated with an oral device

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Aim. Obstructive sleep apnea (OSA) is a common disorder characterized by repetitive, complete or partial closure of the upper airway during sleep, resulting in sleep fragmentation and oxygen desaturation. The disorder causes significant morbidity, particularly in terms of impairment of daytime functioning and the impact this has on quality of life. There is also evidence that links obstructive sleep apnea to long-term cardiovascular morbidity, including hypertension, myocardial infarction, and stroke, and increased risk of motor vehicle accidents. There is clear evidence that effective treatment of obstructive sleep apnea provides major benefit to patients. The objective of this study was to evaluate the craniofacial and dental changes in adults with obstructive sleep apnea (OSA) treated with a soft Monobloc Mandibular Advancement Device (sMMAD) for 36 months.

Methods. The study population comprised 20 subjects with obstructive sleep apnea (4 female and 16 male; mean age 52.2± 6.8 years). Polysomnography was used to established the diagnosis of the Obstructive Sleep Apnea. Inclusionary criteria for this study were: Patients affected by a mild-to-moderate OSA (AHI<30) and patients affected by a severe OSA (AHI≥30) intolerant to CPAP; Presence in each arch of at least 10 teeth, for ensuring a proper retention for the Oral Device; No removable dentures; No parodontal and temporomandibular diseases; A body mass index (BMI)<40; No reversible morphological upper airway abnormalities (e.g., enlarged tonsils) as assessed by the ear, nose, and throat (ENT) specialists; No medication that could influence respiration or sleep. Cephalometric radiographs taken in natural head posture were obtained for all subjects at the initial (T0) and after 36 months. Craniofacial and dental morphology were measured on lateral cephalometric radiographs taken before the beginning of the sMMAD therapy (T0) and after 36 months (T1) to beginning of the soft Monobloc Mandibular Advancement Device treatment.

Results. The Statistical Analysis showed not significance changes after sMMAD therapy between T0 and T1 on sagittal SNA (ρ =0,116), SNB (ρ=0,885) and ANB (ρ=0,187) and vertical FMA (p=0,408) and Me-Go^SN (ρ=0,279) values analysed. No significance changes on Overjet (ρ=0,173) and Overbite (ρ=0,381) and on airways values Phw1 (ρ=0,745), MPW (ρ=0,751), Phw2-tb (ρ=0,228).

Conclusion. Treatment with the sMMAD is a therapeutic solution with stable effects on craniofacial and dental morphology of patients suffering from mild or moderate Obstructive Sleep Apnea (OSA).

Influence of the mandibular position on postural balance in civilian and Air Force pilots using Equitest

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Aim. The purpose of this study is to evaluate if the mandibular position is able to modify the balance control and postural stability under dynamic test conditions in a sample of civilian and Air Force pilots.

Methods. 17 male civilian pilots (mean age 34,23±13,64) and 20 male Air Force pilots (mean age 35,15±12,72) in good general health and well physically trained were enrolled in the study. 11 civilian pilots and 12 Air Force pilots were affected by bruxism.

All the subjects were analyzed using the Equitest system that provides assessment capabilities on either a stable or unstable support surface and in a stable or dynamic visual environment. The method was developed by Näscher and coll. in the "University of Portland (USA), to evaluate the contribution of each of the sensory channels (visual, vestibular and proprioceptive) to achieve a correct posture.

This system utilizes a dynamic 18" x 18" dual forceplate with rotation and translation capabilities to measure the vertical forces exerted by the patient's feet; and a moveable visual surround. Normally at each oscillation of the subject corresponds a similar and agreed movement of the platform.

The movements are:
– Sway-referenced: the platform swings along with the oscillations that the pilot makes into the limits of its "cone of stability"
– Active rotation on the antero-posterior plane of the platform, along an axis which coincides with that of the ankles of the pilot.
– Anterior and posterior active translation of the platform, which imprints movements in a range of -6.5 cm / +6.5 cm, and the maximum linear velocity of 15 cm/s.

The subjects underwent this test in two different mandibular position: Centric occlusion and rest position.

Results. Postural responses of the pilots are collected in the form of pressure variation (force/area), on the vertical plane, and in the form of tangential force on the horizontal plane. The mean values were higher in both groups in centric occlusion compared to the rest position. A 2 ways ANOVA was applied showing that differences for variables of mandibular position and pilot category are not statistically significant ($p = 0.294$ and $p = 0.638$).

Conclusion. In this study the mandibular position doesn't affect the balance control and postural stability of civilian and Air Force pilots. In part these results contrast with the data obtained in previous studies with the use of static posturography. It is possible to read this result by assuming that the postural system of the pilots is able to implement compensatory mechanisms on occlusal imbalances. So it would be appropriate to further the analysis by evaluating the individual parameters of the postural system, considering that the stresses that subjects tolerate during Equitest are not comparable to those related to military flight.

Orthodontic and sistemic features in Moebius Sindrome: an epidemiologic study

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Aim. The aim of this study is to investigate occlusal/orthodontic data in order to estimate a common characteristic in these patients.

Methods. This is an observational and epidemiologic study made in a sample of 88 patients sent, from all Italy, to Parma's Hospital and University Company, by the Italian Association of Moebius Sindrome (MS). To make diagnosis, the criteria recommended in the First Scientific Conference on Moebius Syndrome were followed.

Results. Out of 88 patients visited at the Orthodontics Department of Parma's Hospital and University Company 50 of these, equal to 57% of all patients, were classified as Moebius, 34 (38%) as Moebius-like and 4 (5%) did not meet the minimum criteria for the syndrome. Out of the 50 patients classified as Moebius 40 (80%) had a complete or partial bilateral paralysis and 10 (20%) patients had unilateral paralysis. The concomitant paralysis of the sixth cranial nerve (abducens), convergent strabism as clinical expression, was seen in 41 (82%) subjects.

Of the patients that was possible to make an orthodontic evaluation, 11 (22%) had a I Class dental occlusion, 13 (26%) II Class I Division, 7 (14%) II Class II Division and 3 (6%) patients had III Class dental occlusion. Lip incompetence was noted in 21 (42%) patients. From the 84 Moebius and Moebius -like patients, currently five patients are having an orthodontic treatment in Parma.

Conclusion. At present, the sample number is not sufficient to define an occlusal/orthodontic aspect to be a characteristic of these patients, if there is any. Because of the wide variety of clinical data any therapy protocol can't be realized.

Treatment effects of fixed functional appliances alone or in combination with multibracket appliances in pubertal and post-pubertal class II patients. A systematic review and meta-analysis

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Background. Treatment effects of fixed functional appliances in Class II malocclusion patients according to the pubertal or post-pubertal growth phase has yet to be clarified. Indeed, timing has been reported as one of the key factors for successful treatment outcome with the pubertal growth phase as the optimal period for the achievement of skeletal effects.

Aim. To assess skeletal and dentoalveolar effects of fixed functional appliances, alone or in combination with multibracket appliances (comprehensive treatment), on Class II malocclusion in pubertal and post-pubertal patients compared to matched untreated controls.

Methods. Data source: Literature survey using the Medline, SCOPUS, LILACS and SciELO databases, the Cochrane Library, and through a manual search. The survey covered the period from inceptions to the last access in July 2, 2014 without language restrictions. The eligibility assessment and data collection processes were performed independently by two blinded authors. Study selection: The studies retrieved had to be either RCTs or both prospective or retrospective controlled clinical trials (CCTs) and they had to have a matched untreated control group. No restrictions were set regarding the type of fixed appliance, treatment length or to the cephalometric analysis used. Studies were also excluded if a reliable indicator of growth phase (hand-and-wrist maturation [HWM] method or cervical vertebral maturation [CVM] method) was not used. Data extraction: Mostly pre-defined at the protocol stage by two Authors. Supplementary mandibular elongation was used for the meta-analysis.

Results. Twelve articles qualified for the final analysis of which 8 on pubertal patients and 4 on post-pubertal patients. Overall supplementary total mandibular elongations as mean (95% confidence interval) were 1.95 mm (1.47-2.44) and 2.22 mm (1.63-2.82) among pubertal patients and -1.73 mm (-2.60-[-0.86]) and 0.44 mm (-0.78-1.66) among post-pubertal patients, for the functional and comprehensive treatments, respectively. For pubertal subjects, maxillary growth restrain was also reported. Nevertheless, skeletal effects alone would not account for the whole Class II correction even in pubertal subjects with dentoalveolar effects always present.

Conclusion. Fixed functional treatment is effective in treating Class II malocclusion with skeletal effects when performed during the pubertal growth phase, taking into account that little data is available on post-pubertal patients. Both mandibular elongation and maxillary growth restrain are seen with dentoalveolar effects always present, even in patients treated during puberty.

Visual assessment of the cervical vertebral maturation stages: a study of diagnostic accuracy and repeatability

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Aim. The cervical vertebral maturation (CVM) method has been reported to have poor intra- and inter-rater repeatability, while investigations on diagnostic accuracy, i.e. using a reference standard, are still lacking. This study evaluated the diagnostic accuracy and repeatability of the visual assessment of the CVM stages.

Methods. Ten operators underwent sessions of training in visual assessment of CVM staging. Subsequently they were asked to stage 72 cases equally divided into the 6 stages. Such assessment was repeated twice in two sessions (T1 and T2) 4 weeks apart. Reference standard for each case was created according to a cephalometric analysis of both the concavities and shapes of the cervical vertebrae.

Results. The overall agreement with the reference standard was about 68% for both the sessions, and of 76.9% for the intra-rater repeatability. The overall kappa coefficients with the reference standard were up to 0.86 for both sessions, and to 0.88 for the intra-rater repeatability. Overall, 1-stage and 2-stage apart disagreements were up 23.5% (T1) and 5.1% (T2), respectively. Sensitivity ranged between 53.3% for CS5 (T1) to 99.9% for CS1 (T2), positive predictive values ranged from 52.4% for CS5 (T2) to 94.3% for CS6 (T1), and accuracy ranged from 83.6% for CS4 (T2) to 94.9% for CS1 (T1).

Conclusion. Visual assessment of the CVM stages is accurate and repeatable to a satisfactory level. About 1 case out of 3 remains misclassified, disagreement is generally limited to 1 stage apart and mostly seen in stages 4 and 5.

Association between mesially displaced maxillary first premolars and early displaced maxillary canines

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Aim. The purpose of this study was to evaluate the association between the mesially displaced maxillary first premolar (MDP) and the early displacement of the adjacent permanent canine (EDC) before their eruption.

Methods. The initial sample consisted of 1247 subjects from the Department of Orthodontics of the University of Rome "Tor Vergata". The subjects, in the intermediate mixed dentition stage (permanent incisors and first molars fully erupted and before the exfoliation of the posterior deciduous teeth) and at a prepubertal stage of skeletal maturity (CS1 or CS2), were observed before any orthodontic treatment. The application of exclusion criteria (presence of complex craniofacial malformations, cleft lip or palate, incomplete or inadequate records) reduced the initial sample to the final sample of 1180 subjects (622 females and 558 males; mean age 8 years 6 months ± 1 year 4 months). For each subject were recorded: the mesially displaced maxillary first premolar (MDP), defined as the mesial inclination or mesial position of the bud of the maxillary first premolar toward the erupting permanent canine, and the early displaced canine (EDC), defined as an anomalous position of the tooth germ of the maxillary permanent canine. These consitions were evaluated on the basis of the panoramic radiograph and the PA film. All subjects were assessed for the presence of MDP and EDC and they were divided in two groups: MDP group and noMDP group, according to the presence and absence of MDP, respectively. The following angular measurements were made on panoramic x-rays: the η angle between the long axis of the maxillary first premolar and the occlusal plane and the λ angle between the long axis of the premolar and the midline. The association MDP-EDC was recorded when the EDC was omolateral to the MDP. The chi-square test with the Yates correction was performed to compare the prevalence rate of EDC in MDP (MDP-EDC) and noMDP groups. The statistical comparisons for the values of η and λ angles between MDP vs noMDP, MDP vs MDP-EDC, and noMDP vs MDP-EDC groups were performed by means of ANOVA with Bonferroni correction.

Results. The prevalence rate of EDC in the MDP group was significantly greater than in the noMDP group (66.0% vs 12.1%). The η angle was significantly smaller in both MDP and MDP-EDC groups when compared to the noMDP group. The λ angle was significantly larger in both MDP and MDP-EDC groups with respect to the noMDP group. MDP-EDC group showed a significantly larger λ angle than the MDP group resulting in an increased mesial inclination of displaced premolars while no significant differences were found between MDP and MDP-EDC groups for the η angle.

Conclusion. Mesial intraosseous displacement of the maxillary first premolar is a developmental tooth malposition that is significantly associated with the displacement of the permanent canine in the intermediate mixed dentition. Early detection of a mesially displaced premolar associated to a malposed maxillary canine provides to the clinician the possibility to perform the treatment of choice to prevent canine impaction and root resorption of the adjacent teeth.

Evaluation of maxillary arch morphology in children with unilateral impacted incisors by using three-dimensional analysis of digital dental casts – a controlled study

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Aim. The aim of the present study was to analyze the variations of the maxillary arch size in subjects with unilateral impaction of the maxillary permanent central incisors when compared with a control group of sub-

jects without eruption disturbances by using a three-dimensional analysis on digital dental casts.

Methods. A group of 23 Caucasian children (8 females and 15 males, mean age 9.7 years SD 1.6 years) with unilateral impaction of permanent central maxillary incisors (IIG) was compared with a control group (CG) of 23 subjects (9 females; 14 males, mean age 8.8 years SD 1.9 years) without eruption disturbances. For each subject of the two groups pretreatment dental casts were taken. In order to analyze the maxillary arch form and perimeter, the dental casts of the upper arch were scanned by a tridimensional scanner. Each cast was scanned from 10 or more views that were then combined and rendered into three-dimension by using a specific software. On each digital model linear measurements were performed on the horizontal plane either on the side showing impaction of the central incisor (impacted side -is) or on the side with the erupted central incisor (nonimpacted side -nis). Significant between-group differences were tested with the Student's t-test ($p < 0.05$).

Results. No systematic error was found between the repeated measurements. No significant between-group differences were found in gender distribution (chi-square test = 0.00; p = 1.000) or in the distribution in molar relationships (chi-square test = 0.09; p = 0.768). Data from the current study indicate that subjects with impacted maxillary incisors demonstrate transverse maxillary deficiency when compared with the control group. In particular, both intercanine and intermolar widths were significantly smaller both on the impacted side and on the non-impacted side with respect to the control group. The greatest reduction of arch width was recorded on the impacted side at the level of the deciduous canines (-2.51 mm). Significant differences were found between IIG and CG also in terms of sagittal arch length, suggesting that impaction of incisors affects the sagittal dimension of the maxillary arch. In particular, anterior arch length was decreased by 1.35 mm.

Conclusion. Children with unilateral impaction of maxillary central incisors showed a significant constriction of the maxillary transverse width and a reduction of the arch length on the impacted side when compared with subjects without eruption disturbances. The absence of a maxillary permanent central incisor results. in a reduction of transverse width of the maxillary arch and in a loss of anterior arch length.

Skeletal effects of Sabbagh Universal Spring 2: case report

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Aim. Severe skeletal malocclusions are difficult to treat in children at a late stage of growth and often require orthodontic-surgical combined treatments. Mandibular-propulsion "no compliance" devices now offer new possibilities for functional orthopedic treatments in borderline cases. The SUS2 is a telescopic device similar to Herbst but with a different type of activation. It consists of a telescoping rod located in a guide tube. Inside the tube has a spring that can be activated according to the level of forces desired. The device application is performed by engaging the Omega loop in the accessory tube of the 1st upper molar and inferiorly it is inserted on the arch between the first premolar and canine through a SUS arch adapter with conical tip of screw. This Case Report describes a patient treated at late stage of growth for severe Class II Division 1 malocclusion, open bite and dental transverse discrepancy. The aim of this work is to valuate a sagittal correction obtained with SUS2 (Sabbagh Universal Spring 2; Dentaurum, Ispringen, Germany).

Methods. A maxillary transversal expansion was performed using a RME bonded on the 4° and 6° to achieve a skeletal correction, since the ossification of the sagittal median suture was not complete at that stage. The dental arches were straightened and levelled with orthodontic MBT fixed appliances according to the Class II biomechanic preparation. The sagittal Class II correction was performed with a Sabbagh Universal Spring 2 (SUS2): a fixed free-compliance functional appliance. The SUS2 has been maintained for 7 months to achieve a sagittal hypercorrection: "1st class hyper-correct" molar and canine. During treatment, anterior up and down inter-maxillary rubber bands were used to correct the openbite.

Results. The analysis between pre- and post-treatment cephalogram tracings showed a significant improvement on the sagittal relationship between jaws, due to a mandibular advancement, and with no changes on the vertical proportions. The full correction of Overjet and Overbite, canine and molar relationships and transversal relationships were achieved with treatment.

The pre- and post-treatment profile analysis showed significant results a considerable aesthetic improvement with a reduction of profile convexity, nose-lip angle increase, and an improvement of chin and lower lip anterior projection.

Conclusion. A good result was achieved with a late orthopaedic-orthodontic therapy using the residual growth and permitted a rapid resolution of the malocclusion without orthognatic surgery treatment. The use of SUS2 resulted in an effective maxillary growth stop and in a forward sagittal mandibular growth promotion. The SUS2 effects, enhanced by elastics biomechanics, led to open bite closure and the achievement of the correct occlusion.

Orthodontic force levels during distalization with clear aligners: an *in vitro* pilot study

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Aim. In recent years, clear aligner treatment has been cited as a safe, aesthetic and comfortable orthodontic procedure for adult patients that expressed a desire for aesthetic and comfortable alternatives to conventional fixed appliances. However, only few investigations have been focused on the biomechanical configuration of forces adopted by clear aligners to obtain a predictable and efficient orthodontic tooth movement. The aim of this pilot study was to assess the entity and distribution of orthodontic forces applied on active and anchorage units during upper first molar distalization performend

with clear aligners. The active unit represented by the upper first molar and the anchorage unit by the upper first incisors.

Methods. Strain - gauge microsensors (0.1 mm thickness) were applied onto the vestibular surface of left upper central incisor (anchorage) and onto the occlusal surface of upper first molar (active unit) of 13 clear aligners. For each aligner a correspondent gypsum cast was obtained. The difference of potential (uV) revealed between the aligner positioned on its cast (passive wear, PW) and the aligner positioned on the previous stage cast (active wear, AW) was measured with a multimeter. This passage was performed in order to simulate the effect of orthodontic forces released by clear aligners when applied by the patient. Three registrations were performed for every session and repeated twice for every cast. Two expert clinicians (A.B. and G.R.) performed the registrations blindly and then matched by a third observer (T.C.).

Results. The active unit showed a mean difference of 50 uV between rest and PW, while the mean difference increased to 289 uV between rest and AW. The anchorage unit showed a mean difference of 11 uV between rest and PW and a mean difference of 50 uV between rest and AW. Upper central incisors showed no statistical differences of potential (uV) between passive wear and active wear. A significant difference ($p<0.05$) was registered between mean values of central incisor and mean values of first molar during AW.

Conclusion. This trial showed that, when properly prescribed, it is possible to achieve the correct force configuration to obtain a bodily movement. Moreover, upper central incisors during first molars distalization tend to maintain their position, proving to be useful and stable pillars for this aim. Further studies must be requested to improve the significance of this in-vitro pilot study.

Class III malocclusion. Genetics or environment? A case report of monozygotic twins

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Aim. The twin method is one of the most effective methods available for investigating genetically determined variables in orthodontics, as well as in other medical fields, depending on the variance in the shape and the size of skull and teeth, both on genetic and environmental influences.

The premise is that since identical twins have identical genotypes, differences between them are solely due to environmental factors.

The purpose of this study was to analyze the dental and skeletal pattern, the type of malocclusion in a pair of monozigotic twins.

Methods. A pair of monozygotic male twins is presented. Dental casts, panoramic X-ray, lateral and postero-anterior cefalograms, cephalometric analysis and facial photographs were studied. The boys exhibited a marked similarity in facial appearance. Their occlusions, however, were remarkably different. One boy (S.N.) had a Class III malocclusion, with an anterior bilateral crossbite, short lingual frenulum, nasal septal deviation, adenotonsillar hypertrophy and atypical swallowing. Because of the abnormal muscle function the maxilla is contracted having a "V" shape and a palate which appears higher than normal. His brother (S.A.) had a Class I malocclusion, with an overjet of 2 mm, an overbite of 1 mm and atypical swallowing. According to the mother, there was a history of non-nutritive sucking abits in both twins. The radiographic cephalometric analysis revealed no differences in skeletal morphology, although they did differ in the inclination of the upper and lower incisors, with the lower teeth retroinclined in twin with class III and proinclined in twin with class I.

Results. The question of whether nasopharyngeal airway obstruction and mouth breathing caused by enlarged adenoids are related to facial changes has been disputed. In fact it is extremely difficult to separate the normal genetically determinated growth from the one due to abit of mouth breathing. By utilizing a sample of monozygotic twins, who theoretically have the same genetic growth determinants, those changes in mandibular morphology related to nasopharyngeal airway obstruction were determinated. Another explanation may be a difference in the funtional pattern of the lip muscolature. However, if incisor position is genetically determined, the question is: what caused the difference in upper incisor position in the identical twins? Is it the functional pattern of the lip muscolature? The function could overcome the genetically predeterminated pattern.

Conclusion. The etiology of class III remains unclear. Neither form nor function seems to be the sole controlling factor. There are many open questions, and further research is necessary to elucidate the true etiology of class III malocclusion.

Anatomical changes of incisive foramen following rapid maxillary expansion

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Aim. Several studies have been conducted in order to evaluate skeletal and dental changes following rapid maxillary expansion (RME) in growing patients, but no anatomical evaluation of incisive foramen before and after treatment were performed. The importance of the incisive foramen and its changes in size and shape are related to its role as reference landmark for placement of orthodontic miniscrews according to recent guidelines. The aim of the present pilot study was therefore the evaluation of incisive foramen anatomical changes after RME in growing patients usign low-dose computed tomography (CT).

Methods. Seven causasian patients (three males and four females) with a mean age of 9.7 years (SD 1.41) were retrospectively selected as sample for the present study. Patients underwent RME as a first phase of orthodontic treatment. The maxillary expander was banded to the upper first molars and was activated according a rapid maxillary expansion protocol. Low-dose CT examinations of maxilla and of the low portion of nasal cavity were performed before inserting the maxil-

lary expander (T0) and at the end of retention (T1), 7 months later. CT scans were reoriented so that foramen spinosum right and left lying in the same coronal and axial scans; and anterior nasal spine and posterior nasal spine in the same axial and sagittal scan. Then antero-posterior length (mm) and mesio-distal length (mm) of the incisive foramen were measured on the axial slice before at the two timepoints. The registrations were performed twice by the same trained operator with one month interval time. Dahlberg coefficient was used to verify the method error. The Shapiro Wilk test was employed to verify the normal distribution of the data then the paired t-test was used to compare results between the two timepoints and $P<0.05$ was set.

Results. Means and standard deviations were calculated for each of the tested variables. Incisive foramen antero-posterior length significantly increased of 0.54 mm (SD 0.48 mm) ($P<0.05$) and mesio-distal length significantly increased of 0.65 mm (SD 0.32 mm) ($P<0.01$).

Conclusion. According to the results of the present pilot study both antero-posterior and mesiodistal length at the incisive foramen underwent statistically significant increase after RME for the tested sample. The resultsof the present study evaluate changes after 7 months interval time. Further studies are needed to confirm the present findings and to aveluate long term follow-up.

Long-term stability of unilateral posterior cross-bite correction with function generating bite

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Aim. The aim of this study is the evaluation of the long term stability of unilateral posterior cross bite correction with the Function Generating Bite (FGB).

Methods. For this study 20 patients (10 girls, 10 boys – mean ages 8,3 years ±2) with unilateral posterior cross-bite corrected with a functional appliance (Function Generating Bite) were selected. Transversal linear measurements were evaluated on the study casts and recorded at baseline (T0), post treatment (T1) and at 3 years follow-up (T2). The measurements included maxillary intercanine and intermolar distances at the cusp tips of the teeth (mesio-buccal cusp for the first molar) and at the shortest linear distance at the gingival margins. The measurements were made by using a digital sliding caliper.

Results. The results showed that: the mean intercanine distance before therapy was 28,939 mm (±2) at the cusp tips and 20,652 mm (±2)at the gingival margins, the intermolar was 47,209 mm (±2) and 31,568 mm (±5); after therapy the mean intercanine distance was 31,333 mm (±2) at the cusp tips and 23,203 mm (±2) at the gingival margins, the intermolar 51,716 mm (±3) and 34,838 mm (±4); At 3 years post treatment the mean intercanine distance was 32,833 mm (±2) at the cusp tips and 24,047 mm (±2) at the gingival margins, the intermolar were 52,713 mm (±3) and 35,716 mm (±4). The mean values of the increase of transversal dimension during the treatment period (T0-T1) were 2,394 mm (±1) in the intercanine measurements at the cusp tips and 2,551 mm (±1) at the gingival margins, 4,507 mm (±1) in the intermolar measurement at the cusp tips and 3,27 mm (±1) at the gingival margin. The analysis of study cast showed an increase of transversal dimension also in the post treatment period (T1-T2); mean values of the changes during post treatment period were 1,5 mm (±1) in the intercanine measurements at the cusp tips and 0,844 mm (±1) at the gingival margins, 0,997 mm (±1) in the intermolar measurement at the cusp tips and 0,878 mm (±1) at the gingival margin. The mean overall changes during the study period (T0-T2) were 3,894 mm (±1) in the intercanine measurements at the cusp tips and 3,395 mm (±1) at the gingival margins, 5,504 mm (±1) in the intermolar measurement at the cusp tips and 4,48 mm (±1) at the gingival margin.

Conclusion. The increase of transversal dimension during the treatment period with Function Generating Bite are in agreement with the literature after fixed appliances. On the contrary at 3 years follow-up, instead of a relapse reported in literature with fixed appliance patients treated with Function Generating Bite showed a further increase of the maxillary transversal dimensions.

This study shows not only the efficacy of the Function Generating Bite regarding the correction of the unilateral posterior cross- bite, but especially an additional increase of maxillary transverse dimension at 3 years follow-up.

Post-permanent dentition: three cases report

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Aim. Post-permanent teeth are those that exceed the normal dental formula composed by 20 primary teeth and 32 permanent teeth. This anomaly could be X-linked, affecting more males than females, with a ratio of 2 to 1. The classification can be topographical, morphological and chronological. According to the topographic classification we distinguish: mesiodens, distomolars and paramolars. Morphologically these teeth are classified as: additional and rudimentary (cones, tuberculate, molariform). According to the time of eruption we have: predeciduous, teeth similar to permanent one and postpermanent (or complementary). Several theories about the eruption of post-permanent teeth have been proposed. The most credible seems to be the one proposed by Brook, who theorized the multifactorial nature of this anomaly.

Methods. In this study three patients have been included. Analizing their panoramic radiograph post-permanent teeth have little eruptive chance. The patients were all in good health and have come to our attention to undergo orthodontic treatment, with no evidence of symptom or complication by the post-permanent teeth.

Results. Post-permanent teeth require careful evaluation to decide whether it is better to extract or to monitor them. The decision is made on the basis of: tooth position within the alveolar bone, the alteration that these teeth produce during the mixed dentition, the risk of cystic degeneration resulting in rizalisi of adjacent teeth, and finally the risk-benefit ratio of their avulsion. Current guidelines suggest follow up in order to monitor the possible degeneration of impacted teeth. Otherwise a proper treatment plan must be proposed, deciding

which and how many teeth have to be extracted. In this case, CT or CBTC are fundamental to allow a full and three-dimensional prospective in order to extablish the correct positions of the teeth and their relationship with the surrounding anatomical structures.

In these study three different therapeutic strategy were chosen. In the first case, it was decided to follow up periodically because of the location and because of the surgical risk. In the other two cases, we proceeded with a multidisciplinary treatment plan in order to correct abnormal dental exfoliation.

Conclusion. These cases report show that in orthodontics must be requested rx at beginning and end of treatment, in order to correct diagnosis and therapy. It is also important to monitor every clinical case with radiographic examinations because of the characteristic that these teeth have to appear in the permanent dentition, even after years of the end of orthodontic treatment. Finally, the advice is to choose the most appropriate therapy with less risk for the patient.

Clinical application of IOTN in an orthodontic department: dental and aesthetic features

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Aim. The purpose of our study was to evaluate the orthodontic features of first-visit subjects in Orthodontic Department of "Sapienza" - University of Rome on the base of the DC-IOTN index (Dental Component of Index of Orthodontic Treatment Need), and to compare these data with those of AC-IOTN (Aesthetic Component). Also we performed an evaluation of clinic objectivity and of patient's self perception.

Methods. The survey was conducted in the Orthodontic Department of "Sapienza- University of Rome". 2664 "first accesses" were performed In a period of 30 months (from June 2012 to December 2014).

The visit was carried out using a probe, a small mirror, a light source of white light and a meter gauge, and by at least two operators belonging to the Postgraduation School of Orthodontics ("Sapienza – University of Rome"), adequately trained and calibrated in accordance with the procedures established by the WHO. According to DC-IOTN we detected several occlusal and functional parameters as: dentition, molar class, canine class, overjet, overbite, crossbite, crowding (in the upper and in the lower arch), deviation of the midlines, presence of decay, agenesis, supernumerary teeth, temporo-mandibolar dysfunctions, oral/ nasal breathing, dyslalias, oral habits. Considering the overall evaluations of clinical parameters was possible to assign each subject to a different degree (from 1 to 5) of DC relating to the severity of malocclusion.

In the AC-IOTN we showed to each patient ten photographs illustrating ten level of increasing dental disharmonies (SCAN scale: Standardized Continuum of Aesthetic Need); and we asked to recognize themselves in a photos, without the aid of a mirror or suggestion by a third person. This procedure was used to evaluate the aesthetic component of self-perception of the IOTN.

Results. According to the DC-IOTN, 23,72% of the whole sample was classified as being in need of orthodontic treatment, as grade 4 and 5 (most severe malocclusions and craniofacial deformities); 56% showed no need of treatment (grade 1 and 2 of IOTN). According to AC-IOTN 16% of subjects presented an high aesthetic need of treatment and 72% subjects presented no need for treatment.

Conclusion. This study demonstrated that patient's self perception of orthodontic disease does not strictly correlates with orthodontic treatment need calculated using DC-IOTN. This odds is probably due to the uncompleted representation of oral disharmony made by the ten frontal views included in AC-IOTN. This limitation maybe leads the patient to not consider or underrate some orthodontic problems as for example sagittal views, anterior/posterior crossbites and smile harmony (lateral corridors, gummy smile). Anywhere the introduction of IOTN in clinical practice is useful to identify patients that really need a prompt treatment in public health.

Uprighting of impacted lower second molars with TADs: a pilot study

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Aim. To compare two orthodontic techniques used to aid impacted second molars eruption in the dental arch to underline: bio-mechanics properties, techniques advantages and disadvantages, therapeutic effectiveness, patient's comfort.

Methods. 6 patients (2 males and 4 females) have been selected, with mean age of 15,6 years, which underwent treatment for impacted lower second molar at Orthognatic Department of Sapienza University of Rome. The total amount of the impacted second molars treated is 6. The diagnostic documentation includes: dental casts, intra-oral photos, radiological examinations. The techniques we have used are: surgical dislocation with brass lace and uprighting with miniscrews. The amount of the uprighting was evaluated calculating the impacted angle created by the intersection of the long axis of first and second impacted molar before the treatment (T0) and after 3 month treatment starts (T1). Pain was valued using the Visual Analogue Scale (VAS) with a range from 0 to 5 where 0 is no pain and 5 is maximum pain level.

Results. Intermolar angle in patients treated with miniscrews at T0 was: patient 1 (50°); patient 2 (44°); patient 3 (64°). Intermolar angle in patients treated with brass lace at T0 was: patient 4 (41°); patient 5 (50°); patient 6 (44°). Intermolar angle in patients treated with miniscrews at T1 was: patient 1 (32°); patient 2 (30°); patient 3 (46°). Intermolar angle in patients treated with brass lace at T1 was: patient 4 (30°); patient 5 (41°); patient 6 (38°). Average uprighting degrees was: 12° degrees for surgical dislocation with brass lace (3 cases); 16,2° degrees for miniscrews (3 cases). Pain average value was: 4 for brass lace; 2 for miniscrews.

Conclusion. Although the disimpaction with miniscrews shows an higher value of uprighting and a lower discomfort for patients, according to us, it's not possible, at the moment, to assess the superiority of one method over the other one. That because of the observed variability on the type of disimpaction, such as: inclusion's depth, mesio-or distoversion, complications, patient co-

operation. Procedural decision has to be exactly based on a clinical and radiographical evaluation. A higher sample of patients must be recluded to better validate our results. Second molar impaction is a very challenging disturbance that requires proper clinical, radiological, and biomechanical evaluation and a good appliance selection for successful treatment results.

Genetic factors and agenesis in non-syndromic population: landmarks and newer concepts. Systematic review and meta-analysis

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Aim. Tooth agenesis is one of the most common anomaly in the craniofacial district and it may be associated with many syndromes but it's present in non-syndromic population(NSP) too. It can be joined to other dental and skeletal anomalies. This phenomenon is influenced by chromosomal defects or mutated genes involved in organogenesis. Hundreds of genes seem to be connected with it but PAX9 (paired box 9) and MSX1 (muscle segment homebox 1) are the more frequently studied genes in NSP.

Methods. This systematic review of English-language literature from 1990 to 2014 based on PubMed, Scopus, Scholar, Lilacs databases makes the point on the knowledge of genetic pathways and mechanisms cause hypodontia in NSP paying attention to results about both lateral-posterior teeth (LPT) and anterior teeth (AT).

Results. From early 1459 articles we excluded 92 in not-English language, 100 without abstract, 175 experimental experiences on animals or *in vitro*, 840 not inherent our topic. From the 251 remaining results we differentiated in 2 groups: 1) syndromic (146) and 2) non-syndromic agenesis (105). In group 2, 13.3% treat about premolars, 1st-2nd molars, 21.9% about lateral incisors, 3.8% about 3rd molars, 9.5% incisors, 0.2% canines. The remaining 51.3% don't describe non-syndromic agenesis clearly referred to teeth elements. Defects in MSX1 are directly associated with 2nd premolar and 3rd molar agenesis, while PAX9 is connected with missing maxillary and mandibular 2nd molars and upper and lower incisors too. Other genes and multigenic associations are involved since not all NSP with missing LPT or AT show these mutations.

Conclusion. Early identification of missing teeth using DNA tests is an interesting perspective for the future. The knowledge regarding the etiology and the involved genetic factors increased but we are still far anyhow to define entirely the genetic features of agenetic LPT and AT. Starting from this standpoint of literature and from our previous results further studies and wide samples will help us to better understand the processes of dental development, those lead to dental agenesis and other dental skeletal anomalies included decisive genetic mutations.

Diagnostic accuracy of digital models for orthodontic purpose: a systematic review

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Aim. In past 10 years, model scanning and CBCT technological advances made it possible to develop a complete virtualization of the orthodontic patient, with more and more accurate 3-dimensional reconstructions of teeth, bone and soft tissues.

The aim of the present review was to assess how detailed are digital models for orthodontic diagnostic purpose and if they can substitute plaster casts in common orthodontics practice.

Methods. A systematic search in the medical literature produced between January 2000 and April 2014 was performed.

The research was performed in the following databases:

— Pubmed
— Pubmed Central
— National Library of Medicine's Medline
— Embase
— Cochrane Central Register of Controlled Clinical trials
— Web of Knowledge
— Scopus
— Google Scholar
— LILACS.

A hand search was thoroughly performed for additional papers in the medical library of Turin University, in the authors' personal libraries and in the references of the selected articles. Title and abstract screening was performed to select articles for full text retrieval.

The inclusion and exclusion criteria for admittance in the systematic review were based on the type of study, were dependent on the clinical research questions

The exclusion criteria were case reports, reviews, abstracts, author debates, summary articles, and studies on animals. It was used the Cochrane quality assessment tool.

The studies were selected for inclusion independently by two of the authors. All decisions on the definitive inclusion of a potentially relevant paper were taken by consensus.

From the selected articles, the investigators independently extracted data which answered the clinical research questions.

Results. Application of the inclusion and exclusion criteria and follow-up of the referred studies identified 30 relevant publications.

20 studies were controlled clinical trials, ten studies were randomized clinical trials. The risk of bias degree was low in 14 studies and it was unclear in 16 studies, due to the absence of clues about randomization of the sample. Three macro-groups (CBCT models, Plaster models, Models obtained by scanning) were identified to semplify and standardize as much as possible the analysis and comparison of results.

Conclusion. The most recurrent sources of error for measurements on digital models are the landmark positioning and the low accuracy of interproximal surfaces, but these features did not influence the clinical out-

come. Landmarks identification, rather than measuring device or software, appears to be the greatest limitation. Furthermore, stated their advantages in terms of cost, time and space required, they could be considered the new gold standard to achieve in current practice.

The effects of different bolus hardness on masticatory function and craniofacial development

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Aim. The aim of this study was to evaluate if chewing patterns of different food consistencies have an impact on masticatory function and on children's craniofacial development. It was hypothesized that different hardness of the bolus can influence the activation of masticatory muscles and motor performance and consequently the structure of the jaws.

Methods. Eighty-two subjects (age: mean ± SD, 8.6 ± 1.3 years) with normal occlusion and function were selected for the study. The mandibular motion and surface EMG signals from the masseter and anterior temporalis muscles were recorded with a K7 kinesiograph (Myotronics Inc., Tukwila, WA, USA) interfaced with a computer for data storage and subsequent analysis. The soft bolus was a chewing gum and the hard bolus was a winegum with the same size (20 mm large, 1.2 mm height, 0.5 mm width) and different weight (2 g the soft, 3 g the hard). Kinematics and EMG data were analyzed respectively with a threeway and a four-way repeated measures analysis of variance (ANOVA), with the level for statistical significance set to $p< 0.05$.

Results. When chewing a hard bolus, the chewing pattern in the frontal plane was significantly higher and wider, with smaller closure angle and larger peak velocity than with the soft bolus ($p < 0.01$).

EMG peak amplitude of both the masseter and anterior temporalis muscles was higher for the side of the bolus with both hard and soft bolus ($p < 0.01$), but the contralateral side increased its activity significantly more than the ipsilateral side when the hardness of the bolus increased (for the masseter, mean ± SD: 130.4 ± 108.1% increase for the contralateral side and 29.6 ± 26.9% for the ipsilateral side; $p < 0.05$). Moreover, the peak EMG activity for both muscles occurred more distant from the closure point with hard bolus than with the soft one ($p < 0.01$). Hard bolus require a more efficient chewing pattern and a higher EMG activity of masticatory muscles with respect to the soft one.

Conclusion. Increasing bolus hardness, chewing cycle increases in size and this is reflected in increased activity of the jaw-elevator muscles, providing the adaptation of the stomatognathic system to bolus hardness. Moreover, the increased activity of masseter of the controlateral side may help maintaining the mandibular equilibrium and may also be a mechanism of protection of the temporomandibular joint from load.

Several studies have reported that the physical consistency of food influences animals' craniofacial growth, resulting in a reduced size of the masseter and temporalis muscles, a narrower maxillary arch breadth and a smaller mandible in animals fed a soft diet. This findings may indirectly suggest implications of food consistency for human orofacial development. Many Authors focus social attention on modern foods that are softer and partly responsible for the functional atrophies of masticatory muscles and bone growth, suggesting that chewing harder textures enhances bone and muscle growth, which could indirectly lead to better mastication efficiency and potentially reduce the need of orthodontic treatment. This study shows that there is a difference in masticatory function and muscular activity depending on the consistency of the bolus, providing evidence that chewing harder food increases masticatory efficiency and may aid in children's craniofacial growth. Finally, normal kinematic and EMG adaptation to bolus hardness can be used for early diagnosis of impaired chewing function.

The influence of composite resin restoration on gingival tissue: a pilot study

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Aim. The study is aimed to compare human gingival tissue close to composite cement restorations with the physiologic situation to natural dental hard tissue at the dental neck of the same tooth.

Methods. Eight healthy patients with almost a tooth suprabony jeopardized at the neck/root zone requiring endodontic-conservative therapy, were treated by composite build-up (Esthet.X®) to ensure marginal tissue stability and to allow secure dental matrix apposition. Esthet.X® was used to treat the defect but the perimeter of the residual coronal tooth had to present at least a subgingival restored section and another section consisting of natural enamel to permit subsequent comparison of the gingival tissues close to the natural hard tissues of the tooth (control site) and to the composite restorations (test site). Three months after the Esthet. X® build-up, the crown lengthening surgical procedure was performed to restore the physiological dimension of the biological space. During the surgical procedure, the secondary flap was harvested, fastened to a semi-rigid support, and histologically examined using the following grade scale of inflammation: 1) Absence or occasional (0-3), 2) Weak (4-19), 3) Moderate (20-99), 4) High (100-499) and 5) Severe (500 and above). The statistical analysis was performed by the non-parametric Mann-Whitney test.

Results. The histological analysis showed an uneven distribution of inflammatory cells in the corion of gingiva portions, both close to the Esthet.X® restorations and the dental hard tissues, in all biopsies. The inflammation grade varied from severe to weak. The statistical analysis did not show any significant difference between the corion of gingival tissue close to the restoration and dental hard tissue surface.

Conclusion. No information exists about the behavior of human gingival tissue close to composite cements used to treat crown and dental neck defects. The reaction of the human gingival to composite build up performed in the dental neck area and the coronal part of the dental root was analyzed in this study and within the limitations of this pilot study, the results seem to indicate that use of this kind of composite does not so much alter greatly the gingival tissue.

Aptamers improve cell biocompatibility of implantable biomaterials

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Aim. Biomaterials, once inserted into a tissue, adsorb plasma proteins, which trigger and control the subsequent host reactions. To stimulate undifferentiated precursors to commit to the desired lineage, implantable biomaterials have been coated with different bioactive molecules, which can enhance tissue regeneration. A possible approach is to coat biomaterials with elements able to dock a specific peptide, such as aptamers. Aptamers are oligonucleotides able to bind and sequester specific proteins on the surface of the scaffold, enriching it for desired protein species, to control and direct tissue responses. The aim of the present study was to investigate whether immobilised anti-Fibronectin aptamers could selectively enrich hydrogel scaffolds for Fibronectin and promote the attachment and growth of osteoblastic cells. This preliminary study aimed to serve as a proof of concept for a novel class of biomimetic coatings, which could selectively sequester useful proteins on biomaterial surfaces.

Methods. We had anti-human Fibronectin DNA aptamers screened for and functionalized with a thiol group on their 3' end. Polyethyleneglycole diacrylate/thiolated Hyaluronic Acid hydrogels (PEGDA/tHA) were selected as 3D matrix. Aptamers were first immobilised on hydrogels and incubated with DMEM enriched with 10% human serum (HS). Fibronectin binding on hydrogels was investigated by spectrophotometry and immunofluorescence. To investigate aptamer effect on cell adhesion, we plated primary human osteoblasts (hOB) on the surface of PEGDA/tHA hydrogels in the presence or in the absence of aptamers and added DMEM enriched with 10% HS in 24 well plates. Cells were cultured on hydrogels for 10 days, rinsed with PBS and fixed for microscopy. Cells were also stained for fluorescent labelling of focal adhesions, microfilaments and nuclei. We quantitated cell number on hydrogels by MTT assay. We then encapsulated hOBs in PEGDA-tHA hydrogels in the presence or in the absence of aptamers in DMEM enriched with 10% HS. After 10 days, gels were fixed, paraffin enclosed and cut. Sections were then stained with hematoxylin-eosin and analyzed at transmission microscope. Hydrogels were then implanted in subcute pouches in rats and harvested 4 and 7 days after surgery for histology.

Results. Aptamers specifically bound to Fibronectin and enriched hydrogel scaffolds for this protein.

Aptamers increased the number of adherent hOB cells on hydrogels after 10 days of culture. When stained with fluorescent markers, more cells were observed on aptamer-enriched hydrogels and their cytoplasm appeared more spread and richer in adhesion complexes than on control hydrogels. MTT assay confirmed that significantly more viable cells were present on PEGDA-tHA hydrogels in the presence of aptamers binding to Fibronectin. In contrast, cells in aptamer-containing gels had wider cytoplasm with broad podosomes, suggesting a firmer attachment to the substrate. In vivo preliminary data confirmed that aptamers promoted scaffold colonisation by neighbouring cells by day 7.

Conclusion. Our data demonstrate that 3D hydrogel scaffolds coated with anti-Fibronectin aptamers can be enriched for this target protein, thus promoting cell adhesion and scaffold colonisation. This approach has a wide potential, in that biomaterials can be enriched for any target protein for which aptamers are selected, thus conveying the desired stimulus to cells.

Anti-inflammatory and antibacterial activity of vitamin D on human gingival fibroblasts and periodontal ligament cells

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Aim. It has been recently demonstrated that Vitamin D can exert, apart from its regulatory effects on calcium homeostasis, an additional modulatory role on the inflammatory and immune responses through its binding with specific vitamin D receptors (VDR) in many tissues not involved in skeletal health. The aim of our study was to investigate the effects of vitamin D3 (VD) on the response of human gingival fibroblasts (hGF) and periodontal ligament cells (hPDLC) exposed to Porphyromonas gingivalis (Pg) and Streptococcus pyogenes (Sp).

Methods. An exogenous active form of vitamin D3 (1α,25[OH]2D3) was obtained from Elifab s.r.l. (Naples, Italy). Primary hGF and hPDLC were cultured with serial dilutions of VD for 12 hours. Cells pretreated or not by 10^{-8}M VD were co-cultured with Pg and Sp for 24 hours. Cell viability was assessed by 3-[4.5-dimethyl-2.5 thiazolyl]-2.5 diphenyl tetrazolium bromide (MTT) test. Cell production of pro-inflammatory interleukin-8 (IL-8) and antiinflammatory interleukin-10 (IL-10) by enzyme-linked immunosorbent assay (ELISA) was also evaluated. Furthermore, bacterial growth by counting of colony forming units (CFU) was also assessed. Experiments were carried out three times in triplicate. Data were summarized by using medians, interquartile ranges (25th–75th percentile) and minimum/maximum values. Inter-group differences were tested by the by the Kruskal–Wallis rank analysis of variance with the level of significance set at $p < 0.05$. Calculations were done with statistical software SPSS 15.0 for Windows (SPSS Corp. Chicago, IL, USA).

Results. VD-treated cells increased their growth in a dose-dependent manner compared to untreated cells. Cells exposed to Pg and Sp showed a decreased growth. Such bacteriainduced growth inhibition, however, was significantly counteracted when cells were pretreated with vitamin D. In both hGF and hPDLC exposed to bacterial infection, the level of IL-8 significantly increased whereas the basal level of IL-10 remained substantially unchanged. In VD-treated cells, IL-8 level was significantly reduced, and the IL-10 level significantly increased, compared to untreated cells.

Conclusion. The obtained results support the hypothesis of a modulatory and protecting role of vitamin D on periodontal cells when they are exposed to a bacterial insult. Further studies, however, are needed to confirm these encouraging results and assess their potential clinical relevance in periodontal disease prevention and therapy.

Patient-related outcome: signs and symptoms of periodontal disease

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Aim. The relationship between oral health and the quality of life focuses on the importance of considering the mouth to be essential in satisfying human biological and social needs in terms of survival, socialization and self-fulfilment, and recognizing the mouth and its health as an integral part of the entire body and overall health. Periodontal diseases (PD) symptoms can be important from patient prospective. Cross-sectional studies have shown that the impact of oral health has a very important role on the quality of life in periodontal patients. However, clinical studies have mainly focused on therapeutic outcomes in terms of clinical parameters such as gain in probing attachment level (PAL) and decrease in probing pocket depth (PPD), while little attention has been paid to studying the impact of PD from patient perception and perspective. In particular only few studies focused on the relationship between patient perception of PD and its clinical signs and symptoms. Aim of this study was to evaluate the perception of PD and its possible impact on the overall health/social awareness.

Methods. Were consecutively enrolled 240 subjects. Inclusion criteria was a positive diagnosis for PD. Three questionnaires were given per patient: i) 19 questions about self reported symptoms, ii) an Italian version of oral health impact profile (OHIP-14) and iii) 14 questions concerning the impact of periodontal disease on patient's general health and social aspects. A full-mouth periodontal clinical examination was also collected. Clinical variables were analysed with ANOVA. Categorical data were analysed with Chi square test. Sensitivity and specificity were also calculated and multivariate logistic regression analysis was used to relate severity of PD to the questionnaires.

Results. Bleeding (50%), oral malodour (42%) and tooth mobility (38%) were the most prevalent symptoms. Severe-PD was more associated with these symptoms ($p<0.05$) such as tooth mobility (OR= 3.49,

p<0.01), which pooled together, show specificity of 91,2/81,2 for severe/mild PD respectively. Quality of life diminishes according to the severity of the disease (p<0.01). The impact on systemic health was reported by the 70% of the subjects. 91% of the sample consider that PD treatment may determine an improvement of quality of life. Severe-PD patients show a higher concern about the transmissibility of the disease, its impact on social life and the influence of the disease on the quality of sleep (p<0.05).

Conclusion. Severe forms of PD are associated with higher frequency of symptoms and signs, inferior oral health-related quality of life and higher perception of systemic health.

Surgical treatment of Stillman's clefts with and without connective tissue-graft: a parallel randomized clinical trial

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Aim. The aim of this randomized clinical trial (RCT) was to compare the clinical effectiveness of two different surgical approach Subepithelial Connective Tissue Graft (SCTG) and Lateral Pedicle Flap (LPF) for the root coverage treatment of Stillman's clefts.

Methods. A total of 30 patients with almost one Stillman's cleft were enrolled; 15 patients were randomly designated to Lateral Pedicle Flap (B) while the remaining 15 to Subepithelial Connective Tissue Graft. (A) Presurgical and postsurgical measurements were performed by a blind and calibrated examiner. Main outcome clinical measures included REC, CAL and KT. Secondary outcome measures of %root Coverage and RECRed were calculated.

Results. At the 18 months follow up the Group A showed a mean residual recession (REC) of 0,13±0,35 mm with a significative reduction of about 2,74 mm (p<0,0001). Also CAL shifted from 3,80±0,70 to 1,00±0,00 with a significative reduction of 2,80 mm (p<0,0001). Probing depth was reduced from 0,93±0,26 mm to 0,40±0,50 mm with a significative Δ=0,53 mm (p<0,01). Only the Keratinized Tissue (KT) varied less from 1,80±0,77 mm to 1,93±0,59 with a mean gain of 0,13 mm (p=0,69, not significative).

At the 18 months recall the Group B showed a residual recession (REC) of 0,93±0,80 mm with a significative REC reduction of mean 1,74 mm (p<0,0001). CAL showed a significative gain of 2,07 mm (p<0,0001) shifting from 3,60±0,74 mm to 1,53±0,51 mm.

PPD varied in the same way as the Group A from 0,93±0,26 mm to 0,47±0,51 mm with a significative reduction of mean 0,46 mm (p<0,01).

KT gain in this occasion was negative as well as it shifted from 1,67±0,61 mm to 1,47±0,63 mm with a mean change of -0,20 mm (p=0,38).

Percentual Root Coverage (%RootCoverage) at 18 months follow up resulted in 94% for Group A and im 67% for group B with significand difference (Squared Chi Test p<0,0001).

Conclusion. Subepithelial connective Tissue Graft gave better clinical results than the Lateral Pedicle Flap.

Reconstruction of the extraction site with PRF and laterally sliding flap with free gingival graft. A case report

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Aim. To reconstruct segmental defects on the mandibular insicor teeth performed using autologous platelet-rich fibrin (PRF) and various mucogingival surgery techniques.

Methods. A 33-year-old female patient with self-induced vomiting (bulimia nervosa) suffering from eating disorders referred to our clinic for periodontal examination.

The patient had deep acid erosion of enamel and dentin on all her teeth and large periapical lesions with root resorptions involving both mandibular insicors. The mandibular insicors had mobility Class II and deep periodontal pocket depths.

Tooth extractions were done and the PRF was applied for the acceleration soft and hard tissue healing. Laterally sliding flap surgery was performed for management of soft tissue coverage. After 4 week autologous free gingival grafts (FGG) were placed in terms of augmenting the keratinized mucosa.

The patient was rehabilitated with zirconia prothetic restorations.

Results. This case report shows that consistent periodontal surgery planning leads to gingival, functional and esthetic rehabilitation in cases with hard and soft tissue destructions.

Conclusion. Acid erosion of enamel is the chemical dissolution of the superficial layers of teeth can cause periodontal and endodontic problems even without the presence of plaque. Before prosthodontic rehabilitation periodontal approach is convenient for soft tissue management.

Bacterial decontamination of suturing material on surgical periodontal wounds: an *in vivo* study

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Aim. To compare the level of contamination of Polyglactin 910 suture materials with and without the addition of Triclosan.

Methods. Two types of same diameter suture (Vicryl Plus TM or Vicryl TM) were used in fifteen patients during periodontal surgery.

Samples of 3-4 mm from each suture were collected at 48 hours and 7 days post surgery. Each suture sample was conserved in codified eppendorffs and delivered to the laboratory for the bacterial load calculation with classic and Real Time PCR.

Results. A total of 60 samples were collected. The total bacterial count decreased at 48 hours but increased afterwards. Significant bacterial increase was observed at 7 days in both sutures, but this contamination was below the limit of bacterial load (100 bacteria/PCR equivalent to approximately 1000 bacteria per sample).

Triclosan suture showed lower bacterial load at each time level, however this difference was not statistically important.

Conclusions. Triclosane adjuction to the suture structure did not improve significantly the performance of the suture against contamination in the oral cavity.

Influence of tissue tickness on root coverage. A randomized controlled clinical study

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Background. The coronally advanced flap (CAF) is a predictable procedure to treat gingival recessions. Several factors, as flap tension, the surgical positioning of the flap relative to the cemento-enamel junction and the thickness of the flap, seem related to achieving complete root coverage (CRC). Recently, a modification of CAF in flap elevation for single recessions was introduced. A split–full–split approach was used to elevate the flap, with the aim that the portion of the flap residing over the previously exposed avascular root surface, including the periostium, confers more thickness, and thus better opportunity to achieve root coverage. However, in the current literature lot of studies utilizing CAF still describe the surgical technique as a complete partial-thickness flap, obtaining in many instances good results in complete root coverage and stability over time. For such, it is not yet clear if the presence of the periosteum in part of the flap could play a role or not in achieving better clinical outcomes.

Aim. The aim of this double blinded, controlled and randomized clinical trial is to compare the CAF performed either by a "split-full-split" (SFS) and a "split" (S) thickness flap elevation for the treatment of isolated-type gingival recessions in the upper jaw.

Methods. Fourteen patients with one single Miller Class I or II gingival recessions (14 recessions) were selected. Each recession was treated by a CAF, during which flap elevation was randomly assigned to the test group (SFS) or the control group (S). Clinical parameters recorded at baseline and at 6 months were recession depth (RD), probing pocket depth (PPD), clinical attachment level (CAL) and keratinized tissue (KT). Percentage of root coverage (RC) and of complete root coverage (CRC), as subject-reported values of pain, discomfort, and esthetic satisfaction were also recorded.

Results. RD reduction resulted in a significant CAL gain in both groups, whereas PPD was not altered. In the test group, mean percentage of RC was 92.31%, whereas in the control group it was 81.8%. CRC was achieved at 6 months in 80% of test group and 60% of the control group. KT increased in both groups, even if with a significant difference only in test group. There were no statistically significant differences between subject-reported values for esthetic satisfaction, and subjects' assessments of pain and discomfort were also equivalent.

Conclusion. A SFS flap elevation seems to be superior with regard to percentage of RC, CRC and KT increase, confirming as the the presence of the periosteum in part of the flap may play a role in achieving better clinical outcomes.

Efficacy of treatment of peri-implantitis: a meta-analysis

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Aim. To assess the clinical performance of therapeutic approaches to peri-implantitis (PI) in terms of probing pocket depth reduction (PPD) and bleeding on probing (BoP).

Methods. RCTs on PI treatment with at least 10 subjects per group and 6 months follow-up were identified through electronic databases and hand-searched journals (until September 2014). A detailed protocol was designed according to the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analyses) statement. The systematic review was designed to answer the following focused question: "in subjects affected by perimplantits, which is the efficacy of periodontal treatment in terms of pocket reduction and bleeding reduction?". Only randomized clinical trials (RCTs) evaluating surgical and non surgical treatment of peri-implantitis defects were included. Selected studies included at least 10 subjects and showed a 6-months follow-up. No language limitations were applied. PD and BoP were the primary outcomes. Weighted means and forest plots were calculated overall and in subgroup analysis according to the protocol of treatment. Primary outcome measures considered were PPD reduction and BoP reduction. PPD reduction had to be expressed as the average difference baseline/follow-up of the treated sites in millimetres. Thus, studies not reporting differences between baseline and follow-up examinations were excluded unless data of each patient was provided. In the latter case average difference was calculated by the authors. Heterogeneity between the studies was tested and evaluated through Q and I2 test. A p value of Q statistic <0.05 was defined as an indicator of heterogeneity and data were considered heterogeneous for I2 value higher than 40%. In terms of quality of the trial, included articles were evaluated mainly through four methodological RCT phases: (i) sequence generation, (ii) allocation concealment, (iii) blinding of personnel and outcome assessors, and (iv) incomplete outcome data.

Results. 14 trials met the inclusion criteria (9 non-surgical and 5 surgical, 427 patients). The overall weighted mean differences (WMD) for PD reduction were 0.71 mm (CI:[0.47, 0.95], p<0.01). Sub-group analysis identified 0.68 mm (CI: [-0.09, 1.46], p <0.085) for non-surgical instrumentation and 0.89 mm (CI: [0.56, 1.21], p <0.001) for laser application. Surgical therapy showed an overall PD reduction of 2.18 mm (CI:[1.90, 2.46], p<0.01). open flap debridement showed a 3.63 mm (CI: [1.89, 5.37], p <0.001) reduction and 2.58 mm (CI: [2.35, 2.08], p <0.001) in reconstructive treatment. The overall WMD

for BoP reduction for surgical treatment was 47.16% (CI: [39.83, 54.48], p<0.01) and 37.62% (CI: [22.49, 52.84], p <0.01) in non surgical treatment.

Conclusion. 6 months after treatment reduction of PD and improvement of BOP is noted after both non-surgical and surgical treatment. However, the quality of the overall literature is limited. Thus, data should be cautiously interpreted.

A new clinical approach to improve soft tissue surface by an osmotic expander before bone augmentation techniques

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Aim. The following work represents a clinical evaluation on the potential increase of the soft tissues in complex cases obtained by the use of an osmotic tissue expander. The success of regeneration techniques of volumetric increase of hard tissue in pre-implant phase can not prescind from a surgical healing by first intention. A key moment in the execution of this procedure is therefore the relaxation of the primary flaps and their sufficient mobilization. In case of presence of frenula or coronal muscle insertions or cicatricial results due to previous surgeries, the translation of the tissues may be insufficient and cause exposure of the regenerative materials.

Methods. In this study there are described two clinical cases, we observed with the following features.

The first patient presented an edentulia intercalated of upper left central and lateral incisors, associated with a bone atrophy of the upper jaw belonging to class IV of Cawood and Howell. Are also reported cicatricial results of the gingiva within 1.1, related to a previous intervention of apicectomy.

The second patient presents with an edentulia intercalated of the upper left canine and the two premolar, also in this case associated to a bone atrophy of the upper jaw belonging to class V of Cawood and Howell.

The patient presents finally fibrosis, linked to a long-perimplantitis against two implants subsequently removed.

It was therefore planned an implant-prosthetic rehabilitation after vertical bone regeneration in both patients with the use of an osmotic tissue expander.

Both interventions were performed under regional anesthesia, with mepivacaica and vasoconstrictor. It was, therefore, elevated a flap in total thickness, performing an incision with a 15C scalpel. The expander was then positioned following the crestal anatomy in the second patient, so that it can later make a vertical bone regeneration. While in the first case shown, the positioning was done buccally with the aim to carry out a horizontal bone regeneration. The Osmed expander we used is constituted by hydrogel, a copolymer of methyl methacrylate and N-vinylpyrrolidone, and contained in a holed silicone shell of cylindrical shape. This device is kept in place thanks to the containing action implemented by the flaps and the suture.

The suture used is in silk 5.0 non-absorbable. The expander was kept in place for 30 days.

Since the expander is not resorbable, its removal was performed in a second surgical step to 4 weeks apart.

The evaluation of the expansion has been done through the use of two pigmentations the first of which was positioned in the time of insertion of the expander itself. The distance between the two pigmentations was then measured both in the vertical direction than in the horizontal.

Results. Patients have not presented rejection reactions to the material used nor were observed peri-operative and post-operative complications. The postoperative edema, present in both cases, was treated with ice packs associated with 0.2% chlorhexidine rinses for 3 times a day until the removal of the suture. The expansion obtained is around 38% in corono-apical and vestibule-palatal sense.

Conclusion. This study demonstrates how, using a technique easy to perform and relatively atraumatic for the patient, it is possible to increase the volume of soft tissues considerably, so as to find an optimum situation in order to perform techniques for increase bone volume. The expansion of the tissue actually improves the quality and the quantity of soft tissue and facilitates the closure of the primary flap during the regenerative surgery.

New approach in alveolar ridge reconstruction: a clinical case report with histological findings

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Aim. Alveolar ridge resorption following tooth removal is an undesirable, but well-documented physiologic process. The reduction of the alveolar ridge width following extraction is usually greater than the loss of height in the first 6 months after extraction. Different ridge preservation or augmentation techniques have been advocated to avoid or minimize this resorptive process, using different bone grafting materials or in conjunction with barrier membranes. For the most part, research focused on the treatment of alveolar sockets with intact four-wall configuration. The treatment of socket with severely resorbed facial/lingual plate and loss of interproximal attachment due to periodontal disease represents a therapeutic challenge for clinicians. Thus, the aim of the present case report is to demonstrate the clinical and histological efffectiveness of a novel ridge augmentation procedure performed using non-adsorbable membrane and collagen sponge without rigid scaffold material for the treatment of severely resorbed sockets in a periodontitis patient.

Methods. A 43-year-old man was referred to the Department of Periodontology, University of Turin for treatment of severe generalized chronic periodontitis. Due to high mobility degree and persistent suppuration during the maintenance therapy the prognosis of the upper right central and lateral incisors was deemed to be hopeless. At the time of extraction, a flap was raised on the buccal and palatal aspect. Both sites showed a severe horizontal bone loss. The buccal and the palatal wall of the central incisor presented with a large and deep dehiscence defect. The sockets were

debrided to remove the granulation tissue. A textured high-density e-PTFE membrane was placed under the buccal flap and the gap between the membrane and the residual palatal wall was filled with collagen sponge. Afterwards, the membrane was tucked under the palatal flap. The flaps were repositioned by means of vertical and horizontal mattress sutures. Intentional primary closure was not attempted and the membrane was left partially exposed. After six weeks the membrane was removed and four months later a core biopsy was obtained for histologic examination. At 12 months postoperatively a CT scan was taken in order to plan the implant-supported prosthetic rehabilitation.

Results. Healing was uneventful. Neither infection nor inflammation was present although the membrane was partially exposed. The tissue re-epithelized completely within 3 weeks. Radiographically complete remineralization and bone volume augmentation were attained after 12 months. The histology of the core biopsy showed new bone formation through the entire length of the specimen with absence of inflammatory reaction. The amount of newly formed bone was greater towards the apical region of the specimen.

Conclusion. The principles and techniques of guided tissue regeneration can be successfully applied to the treatment of severely resorbed alveolar sockets due to advanced periodontal disease. This case report demonstrates the regenerative potential of the alveolar socket when using a non-resorbable membrane that optimizes the available space for regeneration and ensures blood clot stabilization without insertion of any scaffold material.

Generalized aggressive periodontitis in prepubertal age: description and comparison of two cases

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Aim. The aim of the following work is to describe two different cases of generalized prepubertal periodontitis.

Case presentation. Case report 1: In July 2010, patient E.H, male, age 4 years, came to our attention declaring premature loss of some deciduous teeth.

Case report 2: In 1990, patient F.D, male, age 5.5 years old, also came to our attention for premature loss of 9 deciduous teeth.

At the examination both cases showed a framework of generalized prepubertal periodontitis. Orthopantomography showed a marked and widespread bone resorption in both arches, in both patients. Routine blood tests have been requested, tests of polymorphonuclear functions and microbiological test of sub gingival plaque have been analyzed.

Case report 1.—Patient E.H did not present himself for the examinations and did not follow the advices for the improvement of his oral hygiene after the first examination, coming back to our attention after an absence of three years, at the age of 7 years old, declaring widespread tooth pain.At the examination we observed third grade mobility of the first permanent molars and widespread gingivitis.After completion of antibiotic therapy with Amoxicillin and Metronidazole, the extractions of the four first permanent molars and of the other mobile deciduous teeth have been performed with local anesthetic.Blood and instrumental routine tests and polymorphonuclear function test did not show any alteration.Not even microbiological sub gingival plaque test showed significant results from July 2013 patient

E.H undertook a strict monitoring course with monthly visits and careful references to the improvement of his own oral hygiene.

Case report 2.—Patient's oral hygiene was observed to be very poor at the first examination with all the deciduous teeth compromised. In this case a loss of polymorphonuclear function has been observed and the microbiological analysis of sub gingival plaque of the patient has given as result the isolation of A. actinomycetemcomitans, strains of Capnocytophaga and Bacteroides. The patient has also completed three cycles of antibiotics at monthly intervals; being allergic to Amoxicillin, Tetracicline were administered in combination with metronidazole.Early avulsions of compromised deciduous teethe were performed and subsequently the patient was subjected to periodic inspections and regular sessions of oral hygiene that allowed the maintenance of periodontal health and thanks to the immediate improvement of the conditions of daily oral hygiene, periodontal disease involved only the primary dentition.

Conclusion. From the comparison of the two cases, the importance of early diagnosis and the achievement of an optimal oral hygiene can be deduced. In fact, in the first case the patient has maintained a poor oral hygiene until the age of seven years, with impairment of the first permanent molar teeth; in the second case the patient has applied properly and constantly the maneuvers of oral hygiene at home since the age of 4 years with immediate stabilization of periodontal health.It is also really important that all the tutors and promoters of health in childhood, pediatric dentists and pediatricians, share the knowledge required for the diagnosis and clinical management of the disease.

Non-surgical treatment of aggressive periodontitis in a patient with multiple sclerosis

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Aim. Multiple sclerosis is a chronic demyelinating of the central nervous system, characterized by progressive disability. It predominantly affects the female sex and leads to motor, sensory, cognitive and psicological dysfunctions. Several predisposing factors to periodontal involvement were identified in patients with multiple sclerosis: motor difficulty in brushing teeth, mouth breathing, decreased ability to auto-cleanse by soft tissue, resulting from motor deficit. Also the side effects of some drugs used in this pathology, as immunosuppressants and others, like phenytoin, aggravate periodontal aspects.

Methods. This case report presents the non-surgical periodontal treatment of a female patient of 43 years, suffering from multiple sclerosis in drug therapy with natalizumab and with allergy to cefotaxime. The patient, had the characteristic signs of aggressive periodontitis: she presented with severe inflammation of periodontal soft tissue, with bleeding on probing, teeth mobility grade two and three, several deep periodontal pockets and pres-

ence of suppurative exudate. The patient expressed the will to follow a conservative therapeutic procedure. The diagnosis was: aggressive periodontitis during systemic disease. Treatment included: four sessions of scaling and root planing with the application of chlorhexidine 1% gel and irrigation of hydrogen peroxide in the pockets. At the end of this, we administered antibiotic therapy, constituted by: amoxicillin and clavulanate 875mg/125mg, a tablet every 12 hours, with metronidazole 250mg, a tablet every 8 hours for 8 days. We reassessed the patient after 40 days and postponed for additional therapeutic cycle similar after about three months.

Results. the periodontal treatment performed in this case, was effective in eliminating the severe signs of inflammation associated with this form of periodontitis, with an improvement of all periodontal indices and pocket resolution.

Conclusion. A conservative, non surgical periodontal treatment was an effective approach, as first choice for the treatment of an aggressive form of periodontitis, in a patient at risk due to a state of general impairment.

The bacteria present in patients with chronic periodontitis in the absence of systemic disease and non-smokers

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Aim. The purpose of this study is to describe the prevalence of periodontal bacteria in 11 patients with chronic periodontitis before any treatment.

Methods. We have selected 508 patients, 250 men and 258 women, mean age 38 years + -12 during 2013. We included all patients who had a chronic periodontitis with BOP + and pockets of at least 4mm and not deeper than 7 mm after microbiological sampling, showed a concentration of bacteria such as to require, in addition to SRP, also antibiotic. Samples were taken in 2540 sites. The regions of bacterial DNA were amplified by multiplex PCR (Polymerase Chain Reaction). The amplified products were analyzed by reverse dot-blot. The presence of bacterial DNA was determined by reverse hybridization: amplified gene sequences hybridize specifically to oligonucleotide probes linked to a membrane.

Results. Divided into two semesters and are reported only the data in which the colony-forming units (CFU) are greater than 10 to the third:

Aa = Aggregatibacter actinomycetemcomitans 12,75%; Pg = Porphyromonas gingivalis 72,06%; Tf = Tannerella forsythia 75,39; Td% = Treponema denticola 70,59%; Pi = Prevotella intermedia 36,76%; Pm = Peptostreptococcus micros 28,43%; Fn = Fusobacterium nucleatum/periodonticum 33,82%; Cr = Campylobacter rectus 40,2%; En = Eubacterium nodatum 21,57%; Ec = Eikenella corrodens 27,45%; Cs = Capnocytophaga spec. (gingivalis, ochracea, sputigena) 21,7.

Aa = Aggregatibacter actinomycetemcomitans 12,5%; Pg = Porphyromonas gingivalis 59,2%;Tf = Tannerella forsythia 75,3; Td% = Treponema denticola 70,1%; Pi = Prevotella intermedia 38,5%; Pm = Peptostreptococcus micros 29,3%; Fn = Fusobacterium nucleatum/periodonticum 23%; Cr = Campylobacter rectus 27,6%; En = Eubacterium nodatum 14,8%; Ec = Eikenella corrodens 19,4%; Cs = Capnocytophaga spec. (gingivalis, ochracea, sputigena) 21,7.

Conclusions. The bacterial group most affected is the red of Socransky, that on average over 70% of cases. More studies are needed to confirm the prevalence of bacteria. It would be interesting to assess concentrations combined with various indices gum. The approach with genetic markers IL1 and microbiological study of the bacterial flora of the oral cavity has given us the ability to treat patients in a rational manner in serious condition not only periodontal, but also with systemic diseases such as diabetes and cancer (radiotherapy and osteonecrosis lesions by bisphosphonates). The recruitment of a greater number of patients with various diseases may help the clinician to approach the case on a client, improving the management of infectious complications. in oral and maxillofacial surgery.

Photodinamic therapy in treatment of peri-implantitis in initial stadium

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Aim. The purpose of the study is based on evaluating the effectiveness of the light photodynamic therapy (PDT) combined with the use of titanium currettes on implants suffering from mucositi and peri-implantitis.

Methods. The study was carried out on 57 implants Astratech distributed in 10 patients referred to the outpatient clinic of the University Hospital of Siena. The implants were subdivided in two groups (Test and control) and at the first time were recorded the following parametres: ppd (probing depth), kt (high keratine tissue), bop (bleeding on probing), pi (plax index). The test group underwent a stage of subgingival scaling with titanium currettes and photodinamic terapy while control group recevied only subgingival scaling with titanium currettes. The follow-up was recorded after 30-40 days.

Results. The study about dipendent variables shows a reduction of the plaque index, probing depth, bleeding on probing and recession. Only the high of keratine tissue not showed a difference between t0 and t1 after 40 days.

Conclusion. The application of the photodynamic therapy and titanium curruttes for the treatment of implants affected by mucositis and peri-implantitis showed a reduction of the flogosis and bleeding in the periimplant tissue without pain and stress for the patients. We suggest more studies about this therapy to show the real effectiveness of this treatment.

Association between socio-demographic characteristics, oral health-related variables and clinical halitosis in an adult population of a city in Northern Italy

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Aim. In Europe, epidemiological data on the prevalence of halitosis, which are based on self-reported and objective criteria are still rare. No epidemiological data are available for Italy. Since data on the prevalence of bad breath seem to be highly variable depending on the population studied, additional information on specific risk indicators in a given population may be helpful. Thus, the

aim of the present epidemiological survey was to assess the prevalence and factors associated with clinical oral malodor in an adult population from Northern Italy.

Methods. A two-stage probability sampling method was used to collect a representative sample of the inhabitants (N=1600) aged between 20 and 75 years, of the city of Turin (Italy). The primary sampling units were general practitioners (GPs) stratified by the four districts of Turin to ensure a geographic and socioeconomic coverage over the whole of Turin. At the second stage subjects were randomly sampled within the selected GPs using the Health Regional Register as sampling frame. Seven hundred and forty-four adults were clinically examined (47% of the sampled subjects). Using a structured questionnaire socio-demographic, medical and halitosis-related parameters were collected. Organoleptic testing of whole-mouth malodor and oral examination were performed indipendently by two calibrated and experienced clinicians. Significant associations between clinical oral malodor and sociodemographics, oral health status and health behavioral characteristics were examined with multiple logistic regression models. Data were expressed as odds ratio (OR) and 95% confidence interval (95% CI).

Results. The prevalence estimate of clinical halitosis was 36.98% (95% CI: 33.17-40.79) of slight/moderate (organoleptic score 2-3) and 16.53% (95% CI: 13.77-19.83) of strong oral malodor (organoleptic score 4-5). With regard of self-reported halitosis 163 (21.91%) subjects reported having light/moderate malodor, and 16 (2.15%) a strong bad breath. Most subjects who complain halitosis perceived themselves as suffering from the problem (75.98%). The correspondence between self-reported and organoleptic measurements was low (K-index= 0.152, 95% CI 0.01-0.21).

All the examined oral health-related parameters were significantly associated with oral malodor, even adjusting by socio-demographic variables. The FMBS had the highest odds ratio values (Adjusted $OR_{(25\text{-}50 \text{ vs } <25)}$= 3.77, 95% CI: 2.50-5.69; Adjusted $OR_{(50\text{-}75 \text{ vs } <25)}$ = 16.36, 95% CI: 9.43-28.38, Adjusted $OR_{(>75 \text{ vs } <25)}$= 36.06, 95% CI: 13.88-93.76) followed by the diagnosis of severe periodontitis (Adjusted OR=6.85, 95% CI: 4.25-11.04) and tongue coating score (Adjusted $OR_{(2\text{-}3 \text{ vs } 0)}$ = 2.80, 95% CI: 1.75-4.50; Adjusted $OR_{(4 \text{ vs } 0)}$= 3.87, 95% CI: 2.29-6.54; Adjusted $OR_{(\geq 5 \text{ vs } 0)}$= 7.57, 95% CI: 4.46-12.86).

Conclusion. Within the limitations of the present study, it may be concluded that selfperception is an invalid method of judging one's own oral malodor. There was a high prevalence of clinical halitosis in the population we studied. Severe periodontitis, FMBS and the level of tongue coating were the most important predictors of oral malodor.

Gas cromatografy analisys in patients affected by halitosis and recurrent tonsillitis: evaluation pre-post tonsillectomy

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Aim. Halitosis, or oral malodor, is a term used to describe noticeably unpleasant odors exhaled in breathing whether the smell is from an oral source or not. Oral causes have been proposed to be responsible for the majority of halitosis complaints (90%), followed by otolaryngology and respiratory diseases (8%). Gastrointestinal diseases, liver/renal impairment and other metabolic syndromes are minor causes (2%). Recurrent tonsillitis, considering the frequency of disease in the population, may represent one of the causes of halitosis. The present case series study aimed to evaluate the role of recurrent tonsillitis as primary cause of halitosis and to assess the impact of tonsillectomy on oral bad breath.

Methods. Patients were consecutively enrolled among those referred to the Division of Periodontology, C.I.R. Dental School, University of Turin with a halitosis complaint and recurrent tonsillitis. Patients with dental and periodontal diseases (presenting bleeding on probing index or probing depth more than 3 mm) were excluded from study in order to avoid any oral etiology of oral malodor. Current smokers, heavy alcoholic drinkers (more than 30 g alcohol/day), pregnant women, and subjects taking medications were excluded. After excluding sinus, oral, pulmonary, and gastroenterological diseases as extra-oral causes of halitosis, 9 patients were included in the study. At baseline (T0) patients were evaluated for the presence of clinical oral malodor. The volatile sulfur compounds level (VSC) was quantified by an experienced and calibrated clinician with a portable gas chromatograph (OralChroma™ Abilit Corp., Osaka City, Japan) which measures the concentration of hydrogen sulfide (H_2S), methyl mercaptan (CH_3SH) and dimethyl sulfide [$(CH_3)_2S$]. All patients, after etiological periodontal therapy, were treated by tonsillectomy. Patients were reviewed after 4 (T1) and 12 weeks (T2) postoperatively and VSC measurements were repeated.

Results. The presence of recurrent tonsillitis statistically significantly increased the whole-mouth levels of VSCs. The tonsillectomy resulted in improvement of clinical halitosis in all the treated patients at 4 and 12 weeks postoperatively. There was a statistically significant difference from T0 and T1 (20.11 ± 20.46 ppb, p-value= 0.015) and between T0 and T2 (24.33 ± 20.58 ppb, p-value= 0.008) in the measurements of H_2S. No statistically significant difference was detected between T1 and T2 values. Similar results were obtained when considering CH_3SH levels (difference T0-T1= 19.23 ± 23.60 ppb, p-value= 0.017 and difference T0-T2= 26.45 ± 23.78 ppb, p-value= 0.010). The [$(CH_3)_2S$] concentrations remained nearly unchanged over the experimental period (p> 0.05).

Conclusion. It is generally recognised that oral malodour can be managed by treating periodontal diseases, tongue coating and carious lesions. However, dentists should also be aware that tonsillitis may sometimes be the cause of halitosis.

Professional local administration of a chloramine-based treatment in conjunction with ultrasonic mechanical instrumentation: clinical outcomes in patients with deep periodontal pockets persisting following active non-surgical therapy. A 3-case report

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Background. Recently, a chemical agent (Perisolv®) has been proposed as an adjuvant to non-surgical therapy. The rationale for its use is based on the bactericidal

effect of chloramines and a softening effect on debris that must be mechanically removed from the root surface.

Aim. To evaluate the clinical outcomes of ultrasonic mechanical instrumentation (UMI) when performed in conjunction with local application of Perisolv® at deep periodontal pockets persisting following active, non-surgical therapy (NST).

Methods. Three periodontitis patients showing residual sites positive to bleeding upon probing (BoP) with pocket probing depth (PPD) ≥ 5 mm following NST were included. At randomly selected, BoP-positive sites with PPD≥ 5 mm, the activated agent was applied and left in place for 30 seconds before proceeding with full-mouth UMI. After 20-25 minutes from agent activation, the sequence (Perisolv® application + UMI) was repeated.

Results. Mean PPD was 5.7 ± 1.0 mm at the conclusion of NST, and decreased to 3.4 ± 0.5 mm at 4-6 weeks following the administration of UMI+ Perisolv®. All sites treated with UMI+ Perisolv® showed PPD≤ 4 mm and were BoP-negative following treatment.

Conclusion. The professional, local administration of a chloramine-based treatment (Perisolv®) in conjunction with UMI resulted in a substantial improvement of the periodontal conditions of patients with deep periodontal pockets persisting following NST.

Gingival recession following single flap approach in periodontal intraosseous defects

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Aim. To evaluate the association of patient-related and site-specific factors as well as the adopted treatment modality with the change in buccal and interdental recession (bREC and iREC, respectively) observed at 6 months following treatment of periodontal intraosseous defects with the Single Flap Approach (SFA).

Methods. Sixty-six patients contributing 74 intraosseous defects accessed with a buccal SFA and treated with different modalities were retrospectively selected. A logistic 3-level model (patient, defect and treatment modality) was constructed, with the 6-month changes in bREC and iREC being regarded as the dependent variables.

Results. (1) significant 6-month increases in bREC (-0.6 ± 0.7 mm) and iREC (-0.9 ± 1.1 mm) were observed; (2) bREC change was significantly predicted by pre-surgery interproximal probing depth (PD) and depth of osseous dehiscence at the buccal aspect; (3) iREC change was significantly predicted by pre-surgery interproximal PD and the treatment modality, with defects treated with SFA in combination with a graft material and a bioactive agent being less prone to iREC increase compared to defects treated with SFA alone.

Conclusion. Following buccal SFA, greater post-surgery increase in buccal gingival recession must be expected for deep intraosseous defects associated with a buccal dehiscence. The combination of a graft material and a bioactive agent in adjunct to the SFA may limit the postoperative increase in interdental gingival recession.

Impact of supportive periodontal therapy on periodontal prognosis as assessed with a simplified method for risk assessment: a retrospective cohort study

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Aim. To evaluate the impact of supportive periodontal therapy (SPT) on periodontal prognosis, as assessed with a simplified method (UniFe; Trombelli et al. 2009).

Methods. At 2 clinical centers, data were retrospectively obtained from the record charts of 109 patients (age range: 22-62 years). According to the individual treatment plan, patients had undergone active periodontal therapy (APT) and had been enrolled in a SPT program for a mean period of 5.6±2.2 years. At the completion of APT (T1) and the most recent SPT visit (T2), patient-related periodontal risk scores were calculated according to UniFe on a scale from 1 (low risk) to 5 (high risk).

Results. The mean risk score was 3.7±0.9 and 3.7±1.0 at T1 and T2, respectively, with no significant difference between T1 and T2. Also, no significant difference in the distribution of patients according to risk score were observed between time intervals. Patient mobility through risk groups from T1 to T2 was observed, with 21% of patients showing a decrease in risk score (-1 score: 16%; -2 scores: 3%; -3 scores: 2%), while 28% showing an increase (+1 score: 26%; +2 scores: 2%). The increase in risk scores was mainly due to an increase in the severity and extension of bone loss and probing depths as well as an increase in full mouth bleeding scores.

Conclusion. In general, SPT may be effective in preserving patient-related periodontal prognosis following APT. When occurs, worsening of periodontal prognosis is mainly due to the recurrence of the clinical signs of the disease.

The inflamed gingival unit: a multi-level analysis of associated factors in a 21-day experimental gingivitis trial

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Aim. To evaluate the effect of patient-related and site-specific factors on the risk for gingivitis occurrence at the site level.

Methods. Ninety-six systemically and periodontally healthy patients underwent a 21-day experimental gingivitis trial. Each subject was characterized for different cytokine gene polymorphisms (IL-1A^{+4845}, IL-1B^{-511}, IL-1B^{+3953}, TNF-A^{-308}, LT-A^{+252}, IL-1RN, IL-6^{-597}, IL-6^{-174}). At day +21, Plaque index (PlI) and Gingival Index (GI) were assessed at two sites (buccal and mesio-buccal) for 6 maxillary teeth. A logistic multi-level model was constructed, with site-specific GI_{bin} as the binary outcome event (if GI=0, GI_{bin}=0; if GI≥1, GI_{bin}=1).

Results. The mean probability for any site to have GI_{bin}=1 was 36%. Statistically significant odds ratios (ORs) for GI_{bin}=1 were found for: (i) the rare alleles of IL6^{-174} and IL-6^{-597} (OR=3.90 and 0.84, respectively) versus the respective common alleles; (ii) incisors and premolars versus molars (OR=5.32 and 3.16, respectively); (iii) mesio-buccal versus buccal sites (OR= 2.31); PlI=2 and PlI=3 versus PlI=0 (OR=13.86 and 3.74, respectively). The final logistic multi-level model explained 46% of the observed variability in GI_{bin}.

Conclusion. The probability for a site to manifest clinical signs of gingivitis over a 21-day experimental gingivitis trial is influenced by IL-6^{-174} and IL-6^{-597} genotype as well as site-specific factors (i.e. PlI, tooth type and aspect).

Single flap approach *versus* double flap approach in the treatment of intraosseous periodontal defects with recombinant human platelet-derived growth factor-BB and beta-tricalcium phosphate: a randomized controlled trial

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Aim. To compare outcomes of a regenerative strategy based on recombinant human platelet-derived growth factor–BB (rhPDGF-BB, 0.3 mg/ml) and β-tricalcium phosphate (βTCP) in the treatment of intraosseous defects accessed with the Single Flap Approach (SFA) versus Double Flap Approach based on papilla preservation techniques (DFA).

Methods. Fifteen and 13 defects, randomly assigned to access with SFA or DFA, respectively, were grafted with rhPDGF-BB + β-TCP. The Early Wound Healing Index (EHI) was evaluated at 2 weeks post-surgery. Probing parameters were assessed before surgery and at 6 months post-surgery. Post-surgical pain (VAS_{pain}) was self-reported using a visual analog scale.

Results. Twelve sites in the SFA group and 6 sites in the DFA group showed complete flap closure (i.e., EHI= 1-3). No significant differences in 6-month changes in probing parameters and radiographic linear defect fill were found between groups. Significantly lower $VAS_{pain}$was observed in SFA group compared to DFA group at day +1, +2 and +6. A significantly greater number of analgesics were consumed in the DFA group compared to the SFA group at day +1.

Conclusion. When combined with rhPDGF-BB and β-TCP, SFA results in better quality of early wound healing, lower pain and use of analgesics during the first postoperative days compared to DFA.

Significance of a simplified method for periodontal risk assessment in predicting periodontitis recurrence during supportive periodontal therapy: a retrospective cohort study

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Aim. To evaluate whether patient-related risk scores generated with a simplified method for periodontal risk assessment (UniFe; Trombelli et al. 2009) may predict periodontitis recurrence during supportive periodontal therapy (SPT).

Methods. At 2 clinical centers, data were retrospectively obtained from the record charts of 109 patients (age range: 22-62 years). According to the individual treatment plan, patients had undergone active periodontal therapy (APT) and had been enrolled in a SPT program for a mean of 5.6±2.2 years. Patient-related risk scores referred to the first visit following APT were calculated on a scale from 1 (low risk) to 5 (high risk) according to UniFe. Patients were grouped according to risk scores and compared for tooth loss as well as changes in radiographic bone levels and pocket probing depth (PPD) occurred during SPT.

Results. After APT, 5, 6, 20, 65, and 13 patients showed a risk score of 1, 2, 3, 4 and 5, respectively. The mean number of teeth lost during SPT ranged from 0 to 1.8±2.5 teeth in patients with a risk score of 1 and 5, respectively (p= 0.041), with a mean yearly rate between 0 (risk score 1) and 0.32±0.51 teeth/year (risk score 5) (p= 0.053). Mean bone loss and PPD increase during SPT were both ≤0.50 mm in all risk groups, without inter-group differences.

Conclusion. Within its limits, the present study indicate that risk assessment according to the UniFe method may help to identify patients at risk for tooth loss during SPT.

Effectiveness of a diode laser in addition to non-surgical periodontal therapy: study of intervention

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Background. Chronic periodontitis affects 47% of adult population over the age of thirty, distributed in mild (9%), moderate (30%) and severe (8%). Although a number of risk factors can influence the start, progres-

sion and prognosis of periodontitis (age, sex, cigarette smoking, hormonal changes, immune system disorders, systemic diseases, diabetes, stress etc.), the main etiological factor is represented by dental plaque (anaerobic gram-negative bacilli). So, the first phase of periodontal treatment is always represented by scaling and root planing (SRP), that is a causal, non-surgical therapy that recognizes as primary aim the control of bacterial infection and the reduction of periodontal plaque-associated inflammation. However, in recent years the therapeutic options in periodontal treatment have enriched with the introduction of laser therapy, which consists in the irradiation of periodontal pockets with laser.

Aim. The aim of this study was to evaluate the effect of a 940nm diode laser as an adjunct to SRP in patients affected by periodontitis.

Methods. The present study has a randomized, unblind, single center intervention design. Forty adult patients with moderate-to-severe periodontitis were sequentially recruited on a voluntary basis. Inclusion criteria were: age >18 and <70 years, and the presence of periodontal lesions needing therapy. Patients were undergone to periodontal examination (V1) in order to detect gingival index (GI), plaque index (PI) and probing depth (PD). GI and PI were detected on 6 index teeth (12, 16, 24, 32, 36, 44) and were measured from 0 (absence of inflammation or plaque) to 3 (severe inflammation or accumulation of plaque). As regard PD, the values in mm of the survey were converted into a score called T-score 0 = PD between 0 and 2 mm; 1 = PD between 2 and 4 mm; 2 = PD between 4 and 6 mm; 3 = PD over 6 mm. Afterwards, patients were randomly divided into two groups: the first group (n=20) received SRP treatment alone, whereas the second group (n=20) received SRP and laser therapy with ezlase™ soft tissue 940-nm diode laser (Biolase Technology Inc.). We set the laser using a power of 3 W and a pulsed emission mode of laser light; on time (pulse duration) was 10 ms, whereas time-off (relaxation time) was 20 ms so that the average power was 1 W. We made for each pocket 3 cycles of irradiation, each lasting 30 seconds. The clinical follow-up was performed after 4 months to the treatment (V4).

Results. Data were analyzed by Student's t-test, with two tails; for all clinical parameters, both groups reported statistically significant differences compared to basal values ($p<0.0001$). Both groups showed a substantial improvement of the periodontal indexes, although the group of patients underwent to diode laser therapy showed more evident results. In detail, the group of patients undergone to only SRP showed a reduction of mean periodontal indexes of 45,4% (GI), 52,8% (PI), 50,2% (PD). In the group undergone to SRP + laser therapy, reductions of 69,3% (GI), 59,7% (PI) and 67% (PD) were observed.

Conclusion. The results of this study clearly show that both procedures are effective in improving the periodontal, but the addition of the diode laser allows to obtain more evident clinical outcomes than the alone SRP. Laser therapy will never replace the procedures of scaling and root planing; however, considered the better clinical outcomes, diode laser can be routinely associated with SRP in the treatment of periodontal pockets of patients affected by moderate-to-severe periodontitis.

Effectiveness of local antibiotic in the treatment of acute periodontal lesions

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Aim. The periodontal abscess is a frequent periodontal condition in which periodontal tissues may be rapidly destroyed. It's a bacterial infection (anaerobic) that causes an inflammatory reaction (polymorphonuclear cells and macrophages above all) that causes destruction of periodontal tissue. It is generally treated with incision and drainage and systemic antibiotics. The aim of this study is to demonstrate the efficiency of topical antibiotic (doxycycline hyclate 14% Ligosan®, Heraeus Kulzer) in the treatment of acute periodontal abscess instead of systemic antibiotic.

Methods. Ligosan® is placed in 16 sites with periodontal abscess after drainage, irrigation with clorexidine 0,2% and supra and sub gingival decontamination (Airflow Powder PLUS®, EMS). Probing depth (PPD), relative attachment level (RAL), bleeding on probing (BOP) and presence of pus are recorded using a periodontal probe at baseline (T0). After 1 week (T1) PPD, RAL, BOP and presence of pus are recorded and every sites is treated with supra and sub gingival decontamination and scaling and root planing (SRP).

Results. At baseline every site presents suppuration, bleeding, swelling and bone resorption. At T0 the average PPD was 9,75mm ± 2,38 mm and RAL 8,81± 3,6 mm. Four teeth have second grade mobility.

At one week no suppuration, bleeding and tumefaction were present. The gingiva was pink and tonic and the mobility disappeared in 2 teeth, while in the other two dropped down to first grade. The average PPD and RAL is 6,25 ± 2,86 mm (PPD) and 5,63 ± 3,9 mm. All patients refer pain to percussion at T0 but no longer do at T1.

Conclusion. Ligosan®, used as a local antibiotic, is efficient in the treatment of acute periodontal disease, in fact the clinical parameter of PPD and RAL decrease respectively of 3,5 ± 0,48 mm and 3,18 ± 0,3 mm. The symptoms of pain, tumefaction, bleeding and suppuration disappear after 24-48 hours. The effectiveness of Ligosan® is probably related to its controlled release delivery system that allows the antibiotic to be effective for 12 days (more than 16 micrograms/ml).

Compared to systemic antibiotics local ones have low risk of side effects and induction of antibiotic resistance, it is remain highly concentrated in the site they are placed in and reach effective levels in a short time and dont require patience compliance. Another advantage of topical doxycycline application is the anti-inflammatory action against collagenase, interleukin-1 and bone resorption.

Orthodontic treatment and periodontal therapy – a regenerative mix. Case reports

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Aim. The orthodontic treatment and the periodontal therapy are a correct mix who creates bone and who saves soft tissues.

Material and method. In the periodontal patient we have to use low forces and we have to know the correct center of resistence of teeth in order to have the correct movement of teeth. It is important too a multidisciplinary approach for this kind of patient and to control the hygiene of mouth and to perform the correct treatment of periodontal pockets and to reduce the degree of inflammation of soft tissues and its blending. This behavior are the right protocol for a correct approach. In this work we showed two cases report. In the first we showed a female patient with extrusion of upper incisor and a lesion of soft tissue. We created an orthodontic system in order to performed the incisor intrusion with a palatal direction of force in order to reduce the buccal lesion of soft tissues. In the second case report we showed a young male patient with a defect of bone on the root of lower first molar. We had a multidisciplinary treatment with periodontal operator who use an enamel protein during a periodontal surgery in order to increase the level of bone in the pocket of molar. In the first case the periodontal operator performed the scaling and root planning every week in order to reduce inflammation and plaque. each treatment ended with success and in each case we have create tissue (soft tissue and hard tissue). In the second case we moved the tooth unto bone defect in order to create bone with orthodontic movement.

Results. Each treatment was performed by lower forces and by a low friction orthodontic treatment. The treatment was 12 months long. X-ray were taken before and after treatment. After 1 yrs no relapses were observed. The periodontal operator followed each patient and performed every 3 months the periodontal therapy.

Conclusion. The multisciplinary approach is very important to treat complex cases. The orthodontic therapy combined to periodontal treatment allow to have a correct result in the periodontal patient.

Is radiotherapy of oral cancer an exclusion factor in action planning of orthodontic treatment? A case report

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Aim. First to standardize an operative protocol to treat patient who had cancer of mouth and who was treated by maxillary radiotherapy in order to eradicate a cancer relapse. The goal of this work was to give a general information in order to avoid collateral effects who appear after radio therapy on the maxillary zone (xerostomia, multiple cavity, bone necrosis) . Geneally this kind of patient has a serious problem to receive the usual teeth therapies and in particular the orthodontic treatment. The second goal is to give a general guide for the orthodontic treatment in this kind of patients.

Methods. The first important moment is how to prevent the cancer appearence on the mouth. We advice at our patients this schedule to follow: to demand an annual screening of soft tissues of mouth, to limit alcohol and tobacco use, to limit exposure of uv radiation on lips, and have safe sex. During oral examination is important to study the oral soft tissues and to perform the test of oral tissues in order to detected early suspicious lesions. There is in literature a protocol in order to reduce collateral effects like xerostomia, multiple cavities and necrosis of bone in the patient treated by radiation therapy The first important is to decide if to use or not a Pilocarpina in order to prevent the xerostomia as a secondary effect of head and neck radiation therapy. In the second time but not less important is to use a fluorine on teeth by a bite plate during a night. (this therapy is almost for all life). It is important in order to prevent a multiple cavities who appear in this kind of patients. The hyperbaric chamber is important to prevent a necrosis of bone (90% of cases). We show a case report of female of 44 yrs old treated for oral cancer (T1N0M0) by surgery (R0) and after 1 year treated by a new surgery for a relapse in a throat. She had radiotherapy > 60 GY (no chemotherapy was performed). During and after therapy for a cancer she used a pilocarpina for a 12 weeks and she had a HBO (hyperbaric chamber) 3 time for week, during 10 weeks and after a fluorine application on teeth (the advice was for all life). At this point we waiting 1 yrs and after we started an orthodontic treatment of space closure of anterior teeth. The orthodontic treatment was 6 months long. We used a low friction appliance and low forces. It was important to control the periodontal tissues in order to prevent or treat the periodontal pockets during teeth movement.The second part of treatment was to applye the aesthetic veneers. The patient continue to apply fluorine.

Results. The orthodontic movement didn't have a collateral effects like bone resorption, periodontal lesions or pockets. After orthodontic treatment the teeth was stable and we applies the aesthetic veneers. After 5 yrs no breakaway occured of veneer.

Conclusion. The correct operative protocol to treat the oncological patient during and after radiotherapy allowed to reduce the collateral effects of this treatment and allowed to perform the common teeth therapy. This is important to improve the quality of life of survived patient.

Autofluorescence, narrow band imaging and liquid-based cytology in the early diagnosis of oral and oropharyngeal erythro-leukoplakias

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Aim. Autofluorescence (AF) and narrow band imaging (NBI) demonstrated to be useful as a visualization aid to assist naked eyes (NE) in achieving a more reliable distinction between healthy and preneoplastic/neoplastic mucosa when dealing with erythro-leukoplakia since it is associated with an increased risk of oral and oropharyngeal squamous cell carcinomas (OSCC and OPSCC). Even if histopathological evaluation of a fixed tissue sample is considered the gold standard in oral pathology diagnosis, liquid-based exfoliative cytology (LBEC) has been demonstrated to have a high diagnostic accuracy for detecting and monitoring oral potentially malignant diseases. Aim of the present study is to prospectively evaluate the sensitivity (Se), specificity (Sp), positive (PPV), negative predictive values (NPV), and accuracy (Ac) of a diagnostic protocol including NE, AF, NBI, and LBEC in never before biopsied erythroleukoplakias of the oral and oropharyngeal cavities.

Methods. At the Department of Oral Medicine of the University of Brescia, between March 2013 and December 2014, 79 patients with oral (n=73) and oropharyngeal (n=6) leuko-erytroplakias were prospectively evaluated by NE, AF, NBI and LBEC. Results from NE, AF, and NBI were categorized as "suspect" or "non-suspect". A dedicated cytologist, blinded on clinical and endoscopic findings, graded LBEC samples according to a 5-points-scale: O1, inadequate material; O2 benign cells; O3, cellular modifications suspected of dysplasia; O4, cellular modifications suspected of carcinoma; O5, cellular modifications strongly indicating carcinoma. Excisional biopsy of the whole lesion was performed for every patient and then analysed by a dedicated pathologist, blinded on the clinical and endoscopic findings and on the cytological findings. True positive cases were those considered as "suspect" at NE or AF or NBI and with histopathologic diagnosis ranging from mild dysplasia to invasive carcinoma. For LBEC, we considered true positives all patients with O3 or more and a histopathologic diagnosis ranging from mild dysplasia to invasive carcinoma. Se, Sp, PPV, NPV, and Ac were evaluated.

Results. Among 79 patients, NE turned out to be "suspect" in 43 cases; AF was "suspect" in 35; NBI was

"suspect" in 46; LBEC samples were graded as follows: 2 O1, 31 O2, 23 O3, 10 O4, and 13 O5. On histopathological evaluations of the excisional biopsies we found: 28 benign lesions, 9 mild dysplasias (SIN 1), 4 moderate dysplasias (SIN 2), 6 high-grade dysplasias or carcinoma in situ (SIN3/CIS), 26 microinvasive, and 6 invasive carcinomas. Se, Sp, PPV, NPV, and Ac of NE were 67%, 68%, 80%, 53% and 69%; for AF were 57%, 75%, 78%, 49%, and 63%; for NBI were 86%, 89%, 94%, 78%, and 89%; for LBEC were 79%, 85%, 91%, 68%, and 82%, respectively.

Conclusion. NBI and LBEC confirmed to be a great aid to detecting and monitoring oral potentially malignant diseases, in particular lesions not identified by conventional oral examination or white light examination alone. Even if this report upholds results of our previous researches, larger studies are needed to perform a safe diagnostic protocol in screening and surveillance of oral and oropharyngeal erythro-leukoplakias.

Clinical efficacy of a new medical device composed by sodium bicarbonate and alginate, aloe vera, propoli, chamomile, calendula and honey, in the treatment of recurrent aphthous stomatitis

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Aim. Recurrent aphthous stomatitis (RAS) is a frequent oral mucosal disorder with painful recurrent ulcers. Treatment is not well defined and, since the severe side effects of RAS, it's mandatory to investigate and to deepen alternative therapeutic strategies. The aim of this study is to assess the efficacy of a new medical device composed by sodium alginate and bicarbonate, honey, propolis, calendula, chamomile and aloe vera, compared to hyaluronic acid, in the management of RAS.

Methods. Patients between 12 and 25 years of age with a diagnosis of RAS affered from October 2013 to October 2014 to the Oral Pathology Department of the Dental Clinic of Spedali Civili of Brescia (Italy) were recruited for the study. They were randomized in group A (treated with a new medical device composed by sodium alginate, aloe vera, propoli, chamomile, calendula and honey, in addiction to chlorexidine 0,2%) and group B (treated with hyaluronic acid gel and chlorexidine 0,2%).

Treatment with chlorexidine 0.2% (10ml) were prescribed to be used 3 times/day after the meals for seven days; the buccal gel was used, in group A, three times/day for seven days (10ml per 1 minute) after the chlorexidine rinse, such as hyaluronic acid in group B. Oral aphthous lesions were measured through a ruler to score the diameter length (mm).

The scoring was performed at day 1 (immediately before the beginning of treatment) (T0), after three days of treatment (T1), at day 7 (T2) and at day 10 a (T3) s follow-up by the same two calibrated dentists. Pain was evaluated through the Visual Analogue Scale (VAS) with the same timing of lesions measurement. A statistical analysis was performed.

Results. A total of 27 patients were finally included in the study (group A 14 patients, group B 13 patients) and a total of 66 ulcers (35 for group A and 31 in group B) were analysed.

The difference in the reduction of ulcers between the two groups resulted statistically significative just at T2 ($p=0.0038$) and a statistically significative difference in pain reduction between two groups both at T1 and at T2 ($p<0.005$) was observed.

Conclusion. While a study with a larger sample size is necessary, the present trial demonstrated the efficacy of the new medical device on the healing of RAS ulcers. On the basis of the displayed results, we can suggest that using a device composed by sodium alginate and bicarbonate with aloe vera, calendula officinalis, chamomile, propoli and honey, associated with antiseptic agent, could be considered a valid therapeutic option for minor RAS ulcers treatment.

White sponge nevus: genetic study and histopathological findings in a family

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Aim. White sponge nevus (WSN) is a rare genodermatosis (autosomal dominant disorder) characterized by the presence of bilateral white, corrugated/spongy and diffuse plaques in the oral mucosa, and the cornified surface may peel away from the underlying tissue. In some patients extra – oral sites such as nasal cavity, esophagus, laryngeal,rectum or vagina are affected. Oral lesions typically present in early childhod. We sought to investigate a genetic mutation in the keratin genes assumed to be responsible for a familial case of oral white sponge nevus with associated clinical and histopathologic features.

Methods. The proband patient was a 24 year old female referred to the Department of Oral and Maxillo Facial Surgery University Magna Graecia of Catanzaro with slight symptoms (pain in the last two months) involving extensive white lesion in the mouth. On clinical examination, there were symmetrical white, soft plaques on the buccal and the labial mucosa; the margins were not well defined, oral hygiene was adequate and no lymph nodes were palpable. A review of family history revealed that the 44 year old mother have similar lesions in her mouth, confirmed by clinical examination, suggesting the presence of a genodematosis. We also performed odontoiatric, gynecological and gastroenterological evaluation to detect other white lesion or anomalies (all negative). We performed to the proband biopsy and genetic analysis for our suspect WSN. The histopatologic evaluation of the specimen biopsy was prominent hyperparakeratosis and marked acanthosis with clearing of the cytoplasm of cell in the spinous layer; underlying connective tissue was normal in apparance with rare chronic inflammatory cell infiltration. Genomic DNA was extracted from peripheral blood lymphocytes. DNA samples were amplified at segments of Keratin 4 and Keratin13 genes by the PCR method and then the products were resolved by electrophoresis on 1.2% agarose gel and purified by ethanol precipitation (QIAamp Midi kit; CA, USA). After diagnosis we evaluate, with a clinical examination, all the family and

we find other 4 members affected; no other biopsy or genetic test was performed.

Results. Our report identified the same recurrent mutation N160Del localized in the exon 1 of keratin 4 gene, which results in the removal of an asparagine residue. According with literature we have only 17 reported cases with genetic test with 4 pathogenic mutations in keratin 4 gene (p.160delN, p.153–154insQ, and p.E449K, p.E520K) and 7 mutations in keratin 13 (p.L119P, p.N112S, p.L115P, p.M108T, p.L111P and p.R114H , p.R114H) and we also have mutant mouse models with a missense mutation of p.N154S in keratin 4 that shown to induce the clinical WSN phenotype.

Conclusion. This condition is due to a defect in the normal keratinization of the oral mucosa. Mutations of keratin 4 or 13 gene have been identified as causing WSN. This disease is also known by other name like: Cannon disease, familia white folded dysplasia, hereditary leukokeratosis, white gingivostomatitis and exfoliativeleukoedema. The condition has a high penetrance and variable expressivity and for this reason we have to detect genetic analysis when we have patients with WSN.

Sialometry as a method to study the quantitative salivary secretion

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Aim. The serial evaluation of salivary flow is useful for the diagnosis and prognosis of certain oral and systemic conditions. Mean values of the salivary basal flow are ranging between 0.4 and 0.6 ml/min, while for the stimulated salivary flow the values are estimated to be between 0,79 and 1,9 ml/min. Aim of this study was to analyze the quantitative alteration of the salivary flow in patients affected by oral diseases such as Oral Lichen Planus (OLP), Burning Mouth Syndrome (BMS) and Oral Chronic Candidiasis (OCC).

Methods. Two hundred seventy-one consecutive patients were tested for sialometry spitting mode, to analyze both the volumes of basal salivary flow and stimulated salivary flow. The latter after stimulation by citric acid. The volume of salivary secretion has been measured at 5 and 15 minutes. The patients were divided into 4 groups: Group A, as control group, out of 132 persons, with none clinical evidences for oral diseases; Group B, of 43 patients diagnosed with BMS;Group C, of 62 patients with clinical and histopathological diagnosis of OLP; Group D, of 34 patients with clinical and microbiological diagnosis of OCC.

Results. The volumes of basal and stimulated salivary flow measured at 5 minutes have showed the following values: Group A (healthy subjects): a volume of 1,9 ml and 8,2 ml/5 min, and rate of flow of 0,38 and 1,64 ml/min; Group B (BMS patients): smallest volumes in comparison with the group A, however into the range of the physiological values; Group C (OLP patients): a volume of 2,1 ml and 8,3 ml/5min and rate flow of 0,42 ml and 1,66 ml/min; Group D (OCC patients): a volume of 0,8 ml and 8 ml/5min and rate flow of 0,16 ml and 1,60/min. At 15 minutes, the sialometric values of the basal and stimulated salivary flow have increased proportionally in all groups.

Conclusion. In group A, the collected data are conforming with those reported in the literature, concerning both the flows and volumes of the basal and stimulated salivary secretion. In group B, the data no reflecting the xerostomia sensation, as frequently referred in the majority of the patients. The volumes and flows of salivary secretion are into the physiological values. In group C the saliva secretion has increasing in volume and flow. It could be considered that the chronic inflammation of the mucous membranes leads to an increase in the mucins secretion, for tissues protection. The increasing of the saliva production favors the dilution of irritant compounds in the oral mucosa surfaces. In group D saliva production was lower than the 4 study groups. The decrease of flow even after stimulation could be caused by a reduction of sensitivity of taste receptors, induced by pathological yeast colonization.

Diode laser surgery in Heck's disease treatment

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Aim. Focal epithelial hyperplasia (FEH) or Heck's disease is a rare benign lesion of the oral mucosa associated to human papillomavirus (HPV) subtypes 13 and 32. FHE is found in various ethnic groups such as North, South and Central America, Mexico, and South Africa, with a higher incidence in close communities and among family members, indicating infectious pathogenesis. It occurs mainly in children and young adults of both sexes in the form of multifocal slightly elevated papules on the surface of the lips, cheek mucosa and lateral borders of the tongue. The lesions appear to be varying in size, sessile, of whitish colour or similar to normal adjacent mucosa, with tendency to confluence and erratic clinical course of recurrence. A spontaneous remission can be possible.

Methods. In 2012, a 13-year-old Ecuadorian girl presented to our department. Oral examination displayed several sessile coalescing papules, on the cheek mucosa and which were painless to palpation. Her medical history was negative for a immunosuppressive profile. An incisional biopsy was performed on right labial mucosa. Microscopic analysis showed parakeratosis, acanthosis, epithelial hyperplasia, and koilocytic cells, which confirmed FEH. The patient received therapy with diode laser ablation, (wavelenght 808nm) setting at 1,5W in a pulsated mode, to reduce the layer carbonization of tissues. The patient was monitored with semestral follow-up visits for three years, during which no recurrence of

the pathology was observed. However, it is not possible to predict when FEH lesions will recur or where new lesions will be seen.

Results. At present, 3 year later, the patient has not shown recurrences. The tropism and elasticity of the oral tissues treated with diode laser ablation is found clinically normal.

Conclusion. Several non-invasive treatments have been tested for FEH therapy, such as ablation by use of CO2, KTP and Diode laser. This procedure has a favourable costeffectiveness analysis. We suggest a deep ablation at least below the basal layer to avoid focal recurrence. The diode laser advantages are the photochemistry affinity for haemoglobin, which leads to optimal haemostatic effect associated with the less amount of cicatrization tissue, characterizing the wound healing.

Efficacy of a prevention program to reduce incidence and outcome of osteonecrosis of the jaw in patients exposed to antiresorptive agents

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Background. Antiresorptive agents such as bisphosphonates (BPs) effectively reduce skeletal-related events incidence in patients with metastatic bone cancer and multiple myeloma, thereby placing them at potential risk for developing osteonecrosis of the jaw (ONJ). ONJ onset and progression is due to BPs and many local risk factors, such as periodontal conditions. It is reported that 84% of ONJ patients had periodontal disease, including 29% with advanced disease. Prevention of BPs side effects and ONJ onset and progression is a challenge for medical team, considering Dentist, Dental Hygienists and Physician's involved in BPs prescription.

Aim. To evaluate the association between periodontal disease and ONJ and to assess the impact of non surgical periodontal treatment on oral health in a population at risk for ONJ development.

Methods. In collaboration with the Hematology and Oncology Unit of the University Hospital of Ferrara, Dental Unit developed a preventive program focused on primary prevention of ONJ onset and developed minimally invasive protocol to manage signs and symptoms in all cases of ONJ. All participants underwent a comprehensive oral examination and clinical parameters (PlI, PD, BoP, n. of sites with probing depth > 4 mm) record.

Results. During 24 months observation time 90 patients, elegible for BPs and denosumab treatment (mean age of 67 years age between 33 and 92 yrs) received complete dental preventive treatments, including non surgical periodontal treatment and dental extraction. On average, patients received 12.7 drug treatment cycles (range 1–48 cycles). No ONJ was recorded among treated patients during 24 months. In unadjusted analyses, baseline and 6 months data did differ in terms of average PD, BOP, or percent of sites with probing depth > 4 mm. However, PlI didn't differ significantly.

Conclusion. Although several studies did not find an association between periodontal parameters record and ONJ onset, some evidence suggests that oral infections affect ONJ risk. ONJ is a clinically significant adverse effect of antiresorptive agents. A mandatory preventive program for oral health, involving a multidisciplinary team should be developed for all patients elegible for antiresorptive agents.

Oral biopsy and diode laser: preliminary histomorphological observations

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Aim. The versatility of diode laser in the surgical procedure of the oral tissues is applied to treat a growing range of oral mucosae benign conditions. The photothermal interactions yielded by laser beam focalization on the tissues are cause of the histologic modifications which may be observed along the tissue thickness. Aim of this retrospective study was to analyse comparatively the histologic pictures of biopsy specimens, performed within the same lesion, by use of scalpel in comparison to those carried out by diode laser 810 nm.

Methods. Three patients groups, each of which was composed of 10 patients, were underwent to incisional biopsy by double sample obtained within of the same lesion, the first performed by scalpel, the second by diode laser with wavelength of 810 nm, 2W of power, a super-pulsed modality with a T-on of 10ms and a T-off of 10 ms, and frequency of 50Hz.

Each group was characterized by different lesional typology (fibroma, oral lichen planus, and oral leukoplakia). The interventions were performed by the same operator, with a perilesional incision and inclusion of a portion of apparently healthy tissue, with a minimum depth of 3 mm in the submucosa. The histomorphological analysis of the tissue specimens was carried out by the same pathologist, responsible for drafting of the microscopic diagnosis.

Results. Between the 3 types of lesions, the fibromas appeared as the histologic pictures more easily analyzable in order to formulate the histopathological diagnosis, as well for specimens obtained by diode laser. Diagnostic drawbacks were observed on the pathologic pictures of oral lichen planus and oral leukoplakia associated with dysplasia. Particularly, in the lichen planus cases the laser-induced tissue vacuolation was ob-

served often near the basement membrane and/or in the underlying chorium, complicating the identification of pathologic features that distinguishing these lesions.

Conclusion. Observations of the present study introduce at a widening of the investigation aimed to the determination of use parameters, peculiar for each lesion, to hold the tissues temperature below threshold of biologic damage.

Osteonecrosis of the mandible associated with bevacizumab therapy in ovarian cancer

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Aim. Bevacizumab is a humanized antibody that blocks vascular endothelial growth factor and it is of value for the treatment of some types of advanced cancer. To date, only several cases of osteonecrosis of the jaws (ONJ) associated with bevacizumab, without any association with bisphosphonates, have been reported. An unusual case of bevacizumab-ONJ related in ovarian cancer is here reported.

Case report. In June 2013, a 75 year-old woman underwent a bilateral hysteroannessiectomy with omentectomy for un undifferentiated stage IIIc ovarian tumour. Since July 2013 she was treated with six cycles of chemotherapy (carboplatin + paclitaxel), in association with bevacizumab (Avastin) and those of 15 mg/kg every 3 weeks. In December 2013, she was in complete remission on CT (Computed Tomografy) scan, and since January 2014 she receved a maintenance therapy with Bevacizumab alone.

In August 2014, she was referred to the Maxillofacial Surgery Unit of Alessandria Hospital, showing gingival retraction and disfconfort granuloma in right mandible, with no evidence of bone disease and OPT Radiography. Only oral health misures were adviced.

In November 2014, she suspended the administration of bevacizumab for a clinical doubt of ONJ, with a little area of bone expose and the lingual side of mandible She refused surgical intervention and underwent only antibiotic therapy. In December 2014, while waiting for CT scan ,she reported spontaneous expulsion of a small hard fragment from the area of exposed bone. CT scan showed an area of bone loss on lingual border and disappearance of the cortical. Afterwards the patient reported no symptoms and the area of bone exposure (47-48) completely closed after expulsion of the sequestrum. To date, the patient is free from any additional signs of ONJ.

Conclusion. The present case reinforces recent speculation that the antiangiogenic properties of bevacizumab may represent a potential source of osteonecrosis of the jaws in patients undergoing cancer treatment. Ovarian cancer patients receving hight doses of bevacizumab for long duration time (>12 months) could be and new population at risk of ONJ and reserve carefull oral evaluation and follow-up.

Palatal ulcer in a case of acute myeloid leukemia treated with sorafenib

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Background. The most frequently observed oral findings at diagnosis of acute leukemia are mucosal bleeding and ulceration, petechiae, and gingival hyperplasia. In the last decade the survival to acute myeloid leukemia didn't show any improvement, because there isn't a common treatment for this neoplasia. Different clinical trials have been done to highlight the efficacy of new chemotherapic drugs against leukemia, but none gave encouranging results on a wide sample of patients. Sorafenib is a novel oral multitargeted thyrosine kinase inhibitor of VEGFR, PDGFR, C-Kit and the RAF-1 protein. It induces both tumor apoptosis and disruption of the tumor vasculature. Metabolism of sorafenib occurs primarily in the liver by the CYP 3A4 system and by glucuronidation mediated by UGTIA9. The range of potential adverse effects is wide and may affect many systems and organs including gastrointestinal, cardiovascular, endocrinologic and metabolic, dermatologic, and others.

Case presentation. Acute myeloid leukemia was diagnosed in a 32-years old man in March 2013. Tumoral cells were positive for FLT-3 ITD and NPM1 3, which were molecular target of a more aggressive leukemia. The patient underwent different chemotherapic procedure (DCE and FLAG-IDA) without any positive evolution of the illness. Seven months after diagnosis, the patient underwent autologous stem cell transplantation (ASCT) and 5 months later an allogenic stem cell transplantation was performed. He developed a graft-versus-host disease with cutaneous and enteric manifestations, which were well treated. From February 2014 the patient was assuming Sorafenib with dermatological side effect: cutaneous ulcers which healed after aspecific treatment and without drug holiday. On November 2014 the patient was referred to our unit, for a strongly painful ulcer, 15 mm wide, of the left hard palate, that had appeared seven days before as a small ulcer. The patient was subjected to incisional biopsy of the ulcer. The istopathological analysis demonstred an unspecific ulcer. Microbiological and blood exams didn't show any particular alteration, a part from the immunodeficiency. No further examination could be carried out because the patient passed away on December 2014 for respiratory failure.

Conclusion. The onset of oral ulcers in immunodeficient patients requires an evaluation in order to primarily assess potential infective or neoplastic conditions. Particularly in case of haematologic malignancy an oral localization of the primary has to be ruled out. Afterwards a through evaluation of potentially drug-induced ulcer is mandatory. The antiangiogenic effect of sorafenib has been related to the onset of jaw osteonecrosis, while data on its potential effects on soft tissue are more scanty; nevertheless in the present case a potential side-effect of sorafenib can be hypothesised.

Narrow band imaging as a diagnostic tool in oral potentially malignant epithelial lesions and squamous cell carcinoma. Analysis of a case series

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Aim. Narrow band imaging (NBI) is a non invasive optical technique that enhances the mucosal surface texture, and mucosal and submucosal vascular morphology; endoscopy with NBI systems has been successfully used in detecting neoplastic and dysplastic lesions in the pharynx, larynx, upper aerodigestive tract, gastrointestinal tracts and urogenital tracts. The aim of this study was to analyze a case series of 12 patients affected by oral potentially malignant conditions or squamous cell carcinoma (OSCC) evaluating the correlation between the clinical appearance of the oral mucosal condition, the patterns of intraepithelial microvasculature of NBI and histopathology.

Methods. 12 patients referred to the oral diagnosis, ENT or maxillofacial clinical units of the DISS head and neck clinical department for mucosal diseases and conditions were submitted to (i) conventional oral examination (ii) fiberoptic videoendoscopy and/or endoscopy with NBI (Olympus CV-170 Imaging Platform®) and (iii) incisional biopsy in the relevant areas of the mucosal lesions.

Demographics, risk factors and medical data were recorded; clinical pictures and endoscopic pictures collected. Surgical incisional biopsies were obtained from significant areas of the diseased mucosal surfaces employing the clinical aspect and the NBI macroscopic and microvasculature appearance as a guidance to the biopsy area selection.

Results. Three patients with leukoplakia or verrucous leukoplakia were observed, three with oral lichenoid lesions, one with oral erytroplakia, five with clinical suspect oral carcinoma or suspect recurrence of previous OSCC. The definitive histopathological diagnosis were benign hyperkeratosis and/or low grade dysplasia in patients with leukoplakia, oral lichen planus without or with focal dysplasia in patients with lichenoid lesions and squamous cell carcinoma in patients with erythroplakia or clinical suspect carcinoma. In carcinomatous lesions the NBI appearance of mucosal surface color and texture and the intrapapillary capillary loops (IPCL) aspect were consistent with the microvasculature patterns described in the modified Takano's classification for oral mucosa.

Conclusion. While the results of NBI observation in benign and inflammatory conditions are not specifically diagnostic, the NBI endoscopy could be a useful tool in identification of oral mucosal areas affected by squamous cell carcinoma; the NBI macroscopic appearance of the texture and color of mucosa and the microvasculature patterns could suggest the presence of epithelial malignant disease helping in the patient case finding and in the surgical management of disease.

Implant-supported prosthetic rehabilitation in a patient with infiltrating epidermoid carcinoma of the tongue

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Aim. This study wants to show the more suitable therapeutic choices for the prosthetic rehabilitation which can improve the health and quality of life of patients suffering with oral carcinoma. The profound alteration in both soft and hard tissues of these patients represents indeed an important clinical challenge for a correct prosthetic rehabilitation.

We will depict how these difficulties can be overcome using endossus dental implants.

Methods. The case refers to a 70-year-old Caucasian woman with a right hemiglossectomy's history, caused by an infiltrating epidermoid carcinoma, came to our ward for a new prosthetic rehabilitation. The patient presented a total edentulia in lower dental arch, a reduced mandible bone density and the interrelated total lack of lingual and vestibular fornix. After considering her previous expositions to a radiotherapy treatment and after making multidisciplinary valuation about her generally compromised health status, the implant-supported prosthesis rehabilitation was carried out with an overdenture medical device supported by two implants, Biosafin Winsix 3,8 mm x 11 mm internal hexagon, placed in the interforaminal area, based on locator.

Results. The functional rehabilitation is an essential point in the treatment of patients suffering with oral carcinoma, especially when physical functions are related with the patient quality of life. When missing teeth are not replaced with prosthesis, the quality of social patient's life can get worse both for healthy and oncological patients. In oncological patients the prosthetic rehabilitation frequently presents a variety of problems due to both their post oncological anatomic conditions, and to their predisposition to undergo other surgical invasive operations. In this clinical case, the prosthetic rehabilitation inserting only two osseointegrated implants provided the achievement of all therapeutic objectives: it guaranteed a perfect physical function and good aesthetic results but it did not weigh on the already compromised patient condition. The management of the prosthetic rehabilitation and the achievement of good functional/aesthetic results is as important as the management of the disease. The correct functions of speech, mastication and swallowing allow the patient an adequate standard of living. This modern dental treatment confers a great importance to these functional factors in order to reach optimal results.

Conclusion. After making multidisciplinary valuations, we can say that this kind of implant-supported rehabilitation could be also reliable for those patients with several systemic disease caused by the treatment with radiotherapy and chemotherapy. We can reach good and suitable results just applying simple implant-prosthetic solutions even in patients with systemic or local physical problems, and even in patients who cannot economically afford or physically/psychologically tolerate this therapy. The patients and we declare us satisfied with the results of this treatment.

Multidisciplinary approach in the treatment of oral mucositis and ulcers related to graft *versus* host disease

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Aim. The aim of this study is to assess safety and efficiency of non transfusional use blood components (Platelet gel and Platelet Rich Plasma) in the treatment of oral mucosa lesions due to Graft Versus Host Disease (GvHD) developed after allogeneic Hematopoietic Stem Cell Transplant (HSCT). We focused also in identification of pre-transplant stomatological risk factors related to oral GvHD occurrence and follow up.

Methods. All patients designed to allogeneic HSCT at the Department of Haematology, Stem Cell Transplant Unit, were submitted to dental evaluation through orthopanoramic RX and dental videat at the Department of Special Odontostomatological Pathology in Policlinico Tor Vergata of Rome; all oral pathologies virtually dangerous to the transplant outcome were removed. Then we continued a monthly follow up for 1 year after the transplant procedure. For those patients who showed the presence of oral ulcers as a manifestation of GvHD we proceeded to topic treatment using platelet gel obtained by "Vivostat" System, we established twice a week follow up until the resolution of symptoms and then monthly up to 5 years after the transplant.

Results. On average of 50 allogeneic HSCT/year, in the last year 3 patients developed oral ulcers due to chronic GvHD and needed topical application of Platelet gel in addition to systemic therapy based on steroids and photoapheresis. The response to treatment was evaluated by ulcers reduction and regression of the painful symptoms and was obtained after a median of 4 platelet gel application (range 2 – 12). Every patient showed pain disappearance after the second topical application already. Local epithelization process and the consequent improvement of ability to swallow were also documented.

Conclusion. Although those preliminary data require to be confirmed by larger sample of patients, efficacy and safety of platelet gel is confirmed. Topical use of platelet gel could be considered as a useful and safe treatment option for oral mucosa ulcers caused by GvHD acute or chronic. Moreover, the pre- transplant dental evaluation could lead to identification of risk factors for the onset of oral manifestation due to GvHD. According to us a multispecialist collaboration is the best way to establish the most accurate treatment plan to avoid and to deal post treatment complications ensuring a better life quality to the patient as soon as possible.

Timing of onset of osteonecrosis of the jaw associated to bisphosphonates and antiresorptive/antiangiogenic therapy: preliminary data

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Aim. To evaluate timing of onset of osteonecrosis of the jaw (ONJ) after therapy with NBP (amminobisphosphonates) alone or in combination with anti-resorptive (AR)/antiangiogenic (AA) drugs.

Method. A retrospective analysis of patients with diagnosis of ONJ related to NPB, administered alone or in combination with AR/AA drugs was performed. Data regarding drug-related risk factors (*i.e.* molecular agent, way of administration, time of therapy, concomitant drugs), clinical/radiographic features, SICMF-SIPMO staging, and local/systemic risk factors (*i.e.* dental extractions, incongruous prosthesis, concomitant diseases and related drugs) were reviewed. Subjects enrolled were grouped as osteoporotic (group A) and oncological ones (*i.e.* multiple myeloma or bone metastasis; group B).

Results. A total of 61 subjects with ONJ consecutively referred from June 2012 to January 2015 to the Sector of Oral Medicine, University of Palermo.

Group A included 25 patients (F/M=23/2; middle age=74,8 yrs) treated with NPB (median duration of therapy: 68 months), none in combination with AA/AR drugs.

The staging at the onset of ONJ was: 1a= 7/25; 1b=11/25; 2a=1/25; 2b=3/25; 3=3/25. About the site, 18/25 case were located in the mandible and 7/25 in the upper maxillary.

Group B included 36 patients (F/M=22/14; middle age=70,2 yrs), divided in a first subgroup (14/36; 38,8%) treated in mono-therapy with NPB and a second subgroup (22/36; 61,1%) subjected to combined therapy (NPB+AR/AA drugs). Overall median duration of therapy was of 27 months: duration of drug exposure was shorter among patients of second subgroup (24 months) than among those subjected to mono-therapy (32 months). Other relevant effect on clinical presentation of ONJ was observed among the two sub-groups in terms of staging. In the subgroup of mono-therapy, 57,1% of patients have been staged as early ONJ cases (1a/b) and 42,9% as advanced/complicated cases (2a/b and 3); in the second sub-group, 40,9% of cases were early ONJ cases and 59,1% were advanced/complicated ones (χ^2 p value: 0,02). About site distribution, no differences were observed among previous subgroups (mono-therapy-related ONJ: mandible=10/14; upper maxillary=3/14; both=1/14; combined therapy-related ONJ: mandible=17/22; upper maxillary=4/22; both=1/22).

Conclusion. The combination of NPB drugs with AR/AA agents, still less administered among osteoporotic patients, is very frequent among oncological patients, in fact in the present retrospective study about 60% of ONJ patients were subjected to this therapy.

The findings of the study, moreover, suggest that the association of NPB and AR/AA agents could produce relevant effect on the onset of ONJ in terms of reduced duration of drugs exposure before the complication and of speed of ONJ worsening, that is more frequently in mono-therapy patients, having a severe ONJ stage.

Although the exact mechanisms of this combined effect in the development of ONJ are not still clarified, the primary dental prevention for patients candidate to NPB+AR/AR therapy appears as essential, especially among cancer patients.

Oral cancer awareness and relation to lifestyle and behavior campaign among middle school students

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Aim. Oral cancer represents one of the most common but scarcely known malignancies worldwide. While epidemiological data have been consistent for many years showing that it developed mostly in male individuals over the fifth decade, latest data report an increase in the occurrence in younger and female individuals. Furthermore, its total incidence is continuously increasing in all cathegories. Despite of a general decrease in mortality rate in most of major cancer types, oral cancer's survival rate has remained stable over time (about 50%), strongly depending on disease stage at diagnosis. Unfortunately, most patients and several clinicians are not aware of the problem and may not pay attention to early signs, leading to major delays in diagnosis and thus affecting patients' survival. Etiology of oral cancer is strongly related to lifestyle habits and behavior, especially tobacco smoking, alcohol abuse, exposure to solar radiation and HPV infection. The mean age of individuals who start smoking and alcohol drinking is decreasing, thus people are starting to expose themselves to risk factors in young age. The aim of our campaign is to test the awareness and increase knowledge of oral cancer and its risk factors among young preadolescents.

Methods. A lecture about carcinogenesis, oral cancer epidemiology, characteristics and risk factors has been prepared by clinicians attending the Oral Pathology and Medicine Department of the University of Trieste School of Dentistry. In addition, two questionnaires have been redacted: the first to test the knowledge and awareness of oral cancer and its risk factors to be submitted before the lecture, and the second to test the understanding of the lecture key facts and the appreciation of the initiative after the lecture.

Results. The lecture and questionnaires have been submitted to 125 middle school students from 12 to 14 years old. From the results of the pre-lecture questionnaire, 36.8% of the students' family members or friends experienced cancer. Only 24.8% of the students knew about the existence of oral cancer and most of them didn't recognize it as a malignancy. The majority had heard about it from school and family/friends, but only 16% from the dentist. 4% among the students' family members or friends experienced oral cancer. After listening to the the lecture, the students answered differently to questions regarding risk factors, survival rate, early diagnosis ($p<0,0001$), increasing their awareness about the disease. Students were then asked to assign a vote from 1 to 10 to the appropriateness of such campaign (mean vote 8,8) and to the overall appreciation (mean vote 8,8).

Conclusion. Our survey confirmed that oral cancer awareness is generally low. Social campaigns, especially among young students, seem to be appreciated and may be helpful in increasing knowledge about risk factors, that are highly related to lifestyle habits and behavior.

Follow-up of non-exposed ONJ related to bisphosphonate: a two-year study

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Aim. Osteonecrosis of the jaw (ONJ) is a serious side-effect of amine bisphosphonate (NBP) and/or other antiresorptive agents frequently used in the management of osteometabolic and cancer-related condition. The traditional ONJ definition exclude patients who present the non-exposed variant. However, according to recent data, staging and monitoring of ONJ should be closely linked to clinical and radiological manifestation regardless of the presence of bone exposed. The aim of this study was a descriptive analysis of a case series of patients with non-exposed ONJ (exclusively related to NBP) monitoring for two years.

Methods. From 2012 to 2014, 16 patient [7 oncological (F/M=3/4; mean age=66,28 years) and 9 osteoporotic (F/M=9/0; mean age=67,22 years)] with non-exposed ONJ, clinically and radiologically confirmed, were consecutively enrolled. All oncological patients took zolendronate (IV); the majority of osteoporotic patients (44,4%) used alendronate (OS). All patients were staged at diagnosis (T0) and treated according to SICMF/SIPMO recommendations (www.sipmo.it); then were monitored for 24 months especially focusing on bone exposition. During the follow-up period, data on symptoms (presence/absence of pain) and/or clinical and radiological ONJ status (i.e. reduction or extension of necrotic bone, occurrence or remission of intraoral/extraoral fistula) were registered. Finally, a new staging was carried at the end of monitoring time (T1). A descriptive analysis was performed.

Results. At T0, 8 patients (50%) were staged as early ONJ (stage 1), 6 patients (37,5%) as advanced (stage 2) and 2 patients (12,5%) as complicated (stage 3). At T1, among the 8 patients with stage 1, 6 maintained the non-exposed bone condition and 7 the same stage; for the 6 patients with stage 2, 2 maintained the non-exposed bone condition, 2 healed and 2 died during the follow-up period. About pain, the majority of patients (62,5%) have experienced an improvement of their symptoms.

Conclusion. In the majority of supervised patients, the bone exposition has not occurred during the two years of follow-up. As well as for diagnosis, also for the monitoring of patients of ONJ, other clinical ad instrumental features must be considered.

Epithelial thermal damage induced by laser in the treatment of vascular anomalies in the oral cavity

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Aim. Vascular anomalies are an heterogeneous group of circulatory system's disease which can af-

fect arterial, venous or lymphatic vessels. Classification of hemangiomas and vascular malformations was still a source of considerable difficulty and controversy, due to the heterogeneity of the clinicopathologic entity and the confusion generated in the past by many popular medical definitions and rooted in common use. The International Society for the Study of Vascular Anomalies (ISSVA) classified the vascular lesions into vascular tumors and vascular malformations (low and high flow) on the basis of their natural biologic behavior and functional hemodynamic peculiarities. Vascular tumors are characterized by endothelial proliferation while vascular malformations are characterized by different morphogenic vessels and have stable endothelial turnover. Patients with intraoral vascular lesions commonly have no symptoms but complications including bleeding, ulceration, functional and aesthetic problems, can occur.Many treatments, such as conventional surgery, embolization, steroid therapy and laser therapy, are available for vascular lesions. The aim of this study is to describe epithelial thermal damage during the use of Diode laser and suggest a technique to avoid it.

Methods. In order to obliterate the vessels, lasers used to treat vascular lesions must have affinity to hemoglobine to obtain photothermolysis with micro-agglutination of intra capillaries red blood cells. Instrumental examinations such as Color-doppler-US and/or Magnetic Resonance Imaging (MRI) allow to know the depth and the extension of the lesions. The laser approach relies more therapeutic techniques: the transmucosal thermophotocoagulation (TMT), intralesional photocoagulation (ILP) and the combination of these two techniques. The TMT is based on laser irradiation without contact of the fiber with the tissue. The distance from the lesion surface is about 2-3mm. For a more safe execution of the TMT, a transparent glass slide is put over the lesion to reduce lesion thickness and to facilitate the laser action. The ILP treatment allows the laser to focus its energy directly into the lesions.The tissues hired by the laser beam underwent a rapid overheating with different consequences depending on the temperature reached. Exceeding the temperature of 300°C the tissue is carbonized and the result is a scar.To avoid this thermical damage, Miyazaki suggests to use a multiple-spot tecnique with single pulsed wave instead of the continous one to prevent the overlap that can cause the increasing of the temperature in the involved area.During the use a whitening of the lesion is observed.In the multiple-spot tecnique the margins of each application of 2–3 mm are separated by at least 2–3 mm, similarly to "leopard" spots. This method results useful for superficial lesions (almost 1 cm), while for deeper lesions is necessary the combination of the two tecniques (multiple-spot TMT+ILP).

Results. Multiple spot irradiation technique with a single pulsed wave avoids thermal accumulation, decreasing the incidence of erosion without loss of therapeutic effect and avoiding carbonization of adjacent tissues.The great advantage of this technique is that a reepithelization takes place smoothly from the margins of remaining untreated normal mucosa. This approach allows to remove the lesions with good healing and aesthetic results.

Conclusion. Today laser is demonstrated to be the gold standard technique to treat vascular lesions that allows a safe and efficient treatment and a lower postoperative healing time. The only disadvantage is the risk of carbonization that could be avoided by using the multiple-spot single pulsed wave technique, as Miyazaki suggests.

Paresthesia of the lip caused by a large osteoma of the mandible treated with a conservative approach: a case report

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Aim. This study focused on a case of paresthesia of the right lip caused by an extensive osteoma of the mandible. This lesion has been subsequently removed with surgical excision and curettage avoiding nerve injury.

Methods. A twenty years old boy referred to our institute for a paresthesia of the right lip from one month. Ortopantomography and CT-scan revealed the presence of a large and well defined osteosclerotic lesion between elements 4.5 and 4.6. After three-dimensional reconstruction it was evident that the lesion was not in contact with the alveolar nerve, so paresthesia could be probably due to an inflammation or indirect nerve compression. The lesion determined a complete resorption of the mesial roots of the elements 4.5 and 4.6 . The patient did not report the presence of other systemic pathologies.

Results. It was performed an incision between elements 4.7 and 4.4 and full-thickness flap was raised to highlight the entire lesion. To obtain a correct visualization it was necessary the extraction of the elements 4.6. After the excision of the lesion, a curettage with rotary instruments was performed to decrease the probability of recurrence. The surgery was performed under local anesthesia and the patient was discharged after three days of observation. Histological examination revealed that the lesion was a benign osteoma of the right mandible. The conservative approach was preferred in order to avoid permanent injury of the inferior alveolar nerve. The reappearance of sensitivity occurred after a period of about nine months. At two years follow up it has been seen the absence of recurrence, and a complete sensitivity recovery.

Conclusion. We report a case of an extensive osteoma of the right mandible involving the medial roots of the first molar. Osteomas are benign osteogenic bone tumors arising from the proliferation of compact or cancellous bone. Osteomas are usually asymptomatic and have a very slow growth rate. A correct excision has been achieved with a conservative approach avoiding recurrence and the appearance of permanent nerve injury.

Low-level laser biostimulation in patients affected by mucous membrane pemphigoid gengivitis

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Aim. Mucous membrane pemphigoid in an immune mediated subepithelial blistering disease consisting of heterogeneous subgroups.

Previous studies showed that gingival localized lesions can improve with periodontal treatment.

The present study was designed to evaluate the efficacy of a low level laser biostimulation (LLL-B) associated with periodontal therapy versus periodontal therapy alone in patients affected by mucous membrane pemphigoid gengivitis.

Methods. 8 patients (7 female, 1 male), attending the Oral Medicine Section of the Lingotto Dental School, Turin Molinette Hospital, with a histological diagnosis of mucous membrane pemphigoid were enrolled in this study. None of these patients had pharmacological therapy for pemphigoid in the last six months.

In each patient gingival lesions were randomized in two groups; the first group of lesions were treated with non surgical periodontal therapy (scaling and root planning, SRP) and biostimulation with a low-level laser (Diode Laser 980nm, DMT SrL), 10 applications, the second one with nonsurgical periodontal therapy.

Each laser session was performed delivering a fluence of 4J/cm^2.

Sign and symptoms were evaluated at each visit. Visual analogue scale (VAS) was used for symptoms: the VAS consisted of a 10 cm horizontal line marked 0 (=no pain) to 10 (=most severe pain ever experienced).

For signs an Activity score were used, as reported in other studies (site score x severity score).

Results. At the end of the protocol, both groups improved signs and sympthoms. SRP+laser had better results compared with SRP alone. The difference was statistically significative (Wilcoxon test, $P<0.05$).

Conclusion. It is unclear how LLL-B works: it has been suggested to reduce inflammation by lowering, in a dose-dependent manner, levels of prostaglandin E2, prostaglandin-endoperoxide synthase 2, interleukin 1 beta, tumor necrosis factor alpha, the cellular influx of neutrophil granulocytes, oxidative stress, edema.

Other mechanism may be related to stimulation of mitochondrion to increase the production of adenosine triphosphate.

Laser biostimulation can obtain different biological reactions, without undesidered adverse effects, reducing the pharmacological support.

Low level laser biostimulation and periodontal therapy can help clinicians in the management of mucous membrane pemphigoid gengivitis. We showed a statistical significance in the different clinical scores after treatment.

Larger studies are necessary to confirm these conclusions.

Spontaneous healing of osteonecrosis of the jaw after interruption of target therapy in a patient with lung cancer

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Aim. Pamidronate or pamidronic acid is an aminobisphosphonates, used in the prevention and treatment of osteoporosis, in the therapy of Paget's disease, of osteogenesis imperfecta and of bone metastasis associated to breast or lung cancer, and of multiple myeloma. This drug exerts a strong inhibition of osteoclast activity slowing down tumor osteolysis. One of the most rare and severe adverse event of pamidronic acid is osteonecrosis of the jaw (ONJ). Another cancer cure is the target therapy that identifies and attacks cancer cells more precisely, causing usually little damage to normal cells. FDA summary has reported 13 cases of osteonecrosis of jaw after topotecan (one of the cancer target therapies) administration, with a rate equal to 0,7813% (http://factmed.com/studyTOPOTECAN-causing-OSTEONECROSIS%20OF%20JAW.php).

Case report. In May 2014, a 59 years old man was evaluated for pain of right posterior lingual mandibular region. Extraorally, swelling of right midface was present; furthermore, intraoral examination, and in particular of mentioned site, showed bone exposure, and erythematous soft surrounding tissues with purulent discharge with a clinical-radiologic diagnosis of ONJ associated to medications.

He made mention that in January 2014 a small cell lung cancer diagnosis with bone metastases was made and intravenous infusions of pamidronate were administrated from January to April 2014. In April 2014, also antiblastic chemotherapy with topotecan (two monthly cycles) was managed due to the worsening of the neoplastic disease. In the area of osteonecrosis, orthopantomography showed a bone trabecular radiopacity by osteosclerosis; TC scans showed a diffuse hyperdensity of trabeculaes of the jaw, and in site of missing 4.8, a millimetric solution of continuous of lingual cortical, with detachment of a bone fragment (6 mm), was attributed to the areola of osteonecrosis with small sequestration.

In agreement with the oncologist, pamidronate and topotecan were suspended and systemic antibiotic (ampicillina/sulbactam intramuscularly twice daily for 8 days and metronidazole 250 mg per os twice daily for 8 days) and local antiseptic (chlorhexidine 0.2% mouth rinses and 0.5% chlorhexidine gel) therapies were administered.

After one month, a complete healing of the buccal mucosa, after spontaneous elimination of a necrotic bone fragment, was observed.

Conclusion. As known from literature, the toxic action of amino bisphosphonate associated with anti-angiogenic drugs, used in target therapy of cancer, could increase the risk of osteonecrosis of the jaw. Pamidronate, one of most powerful of aminobisphosphonates following zoledronic acid- could be responsible of ONJ. Together with topotecan, an antiangiogenic

drug, could be associated with an incresead risk. The discontinuation of both drugs was found to be associated to the spontaneous healing.

The surgical treatment of mandibular peripheral calcifying epithelial odontogenic tumour (pindborg tumor) with Er,Cr:YSGG laser: a case report

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Aim. Calcifying epithelial odontogenic tumor (CEOT) is a rare, benign, locally aggressive odontogenic epithelial tumor that affects the jaws. It is also referred as Pindborg tumor.

Topographically two entities have been distinguished: intraosseous (central) and extraosseous (peripheral). Numerous surgical treatment modalities have been suggested, and the treatment plan is dependent on multiple factors such as size and location of neoplasm, general condition of patient and operator skill. Small lesions with not bone involvement and well-defined borders could be treated by conservative surgical approach. The aim of this case report was to propose a new treatment modality of peripheral CEOT using Er, Cr: YSGG laser.

Methods. A 55-year-old male was referred to our oral medicine surgery for a single, slowgrowing, painless, fibrous, gingival swelling. Past and medical history did not reveal any relevant information. He was taking no medication and had no history of known drug allergy. The intra-oral examination revealed a sessile mass of approximately 1,2 x 0,7 x 0,3 cm in size involving the left lingual mandibular alveolar process. The overlying mucosa showed an ulcer due to chronic trauma by chewing. On palpation, growth was no tender, no fluctuant, hard and fibrous in consistency. CT-scans did not indicate any bone involvement. Treatment plan comprising of excisional biopsy of the lesion using an Er, Cr: YSGG laser was planned. An incision was made including the overall mass, the lesion was lifted along with the underlying perosteum from the bone surface and removed. Haemostasis was achieved by laser and healing was obtained for second intention. The specimen was sent for histological examination.

Results. Histopathological assessment showed sheets of polyhedral epithelial cells with well-defined borders, arranged in a pseudoglandular pattern. The cells were separated by thin bands of connective tissue in areas showing deposits of amorphous eosinophilic material. Small foci of calcifications were also noted. Diagnosis of CEOT was formulated. The postoperative course of the patient was uneventful, and there was no evidence of disease at the 2-year follow-up.

Conclusion. A new conservative surgical treatment with Er, Cr: YSGG laser was proposed for the treatment of a peripheral CEOT. This approach was possible since the lesion was small without characteristics of malignancy. It appeared to be efficient being minimally invasive and offering many clinical advantages (minimal intra-operative bleeding, haemostasis, reduced times of healing).

Medication-related osteonecrosis of the jaw: a 4-year experience

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Aim. Bisphosphonates, antiresorptive (mainly Denosumab) and antiangiogenic therapies are widely used in the management of metastatic disease involving the bone and in the treatment of osteoporosis. Patients are referred to our clinic aiming to: 1) evaluate the oral conditions of the oncologic and osteoporotic patients before the beginning of the therapy with bisphosphonate in order to reduce as less as possible the oral risk factors, 2) follow up patients during all the period of treatment in order to intercept as soon as possible the onset of the disease and 3) plan the treatment in case of bone necrosis.

Methods. Data on patients observed in a 4 years period have been collected with particular attention for indications to treatment, medication type, incidence, treatment and prognosis of medication-related osteonecrosis of the jaw (MRONJ).

Results. From May 2011 until December 2014, 199 patients (84 males, 115 females) taking bisphosphonates or antiresorptive or antiangiogenic drugs were referred to our Department. Patients with oncologic diseases represents the 90% of subjects: 20% were affected from breast cancer, 32,6% prostate cancer, 15,5% lung cancer, 28,2% other malignant tumors with bone metastases. Osteoporotic patients represented only 10% of the sample and treated with oral bisphosphonates (alendronate). MRONJ occurred in 28/199 patients (14%), after a mean latency time of 36 months after the first assumption of medication. 68% of patients with MRONJ (19/28) were oncologic patients. 42% were affect of breast cancer, 15% prostate cancer, 15% multiple myeloma and 28% other tumors. The most relevant complication was pain, observed in 80% of cases. 60% of the MRONJ was localized in the mandible, 35% in the maxilla, and 5% in both mandible and maxilla. 57% of the MRONJ occurred after extractive procedures, 18% in patients with removable prosthesis, 20% were considered spontaneous and only 5% occurred on a site of periodontal disease. Surgical treatment was performed in case of exposed and necrotic bone or fistulas that probes to bone associated with infection as evidenced by pain and erythema in the region of exposed bone with or without purulent drainage (stage 2). On the base of such indications, 16 patients were treated, with 2 patients presenting relapse in less than 6 months, corresponding to a success rate of 88%. Patients were mainly treated under local anaesthesia, only with performing debridement of necrotic bone. In six cases (stage 3) the extension of bone necrosis required a segmental ostectomy under general anaesthesia. These surgical approaches had similar success rate.

Conclusion. Since the discovery of bisphosphonates-related osteonecrosis of the jaw, there has been increasing evidence in recent years of osteonecrosis induced by drugs other than bisphosphonates, mainly agents with antiangiogenic and antiosteoclastic activity. Patients assuming antiresorptive medications for osteoporosis are less often referred for prevention of MRONJ and usually come to specialized clinics when MRONJ is already underway.

Epidemiology of post-operative complications after exodontic surgery: a retrospective study

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Aim. The aim of this study is to evaluate the frequency of complications after exodontic surgery, and the relations existing between complications and patient's related systemic factor such as smoking habits, systemic disease and pharmacological treatments which could negatively affect wound healing.

Methods. 1296 exodontic interventions carried out during six months of 2009 in the Clinical Unit of Oral Surgery in Trieste were examined. Anamnestic information and drugs adsorption about all patients were collected, together with habits (smoking). Exodontic interventions were divided into simple and surgical (have been considered surgical extraction if flap and ostectomy were performed), frontal and posterior maxillary and mandibular sites were considered distinguished and teeth were divided into primary teeth, permanent teeth and root residuals. All details regarding the intraoperatorial behaviour were collected, such as use of adrenalin in anaesthesia, surgical approach, type of stiches used, haemostasis technique, intraoperative complications and the number of extracted teeth. We also considered the eventual prescription of drugs before or after surgery, such as antibiotics, FANS or corticosteroids.

Results. 97,1% of extractions did not have post operatory complications. Among the complications, alveolitis, the infectious one, was the most frequent (1,2%), followed by edema (0,7%), bone spicule formation (0,7%) and late haemorrhage (0,3%). Considering all the parameters collected, the only one which seems to be in correlation with alveolitis complication is smoking habits.

Conclusion. In the majority of cases, when exodontic surgery is well conducted, preventing excessive bleeding, using stiches, pre-medicating special needs patients and prescribing drugs to patients who underwent more aggressive surgery, post operative complications are preventable. Bone spicule formation, late haemorrhage and paraesthesia are mostly related to morphological features of surgical sites or to anatomic characteristics. Alveolitis frequency, instead, seems to be related only to smoking habits. All the considered parameters regarding anamnestic collection or drugs absorption, have an equal distribution in patients who had no complications and patients who had alveolitis. If we consider smoking, instead, we can notice how in the totality of patients smokers are only a limitate slice of population (around 27%), while among patients with an alveolitis the percentage of smokers is considerably higher (53%).

Usefulness of micro-biopsy in the follow-up of oral lichen planus: case report

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Aim. Oral lichen planus (OLP) is a relatively common potentially malignant disorder of uncertain etiology with an annual malignant transformation rate lower than 0.5%, without any chance to prevent it. Such feature makes clinical and when needed histological followup essential in order to improve the prognosis of patients by achieving early diagnosis in case of malignant transformation. Micro-biopsy is a non-invasive tissue sampling technique first described in 2008 which is able to provide representative samples from wide areas of the oral mucosa. Its use has been suggested in in the follow-up of potentially malignant disorders, above all in the presence of multiple lesions, such as in proliferative verrucous leukoplakia or oral lichen planus, which may require repeated histological assessment to detect any dysplastic/malignant evolution as early as possible. The report illustrates the important diagnostic contribution provided by micro-biopsy sampling in the early detection of malignant transformation in a patient affected from oral lichen planus.

Methods. A 40 years old female smoker was referred to the Department of Dentistry and Oral and Maxillofacial Surgery of San Rocco Hospital Brescia for the presence of oral mucosal lesions. She had white reticular, symmetrical lesions involving the buccal mucosa and dorsal tongue, with clinical features typical for oral lichen planus. The incisional biopsy performed confirmed the diagnosis.

She entered a follow-up scheduling; the first visit (6 months after) revealed that the white lesions were unchanged. At the second visit, almost one year after the diagnosis, a large plaque lesion was observed on the posterior side of the dorsum. Therefore the following control was scheduled 1 month later. Given the persistence of the lesion, the clinical data, even if not strongly suggestive for malignant transformation, were worthy of a histological assessment. On the basis of the low suspicion index, of the homogeneous clinical aspect and of the wideness of the lesion a micro-biopsy was performed.

Results. The sampling allowed collecting small tissue fragments from the whole surface of the lesion. These fragments were processed as described in the previously cited paper, which first described the technique resulting in a diagnosis of dysplasia. According to the diagnostic flowchart proposed in the same paper, the patient underwent a scalpel biopsy to complete the diagnosis. Vital toluidine blue staining was performed to better define the full extent of the lesion and resulted in a diffuse pale royal blue uptake, which did not point out any specific area to be selected for incisional biopsy. Three incisional biopsy samples were obtained: verrucous hyperplasia with mild dysplasia was found in two samples, while the third revealed the presence of severe dysplasia with areas of carcinoma in situ. After a full clinical staging derived from MR imaging, the patient underwent surgery under general anaesthesia to remove the lesion with a definitive pathological diagnosis of carcinoma in situ.

Conclusion. Micro-biopsy could be performed as a first-level diagnostic test in presence of oral potentially malignant disorders showing lesions with a low suspicion index in order to reduce the need to perform more invasive incisional biopsies and consequently in order to reduce the patient stress. Therefore it could represent a potential diagnostic aid for practitioners involved in the management of oral potentially malignant disorder.

Methicillin-resistant staphylococcus aureus (MRSA) osteomyelitis of the mandible: a case report in pediatric patient

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Aim. Methicillin-resistant Staphylococcus aureus (MRSA) is usually considered a nosocomial pathogen, but more and more it is procured in the community: in fact, community associated MRSA (CA-MRSA) infection has been observed in many patient groups and healthy children. Mostly, CA-MRSA infection has been associated not only with skin and superficial soft tissue lesions, but also with invasive infiltration, requiring aggressive treatment with a specific antibiotic therapy and often hospitalization.

We present a case of acute osteomyelitis - with severe progression - caused by community associated MRSA (CA-MRSA) in an healthy young patient who had no risk factors.

Case presentation. In October 2014, a 10 year-old boy was hospitalized for pain and swelling of anterior mandible associated with persistent fever (39°C) and the staphylococcal gingival odontogenic cellulite was diagnosed. He was immediately treated with antibiotic (intravenous amoxicillin/clavulanic acid and orally clarithromycin for 15 days) and anti-inflammatory therapy (ibuprofen).

In December 2014, the patient came to our observation and his parents reported spontaneous teeth exfoliation. Clinical examination revealed the absence of two central mandibular incisor (3.1 and 4.1) and corresponding necrotic bone exposure. We proceeded to request some findings: normal level of erythrocyte sedimentation rate (ESR) of 2 mm/h and a C-reactive protein (CRP) measuring 0,02 mg/dl were showed. Furthermore, bone biopsy was performed and necrotic bone lesions was confirmed: no Langerhans cells were recognized in the biopsy, so excluding suspected diagnosis of Langerhans cell histocytosis. Patient was instructed for correct oral hygiene and local antiseptic therapies (chlorhexidine 0.2% mouth rinses and 0.5% chlorhexidine gel topical applications twice daily for 1 week) were prescribed.

Conclusion. Nowadays, CA-MRSA infection is a common and serious problem in most developing countries. Clinicians should be also aware of possible severe community associated MRSA (CA-MRSA) infections in healthy people without previously recognized risk factors and who have never been hospitalized before. The widespread use of antibiotics could have contributed to the high resistance rates of community associated MRSA (CA-MRSA). It is our opinion that an early identification of bacteria is essential in order to provide an early appropriate antibiotic treatment and minimize progression to osteomyelitis.

The low level laser therapy in the temporomandibular joint disorders: a new experimental home treatment protocol

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Aim. The temporomandibular joint (TMJ) plays a crucial role in many functions of the oromaxillofacial district: chewing, swallowing and speaking through the execution of complex movements.

The temporomandibular joint disorders (TMJDs), are defined by the American Association of Orofacial Pain (AAOP) as: a collective term that includes a variety of pathological conditions involving the masticatory muscles, temporomandibular joint articulation and structures associated with them.

The diagnosis of TMJDs is based on several symptoms and leads to a three categories sub classification: inflammatory diseases, intra-capsular disorders and osteoarthritis.

The disease is characterized by three major symptoms often present: pain, joint sounds (clicks or bursts) and reduced mouth opening.

One of the most recent and important mode of treatment of the pain related to the TMJDs is the low-level laser therapy (LLLT). The therapeutic properties of LLLT may induce tissue repair and reduce the inflammatory processes, and ensure analgesia in acute and chronic pain.

Methods. A wide Literature review about this topic lead to a very powerful collection of data that confirmed the excellent results obtained in the laser management of the pain related to TMJDs. It has been largely demonstrated that LLLT is effective in reducing TMJD symptoms, and it may cause an improvement in muscle contraction strength and in maximal mouthopening.

Results. According to the scientific evidences emerged from this review, a double blind placebo controlled clinical study will be performed at the Department of Oral Sciences and Maxillofacial Surgery of "La Sapienza", University of Rome. The peculiar aspect of the proposed protocol is that, after a practice at the department by the researchers, most of the treatment will be performed directly at home by the patients themselves, twice a day for seven consecutive days, so giving to the patients an active role in the treatment of their own disease.

In the study will be enrolled adult patients affected by pain related to TMJDs. Form the study will be excluded: patients who received analgesic or non-steroidal antiinflammatories therapy within 2-3 weeks before the start of the treatment; pregnant women; patients with neoplasms that affect the area of LLLT irradiation; patients affected by epilepsy, coagulative disorders and/or connective tissue diseases. Patients will be randomly subdivided in two groups, the first group (Study Group) will receive an effective device, while the placebo group will receive a fake device, similar to the other one. Both patients and researchers will be blinded about the kind of device utilized in the specific treatment.

With this study we aim to emphasize the potentiality of LLLT in reduction of pain related to TMJDs, assessing some parameters that include pain, mouth opening, EMG variation and muscle contraction strength.

Conclusion. This study can be considered helpful and easy to apply for the treatment of the pain related to the TMJD.

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Oral manifestations in patients affected by psoriasis

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Aim. Psoriasis is a common multifactorial inflammatory skin disease, affecting from 1% to 3% of the world population, with geographic and ethnic variations. It has a bimodal age distribution, with the earlier peak incidence between 15 and 30 years of age (Psoriasis Type I), and the later peak incidence between 50 and 60 years of age (Psoriasis Type II). Psoriasis is classified clinically into several types: vulgaris, erythrodermic, guttate, onycodistrophy, pustular, inverse and psoriatic arthritis. Even though it is a common disorder, in International literature there are only few publications about its oral manifestations. Typical cutaneous lesions are flat polygonal red scaly-plaques, that evolve into hyperpigmented lesions. In the oral cavity, manifestations include small whitish papules that yield bleeding points when scraped and red/white plaques having the same trend of the skin lesions. Of interest to the oral health care provider is the increased frequency of fissured and geographic tongue (FT and GT). Psoriasis and periodontitis have a common etiopathology; in fact, probing depth and periodontal attachment level are significant higher in psoriatic patients. Patients affected by arthropathic psoriasis report Temporo-Mandibular Joint Disorders (TMJD). In addition, patients using methotrexate and cyclosporine as immunosuppressive therapy of psoriasis show higher risk to develop oral candidosis. The aim of this study is to investigate and compare the prevalence of oral mucosal lesions in a group of psoriatic patients and healthy subjects.

Methods. 40 psoriatic patients, 24 males and 16 females, aged from 21 to 91 years old, followed in Dermatology and Venereology Department of Policlinico Umberto I in Rome, were enrolled in this preliminary study. There were included 4 cases of psoriasis Type I and 36 of psoriasis Type II, counting 24 with diagnosis of vulgaris psoriasis, 9 with arthropathic psoriasis, 2 with erythrodermic psoriasis, 4 with pustular psoriasis, 1 with guttate psoriasis. Clinical examination, Panoramic XR, Magnetic Nuclear Resonance (MNR) of Temporo Mandibular Joint (TMJ), parodontal evaluation, oropharyngeal buffer and incisional biopsies by scalpel were done in order to value the patients. The control group was formed by 40 non-psoriatic patients of Odontostomatologic Clinic of Policlinico Umberto I in Rome.

Results. According to International Literature data, we found out that there is a statistically significant difference between the number of patients with oral lesions in the psoriatic group as compared to the control group. The lesions positively related to psoriasis are FT and GT. 40% of psoriatic patients presents FT compared to 17% in the control group, while 7,5% of patients affected by psoriasis shows GT compared to 2,5% of the control group. TMJD was found in about half the patients with arthropathic psoriasis. Periodontitis was discovered in 15 out of the 40 patients affected by psoriasis, especially those affected by vulgaris psoriasis and arthropathic psoriasis. Furthermore, smoking patients have an increased risk of developing periodontal's disease. Duration and severity of disease did not influence the prevalence of oral lesions.

Conclusion. Due to the strong match between psoriasis and oral lesions, dermatologists and oral health care providers have to cooperate efficiently being aware of the predisposition of psoriatic patients to different oral diseases. The goal of achieving and maintaining periodontal health leads to healthy and functional dentition in psoriatic patients and reduce the risk factors triggering psoriasis itself.

Painful oral aphthous-like lesions in patient with kidney cancer after target therapy and bisphosphonate administration: a case report of adverse drug reaction

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Aim. Tyrosine kinase inhibitors (TKIs) targeting tumor angiogenesis and mammalian target of rapamycin inhibitors (mTOR) are indicated for the management of several cancer types, as for renal cell carcinoma (RCC).

Oral ulcerations are reported as common adverse drug reactions of mTOR inhibitors and are currently classified as mTOR inhibitor associated stomatitis (mIAS). Interestingly, these lesions appear as aphthous-like stomatitis rather than the mucositis seen with chemotherapy agent.

Case report. A 49 years old male patient underwent to the left radical nephrectomy in May 2014 for clear RCC. From July to October 2014 he was treated with Pazopanib, a tyrosine kinase inhibitor. In December 2014 the patient started the treatment with Zoledronic-acid and Everolimus, an amino-bisphosphonates and an mTOR inhibitor, respectively. Everolimus administration was suspended on the 1st of January 2015 and resumed on the 4th of February. In February 2015, the patient referred to our department for acute pain of mouth floor and tongue; the onset of these symptoms was subsequent to mTOR therapy. This pain compromised his oral functions (chewing, swallowing, phonetic) and quality of life. Intraoral examination showed aphthous-like lesions on both borders of the tongue and on the right side of the mouth floor.

Local antiseptic (0.2% chlorhexidine rinse, twice daily for 1 week), 0.050 g clobetasol propionate cream (twice a day for 4 week, and one times a day for the following 4 weeks) and a wound-healing promoter (Mucosamin Spray®, twice a day for 2 weeks) were administered. Since the oncologist decided to not discontinue the target therapy, the patient continued local therapy until the end of the treatment with everolimus.

After two weeks from the first visit, a complete heal-

ing of the oral mucosa was observed and the patient complained no pain.

Conclusion. This case report confirms the recent view that target therapy with everolimus may induce the onset of aphthous-like stomatitis as adverse drug reaction. Therefore, diagnostic algorithms for stomatitis should include a careful drug history, emphasizing the focus also on oral adverse effects the new target cancer therapies.

Risk factors and medication related osteonecrosis of the jaw: a single center 11-year experience

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Aim. Medication-related osteonecrosis of the jaw (MRONJ) is a well-recognized side-effect of medications prescribed in patients suffering from several forms of cancer, bone metastases from solid tumors, multiple myeloma and dismetabolic bone diseases.

This study describes the 11 years experience of a Oral Surgery Unit in the management of patients affected by this avascular necrosis pathology of the maxillo-facial district, evaluating the relationship between risk factors and onset and progression of this maxillary pathology.

Methods. During a period ranging from 2005 to 2015 a group of 93 patients affected by MRONJ was consecutively observed and treated by the Oral Surgery Unit of the University of Messina -School of Dentistry.The patients (23 males, 70 females) aged between 46 and 89 years.

MRONJ diagnosis and staging was assessed according to the SIPMO - SICMF criteria, adopting a work-flow including CT examinations.

According to the MRONJ stage, antimicrobial therapy (systemic antibiotics and topical antiseptics) surgical treatment (sequestrectomy, alveolar resection) and/or palliative treatments were adopted to manage the patients.

Different parameters were evaluated to analyze MRONJ onset and progression: demographic data; local risk factors (tooth extraction, oral infections, decubitus ulcers by dental prosthesis, etc.); systemic risk factors (diabetes, hypertension, etc.); cumulative dose of each medication taken on, contemporary and/or consecutive assumption of different at risk drugs.

Statistical analysis was conducted using multiple regression, ANOVA and Spearman correlation.

A scoring system to evaluate the severeness of the MRONJ was used considering the following phenomena (indicating with 0 the absence of event and with 1 its presence): pain, bone exposure, purulent discharge, extra-oral fistula, displaced mandibular stumps, nasal leakage of fluids.

Results. The statistical analysis showed how the MRONJ is far more severe in the oncologic patients treated with zoledronic acid, with a strong correlation between the cumulative dose and the MRONJ score. The data demonstrate how the main oral triggers are tooth extraction, periodontal disease and decubitus ulcers by dental prosthesis. On the other hand, drug therapies including steroids and antiangiogenic factors, as long as hypertension and diabetes had lower cumulative dose related to the pathology onset.

Conclusion. A group of MRONJ patients consecutively treated in 11 years was analyzed.

Data regarding diagnosis and treatment were exposed. Oncologic patient showed the worst clinical outcomes. Hypertension, diabetes, and specific drug therapies that interfere with the vascular asset of the patient are the most significative risk factors involved, lowering the mean cumulative dose of the drug hastening the MRONJ onset.

Oral carcinoma and its precursors in patients with graft-*versus*-host disease (GVHD)

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Aim. Chronic Graft-Versus-Host Disease (cGVHD) is an immuno-mediated disorder occurring as a frequent complication of allogeneic Hematopoietic Stem Cell Transplantation (HSCT), and affecting multiple organ system (skin, oral cavity, GI tract, lung, muscles and joints). Its prevalence is between 25-80 % in long-term survivors. The immune cells of the morrow bone donor mediates the immune attack to the recipient tissues. This immune attack probably causes an overstimulation of the apoptotic processes, that play a role in the pathogenesis of this disease. Frequently, oral manifestations can be the first symptom of systemic GVHD (80%), presenting as atrophic-erosive and/or hyperkeratotic lesions that clinically mimic autoimmune diseases such as Lichen Planus, Scleroderma, and Sjögren's syndrome with oral inflammation and erythema, atrophy, fibrosis with narrow mouth, tongue depapillation, hyposalivation and pain.

The aim of this study was to describe the development of oral carcinoma and its precursors in patients affected by GVHD and the importance of a periodical and careful oral follow-up of patients with oral GVHD to detect premalignant or evident malignant lesions at an early stage.

Methods. Ten consecutive patients undergoing first allogeneic HSCT from consanguineous were visited at the Complex Operative Unit of Odontostomatology, Policlinic of Bari and were included in this study.

Clinical examination showed seventeen ulcerative, leukoplastic and/or erythroplastic lesions in different oral sites (tongue, cheek, retrocommissural side, lower lip). All these lesions underwent an incisional biopsy for histopathological assessment in order to assess the presence of dysplastic or neoplastic areas; specifically for neoplastic tissues, six prognostic factors were also evaluated: tumor thickness, invasion pattern (single cell, large front), vascular, neural, ducts of the salivary glands and muscle infiltration.

Results. All the surgical wounds healed without complications. Histological examination highlighted:

— 53% are oral carcers:
— 78% were oral squamous cell carcinoma (OSCC) low or high grade, infiltrating the muscles surface, with a single cells or large front infiltration; no vascular, perineural and salivary duct infiltration were noted; resection margins are free of tumor.
— 22% were verrucous carcinoma (grade 5-6).
— 47% are precancerous lesions, with dysplasia and other features (hyperkeratosis, spongiosis, dyskaryosis):
— 62,5 % had mild or moderate dysplasia (oral intraepithelial neoplasia, OIN 1 or 2).
— 37,5% presented a pattern of lichenoid dysplasia.

Conclusion. These results suggest that oral carcinoma and its precursors represent a serious complication in cGVHD patients. Therefore for these patients is recommended a periodic follow-up carried out with two examination methods vital dyes, such Lugol's solution and autofluorescence based imaging system (VELscope®), to detect these premalignant and malignant lesions at the initial stage and implement the most appropriate therapeutic measures.

Variations in expression levels of salivary proteomic biomarkers in oral mucositis caused by cancer treatments

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Aim. The oral mucositis is the main consequence of anticancer treatments such as radiation and chemotherapy.

Moreover, the incidence of mucositis increased by 5-fluorouracil is higher in patients treated with continuous infusion compared to those receiving intermittent intravenous administration.

The oral mucositis can affect the quality of life of the patient and may interfere with the management of neoplastic disease, therefore it is useful to find a protocol for prevention and/or adequate care of the disease.

One of our objectives is to understand how cancer treatments cause alterations on the proteomic profile of patients who develop mucositis, identifying specific biomarkers for avoid the development of mucositis.

Methods. The study was developed using the SELDI-TOF/MS (Surface Enhanced Laser Desorption Ionization Time-of-Flight Mass Spectrometry) technology with ProteinChip array® (Bio-Rad).

The salivary samples of 60 subjects recruited were investigating and the patient are grouped in: MUCOSITIS – NO MUCOSITIS; MUCOSITIS RADIO – MUCOSITIS NO RADIO; MUCOSITIS CHEMIO – MUCOSITIS NO CHEMIO.

All samples were examined with Q10 ARRAY® ProteinChip SELDI-TOF analysis and proteomic profiles of all samples were analyzed with the software BIO-RAD Data Manager™ (Version 3.5) to identify mass peaks differentially expressed (clusters) within two groups with a significance of $p < 0.05$.

The datasets proteins were also analyzed by PCA (Principal Components Analysis), a nonparametric statistical analysis method to extract the most relevant information from large data sets. It is used in BIO-RAD Data Manager™ software (Version 3.5) to visualize spectra In two and three-dimensional graphs.

Results. From the cluster analysis we found the expression levels of peaks 3443, 3487, 4135 m/z increased in MUCOSITIS group, while 6237 m/z reduced. The same peaks are increased in MUCOSITIS RADIO, while in MUCOSITIS CHEMIO are increased 3443 and 6237 m/z but 3487, 4135 m/z are reduced. The datasets proteins were also analyzed by PCA (Principal Components Analysis), which confirmed that there is no correlation between the MUCOSITIS and NO MUCOSITIS groups, for peaks differentially expressed (3443, 3487, 4135, 6237 m/z). Therefore the particular variation of these proteins expression can be associated with the one condition rather what to another. Also, the Heat Map confirmed the increase in the expression level of peaks 3443, 3487, 4135 m/z and decrease of peak 6235 m/z in MUCOSITIS compared to NO MUCOSITIS.

Conclusion. Radiotherapy and chemotherapy influenced level expression of many salivary biomarkers in mucositis. Therefore 3443, 3487, 4135 and 6237 m/z are good biomarker candidates of oral mucositis. Also, it would be necessary to deepen this study going to identify these potential biomarkers to make a useful contribution to identify a protocol for prevention and treatment of oral mucositis.

Quantitative real-time PCR in HPV investigation in potentially malignant disorders

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Aim. Oral Squamous Cell Carcinoma (OSCC) is caused by different etiologic agents, such as tobacco, alcohol, chronic trauma, unbalanced diet and infections. In fact Human PapillomaVirus (HPV) is estimated to be the cause of 40-80% of OSCC. Differently from cervical cancer, in the oral cavity there are not any markers to identify risk of malignant transformation in oral Potentially Malignant Disorders (POMD), in which leucoplakia and lichen planus are included. The aim of this study is to propose a reliable method to detect HPV DNA in POMD or other lesions and to understand important differences between investigation in oral mucosa and in cervical mucosa.

Methods. In the most suitable technique described in International literature, oral cells are collected from patients' lesions using Cytobrush and suspended in Phosphate-Buffered Saline (PBS). HPV is detected with quantitative real-time PCR (qPCR) for the most common low-risk (LR) HPV 6, 11 and high-risk (HR) HPV16, 18, 31, 33, 53, 58. PCR fluorogenic assays (qPCR) provide an analytical sensitivity without requiring intact genomic DNA. As suggested by recent International Literature,

to avoid false negative results, all samples should be tested for the quality of extracted DNA, amplifying the housekeeping gene glyceraldehyde-3phosphate dehydrogenase (GAPDH) instead of amplification of a 400 bp fragment of the human leukocyte antigen (HLA), used in anogenital HPV detection.

Results. Many oral brushes result negative for the HLA gene amplification used in traditional DNA extraction, probably because of fragmented DNA, therefore resulting also not amplifiable with the consensus primer MY09/11 widely used in anogenital HPV detection.

Conclusion. This method is different from others because it detects HPV genotypes with the highly specific and sensitive qPCR technique in the not-invasive and site-specific oral brushing. This technique is easy to apply, and can be made in any condition, but qPCR, even if is very reliable, is expensive. This disadvantage makes it difficult to use oral brushing as a screening test for OSCC. Moreover this technique is not equally effective than one in exocervix cancer prevention because OSCCs are very well differentiated in the surface and with oral brushing we collect only superficial cells, with an underestimation of carcinoma's cases.

Further studies are needed to demonstrate the role of the disclosure of HPV in oral lesions in malignant transformation.

Oro-genital lichen planus in a child: a case report

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Aim. Lichen planus is a rare, autoimmune, chronic, inflammatory mucosal and cutaneous disease that affects middle aged and elderly population, with a prevalence of about 0.5% to 2%. Clinical spectra include papules, reticular pattern, plaque-like, atrophic, bullous and erosive forms.

Mucosal lesions have symmetrical distribution, in particular on the mucosa of the cheeks, near the region of molars, and on the dorsal and border mucosa of the tongue, less frequently on the gums (atrophic and erosive forms localized on the gums are called as desquamative gingivitis), more rarely on the palate and floor of the mouth. Moreover, an association between OLP and genital lichen planus was recognized and confirmed.

In childhood, OLP is even more rare probably due to scarce use of some related drugs (e.g. antihypertensives, as frequently happened in elderly) or to infrequent infections by some viruses (e.g. HCV, already incriminated). Also genital localization in children is extremely rare.

We present a case of a young boy with bullous and reticular OLP and, later a genital involvement.

Methods and results. In 2005, a 10-year-old boy was referred to the Department Surgical, Oncological and Oral Sciences, University of Palermo, with worsening oral pain. Clinically, bullous lesion on the dorsum of the tongue and reticular lesion on the right buccal mucosa were recognized. Oral hygiene was good. No significant medical history or family history were distinguished.

Histopathological examination confirmed oral lichen planus diagnosis.

In 2015, he came back to our attention and reported a new datum of genital concomitant lesions with Lichen Planus diagnosis. Intraoral examination showed reticular lesions on the dorsum of the tongue and on the right buccal mucosa. No skin lesions were found.

OLP therapy was based on topical clobetasol and genital lesions were treated with topical difluocortolone with isoconazole.

Conclusion. Lichen planus diagnosis in childhood is very infrequent, both in mono or multi localization (orogenital sites). However clinicians should be aware of its existence also in early age and in case of suspected OLP diagnosis, a concomitant genital localization should be considered in order to plan a multidisciplinary approach (then oral medicine, dermatology and urology/gynecology).

Effect of Nd:YAG laser light on post-extractive socket healing in rats treated with zoledronic acid and dexamethasone

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Aim. Effective strategies are needed to manage dentoalveolar surgery in patients at risk for medication-related osteonecrosis of the jaw (MRONJ). The aim of this study was to investigate the effects of Nd:YAG laser light on healing of post extractive sockets in a rat model for MRONJ.

Methods. Thirty male Sprague-Dawley rats were divided in 4 groups: control group (C, n = 5), laser group (L, n = 5), treatment group (T, n = 10) and treatment plus laser group (T+L, n = 10). Rats of group T and T+L received intraperitoneal zoledronate 0,1 mg/Kg and intramuscular dexamethasone 1 mg/Kg every 2 days for 10 weeks. Rats of groups C and L were infused with saline. After 9 weeks the first maxillary molars were extracted in all rats. The operative time and the frequency of tooth fractures were recorded as indicators of surgical trauma. Rats of groups L and T+L received laser therapy (Nd:YAG, 1064 nm, 1.25W, 15Hz, 5 min, 14.37 J/cm2) in the socket area at days 0, 2, 4 and 6 after surgery. At 8 days from extraction, the sockets were clinically assessed with a grading score and the wound area was measured with a dedicate software. Histomorphometric evaluation was performed followed by western blot analysis of osteopontin and osteocalcin expression.

Results. The operatory surgical time and the frequency of tooth fractures were similar among the groups (P>0.05). Rats of group T+L showed a better clinical grading score compared to rats of group T (grade I 22% Vs 28 % - grade II 56% Vs 28% - grade III 22% Vs 44%, respectively), without reaching statistical significance. The average wound area was 47084.4 pxl ± 27487.25 pxl, 61040.25 pxl ± 16241.82 pxl, 50427.83 pxl ± 23298.81 pxl, 68393.89 pxl ± 33021.32 pxl in group C, L, T and T+L, respectively (P>0.05). Inhibition of osteoclastic alveolar bone resorption was found in groups T and T+L (P<0.001). Rats of groups L and T+L

showed a significant higher expression of osteocalcin compared to rats of groups C and T (C = 0.3993; L = 1.394; T = 0.2922; T+L = 1.156; P = 0.0001). The expression of osteopontin did not show significant differences in the groups treated with Nd:YAG compared to the ones that did not receive laser irradiation.

Conclusion. Our findings suggest that laser irradiation after tooth extraction can promote osteoblast differentiation, as demonstrated by the higher expression of osteocalcin. Further investigations are needed to better elucidate the role of laser therapy in the prevention of post extractive MRONJ.

An emblematic case of a patient with recurrent oral cancer

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Aim. To describe an exemplary case of a patient's metachronous oral squamous cell carcinoma (OSCC) in different sites of the oral cavity. Recurrence in oral cancer patient represents a pivotal prognostic factor in OSCC patients and is related to significantly reduced survival rates.

Methods. We report the case of a patient, regularly attending our oral medicine service since 2008, when he was referred because of white lesions of the mouth. During this period, the patient underwent 12 incisional biopsies of multiple oral lesions.

Results. A 73-year-old male, no smoker and no heavy drinker, affected by Discoid Lupus Erythematosus, diabetes, with history of squamous-cell carcinoma on the lower lip, surgically removed in 2007, presented at our service for slightly symptomatic red and white lesions, on both right and left buccal mucosa. At clinical examination, an erythematous area with non-removable white component, with erythroleukoplasic aspect near the scar of previous intervention, was observed at the left buccal commissure. Clinical diagnosis of oral lichenoid lesions was proposed and a diagnostic biopsy performed, allowing a histological examination that revealed hyperplasia, hyperkeratosis, ortho-para-keratosis and lichenoid flogosis. The patient regularly attended control visits, and, during follow-up, the white lesions acquired a more verrucous aspect and increased in size. Further biopsies confirmed a clinical picture of proliferative verrucous leukoplakia. In 2009, a new white, non-removable, hard and irregular white-red lesion, with verrucous aspect, was noticed. The lesion was suggestive of OSCC or, alternatively, dysplastic erythroleukoplakia. Histological examination confirmed the diagnosis of OSCC. The patient underwent surgical treatment, but, in February 2011, another very similar lesion appeared on the right buccal mucosa and was again biopsied. The histological analysis revealed another OSCC, and the patient received a further respective surgery. The last malignant lesion occurred in January 2014, when a further hard erythroleukoplakia was detected on the left lip mucosa, confirmed by histological examination of verrucous OSCC, once more surgically treated. In all episodes, persistence of fungal infection could be observable and treated with local antifungal drugs.

Conclusion. This case highlights the importance of continuous follow up treatments for patients affected by oral cancer, whose recurrence is one of the highest risk factors predisposing to relapse. Moreover, when lesions localized at buccal commissures, antimicotic treatment should be always contemplated before diagnostic biopsy.

Possible correlation between salivary inflammatory cytokines and the state of oral health

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Aim. The aim of this study was to evaluate the salivary levels of inflammatory cytokines in psoriatic patients and to compare them with healthy subjects. Furthermore, the cytokines levels were compared with the frequency of gingivitis and periodontitis in the two groups.

Methods. 20 psoriatic patients from the Clinic of Dermatology were enrolled in this study, while a group of 15 healthy subjects matched for age and sex was used as control. The diagnosis of severe psoriasis was made mainly on clinical data by a trained dermatologist. All subjects were evaluated in the Dental Clinic. To uniform as much as possible the oral hygiene conditions in both groups, gingival disease assessment was evaluated both before and 4 weeks after scaling. Chronic periodontitis was considered localized or generalized, and severity was characterized by the amount of clinical attachment loss. Plaque index and bleeding on probing were utilized to evaluate the state of periodontal health. Saliva samples were collected from all subjects, from 9:00 to 11:00 AM, to minimize circadian variations of salivary biomarkers. Subjects refrained from eating, drinking or smoking for at least 2 hours prior to sampling. Saliva samples were collected using Salivette. The swab with the absorbed saliva was subjected to centrifugation (2750 rpm for 2 minutes) to facilitate the collection of saliva in the bottom of tube. A second centrifugation was performed (1000 rpm for 10 minutes) to obtain the cell supernatant, that was analyzed with the Multi-Analyte Array kit (Qiagen), evaluating the concentration of several cytokines (IL-1β, IL-6, TGF-β1, IL-8, TNF-α, IFN-γ, IL-17A, IL-4, IL-10, MCP-1, Mip-1α, Mip-1β).

Results. All psoriatic patients suffered from gingivitis, and 9 of them showed periodontitis with varying degrees of severity. In the control group, there were 5 cases of gingivitis and 2 of periodontitis. Regarding the inflammatory cytokines profile, psoriatic patients showed higher levels of TNF-α, TGF-β1, MCP-1, IL-1β ($p<0.05$), while there were no significant differences for the othe cytokines. Considering only patients with periodontal disease, there was a positive correlation between the severity of periodontitis ant the salivary levels of TGF-β1, MCP-1, IL1β ($p<0.05$).

Conclusions. In agreement with other authors, our results showed that patients with severe psoriasis had a higher frequency of gingivitis and periodontitis than the general population. The present study suggests that psoriasis and periodontal disease share the same underlying inflammatory process.

New technologies in early carious lesion management

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Aim. Caries are among the most common human diseases and are recognized by EBD as dynamic multifactorial processes, at biofilm/tooth interface, that involve the enamel mineral balance in demin/remin cycles. Best primary and secondary prevention of enamel conditions is ensured by the knowledge and understanding of these interactions, having the ability to early identify and correctly quantifying the degree of mineral loss. Emerging technologies for the ultrastructural and clinical enamel diagnosis, remineralizing materials and proper equipment enhance early detection that encourage remineralization process turning lesions into inactive thus preserving tooth structure, function and aesthetics. In this project, the minimally invasive dentistry approach claims that non-surgical treatments for caries lesions should be preferred to invasive ones, in order to increase the tooth's longevity in the mouth. The goal is to give an overview of new minimum intervention dentistry (MID) new technologies assigned to diagnose and treat caries in a pre-cavitated or cavitated stage using a medical (i.e. minimally invasive) approach.

Methods. Early enamel carious lesions (ICDAS 1 and 2) are represented in an integrated evaluation through the use of new technologies: a) a digital camera with a macro lens and a macro flash documented the visual assessment consistent with ICDAS score 1 and 2. b) a calibrated reflectance spectrophotometer (Spectro Shade); c) VistaCam iX, an imaging software, through which caries and plaque filters show caries activity using a color scale with a numerical evaluation. Explanatory clinical cases are reported.

Results. ICDAS 1 and 2 scored early carious lesions are effectively visualized with the three applied technologies. Nevertheless sensitivity for hidden higher score lesions (ICDAS 4) are exalted inVista Cam iX, due to metabolic activity detection.

Conclusion. Prior to a comprehensive restorative treatment plan, a comprehensive plan for diagnostic management of caries must be formulated. In the past, the first invasive intervention brought the tooth into a treatment/retreatment loop, often leading to crowns and implants irrespective of the quality of the first restoration. Combining the ultraconservative, restorative approach (which is considered micro-invasive), new detection method with a substantial caries risk assessment and caries management with remineralization program may provide therapeutic benefits and will significantly reduce both long-term restorative needs and costs, thus complementing the overall concept of MID.

Comparison between non-surgical periodontal treatment in patients with generalized chronic periodontal disease with the assistance of air-flow with glycine powder and without: randomized clinical split mouth trial and microbiological analysis

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Aim. Evaluate the effectiveness of non-surgical mechanical therapy with curettes and subgingival ultrasonic tips, compared to the same therapy added with glycine.

Methods. 7 patients, aged between 30 and 70 years, affected by generalized chronic periodontal disease with probing bigger than 3 mm in 30% of the observed sites, without cardiopathy, type 1 or 2 diabetes and free from pathologies that need antibiotic prophylaxis before therapy, were recruited. All subjects were treated with the following method:

The 1st and 3rd quadrant with nonsurgical therapy added with air-polishing with glycine powder;

The 2nd and 4th quadrant only with nonsurgical therapy, without additives, as chlorhexidine. At the first appointment (T0), after two weeks (T1) and after a month (T2) plaque index and bleeding index were calculated, using respectively the "Full Mouth Plaque Score" (FMPS) and the "Full Mouth Bleeding Score" (FMBS). The obtained percentages were valuated comparing the first and third quadrant (Q1-3) with the second and fourth quadrant (Q2-4). Subsequently they were considered singly and compared to the other quadrants. In addition, samples of subgingival bacterial plaque, two in T0 and one in T1 and T2, were collected, positioning a periopaper in the gingival sulcus of the first upper and low molars for 30 seconds, which were quickly sent to the laboratory in order to be microbiologically analyzed (KIT GENOMICA for the extraction of bacterial DNA processed with PCR Real-Time).

Results. A decrease of 75% for FMPS and 71% for FMBS, in addition to an improvement of the probing depth in all treated sites, was registered. A reduction of the average pocket depht from 3,93mm (T0) to 3,28mm (T2) in Q1-3 and from 3,92mm (T0) to 3,44mm(T2) in Q2-4 was obtained. The microbiological results individuated:

– P. gingivalis: 0,85% in Q1-3 and 1,69% in Q2-4 and increase to 4,24% in Q1-3 and 10,63% in Q2-4 after treatment in T0 and decrease to 2,64% in Q1-3 and 1,96% in Q2-4 in T2;

– T. forsythia: 0,16% in Q1-3 and 6,34% in Q2-4 in T0, reduction to 0,03% in Q1-3 and to 0,1% in Q2-4 from T1 to T2;

– T. denticola: average 0,02% in Q1-3 and 0,2% in Q2-4;

– F. nucleatum: 2,01% in Q1-3 and 4,17 in T0, increase of 69% in Q1-3 and reduction of 26% in Q2-4 in T2;

– P. intermedia: average presence of 0,004% in Q2-4 from T0 to T2 and a decrease from 5,95% (T0) to 3,54% (T2) in Q1-3.

Conclusion. In the non-surgical periodontal treatment with addition of glycine a greater clinical probing, reduction compared to the only traditional mechanical therapy, was obtained. In addition, this result was confirmed by the microbiological analysis of the subgingival plaque, that indicated a significant reduction of all pathogens present in quadrants 1-3 (Q13), which were treated with glycine. Amplify the sample in order to confirm and deepen what emerged from the present study is therefore believed necessary.

Spectrophotometric measurement in comparison with visual perception in the evaluation of chlorhexidine staining

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Aim. Spectrophotometer is an internationally approved device used for color measuring. It takes over all the visible spectrum from 400 to 700 nm using mathematical formulas and spectrophotometric parameters, thus making objective a subjective measurement dependent on several variables such as outdoor lighting conditions, experience and human eyestrain. The aim of our study is to compare spectrophotometric measurements with those detected by the human eye in assessing the color of enamel surface after-acquired staining effect of chlorhexidine.

Methods. The study, approved by the Ethics Committee of Policlinico Umberto I in Rome (see. Resolution no. 2779 of 30/05/2013), is set up as a pilot study of clinical trials, with a statistically determined sample size. Adult patients affected with gingivitis (GI) were instructed to use a chlorhexidine mouthwash for 14 days. At T0 was performed scaling and selective polishing. The follow up was conducted after 15 day (T1). A spectrophotometric measurement (cervical, middle, incisal) of the upper incisors was taken using the spectrophotometer (SpectroShade ™ "Micro" Dental), before treatment and at follow-up. At the same time three operators assessed the staining of the teeth in the same three areas (incisal, middle and cervical) according to the index of Lobene. Consistency between the operators has been established according to the method of K Cohen. Data was collected from the Spectroshade as CIE L*a*b* coordinates, or a three-dimensional system of Cartesian axes. The L* value (y axis) is a measure of the lightness of an object on a scale ranging from 0 (black) to 100 (white). The a *and b *values represent the chroma. The a* value is a measure of redness (positive a*) or greenness (negative a*). The b* value is a measure of yellowness (positive b*) or blueness (negative b*).

Results. The sample size considered 40 adult subjects enrolled among the outpatient attending the First Observation Unit of Sapienza University of Rome Dental Clinic. The values obtained through the K Cohen statistic were judged satisfactory since the variation was measured between 66% and 95%. It should be noted as well the high consistency between operators. Nevertheless, the comparison between the spectrophotometric parameters and the values obtained using Lobene index in the same tooth areas show that the operators' visual sensitivity is significantly lower than the spectrophotometer's one.

Conclusion. Despite the high consistency between the operators in detecting the chroma of examined teeth staining, it was found that their measurement does not reach the accuracy of the data collected through the spectrophotometer. Spectrophotometer should therefore be considered as an important diagnostic aid in tooth examination. Additional current studies are ongoing on the use of spectrophotometric evaluation in dental dehydration/rehydration processes, evaluation of aesthetic outcome in white spot lesion and developmental enamel defects treatment.

Rehabilitation of severely resorbed maxilla with zygomatic implants: an evaluation of tissue conditions and patients' satisfaction

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Aim. Moderately to severely resorbed edentulous maxillae present complex problems for the restorative dentist. After their initial clinical use in patients with neoplastic disease, the indication of zygomatic implants was expanded to completely edentulous patients with severe maxillary atrophy. The aim of this clinical case series study is to evaluate the cumulative survival rate (CSR) and the soft tissues condition heaalth of zygomatic implants placed in patients with severely resorbed maxilla.

Methods. This study reports the preliminary results of a prospective cohort study. The sample was composed of 15 patients with extensive defects of the maxilla caused by tumour-resections, periodontitis, trauma, cleft lip and palate and failure of maxillary reconstructions. All patients were treated with at least two 30-to-52.5-mm-long zygomatic implants (Brånemark System®, Nobel Biocare AB, Göteborg, Sweden) and all patients included had worn complete maxillary dentures for at least 6 months. Patients were recalled to obtain a clinical examination of soft tissue parameters. The outcome variables were implant failure, probing pocket depth (PPD), modified bleeding index (mBI), modified placque index (mPI), after at least six months of prosthetic loading. Furthermore, patient response to treatment was assessed with a questionnaire using a visul analog scale (VAS), where endpoints of the scale were defined as "best possible" and "worst possible" results.

Results. A total of 46 zygomatic implants were placed in 15 patients giving a cumulative survival rate (CSR) of 100%. The average probing pocket depth was 2.83 ± 1.24 with an average modified bleeding index of 0.58±0.54. The mean modified plaque index was 0.45±0.48. No suppuration and implant mobility were observed. Patients described significant changes in speech and improvement in chewing ability and esthetics.

Conclusion. The zygoma implant can facilitate the surgical rehabilitation of patients presenting severe maxillary resorption. The lack of need for hospitalization and

bone grafting can result in higher treatment acceptance in this group of patients. This preliminary results demonstrates that, despite all patients were moderately inflammated, the cumulative survival rate (CSR) and the patients' satisfaction was extremely encouraging. However, further studies are necessary to confirm these results.

Preliminary evaluation of oral health among students of a restaurant and hotel management school

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Aim. Evaluation of oral health among students of "Sonzogni" high school of Bergamo.

Methods. The targeted sample was 48 students attending 1st and 2nd year. After an information phase, we continued the study with the clinical examination, sampling of plaque and analysis of salivary pH.

Results. The data analysis showed that 97.9% of students consider their health good or mediocre (never insufficient). 89.5% of boys use the manual toothbrush with horizontal technique, 45.8% of them report bleeding during brushing that occurs in the morning and after dinner. There are not serious defects of enamel, the most retreaded teeth or with caries are molars, while the highest value of pH is 5.5. Although the percentage of total plaque is 52.80%, the bleeding index is only 6.10% and only 6.3% of students shows gingivitis.

Conclusion. The objective evaluation of the correlation was not possible since samples were a limited number and only later they will be broadened; despite this fact, it's clear the misinformation of adolescents about health education and prevention. Finally, the dental hygienist is showed as promoter of projects and information campaigns in the school environment.

Awareness of complications and maintenance protocols of oral piercing in a group of adolescents and young Italian adults

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Aim. Adolescence is indeed an age range of extreme interest for health promotion, specially due to lifestyle habit onset. A particular emerging worth studying aspect is the piercing fashion. Oral area is one of the most common sites of piercing appliance and it has been related to several local and systemic complications. Italian Ministry of Health Working Group on Oral Health Promotion recently considered oral piercings among a published statement on oral health promotion in teenagers, within the Health Promoting Schools Project. The aim of this study was to focus the awareness of oral and systemic complications of oral piercing among a group of adolescents and young Italian adults.

Methods. A group of teenagers of Latina Province attending high schools were asked to fill in a questionnaire on knowledge and awareness of complications of oral piercing. An additional questionnaire was administered to those subjects that confirmed to be wearing oral piercings. The additional questionnaire surveyed on site of oral piercing (lips, tongue, cheeks, etc.), knowledge about piercer license, awareness about oral (dental chipping, diastema, etc.) and systemic (cross-infections, endocarditis, etc.) risks due to oral piercing, disinfection and sterilization of the pierced material, received piercers' recommendations on jewel hygiene maintenance and post-piercing dental check-ups. After completing the questionnaire, all participants received an informative brochure with infos about oral piercing risks and maintenance instructions.

Results. A total of 225 teenagers of Latina Province were involved in the study. Mean age was 18. Males and females represented respectively 45 and 55 of the sample. Data revealed that more than 50% of surveyed teens was found to wear an oral piercing. Overall, 25.3% was aware of the risk of HCV cross-infection and 17.3% showed some knowledge about risk of endocarditis. Only 17% of the piercing-wearing subjects checked the piercer license and 18% the sterilization and disinfection procedures of the used materials. The vast majority (53.7%) did not receive explanations about the risks associated with oral piercing. With regard to the maintenance protocols of the jewel, in 17% of cases it has been suggested to brush the piercing bar. Post piercing dental check-ups have been suggested only in 7% of cases.

Conclusion. A general lack of awareness of complications and maintenance protocols knowledge related to oral piercing has been revealed by this study, both in subjects with and without oral piercings. Educational programs in schools need to be addressed as recently stated by Italian Ministry of Health Working Group on Oral Health Promotion.

A modern frontier adherence treatment thanks to an advanced digital technology management photographic documentation

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Aim. The objective of this study is to evaluate a effective motivational system of digital document management designed to:

— minimize all actions performed by the hygenist during the photographic documentation: acquisition (photographic), cataloging (the data), editing (the images), sharing and realtime presentation of the images with the patient;

— maximize the adherence of the patient thanks to the drastic reduction of working time in the preparation of digital documentation that leaves more room for the motivation of the same.

We proceeded, at various stages of the treatment plan, to measure the time required for cataloging and searching of the necessary images needed to communicate with colleagues and patients and the consequent reactions of the patients themselves, both at a communicative and motivational level.

Methods. 100 patients were selected without dental disorders in progress and in a good state of health and

10 dental hygienists enrolled in the Masters Course in Advanced Technologies in science of oral hygiene of Sapienza University of Rome.

The following have been used:

– Camera dedidicated for intraoral macrophotography, interfaced with wireless system software DipDossier cataloging and image management;

– DipDossier (Digital Information and pictures dossier for dentistry) software for cataloging, researching and editing images specially designed and created for the project;

– Computer Tablets, Laptops or Touch Screen installed on together (depending on the disponibility of the users).

All patients were detected with a plaque index (FMPS) and a bleeding index (FMBS), after which we proceeded with a session of professional oral hygiene care. Each hygienist had preloaded the software on his specific computer and the wireless system compatible with their camera in order to execute a complete photographic status of their patients before the treatment.

Each hygienist tested 10 patients of which 5 documented and motivated with the new digital technology and another 5 documented and motivated by traditional methods. We measured the time taken for the treatment of each patient. It was asked of each patient to express their approval of the treatment received by a Visual Analogue Scale (VAS). After 45 days (T45) the clinical indexes were detected again.

Results. A T45 clinical indexes had improved majorly in the test group and the differences between the two groups were statistically significant according to the Student's T test with a value P <0.05. About 95% of patients in the test group, gave a positive valuation (VAS scores ≥7). The time taken for the treatment was much lower in the test group (xxx yyy against).

Conclusion. We measured the level of approval and integration of the new system in the daily clinical practice of a dental hygienist and of it's tuning.

From the results of the study it can be detected the following potential of the software:

— effectiveness in encouraging and increase of adherence,

— satisfaction of the dental hygienists in simplifying and the reduction of working time.

It can be concluded that the patient may feel that dental practice is also technologically advanced in methods of communication.

Evaluation of chlorhexidine mouthrinsens: review and our clinical experience

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Aim. Chlorhexidine (CHX) is considered the "gold standard" of oral antiseptics for controlling gingivitis and plaque formation. However side effects of chlorexidine limits the acceptability and the long-term employment in preventive dentistry. This stimulated the development of new formulation. The aim of the present study was to evaluate the efficacy of chlorhexidine (CHX) mouthrinses on plaque formation, gingival inflammation and staining in healthy oral status in literature and compared results with our clinical experience.

Materials. Medline, EMBASE and Cochrane Central Register of Controlled Trials were searched through April 2004. Randomized controlled clinical trials comparing CHX to placebo/control mouthrinses or oral hygiene (OH) 4 weeks were included. In our preliminary study six volunteers, with a healthy oral status, were enrolled using CHX containing mouthrinses: 0.12% CHX with 0,05 CPC (1 group), 0.20 ADS (2 group), 0,20 without ADS (3 group), all alcohol free. Gengival inflammation, plaque distribution and Stain index intensity were evaluated during the experimental period .Their age ranged between 18 and 40 years. All subjects underwent an oral examination before the study, including one full-mouth ultrasonic stage, full-mouth periodontal probing and a caries evaluation. Other selection criteria were a dentition with at least 24 teeth (minimum of five teeth per quadrant), pockets <5mm and no orthodontic or removable dental appliances. All subjects were instructed to rinse twice daily for 1 min with one of the three test rinses for a period of 6 days. Over a 6 days experimental non-brushing period, during which subjects abstained from all forms of mechanical oral hygiene.

Results. The results in letterature revealed no significant differences between two concentrations of 0,2 CHX and Anti Discoloration System (ADS), plaque and gingival bleeding were compared.No significant difference was found between the two mouthwashes for plaque index (PI) and gengival index(GI) both at the base condition and after 15 days.With regard to the side-effect of staining, a statistically significant difference between the two mouthwashes was found, showing that mouthwash with ADS significantly prevented the formation of staining. This was confirmed by our clinical experiments, respectly the media of CHX 0,20 (3 group), GI, PI and stain index was 21,35 , 29,7 and 25,5.While mouthwash with CHX 0,20 ADS (2 group) respectly 20,83, 38 and 4,24.The authors concluded CPC containing mouthrinses, when used as adjuncts to either supertvised or unsupervised oral hygiene, provide a small but significant additional benefit in reducing plaque accumulation and gingival infalmmartion.This result in our clinical experience confirmed this data infact the media plaque index and Bop (1 group) was 6,7 and 7,29.

Conclusion. Within the limitations of the protocol, this study compared with literature indicates that the CHX 0.12% in adjunct with CPC 0.05% solution has an antiplaque effect comparable with 0.2% CHX but with less side effects.CHX ADS 0.2% caused less pigmentation than 0.2% CHX . The absence of alcohol offers some small additional advantages.

Smile and culture for a healthy and informed mouth: epidemiological study about the knowledge of oral health

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Aim. Evaluate the knowledge level of subjects resident in Italy about the achievement and/or maintenance of oral health and under stand if the mechanisms and strategies adopted for the disclosure are able to commu-

nicate in a clear and incisive way what is really essential in order to promote oral health and, subsequently, the aesthetics of the smile.

Methods. An anonymous survey of self compilation was made on 365 multiethnic subjects resident in Italy (233 females and 132 males, aged between 10 and 79 years), sharing a questionnaire in some social-networks.

31 multiple choice questions, plus an open one, were given, concerning: role of the dental hygienist; oral hygiene products and habits (IOD); oral health related to alimentation, pregnancy and pediatric age; carious disease and its prevention; will of the individual to undergo an oral health control at the conclusion of the test.

Results. 80% of the participants relies himself to the dental hygienist in order to learn and prevent oral problems, considering oral health a synonym not only of morphological and functional status, but also of well-being and aesthetic. Indeed, 48% of the sample collaborates brushing teeth two times a day; 68% of it before going to sleep, adopting a vertical movement (44%) and 69% deterging interdental spaces with interdental brushes and floss, with the last one also the gingival sulcus. The tongue scraper emerged to be the less known and used product, but 64% guesses that it should be used for the elimination of tongue film and 15% for the prevention of halitosis. Only 16% believes this products useful but not able to use them. 9% thinks that the combination of toothpaste makes their action more efficacy and that the mouthwash replaces the interdental brusher and floss. Using it is there indispensable for 26% after having brushed the teeth. According to 70% of the responders, alimentation is correlated to oral health and 93% of these thinks that there are negative repercussions if not well done. Mostly during pregnancy, for 61% we should have a diet poor of simple sugars and reach of foods containing calcium and minerals, besides a careful oral hygiene, related to caries and gingivitis, risky for the mother's and unborn's health. For 47% of the participants, caries are associated to acida salivar pH and 73% referres that daily use of biberon/pacifier dipped in honey/sugary substances is absolutely to avoid for the oral health of the kids. 80% of the sample is aware of the consequences of smoking on oral cavity, but 16% hyronically associates it to the incidence if caries. From the question "After this test, do you believe that you will book a dental hygiene control visit in the next two months?", emerges that 47% makes regular controls and follows the suggested indications; counter, 31% wants to do one and 22% wants to learn every preventive strategy.

Conclusion. The knowledge degree level about oral health resulted to be 55% but the need to adopt more communication strategies in order to inform and make the remaining part aware to a bigger compliance still emerges.

Quantitative evaluation of dry brushing efficacy in oral hygiene maneuvers

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Aim. To demonstrate that removing part of oral bacterial plaque with a manual brush is possible also in absence of water and toothpaste.

Methods. A group of students of the degree course in "Dental Hygiene" of the "University of the Study of Milan " selected 57 healthy collegues (smokers and non-smokers), aged between 19 and 50 years. Everyone was asked to clean the teeths carefully at evening, to do breakfast during the next morning and go to the clinic (Policlinico of Milan) without having cleaned the teeths again.

At the distance of at least one hour from the introduction of foods and drinks, the O'Leary and the Silness and Löe plaque indices (PI) were calculated at time 0 (T0), considering six surfaces of the teeth, prior use of a plaque indicator.

Subsequently, manual brushing was executed for two minutes, without water nor toothpaste, exploiting the salivar wetting and washing action.

Finally, the PIs were recalculated (T1) with the initial modality.

Results. On 9846 analyzed dental surfaces in T0, 47% (O' Leary PI) presented 22% of plaque (Silness and Löe PI) while, after the dry brushing (T1), only 16% (O'Leary PI) was still covered with almost 6% of plaque (Silness and Löe), which corresponds to 66% of the surfaces initially covered with bacterial plaque and to 73% of the average amount of removed bacterial plaque.

Conclusion. This study demonstrates that manual brushing, without water and toothpaste, is able to remove completely bacterial plaque from 66% of the infected surfaces (O'Leray PI) and to remove 73% of the average amount of bacterial plaque (Silness and Löe PI).

Such results suggest that brushing teeth in situations in which water and toothpaste are not present is still advantageous. The protocol is also particularly attractive for allergic subjects and for those who do not appreciate the taste of toothpaste or also for subjects that live in particular conditions in which teeth cleaning with water and toothpaste can be particularly difficult or impractical (for example astronauts during space missions).

Being fast and practical, this protocol could be useful especially for kids during the days spent in school.

Oral piercing and awareness among Italian piercers. A pilot study in Lazio region

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Aim. Specific regulations about education and training for body piercing licensure courses have to be considered due to the great increase in oral piercing practices. Oral area is one of the most common sites of piercing appliance and it has been related to several local and systemic complications. Italian Ministry of Health Working Group on Oral Health Promotion recently considered oral piercings among a published statement on oral health promotion in teenagers, within the Health Promoting Schools Project. Piercers' awareness of complications and maintenance protocols knowledge related to oral piercing is of crucial importance. Aim of the present survey was to assess the local and systemic risk

awareness in the practice of oral piercing and their prevention in a sample of Italian piercers.

Methods. An anonymous 20-item questionnaire was administered to all the registered body licensed piercers in Latina, a small town of central Italy. Licenses certificates were issued by Lazio Region after the completion of an approved training program for standard body piercing including 90 hours of course and a final examination as provided by regional law. The questionnaire surveyed on oral cavity anatomy, local and systemic risks as result of oral piercing, jewels' maintenance protocols and need of post piercing dental check-ups.

Results. 30 body licensed piercers in the town of Latina (central Italy) were involved in the study. Response rate was 66.6%. Data revealed that only 20% of respondents was aware about oral cavity anatomy and none had knowledge about tongue and gingival anatomy. Only 10% enlightened the need of a post piercing dental check-up and 30% was aware about piercing-related temporary paralysis. The piercing maintenance protocol was habitually proposed only by 40% of respondents.

Conclusion. The study participants showed a low level of knowledge and awareness regarding the potential health risks of oral piercing. Poor knowledge of anatomy and local and systemic risks and poor awareness of the importance of piercing maintenance explanation emerged throughout the participants. Therefore oral cavity anatomy, local and systemic oral piercing related risks and intra-oral jewels maintenance protocols should be included in the approved training program for standard body piercing as provided by regional law.

New diagnostic technology and hidden pits and fissures caries

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Aim. The accuracy in pits and fissures caries detection is of paramount importance in dental caries primary and secondary prevention. The detection and diagnosis of pits and fissures occlusal caries on early stages and the evaluation of lesion depth have frequently been highlighted as diagnostic problems, due to accumulation of calculus, plaque or other contaminants that may interfere with diagnosis. Dentin caries on the occlusal surfaces can be detected under a fissure that appears intact to the naked eye. A clinical case is reported to show the technological aiding tool usage to this important issue. Using of the fluorescencebased camera VistaCam iX (Durr Dental, Bietigheim -Bissingen, Germany) is determined and compared to visual inspection.

Methods. A combination of visual examination and probing has been the mainstay of occlusal caries diagnosis in the past. Unfortunately, these types of inspection alone may leave many dentin pit and fissure caries undetected. Technological aiding diagnostic tool is applied in this study besides the new caries detection and assessment systems.

The visual inspection used International Caries Detection and Assessment System (ICDAS-II) to score caries stage. ICDAS-II codes are:

0 = sound;
1 = first visible sign of noncavitated lesion seen only when the tooth is dried;
2 = visible noncavitated lesion seen when wet and dry;
3 = microcavitation in enamel;
4 = noncavitated lesion extending into dentine seen as an undermining shadow;
5 = small cavitated lesion with visible dentine: less than 50% of surface;
6 = large cavitated lesions with visible dentine in more than 50% of the surface.

The Vista Cam iX fluorescence camera (Durr Dental, Bietigheim-Bissingen, Germany) is a novel dental diagnostic tool for quantitative assessment of dental caries with the capacity for early detection of noncavitous caries lesions. The Vista Cam iX LEDs emit high-energy blue-violet light at 405 nm on the occlusal tooth area. At this wavelength porphyrins produced by cariesrelated bacteria, emit red light, containing less energy, in contrast to sound enamel, characterized by green light. carious tissue and healthy tissue emit fluorescence at different intensities when excited by light at specific wavelengths. The fluorescence is recorded by the camera, transferred and processed by a software (DBSWIN, Durr). As result a digital image show lesions in different colors shades with numerical score between 0 and 4, predicting the extent and depth of caries. Using the VistaCam iX fluorescence-based camera (FC), images of all occlusal tooth surfaces were taken.

In this study photographic images, representing the visual diagnostic approach, are applied as integration to VistaCam iX Proof images step by step during inspection and assessment of operative treatment need in a case of hidden pit and fissure caries on a permanent molar.

Results. The present study showed how technological diagnostic aids can improve the accuracy in pits and fissures caries diagnosis. The case of hidden dentine caries detection oriented to operative treatment option in a permanent molar. The clinical procedure consisted in the carious tissue removal and traditional resin restoration with a minimally invasive approach.

Conclusion. Based on the results obtained, it could be concluded that Vista Cam iX Proof shows promising results in hidden pits and fissures caries detection and could be considered a noninvasive examination method that facilitate the detection of early lesions and a potential diagnostic aid.

Efficacy of oral hygienic protocols instruction on children wearing removable or thermoplastic appliances

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Aim. Many children experience the orthodontic treatment; in particular, removable and /or appliances are often worn by very young children. Since has been demonstrated that oral hygiene reduces in orthodontically treated patients, the aim of this study is to verify the efficacy of oral hygiene instruction to children with removable appliances.

Methods. A group of 22 children (age 5-12) with removable or thermoplastic appliances since 3 months were enrolled. At the beginning of the study (T0),

plaque index (PI) and the presence of tartar on orthodontic appliances were clinically; at the same time, patients were questioned on their oral hygiene habits (mainly concerning the ways and frequency of cleaning their teeth and appliances). Then, a dental hygienist instructed the children about correct oral and appliance hygiene protocols. After 3 months (T1) PI and tartar on appliance were recorded and the hygienist enforced the instruction. At T2 (after 6 months), children were again questioned and PI and tartar recorded.

Results. At T0, oral hygiene of examined patients was unsatisfactory and the tartar was frequently present on removable appliances. At T1 and T2 PI and presence of tartar improved; in the questionnaire, patients showed to understand protocols and to put them into practice.

Conclusion. The role of dental hygienist is fundamental in teaching and maintaining oral hygiene status in children with removable or thermoplastic appliances.

Efficacy of ICON infiltration technique for the treatment of developmental defects of enamel (DDE). Case report

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Aim. Developmental Defects of Enamel (DDE) should be distinguished from the earliest evidence of carious demineralization on the smooth enamel surface, defined as "white spot" lesions. Both these kinds of demineralization lose their translucency because of the extensive subsurface porosity. Recently a new micro invasive technique has been proposed, which includes resin infiltration up to the depth of the lesion. The infiltrant (ICON, DMG) can be used for both vestibular and interproximal noncavitated lesions. This novel approach is meant to improve esthetics and/or stop lesion onset or progression which is thus achieved by no restorative material. The aim of resin infiltration is to soak up the porous lesion body with a low-viscosity resin (infiltrant) that is subsequently light-polymerized. Thereby, in DDE the porosity infiltration aims to both solve the esthetic impairment and to lower the risk of carious onset, in early carious lesions the diffusion pathways for cariogenic acids are blocked, lesions are sealed and the progression is arrested. Overall, this treatment aims upon both the prevention of caries onset and improving esthetics, by diminishing the opacity. An explanatory clinical case is reported.

Methods. The case of two sisters (aged respectively 13 and 18) is presented. Both patients were diagnosed for celiac disease, exhibited demarcated white/cream DDE in vestibular surfaces of the upper anterior sextant and were treated using the Resin Infiltration technique. For the purpose of infiltration, initially rubber dam was placed from upper right second premolar to upper left second premolar to provide working field isolation and to ensure the best treatment results. In order to be treated vestibular enamel surfaces were cleaned using a low-speed handpiece, prophylactic brushes and paste. Infiltration was performed according to the indication of the manufacturer. Spectrophotometric evaluation and digital camera photographs were used before and after the treatment in order to assess color variations and esthetic outcome.

Results. Resin infiltration technique showed to be effective in esthetic improvement in DDE clinical treatment. An uniformization of tooth color and a masking of the defects resulted in the assessment both by digital camera and spectrophotometer. Moreover, the treatment is performed with non-invasive approach, and no local anesthesia is required, thus preserving tooth structure and resulting well-accepted by patients.

Conclusion. Resin infiltration is a novel technique that brings out immediate esthetic improvement in white DDE. This micro-invasive technique is designed to bridge the gap between prevention and restoration by infiltrating and reinforcing the pore system of a lesion with a light curable resin. Further long term studies are required to establish the longevity of the achieved esthetic improvement.

New strategy of prevention against oral problems in absence of water and toothpaste

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Aim. During a previouse survey 365 patients, aged between 10 and 79 years, were interviewed and asked about how ofted they brushed their teeth. 48% of the patients declared to carry out home oral hygiene (OHH) no more than two times a day, 1% once a day, 38% three times a day and 6% more than three times a day. Independently to the individual frequency of OHH, all patients expressed the impossibility practising it after every meal, because having water and toothpaste is not always possible. In fact the aims of the work are: to suggest a protocol for the identification of a strategy for bacterial plaque removal also in absence of water and toothpaste; understand which of the systems on sale are more efficient in this sense. Methods On a sample of patients well-learned about OHH were calculated: "O' Leary" and "Silness and Löe" plaque index considering six surfaces for every tooth (T0), at least one hour after the introduction of foods and drinks and with the use of a plaque indicator. Subsequently, they were asked to brush their teeth for two minutes and the plaque index were recalculated (T1) as for the first time. The same protocol will be used in order to test also the efficacy of electrical and sonic toothbrush, comparing the three instruments, and valuating the effect combined with water and toothpaste or only with water. Results The application of this new protocol will give the chance to individuate a strategy for an efficent removing of bacterial plaque in absence of water and toothpaste, besides the individuation of which between the manual, electric or sonic brusher should be suggested to the patient that might be in similar conditions. Conclusions The proposal of this new strategy for the removing bacterial plaque will demonstrate itself to be useful and fast in all impractical situations and for those who can not use toothpaste. In this way reducing every limit to the control of the bacterial proliferation and the actuation of prevention programs with the stimulation of the patient will be possible.

The access to dental treatments in the weak groups of the population in the city of Turin: variations of consumers

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Aim. In Italy dentistry is mainly performed through private practice and only a little is supplied by the National Health System. Thus, oral health is often overlooked by those families with economic difficulty. Voluntary associations are born to provide free dentistry treatments to disadvantaged patients, whose number is increasing, due to the global crisis. Over the last years, not only immigrants, who represented the main target of these associations, but also Italians with severe economic problems have started to avail themselves of these associations, where dental prosthesis is free. The aim of the study is to evaluate whether and how the type of patients turning to these structures in the city of Turin had changed.

Methods. These associations collect data concerning provided therapies and the number of patients who have showed up for a first visit over the years. Many aspects are taken into account: schedules, number of dental chairs, number of volunteers, treatment access modalities, dental provided therapies, number of patients coming for a first visit over the years, percentage of Italian patients, update of computerized medical records. Data analysis has regarded variations occurred from 2009 to 2013.

Results. The relationship between resources and patients has remained unvaried, thanks to the remarkable medical staff increase. Interestingly, over the years the type of therapies has changed and extractions have shown a statistically significant increase. Patients mean age has remained basically unvaried. Female presence has increased in a statistically significant way. From 2009 to 2013 requests from Italians have increased: incidence has turned from 30,4% to 40,7%. The first data given by the associations reveal that in the first semester of 2014 incidence is way above, reaching 56%.

Conclusion. In the light of these data, institutions taken into account have shown a wide offer to the weakest groups of the population, increasing the number of volunteers and the quality of the services and the structures. However, the study also shows the dramatic consequences of global crisis, in particular the increasing number of disadvantaged Italians showing up to these associations, especially those belonging to categories once not considered at risk; this context is evident all over Italy and especially in a city living the economic crisis like Turin.

Patients with juvenile idiopathic arthritis in orthodontic therapy: proposal of a new data collecting protocol

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Aim. To propose a new protocol for the collection of data in order to individuate recurrent clinical signs in the oral cavity of patients with Juvenile Idiopathic Arthritis (JIA) in orthodontic therapy.

Methods. The points of the data collecting chart for JIA patients (dental formula, plaque index, bleeding index, PSR and subdivision in dental areas (A) for the segnalation of caries, demineralizations, fillings and sealants) previously individuated, were further modified and amplified as follows:

1. Dental surface subdivision (S):

— molars, from 21 to 45 S (9 A for: vestibular, lingual/palatal, distal, mesial and occlusal) plus one for Carabelli's tubercle;

— premolars, from 18 to 45 S (9 A for: vestibular, lingual/palatal, distal, mesial and occlusal);

— canines and incisors, from 13 to 27 S (9 A for: vestibular and lingual/palatal; 3 A for: distal, mesial and occlusal) plus one for the cingula.

Quantitative evaluation of the basal salivary flow and stimulated with lemon juice in three subsequent series of 5 minutes each, for a total of 15 minutes, in first visit (T0), in T1, in T2 and in the following Tn.

Qualitative bacterial plaque analysis.

Quantitative bacterial plaque analysis.

Oral/geniena mucose zones subdivision (Z):

— palatal, 6 Z;
— vestibular upper adherent gum, 3 Z;
— vestibular free upper gum, 3 Z;
— upper vestibular-labial, 3 Z;
— lingual, 6 Z;
— oral floor, 4 Z;
— vestibular low adherent gum, 3 Z;
— vestibular low free gum, 3 Z;
— inferior vestibular-labial, 3 Z;
— right cheek mucose, 6 Z;
— left cheek mucose, 6 Z.

1. Lips Subdivision (L):

— superior, 4 L;
— inferior, 4 L;
— corners of the mouth, right and left.

Results. The further points, as individuated, allow to collect the clinical signs present in the oral cavity of JIA patients in an unambiguous and distinct way, to do a more detailed valuation of their oral health and simplify the communication between the referring doctors.

Conclusion. The proposal of this new diagnostic protocol will allow to every member of the equipe to individuate in an unambiguous way the recurrent clinical signs in oral cavity of JIA patients in orthodontic therapy.

Patients with juvenile idiopathic arthritis inserted in preventodontic iter: qualitative and quantitative valuation of bacterial plaque

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Aim. Make a quantitative and qualitative evaluation about the changes of bacterial plaque in patients with Juvenile Idiopathic Arthritis (JIA), inserted in preventodontic Iter.

Methods. A group of 50 JIA patients, 39 females and 11 males, aged between 4 and 23 years, inserted in pre-

ventodontic Iter four months before the starting of orthodontic treatment, was subjected to microbiological analysis of bacterial plaque.

We proceeded taking a withdrawal of bacterial plaque from the lingual surface of 4.6 through a sterile loop in different moments of the treatment: in first visit (T0), after a month (1), after two months (T2 and after three months from the first withdrawal (T3). The samples of plaque were inviated to the laboratory within 10 minutes from the collection, subjected to quantitative (Thoma chamber) and qualitative analysis (Gram coloration) and closely observed under the microscope.

Results. The laboratory results put in evidence a general improvement of the number of cocci and bacilli from the second to the fourth withdrawal, with an average percentage for each withdrawal of 33% for the first ones and of 43% for the second ones. More specifically cocci were subjected to a decreasing of 78% (38% from T0 to T1; 26% from T1 to T2, 36% from T2 to T3) while bacilly of 80% (40% from T0 to T1; 28% from T1 to T2; 61% from T2 to T3). A decreasing was registered also from the qualitative point of view, with a constant trend of average, both for Gram (58% from T0 to T3) and Gram (74% from T0 and T3), respectively of 25% and 37%.

Conclusions. From this study, as demonstrated by the results of the qualitative and quantitative analysis, emerged the importance of including JIA subjects in preventodontic Iter before the starting of the orthodontic treatment. Proceeding this way, it was possible to decrease the number of potentially pathogen bacteria and reduce the incidence of possible ripercussions on the oral health of the whole sample. The importance of the hygiene and preventodontic protocol (adopted at the Department of Orthodontics, Policlinico of Milan) is therefore confirmed within the dental team, educating and motivating patients with JIA.

Motivational and clinical effectiveness of a tailor-made home maintenance protocol for patients with generalized periodontitis

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Aim. This randomized clinical trial evaluates the home maintenance tailor-made protocol in patients with generalized periodontitis considering objective parameters.

Methods. This randomized clinical trial was conducted on 120 patients with generalized periodontitis and good systemic health general conditions.

Probing pocket Depth (PD), Full Mouth Plaque Score (FMPS), Full Mouth Bleeding Score (FMBS) were collected to all patients before performing Full Mouth Scaling and Root Planing (FMSRP). Universal tips for ultrasonic supragingival and subgingival scaling (Mectron® S1 and P10) were used, in association with airpolishing with glycine powder.

The participants were randomly divided into two groups.

Test group: participants were "tailor-made" educated and motivated, home maintenance was customized and shared between the Dental Hygienist and the patient. For each patient were considered: gingival biotype, dental alignment, diastema presence/absence, occlusion, handiness, temperament.

To each patient was recommended to use the assigned toothbrush with ergonomic handle, compact head, medium bi-level bristles to reach deep cleaning also in interproximal surfaces, subgingival and gingival margin sites, interdental brushes with adequate sizes to fit each hard to reach area. Patients were trained adequately: first the home maintenance protocol was performed by the Dental Hygienist on the patient, and then the patient's independent cleaning was supervised by the Dental Hygienist.

Control group: participants were indicated to follow traditional colorimetric method of plaque control, using dental disclosing tablets to indicate plaque localization and choosing by themselves cleaning dental tools for removing plaque-colour.

Results. None of the patients dropped out the study. At T(45) there was no significant difference on any parameters between any of the groups. At T(180) FMPS and FMBS were improved in both groups without statistically significative difference. This can be associated to the effectiveness of FMSRP protocol in managing generalized periodontitis. However, patients of test group showed a better PD and PAL than the others, and both these difference was statistically significative. (T student Test, $p \leq 0,05$).

Conclusions. The clinical trial confirms that FMSRP protocol is effective in managing generalized periodontitis. Noticeable difference is due to a customized home maintenance tailor-made oral care compliance and adherence, based on the anatomical structure of the mouth analysis and identification of the personalized dental tools (toothbrush, interdental brushes) and skill-technique involving the patient directly.

Quantitative comparison of the salivary flow in patients with juvenile idiopathic arthritis under drug treatment with methotrexate and etanercept: single or combined administration

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Aim. To compare the effect of the pharmacological therapy with Methotrexate and with Etanercept, prescribed by the rheumatologist, individually or in combination, on the quantity of basal and stimulated salivary flow in patients affected by Juvenile Idiopathic Arthritis (JIA).

Methods. At the Department of Orthodontics of the Ospedale Maggiore Policlinico di Milano, 21 JIA patients, 16 females and 5 males, aged between 7 and 25 years, were selected: 11 under drug treatment with Methotrexate (group A), 7 with Etanercept (group B) and 3 under combined therapy (group C).

The sample was subjected to a salivary exam in which it was possible to monitor, in seated position, for 5 minutes, the basal salivary flow volume and the salivary flow volume stimulated with lemon juice: one drop (0,04 mL)/ min put on the top of the tongue.

The collected data were compared to the standard values described by Leo M. Sreeby and Arjan Vissin (0,25 mL/ min ≤ Vsal.flow. basal ≤ 0,35 mL/min; 1 mL/ min ≤ Vsal.flow. stimulated ≤ 3 mL/ min) and afterwards with the data collected during a previous study, which suggested that the drugs used in the treatment of JIA have a significant influence on the salivary flow production, reducing it of 33%.

Results. The collected data individuate:

— group A (Methotrexate): an average volume of basal salivary flow (Vsal.flow) of 0,2 mL/ min and an average volume of stimulated salivary flow (Vsal.flow) of 0,8 mL/ min, both values inferior of 20% to the standard values.

— group B (Etanercept): a basal salivary flow volume of 0,25 mL/ min, coincident with the infimum of the range of reference, while under stimulation the value was of 0,99 mL/min, 1% less than the minimum acceptable value.

— group C (combined therapy): basal salivary flow volume of 0,2 mL/min and stimulated Salivary flow volume of 0,8 mL/min, results coincident with group A

The comparison between the two different considered drugs for JIA treatment the one taken by group B, Etanercept, doesn't cause significant differences on the salivary flow. Counter to this Methotrexate and the combined therapy have a significant influence on the basal salivary flow volume and on the stimulated one, reducing the first of 33% and the second one of 60% compared to the average of the values described by Leo M. Sreeby and Arjan Vissin.

Conclusion. The results collected in this study suggest that Methotrexate in single prescription has a negative effect on the quantity of salivary flow which might, with high probability, have repercussions on oral health of these patients. Therefore, it would be appropriate to consider the adverse aspect o in order to adopt the necessary strategies of oro-dental prevention.

Also in the combined prescription the collected data indicate a reduction of the salivary flow, but, being today the sample reduced, it is not possible to give a reliable assessment.

Management of patients with special needs in a dental department (an observational study)

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Aim. The aim of this research was to detect, through an observational epidemiological survey, the flow of patients with special needs visited in the dental department of the Clinic San Rocco of ome - BS - (San Donato hospital group). The sample of our research was the year 2014. The purpose was to assess the level of service provided in patients with certain disease, in terms of prevention of oral side effects and, after that, assess subjective satisfaction of the patient.

Methods. First of all we have noticed the total amount of patients visited in our department in a year, after we have divided the sample into two groups: healthy and sick (with heart disease, cancer, head and neck cancer, diabetics, people with disabilities, transplanted, immunosuppressed). In the second step we have detected the total amount of patients who have benefited from services of dental hygiene, then dividing them into two groups: patients healthy and patients with special needs. Then we have proceeded considering only patients with special needs, noting the amount of services provided to each patient. In this observational study we have considered only the dental hygiene services provided by the National Health Service (calculus removal, root planning, control visit), so excluding any other services. Data collected was divided into three groups, one for each operator dental hygienist who has operated in the time considered. The following step was to detect dental hygiene protocols applied to each disease and than to evaluate the changes of plaque and bleeding index in the arch of the time considered, without forget to notice the individual satisfaction that each patient has expressed about the services. The last step was to analyze the amount of patients returned to the department due to bleeding, suspected or certain bacterial endocarditis, osteoradionecrosis, infections, dissatisfaction and the amount of patients who have stopped to benefit from our services (to cause death or personal choice).

Results. Collected data about questions raised were analysed using descriptive statistics.

Fundamental data collected are:

— Total amount of patients with special needs treated in a year (coming not only from the province of Brescia, but also from outside the province and region):621

— Total amount of oral hygiene services performed on patients with special needs: 443.

The aggregate data were represented through the use of graphs and tables.

Conclusion. The analysis of results shows how can be possible, in a department of dentistry , manage this particular type of patient through the use of specific protocols, offering an high quality of service.

Five-year retrospective analysis of implant-prosthetic treatment with Winsix implant system

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Aim. Implant-prosthetic techniques allows to restore function and aesthetic of edentulous areas with high expectation of long-term success percentage, which in literature is about 90-95%. The achievement of these results is related to the use of valid materials and surgical and prosthetic protocols. However, current dental implants may occur in mechanical and/or biological complications, that could lead to a failure of rehabilitation. The early intercept of any of these issues is essential to ensure the durability of rehabilitation. Aim of this study is to evaluate the health of the implant sites at 5 years from the functional loading in patients placed in maintenance program at the Centre for Oral Hygiene and Prevention - U.O.C. Dentistry - I.R.C.C.S. San Raffaele Hospital, by monitoring over time of appropriate technical and clinical parameters.

Methods. In 2009, were placed 412 Winsix implants in 160 patients. Of these 160 patients,85 were then included in the maintenance program at the Centre for Oral Hygiene and Prevention, enabling the monitoring of a total of 218 plants. Consulting the surgical registers of UOC Dentistry, medical records on paper and digital medical records, were collected and analyzed relevant parameters to describe the implant health status.

Results. Based on the data collected in the sample under examinations, the five-year survival rate is evaluated in 97.71%, then only the 2.21% of the implants lost the osseointegration. These data are in agreement with those reported in literature, which confirmed the reliability of the implant-prosthetic procedures. In observed failure cases, has been identified the role of the know nrisk factors for the development of peri-implant complications. In summary, it was established that, after 5 years of function, 16 implant sites were affected by peri-implantitis and 29 implants were positive to BOP. 5 implants are failed: with regard to the role of risk factors 3 failed implants were placed in patients with periodontitis, two of which are also smokers, and 1 in a smoker.

Conclusion. The analysis of collected data suggest that implant failure could be caused by inadequate plaque control in both professional and home environments. For these reasons the maintenance protocol for implant-prosthetic rehabilitation actually in use at the Centre for Oral Hygiene and Prevention, is based on the time variable because of the need to periodically reinforce the motivation of patients to maintain high levels of oral hygiene and to be able to monitor the state of health of the implant sites, looking for any signs that may presage mechanical or biological complications. The clinical experience matured at the Centre for Oral Health and Prevention has also shown that this approach also allows to detect late complications related to prosthetic superstructure, like loosening or unscrewing of the components.

Causal non-surgical periodontal therapy: manual *vs.* mechanical instrumentation. Pilot study

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Aim. Periodontitis causes a reabsorption process of alveolar support bone that, if not counteracted, can determine the appearance of a mobility of dental elements, then a loss of the same for lack of anchorage to the underlying tissues. The disease treatment is, at first, not surgical and provides the removal of the bacterial plaque and calculus from the subgingival environment. For this purpose is currently available a wide range of instruments both manual (curettes) and mechanical (ultrasonic scalers). This pilot study wants to compare the clinical efficacy of both types of instruments, evaluated by means of suitable quantitative parameters.

Methods. 10 patients referred to the Centre for Oral Health and Prevention- U.O.C Dentistry of I.R.C.C.S San Raffaele Hospital with a diagnosys of chronic periodontitis were enroled, then submitted to non-surgical treatments of the disease. To select the sample, we used the following exclusion criteria: diabetes mellitus type 1 and 2, tabagism, drug therapies that can induce a gingival increase in the volume, pregnancy, presence of implant-supported prosthetic rehabilitation. Each patient, after a session of professional oral hygiene, was subjected to a periodontal check-up, to evaluate the damage produced by periodontal disease. To this end, they have been measured and recorded on a digital medical case file the following parameters: probing depth (PPD), bleeding on probing (BoP), recession (REC), mobility. Following the periodontal check-up, at baseline, each patient was subjected to scaling and root planing procedures according to the protocol of One Stage Full Mouth Disinfection (OSFMD), which provides for the treatment of both arches in two sessions lasting two hours each, conducted for two days in succession. The OSFMD maneuvers were performed in randomized split-mouth, treating each half with exclusive manual instruments (Gracey curettes mini five) or with mechanical instruments (ultrasonic scaler inserts). Each patient was also receiving home instruction for a chemical monitoring of oral biofilm, by using chlorhexidine for 15 days (in addition to a regular oral hygiene at home). After 60 days from the baseline, the patients were re-evaluated for clinical parameters recorded at the time of periodontal check-up, particularly assessing the changes that occurred for PPD, REC and BOP.

Results. It has not been possible to identify a better typology of instruments for scaling and root planing procedures to obtain the best results in terms of recovering the PPD and/or the production of RECs as a results of the treatment. However it has been possible to observe a significant reduction of BoP apart from the type of instruments used.

Conclusion. The choise of a precise instrumental approach depends on the clinician ability to operate effectively and on his professional experience. The correct and effective use of instruments, mechanical or manual, is a funcion of an irremissible learning, that goes on in the daily clinical. The use of curettes in more complex than the use of ultrasonic inserts for subgingival debridement and, moreover, hand instrumentation can induce damages to the root portion of dental elements, if not properly used. On the basis of what has been observed, it is hoped for the future to conduct more detailed studies on these issues, possibly also including microbiological investigations and bigger and heterogeneous statistical samples.

High pressure oxygen on periodontal treatment in diabetic patients

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Aim. Our purpose was evaluating the effects of oxygen therapy on periodontal tissues healing in diabetic patients, considering objective parameters. METHODS This split mouth study involved thirty (30) patients dealing with the following inclusions criteria: periodontitis from moderate to severe (probing pocket depth > 5mm in more than 30% of bleeding sites; age between 35 to 70 years old; no smokers or mild smokers (less than 10 cigarettes per day); diagnosis of diabetes. We excluded: patients suffering from others systemic diseases; patients under antibiotic therapy up to 6 months be-

fore; patients with full arch restoration. Probing pocket depth (PD), periodontal attachment level (PAL), bleeding on probing (BoP) and plaque index (PlI) were collected. A full mouth scaling and root planing (FMSRP) was carried out using airpolishing with glycine powder in combination with ultrasonic inserts (Mectron S1 and P10) for supra gingival and sub gingival scaling. At the end of the treatment a test and a control side for each patient were selected according to a randomization list. On the test side, an application of high pressure oxygen was performed, using EXEA Genotecnology. 90% pure oxygen was released 10 minutes per quadrant. Each patient was recommended to keep a right oral hygiene level using the individualized and shared with the patient tailoring protocol. A manual medium toothbrush (Gum Tecnique Pro Compact) was selected and showed to the patient and it was recommended to brush for two minutes twice per day, in combination with interproximal brushes codified by colors (Gum Travler) to clean interdental areas. All clinical indexes were collected 6 weeks later by the same operator, evaluating carefully oral hygiene level.

Results. Full mouth plaque and bleeding scores improved hugely in all patients.

On the test sides we observed a greater PD improvement than on the control sides. It means that FMSRP was successfully carried out. PAL improved greater on the test sides too. Fisher test revealed that the results were statistically significative.

Conclusions. We think that our results put the oxygen therapy under new lights. Oxygen high pressure therapy could improve periodontal healing in diabetic patient according to three possible mechanism: cloth stabilization, anaerobic bacteria elimination and new vessels formation. Further studies should be carried out to confirm our results.

White spot lesions: discussion between fixed orthodontic therapy and bad habits

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Aim. The aim of this study is to research the White Spot Lesion (WSLs) factors in patients with fixed orthodontic appliances in order to classify at-risk subjects.

Methods. 24 patients (6 males and 18 females aged between 15 and 29) were selected for orthodontic therapy.

The Silness-Löe Plaque Index (IP) and the Full-Mouth Bleeding Score (FMBS) have been carried out before debanding (T1), the day during (T2) and after a month (T3), while O'Leary's Plaque Index on four sides' bracket at T1 and T2. During T2 and T3 every tooth surface has been observed and dried with air in order to identify and classify WSL siti and possible dentinal hypersensitivity. Four codes have been applied:

— Code 0: none or slight change in the enamel translucency after prolonged air drying

— Code 1: opacity (white color) is not evident on the wet surface but distinctly on the dry one

— Code 2: opacity (white color) distinctly visible without drying

— Code 3: localized enamel cracking or enamel and/or grayish discoloration on the underlying dentin

A form has been procured to intercept characteristics and bad habits related to WSLs. Data recorded have been classified into four values and the incidence risk has been evaluated referring to WSLs.

Results. A significative decrease of IP, FMBS and WSL siti with hypersensitivity has been highlighted from T1 to T3. Moreover, the incidence of decalcifications results correlated to bad habits. The 78% of the sample takes acid and sugary foods and sugary frequently. Only 16% of these performs oral hygiene after each meal.

Conclusions. The phenomenon WSLs , as it emerged from this study, it is not directly attributable to the fixed orthodontic treatment, but many other factors that should be intercepted and monitored in advance, such as the nutritional aspect.

A significative decrease of IP, FMBS and WSL siti with hypersensitivity has been highlighted from T1 to T3. Moreover, the incidence of decalcifications results correlated to bad habits.

The WSL event cannot be straight attributable to fixed orthodontic therapy, but to a lot of factors, such as the nutritional profile, preemptively intercepted.

Oral health and self reported sweet food habits in a cohort of pregnant women

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Aim. Good nutrition and proper oral health care during pregnancy are essential for the oral and systemic health of mothers and children. Unfortunately pregnant women often receive poor guidance about preventive nutritional and oral health care measures. Moreover, adequate oral hygienic habits are mandatory to control the development of periopathogenic oral biofilms, well known as risk factors for adverse pregnancy outcomes. This study is aimed to describe self-reported sweet food consumption during pregnancy, tobacco habits, oral hygiene habits, frequency of visits to a dentist as related to oral symptoms, dental caries and gingival disease in a cohort of postpartum women.

Methods. 410 postpartum women who delivered at the obstetric/gynecological clinic of the University hospital in Milano were interviewed and examined bedside within 5 days from delivery, through a custom developed questionnaire and a full oral examination. All women were informed of the aims of the study and consented to participation. A full mouth dental and periodontal examination was performed according to WHO guidelines. DMFT and periodontal indexes were recorded. Data collection concerned demographical and educational data; sweet food consumption habits, smoking habits; oral hygiene habits, self-reported oral symptoms during pregnancy; dental and periodontal health conditions. Descriptive statistics and relevant associations were estimated and analyzed with JMP 9.01 software.

Results. The postpartum women were aged between 19 and 47 years (mean 32.9, IQR 3036); 31.5% had at-

tained a degree, 66.8% had high school diploma, 7% completed the primary school. 62.4% of the subjects stated that they had never smoked while 37.6% were ex-smokers or current smokers. 71.1% of women surveyed reported taking sweet foods at least once a day. 53.6% of women were frequent brushers, performing oral hygiene at home after main meals. 34.8% of the women reported that they visit the dentist only in case of pain and 65.2% had dental professional control at least yearly. 79.7% of the women had at least one oral or dental symptom during the pregnancy: gingival bleeding, tooth mobility, bad breath. Mean BOP index was 9.7 (14.5 st.d.; 4.5 median; 0.9-12.5 IQR). Mean

DMFT was 7.6 (4.1 st.d.; 7 median; 5-10 IQR). The statistical analysis highlighted the following main associations: oral pregnancy symptoms were slightly higher in smokers women (N.S.); BOP was higher in smokers ($p<0.05$); mean DMFT was slightly higher in the daily consumers of sweet foods with low statistical significance ($p=0.08$).

Conclusion. The study focused on sweet food consumption habits and tobacco habits in pregnancy and their relation with oral symptoms and gingival and dental diseases, demonstrating the existing associations between these risk factors and oral diseases in our cohort of women.

Oral probiotics: a useful adjunct in the management of halitosis. A pilot study

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Aim. Probiotics have been proposed as useful adjuncts in the management of halitosis and the results of studies investigating their use have been equivocal; probiotics are not universally accepted as a proven method to control oral malodor. The aim of this pilot study was to evaluate the modifications of the organoleptic quality of morning breath and the concentrations of oral VSC following the oral treatment with lozenges of Lactobacillus reuteri DSM 17938 in a cohort of bad breath patients.

Methods. Patients were recruited among those referred for bad breath treatment to the Unit of Oral Hygiene and Prevention of the Dental Clinic; they were investigated for systemic diseases and examined to rule out periodontitis and other oral diseases and conditions. The following clinical features and indexes were recorded at baseline: dental conditions, plaque index, PSR, tongue coating index, subjective evaluation of the quality of the breath using a reference VAS (Visual Analogue Scale) with indices ranging from 0 to 10 (0 worst breath, acceptable 6, 10 good), breath organoleptic score and measurement of the concentration of oral VSC through the use of Interscan Halimeter®. For statistic purposes, the continuous VSC data were recoded as a discrete VSC score ranging from 0 to 3 in relation to the measured ppb value. After professional oral hygiene instructions, the patients were informed and randomly divided into two groups: group A underwent professional scaling and prescription of probiotic lozenges containing 10^8 CFU of Lactobacillus reuteri DSM17938; they were instructed to dissolve in the mouth one lozenge per day for seven days following the evening oral hygiene practice. Patients of the B group were prescribed the same course of probiotics lozenges without the professional hygienic phase. On the eighth day, the patients were re-examined recording PRS, plaque index, tongue coating and re-evaluated for subjective and organoleptic bad breath and VSC concentration.

Results. 28 patients were recruited and investigated, aged between 18 and 61 (mean age 36.6 yrs), 14 females and 14 males. Patients in group A and group B showed similar values in the oral conditions and indexes recorded at baseline. Both groups showed reduction of bad breath parameters after the treatment; the mean reduction of relevant parameters i.e. subjective, organoleptic and VSC score were higher in the treatment group A - professional oral hygiene plus probiotic lozenges.

Conclusion. The administration of the probiotic Lactobacillus reuteri as a mouth dissolving lozenge showed to be useful to decrease the subjective and objective levels of oral malodor. Further studies are needed to provide definitive data supporting the effectiveness of probiotics in the treatment of halitosis.

Quantitative analysis of the salivary flow in patients with juvenile idiopathic arthritis

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Aim. The aim of the present research is to compare the volume of the salivary flow ($V_{sal.\ flow}$) patients affected by Juvenile Idiopathic Arthritis (JIA), under drug treatment or untreated, with the standard values descripted by Leo M. Sreeby and Arjan Vissin ($0{,}25mL/min \leq V_{sal.\ flow}$ basal $\leq 0{,}35mL/min$; $1mL/min \leq V_{sal.\ flow}$ stimulated $\leq 3mL/min$) in order to individuate eventual anomalies which might engrave on the health of the oral cavity.

Methods. At the Department of Orthodontics of the Ospedale Maggiore Policlinico of Milan 39 JIA patients, 16 males and 23 females, aged between 7 and 25 years were selected: 21 were under drug treatment prescribed by the rheumatologist and 18 were untreated.

The sample was subjected to a salivary test, in sitting position, by means of which it was possible to monitor for 5 minutes, in sitting position, the volume of basal salivary flow and salivary flow stimulated with lemon juice: one drop (0,04 mL)/ min put on the tip of the tongue.

Results. The collected data put in evidence an average salivary flow volume of 0,2 mL/ min and a stimulated salivary flow volume of 0,8 mL/ min , both measures less than the values of Leo

M. Sreeby and Arjan Vissin taken as reference.

Differently, in the group non in therapy, a basal salivary flow volume of 0,4 mL/ min, higher than the major value of reference, was obtained, while under stimulation a result of 1,2 mL/ min was obtained, value internal to the considered range.

Conclusion. In this study was observed that JIA subjects that are not under drug treatment present a basal salivary flow increased of 25% compared to the standard values of Leo M. Sreeby e Arjan Vissin.

Differently, in the sample under pharmacological-rheumatological treatment was registered a quantity of basal salivary flow reduced of 33% for both the considerations, compared to the values selected as a model. Which of these drugs shell be mostly responsible and if they are more influent in single or combined prescription, still remains to be cleared.

Dental hygienist in the treatment of patients with eating disorders

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Aim. Insert the professional figure of the dental hygienist in the multidisciplinary team for the treatment of patients with eating disorders (ED), revealing its positive influence in the improvement of the disease. In order to reach this aim, a new psycho-pedagogical approach, focused on the effects of nutrition and on the ideal of beauty, oral health and on the smile was individuated. The association between oral condition and type of ED was also analyzed, comparing oral hygiene with psychological parameters of mood and esteem in patients with Anorexia Nervosa (AN), Bulimia Nervosa (BN), Binge Eating Disorder (BED) and Eating Disorder not Otherwise Specified (EDNOS).

Methods. 16 patients were recruited from which emerged the clinical parameters of the study, but only 12 partecipants completed the operative protocol, structured in four phases:

1. (T0) preparatory phase: instruction and motivation of the patients to oral hygiene habits (OHH); calculus of "Full Mouth Plaque Score" (FMPS), "Full Mouth Bleeding Score (FMBS), dentinal erosion (BEWE index) and survey of a new oral hygiene index:

Code 0: poor OHHs (inconstantly executed and practiced with incorrect methods; high risk of hard and soft tissues lesions);

Code 1: insufficient OHHs (actuated two times a day but with the use of casual and inappropriate, sometimes also injurious, products and techniques);

Code 2: sufficient OHHs (more importance given to oral health, practicing OHHs more than two times a day, using adequate products but incorrect techniques);

Code 3: discreet OHHs, carrying out a specific route and adequate technique, practicing excessive pressure and skipping interdental spaces;

Code 4: good OHHs (regularly executed at the end of every meal with adequate route and technique, correct use of all products and balanced brushing pressure).

2. Professional Oral Hygiene;

3. (T1) Revaluation of the clinical and nutritional advice;

4. (T2) follow-up for the oral and psychological clinical evaluation.

Results. In T0 the whole sample presented average high plaque (49%) and flaming (52%) levels. In particular an increasing trend of the indexes in relation to the type of ED was observed, which saw AN patients at the lower end (35% and 40%) and NAS patients at the upper one (63% and 68 %).

15 of the 16 evaluated patients presented moderate or severe dental erosions on the lingual and palatal surfaces, with a maximum average of 10,25 in BED patients.

Oral hygiene was just enough for BN and AN patients (2; 2,4) and insufficient for BED and EDNOS patients (1,5; 1).

The psychological aspect, valuated by psychiatrists and nutritionists, appears to be positive. In the whole sample a maintaining and/or improvement of humor and esteem were found. In addition, 57% of AN and BN patients presented a better nutritional status and 56% of the patients associated the gain of systemic health also to the reached oral hygiene level (FMPS 38%, FMBS 42%). At last, 50% of the participants who occurred to selfinduced vomiting recognizes the preventive importance for the reduction and/or elimination of this compensatory behavior.

Conclusion. The collected data show the importance of the psycho-pedagogical role of dental hygienist exalting the awareness of the relationship between nutrition, health and beauty of the smile in patients with ED, also confirming his utility in the early interception phase and in the treatment.

Intraoral prevalent clinical signs in patients with juvenile idiopathic arthritis in orthodontic treatment

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Aim. Evaluate the prevalence of possible recurrent clinical signs in oral cavity of patients during orthodontic treatment affected by Juvenile Idiopathic Arthritis (JIA), with the aid of a specially prepared data collecting chart.

Methods. During the first visit (T0), 53 patients with AIG, aged between 10 and 21, 41 females and 12 males, were selected. Today a second observation (T1) was executed only for 23 of them, 17 females and 16 males.

Two plaque indexes, the "Full Mouth Plaque Score" (FMPS) with the Silness e Löe plaque index (PI) on 6 surfaces, and two bleeding indexes, the "Full Mouth Bleeding Score" (FMBS) with the bleeding score (GBI) on 6 surfaces giving 4 classification codes, were compared.

The presence of caries, fillings, sealants and White Spot Lesions (WSLs) was also investigated.

Results. The average of the actual results indicates that 62% of the analyzed surfaces presented plaque (FMPS) during the first visit, while the effective quantity of it was of 36% (PI). 57% of the sample, which was observed in second visit, showed a Full Mouth Plaque Score of 63% and a Plaque Index of 33%.

In T0 in 9% of the considered sites were found bleeding by probing (FMBS) and a periodontal flaming degree (GBI) of 4%; instead, in T1 were found a Full Mouth Bleeding Score of 6% and a periodontal flaming degree of 2%.

Always at T0, 8 carious dental elements, 2 filled, besides 14 elements with presence of White Spot Lesions (WSLs) and 12 sealed occlusal surfaces, were observed

Conclusion. From the current data a discrepancy be-

tween the present quantity of bacterial plaque and periodontal flaming degree emerges.

In reference to T0 and T1, comparing the used indexes, unchanged results of plaque indexes were found. Counter to this, the bleeding levels shows a reduction, respectively of 33 for Full Mouth Bleeding Score (FMBS) and of 50% for periodontal flaming degree (GBI).

The results referred to the presence of caries, fillings, sealants and White Spot Lesions (WSLs) do not deviate from the values actually present in literature.

Clinical study of salivary pH in children after using mucoadhesive solution

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Aim. The aim of the present study was to evaluate clinically the salivary pH values of healthy paedodontic patients after an oral rinse with a bicarbonate-based mucoadhesive spray in comparison with an oral rinse with water in order to establish which of the above methods was the most effective in obtaining a good buffer capacity.

Methods. 60 healthy children, 31 female and 29 male subjects aged between 6 and 14 years (mean age 10.03 ys) with a plaque index higher than 50% were selected. They all were divided into two groups: consisting of 30 patients each (group A and group B). The purpose of the study was to measure the pH values after eating two fermentable carbohydrates, i.e. a candy and a biscuit. The patients belonging to the group A ate the candy, while those belonging to the group B ate the biscuit.

After measuring the pH at baseline (T_0), the patients of the group A were asked to eat the candy and immediately after that a new measurement of the pH was done (T_1). Thereafter, one half of the group A, that is 15 patients, did an oral rinse with water whereas the other half did an oral rinse with the bicarbonate-based product. After rinsing, the pH was measured every 5 minutes for 30 minutes for a total of 6 measurements from T_2 to T_7.

The 30 patients belonging the group B, after measuring the pH at baseline (T_0), were asked to eat the biscuit and after that the pH was measured (T_1). Then one half of the group (n=15 patients) did an oral rinse with the bicarbonate-based product and the other half (n=15 patients) did an oral rinse with water. The pH value was measured every 5 minutes for a total of 6 assessments (T_2 a $T_{7)}$.

The choice of using the biscuit and the candy in the present study was made on the basis of the nutritional components of the two fermentable carbohydrates in order to assess possible changes in the pH values: the candy contains sugar and fruit juice and so is rather acidic, while the biscuit contains milk, a basic substance.

Results. The results concerning the pH values after the rinses (with water or with the bicarbonatebased product) showed a higher effectiveness of the product compared with the water starting from T_4 to T_7.

There was a non-significant increase in the pH after the rinse with the product compared with the one with water at T_2 and T_3, that is after 5 and 10 minutes respectively. In fact, the pH values following the rinse with the product were of 0.12 and 0.15 higher than the pH values measured after the rinse with water. However, the other pH values following the rinse with the bicarbonate-based product showed a significant increase of 0.24 at T_4, of 0.29 at T_5, of 0.25 at T_6 and of 0.27 at T_7 compared with the pH values following the rinse with water.

Conclusion. This increase in the pH value usually occurs physiologically and is due to a higher amount of salivary flow which intensifies the bicarbonate concentration in the saliva and, in this case, the use of the mucoadhesive bicarbonate-based product resulted in a further increase in the salivary flow.

Sealant in permanent first molars in children at high risk of tooth decay: evalutation of fissure sealants retention following two different isolation for caries prevention: 12 months clinical trial

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Aim. The aim of this study is to assess the retention of sealants applied with two isolation techniques, through a prospective study of the health of the treated teeth.

Methods. 20 children 10 males 10 females aged 6-9 years, with the four sixths molars completely broken and free from caries, were treated consecutively for two months from early June to late July 2013, with a colored sealant for cracks, tested chemically. The implementing rules are different in every child in the different quadrants, for a total of 80 molars sealed, with 36 technical two-handed technique 44 with 4 hands. Were considered the VPI, DMFT/DMFT, through a questionnaire were investigated frequency and method of oral hygiene, daily diet.

Technique four hands: It involves the use of two operators, the isolation of the treated tooth towards the salivary fluids is performed using cotton rolls.

Technique two hands: It involves the use of an operator, the isolation of the treated tooth towards the salivary fluids is performed using a rubber dam.

The clinical analysis of possible changes of seals has been programmed through checks occurred every 6 months. The results were statistically processed through T-student test.

Results. All the seals to the follow up of six months have shown intact, however, to control the 12 months were found three failures in the group B (technical 4 hands) resulting in a survival rate of 98%. These data are in consistent with the findings in the study took reference from the literature.

Conclusion. It can be said that the materials and methods used are both valuable for maintaining membership stable during masticatory stress in the 12 months since the time of application to the follow up of 1 year. The assumptions made for the failure of the three seals can be operator-dependent theory that finds support in the literature. We can therefore consider the two methods valid and can be used interchangeably as clinically indicated: patient cooperation, capable of erupting and morphology of the dental crown.

A pilot study to explore the feasibility of tobacco cessation in a dental hygiene service for patients with oral cancer and oral lichen planus

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Background. Tobacco is the second cause of death in the world and the most predictable one. Smoking can have serious effects in the oral cavity, in fact it is the second district that can be affected by an oral cancer after the lungs that is the organ with the highest level of cancer caused by tobacco; the relative risk (RR) is 3,43 times higher in the smoking patients against the non-smoker patients for being affected by an oral cancer . The "Smoking Cessation" (process of quitting smoking) is a very difficult subject and needs the synergy of different professionals of the medical area. In recent years more attention has been paid to their role in smoking prevention and treatment.

Aim. Dental hygienists (DI) use a variety of interpersonal and clinical skills to meet the oral health needs of many different patients each day. The aim of this study is to evidence the role of DI in supporting the antismoking intervention. This figure of the dental team regularly see the same patients in follow up and this offers a great opportunity to work with targeted support of quitting smoking. DI can support the patient using the method of the 5 "As", in this case it has been used the first 3"As" of this method, because the other 2"As" has been done in an antismoking center.

Methods. We include in this study 37 patients from the Oral Medicine and Oral Oncology Unit, Dept. of Oncology, University of Turin.

Three groups were formed.

Group 1 : smoking patients (11) that after the diagnose and therapy of an oral cancer still smoke.

Group 2: smoking patients (11) that after the diagnose of oral lichen planus (OLP) still smoke.

Group 3: smoking patients (15) with no smoking-correlated oral pathology.

During the "first visit" in the service of dental hygiene ,all the smoking patients had to fill 3 documents:

— Smoking Habits Questionnaire
— Fagerström test
— Motivational test

Results. In the first group (group 1), the 55% of the patients had a high or very high score in the motivational test, the 17% of these patients went to the anti smoking center; in the second group (group 2), 64% of the patients had a high or very high motivational score in the motivational test and the 17% of these patients went to the antismoking center and in the third group (group 3), the 60% had a high or very high motivational score and 25% of these patients went to the antismoking center.

Conclusion. There was no statistically significant differences in the results of the Fagerström and Motivational test. Patients who are still smoking after the diagnosis and therapy of oral cancer and oral lichen planus (Group 1-2) do not seem more motivated to quit smoking compared to the control patients (group 3).

Our results doesn't differs as reported by the health professionals to smoking cessation (tobacco counseling in small groups is effective insofar 10-25% of the cases in a one year of follow-up). Therefore, the DI can play a significant role in the field of anti-smoking counseling. More effort should be given to increase awareness of DI relating to the smoking habit of their patients.

Relation between Alzheimer's disease and periodontal disease

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Background. Alzheimer's disease (AD) is the most common and severe dementia afflicting the elderly. AD incidence increases enormously with aging. It is supposed that inflammation has a significant role in the etiology and pathogenesis of AD although specific factors involved have not yet clearly characterized.

Aim. To evaluate the need to enhance research of factors linked to periodontitis, likely implicated or involved in mental disorders ethipathogenesys.

Methods. This works presents a review of papers relating periodontal disease and AD. A total of ten studies were included. The studies were identified through a PubMed research using as keywords: periodontal disease, infection, infl ammation, Alzheimer's disease.

Results. Studies related to the topic were found. Specifically, a clinical study suggested chronic periodontitis as potential risk factor for onset and development of AD and hypothesized that brain and other tissues can be reached by periodontal-derived cytokines which amplify brain cytokine pools. Gram-negative anaerobic bacteria were associated with moderate to severe periodontitis through stimulation of proinflammatory cytokines and CD14 activity by endotoxin/LPS. Treponema species was hypothesized to invade brain tissue via peripheral nerve fibers and induce chronic inflammation, cortical atrophy and amyloid deposition.

A case control study showed high plasma TNFα level and increased number of positive tests for antibodies against periodontal bacteria independently associated with AD. A clinical study including 2355 participants ≥ 60 years relating systemic exposure to periodontal pathogens and cognitive tests performance, stated that elderly with cognitive impairment showing poor immediate verbal memory, impaired delayed recall and difficulty with serial subtractions had also high P gingivalis IgG level, relationship verified also after adjusting for socioeconomic and vascular variables. A clinical study considering tooth loss, caries and periodontal disease and poor cognitive function in elderly found that performance on the MiniMental State Examination and Spatial Copying Task cognitive tests is independently predicted by rates of tooth loss and periodontal disease progression during adulthood. A longitudinal study started in 1989 and including 158 participants with serum antibodies to periodontal pathogens underlines that AD patients showed significantly increased antibody levels to Fusobacterium nucleatum and Prevotella intermedia at baseline,proving that elevated antibodies to periodontal disease bacteria could be found years prior the cognitive impairment and that AD onset and progression might be potentially connected to periodontal disease. A recent study examining association between cognitive function

and oral health on a sample of 1053 participants determines that adverse oral health is associated with cognitive impairment, association confounded when adjusting for education and race. In the same study increased gingival index remained independently associated with cognitive impairment and was also shown to be a predictor for cognitive decline.

Conclusion. Review of the state of the art suggests that periodontal disease could impact the expression and progression of AD, and this relationship is worth to be further investigated

Effectiveness of TEO training oral hygiene program in pediatric dentistry

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Aim. The aim of this study is to evaluate the efficacy of a oral hygiene training in pediatric dentistry. Pediatric literature indicates that a two years-old child is prone to receive indication from the environment. Considering this, parents should train a child to a correct oral hygiene through a ludic approach.

Methods. 60 patients between 30 and 42 months old, accompanied by parent/ tutor, were selected for this trial. Both patients and parents of test group received specific guidelines concerning TEO training program through a specific hands on course using Learn To Brush Set (MAM). The control group (G2) only received instructions about oral hygiene importance. At baseline and T(30) days a new simplified plaque index, specifically created for this study, was recorded. Parents /tutors were asked to complete the anagraphic data, structured as follows: date, child's dates, date of birth (in months), number of teeth, graphical illustration of the upper and lower dental arches, simplified approval rating (using emoticons) to be filled out by the child, the visible (initial) plaque index t(0) and following plaque index t (30), and five questions addressed to the parents on the evaluation of this experience. A nursery rhyme reproducing the five steps of TEO training program was invented to create a playful and motivational atmosphere for the child. As consequence the child would have memorize the correct sequence.

Results. Statistical analysis showed that this study is statistically significant with the $p = 0.0016$. All patients of the group G1 confirmed that TEO Training program makes child autonomous and responsible in the management of the oral hygiene. No patients in G1 highlighted plaque at T(30), whereas some patients of control group showed plaque. Parents/tutors appreciated a greater involvement of their children in oral hygiene.

Conclusions. TEO training program seems to have some advantages in educating children to daily oral hygiene. In our opinion, this technique could encourage children in brushing autonomally since oral hygiene becomes a propositive action and makes a child as a protagonist and not a passive actor.

Efficacy of Icon for treatment of the white lesions (WS) of the enamel: a pilot study

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Aim. White Spots (WS) are due to an alteration of the normal inter-crystalline structure of the enamel which confers the whitish aspect to the affected area. They may be caused by plaque, hypoplasia of the enamel, hypo-mineralization of the enamel, or fluorosis.

WS may generate distress and reduce self-esteem in affected patients; therefore, they often require therapeutic intervention.

Aim of this pilot study was to test the efficacy of a new product (Icon, DMG) to treat WS. Icon is made of a high-penetration coefficient low-viscosity resin able to infiltrate the WS lesions and modify their refraction index, providing different translucency proprieties to the treated WS, therefore allowing for an esthetic improvement.

Methods. Treatment protocol: After demineralization with hydrochloric acid (HCl 15% for 120 seconds), ethanol (99%) is used to dehydrate the acid-etched area. Subsequently, the Icon low viscosity resin is applied on the WS.

To test the efficacy of this treatment, in the present pilot study we selected 10 patients with WS, identifying 4 different groups of patients:

Group 1) 3 patients with WS due to plaque;
Group 2) 2 patients with WS due to hypoplasia of the enamel;
Group 3) 3 patients with WS due to hypo-mineralization of the enamel;
Group 4) 2 patients with WS due to fluorosis.

All lesions were treated following the protocol detailed above and results were categorized based on the following evaluation parameters:

Completely resolved cases: after treatment, WS are not visible at clinical inspection;

Partially resolved cases: at clinical inspection, WS are still partially visible, although less visible than before treatment;

Un-resolved cases: at clinical inspection WS are still visible and their aspects has not changed after treatment.

Results. In group 1 all cases (3 out of 3) were partially resolved; in group 2 all cases (2 out of 2) were un-resolved; in group 3 all cases (3 out of 3) were partially resolved; in group 4 all cases (2 out of 2) were completely resolved.

Conclusion. Results of the present pilot study indicate that Icon is effective in treating WS due to fluorosis while it is partially effective in treating WS due to plaque or hypo-mineralization of the enamel and is ineffective in treating WS due to hypoplasia of the enamel. Further clinical controlled studies are needed to confirm the results of the present pilot study.

Quantitative analysis of tryptase enzyme in crevicular and peri-implant sulcus fluid of healthy and diseased sites: a preliminary study

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Aim. To date, the implant therapy success rate at 5 years is 97%, although the results are quite predictable; biological complications may arise during the supportive care, and affect the peri-implant supporting tissues. The most important complication is the "periimplantitis"; this is an inflammatory reaction of the tissue surrounding the osseointegrated implant with a consequent loss of the supporting bone or the total loss of the implant in more advanced cases.

Several scientific studies showed the fundamental role of mast cells, a population that affects the inflammatory process in host defense. Tryptase is a serine protease contained in mast cell granules. Tryptase is present in gingival crevicular (GCF) and peri-implant sulcus (PISF) fluids. A Tryptase quantitative analysis could allow the evaluation and monitoring of the periodontal and peri-implant tissue condition.

The main purpose of this study was to identify a new diagnostic marker in GCF and PISF, developing a simple and non-invasive test clinically useful, which allows a rapid diagnosis of periodontal and peri-implant disease activity.

Methods. A total of five patients of the Clinica Odontoiatrica e Stomatologica, Azienda Ospedaliero-Universitario "Ospedali Riuniti" in Trieste were selected. They presented simultaneously at least two implants and two teeth in both healthy and diseased conditions, GCF and PISF were collected for 30 sec at baseline with paper strips (Periopaper®). After 30 min a second sample of GCF and PISF was collected. Fluid volume was obtained with Periotron 8000®.

The amount of Tryptase was measured by ELISA kit. The samples were divided into four groups:

G1, dental elements with PPD≤3mm;

G2: sites with dental PPD≥5mm;

G3: implant sites with PPD≤3mm;

G4: implant sites with PPD≥5mm. Statistical analysis was carried out with non-parametric tests.

Results. GCF volumes were directly proportional to the depth value ($p<0.05$); data were significant and showed a correlation directly proportional to the PPD. The amount of Tryptase seems not to be directly proportional to PPD values.

Tryptase concentration values are statistically significant ($p<0.05$) in PISF if the comparison is between G3 (T0 152,48 ±25,11 pg/µl; T1 140,86±44,46 pg/µl) and G4 group (T0 130,06±34,34 pg/µl; T1 119,30±37,40 pg/µl).

Conclusion. Results seem to be promising, but do not allow us to state that the enzyme Tryptase as a reliable diagnostic/prognostic marker of a periodontal and peri-implant disease, due to the lack of samples available. Further studies are needed.

Gingival diseases during adolescence. A study of prevalence and a comparative assessment through reflectance spectrophotometry among Italian schoolchildren

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Aim. Adolescence has been identified as a time when personal behaviours may be internalized and become habits, as parents become increasingly less directly involved in their children's care. Oral care during adolescence is important for several reasons, including the eruption of the permanent dentition increasing the number of tooth surfaces which may decay and could be involved in early periodontal diseases. Thus, all adolescents may be at greater risk for dental diseases during a developmental period since they are starting establishing their oral care habits. The aim of this study was hence to assess the gingival inflammation objectively through reflectance spectrophotometry in cross-sectional population studies.

Methods. This study was carried out among 179 cluster sampling chosen Italian schoolchildren, first assessing the prevalence of gingival inflammation and then comparing sextants clinical records to spectral images obtained from a smaller group of 88 adolescents using a portable MTH Spectroshade™ Micro. Spectral ratio at 615 and 460 nm was identified as a method to detect properly the earliest periodontal breakdown.

Results. Although over the 70% of the sample did not show any sign of gingival inflammation, concerning the portion of subjects affected of gingivitis the correlation among the spectral values categorized during data elaboration phase and the clinical records was always strict and stable ($p<0.01$ among all the variables), proving that the reflectance spectrophotometry could be a powerful tool to fulfil the initial purpose.

Conclusion. Despite the shape of the mouthpiece of the instrument chosen, which has been design primarily to include the smile line elements and not proper for the manner in which we approached with it, this study demonstrated that its reliability could significantly contribute to guide the community health interventions to an increasingly preventive direction.

Exploring the impact of oral health on quality of life of eating disorders patients

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Background. Dental anxiety and quality of life are both issues of central importance in dental care. Eating

disorders (ED) patients often present extensive dental health problems. The consequence may be a worsening in their oral health-related quality of life (OHRQoL), and then in the patient's well-being. Oral health has been traditionally assessed based on normative clinical indicators. However, normative approach has been criticized because they neither catch nor document the full impact of oral disease and disorders on affected individuals. Questionnaires are good methods to objectify many aspects, both reated to oral health and QoL. Thus, OHRQoL measures have emerged as an important health outcome in clinical trials and healthcare research.

Aim. To assess the impact of oral health outcomes on QoL in a population of ED patients compared to healthy subjects.

Methods. The Italian version of the Oral Health Impact Profile (OHIP-49) was administered to 37 patients (7 males and 30 females, mean age 28,7 ± 8,7 yrs) at the Dental Clinic and at the Eating Disorders Unit, University Hospital, Ferrara. 24 subjects were diagnosed for ED, 13 subjects were healthy. Between those diagnosed for ED, 12 patients (4 males and 8 females, age between 21 and 43 yrs) underwent to specific non surgical periodontal treatment. After 90 day OHIP-49 was administered again to these 12 patients and results were compared. The association between OHRQoL, ED diagnosis and periodontal treatment was investigated with the Mann-Whitney test.

Results. ED patients showed significantly ($P<0.05$) higher scores of OHIP-total score and OHIP subscales 1,3,4 and 7 (functional limitation, psychological discomfort, physical disability and handicap) when compared to healthy patients. Considering ED patients, there is a statistically significant difference in the psychological dimension of OHRQoL ($P<0.05$) for those refusing dental procedures, which have higher OHIP subscale 3 (psychological discomfort) when compared to healthy patients, indicating a worse well-being. Considering ED patients, there is a statistically significant difference in the psychological dimension of OHRQoL ($P<0.05$) for those patients undergoing dental procedures, when compared to ED patients who refused treatment.

Conclusion. ED diagnosis may have a negative effect on the impact of oral health on quality of life (OHRQoL). Non-surgical periodontal treatment, motivation, counselling and psychological approach may have a positive effect on OHRQoL of ED diagnosed patients. Dental hygienists' role in these patients management is crucial and needs to be investigated in further studies.

Clinical evaluation of the efficacy of Perioscan® on plaque-induced gingivitis in pediatric age

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Background. Perioscan® is an ultrasonic dental scaler that informs the clinician, right during the treatment, of the location of calculus optically, and if desired, also through an acustic signal. Moreover, the controlled-linear oscillation on the tooth surface makes this technology more precise and gentle on the periodontium.

Aim. The aim.s of this study is to evaluate the effect of Perioscan® on plaque-induced gingivitis and to compare its efficacy with hand and ultrasonic instruments. The authors also want to evaluate the pain perception during the scaling performed with Perioscan® and to compare it with the intensity of pain provoked by the use of other conventional instruments.

Methods. This is a randomized clinical trial with split mouth design. The study population consist of 9 pediatric patients (from 9 to 17 years) affected by gingivitis which were undergoing dental cures at the Unit of Operative and Pediatric Dentistry (Department of surgical Science for head and neck diseases) of "Agostino Gemelli" Hospital. All patients received a split mouth treatment with one quadrant of scaling involving Perioscan® (site-group 1), and the others with an ultrasonic conventional dental scaler (site-group 2). Patients were interviewed about the pain felt during the two professional dental hygiene procedures .All participants were instructed to brush their teeth at least twice a day. Patients were clinically monitored at baseline, 2, 5 and 8 weeks after initial therapy; probing pocket depth (PPD), plaque index (PI) and bleeding index (BI) were recorded at all times.

Results. At week 8, in the entire oral cavity, there was a statistically significant improvement ($p < 0.05$) in all clinical parameters when compared to the baseline values, while no significant differences were found between sites-groups 1 and 2. There was significantly more intensity of pain reduction ($p < 0.05$) in the site-group 1.

Conclusion. The results indicate that the efficacy of Perioscan® was similar to that of ultrasonic conventional dental scale in improving gingival conditions. Perioscan® revealed smaller injury potential, combined with a lower intensity of pain felt from the patients than the conventional instruments.The prophylactic goal to achieve high degrees of cleaning while producing minimal pain sensation is important and should have priority when evaluating and selecting work instruments, especially in children. Thus Perioscan®, reducing or eliminating the pain during treatment, can be effective in the treatment of paediatric patients, dental phobic or those particularly sensitive to pain.

Cleaning effect of mastication of a tablet chewing gum with calcium carbonate microgranules following the consumption of a chocolate snack

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Aim. The goal of this research was the evaluation of the cleaning effect of mastication of a microgranules added chewing gum following the consumption of one snack.

Methods. 50 healthy adults joined the trial enter-

ing into both groups, control and test, in a cross-over design, at different times, after a wash-out period. The chewing gum was sugarfree and contained microgranules of calcium carbonate (0.5%) embedded in calcium alginate (1,4g/piece) (Perfetti Van Melle S.p.A.). The debris index was scored as follows:

A. Occlusal surfaces of premolar and molar teeth:

0 - No debris;

1 - Line of debris in fissure pattern but not outlining whole fissure system;

2 - Fissure system completely outlined by debris;

3 - Oral debris starting to extend out of the fissure system at some sites but with less than 1/3 coverage;

4 - Debris extending out of the fissure system with at least 1/3 but less than 2/3 coverage;

5 - Debris extending to cover 2/3 or more of the surface.

B. Interproximal areas (buccal surfaces):

0 - No visible oral debris;

1 - Separate flecks of debris on the papilla;

2 - Debris covering entire inter-dental papilla;

3 - Debris covering entire papilla and extending onto the tooth surface;

4 - Debris covering the entire inter-proximal area and extending past the cervical margin.

C. Gingival margins (buccal surfaces):

0 - No visible oral debris;

1 - Separate flecks of debris at the cervical margin of the tooth;

2 - A continuous band of debris (up to 1 mm wide) at the cervical margin;

3 - A band of debris wider than 1 mm but covering less than 1/3 of crown;

4 - Debris covering 1/3 or more of the tooth crown.

All scores were reported for the Ramfjord teeth. Before the test, participants were requested to clean their teeth with toothbrush, toothpaste, dental floss. Both groups were requested to assume a black chocolate snack, Oreo® (12g). After mastication of the snack (1 min), all participants were scored for debris Index and the values were recorded as baselines. The test group was requested to chew for 3 minutes two pieces of chewing gum and the control group to rest for 3 minutes. At the end, all subjects were scored again for debris index. Data were statistically analysed with paired two-tailed t-Test.

Results. The mean of the debris index in the test group after chewing gum mastication showed a significant reduction of 86% for all surfaces and 81% for interdental areas ($p<0.001$). Also the mean of the debris index in the control group showed a significant reduction of 65% for all surfaces and 62% for interdental areas ($p<0.001$). Baseline indexes of test and control group were not statistically different. At the end of the trial, the test group showed an increased reduction for debris index vs control group of 32% on all dental surfaces and of 31% on interdental areas only. These differences in reduction between the test and the control groups are statistically significant either for all dental surfaces and for interdental areas only ($p<0.001$).

Conclusion. Both groups resulted in a good cleaning on all dental surfaces but the test chewing gum reported better cleaning than control group either for all surfaces and the interdental areas only showing a superior clinical efficacy in order to remove oral debris for all dental surfaces and interdental areas.

Community and preventive dentistry training in the sixth year of the dental degree: a pilot project

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Aim. In the Academic year of 2014-2015 the sixth year of the degree in dentistry has begun. During this year, dental students must carry out clinical trainings on the different dental topics, one of which is Community and Preventive dentistry. Trainings are intended to develop the skills gained in the different clinical areas acquired in previous years of the degree course. This report aims at presenting a pilot project regarding the training in Community and Preventive Dentistry, structured for the purpose of acquisition of an "active teaching role" within the dental profession.

Methods. The pilot project is divided into several phases: 1) a first assessment of middle school students' knowledge on caries and gingivitis prevention. The chosen target population are adolescents, since they start to become independent of their dietary and hygiene habits, who are, therefore, more exposed to risk factors for caries and gingivitis. 2) dental students, divided in small groups, create communication tools such as interactive games or movies to promote oral health prevention and to draw the attention of children on the important role of a healthy diet on oral and general health. This phase is carried out under the teacher's and a clinical pedagogist's supervision. 3) the actual educational intervention at school 4) a few months after the educational lesson, a final test will verify changes in children's habits regarding thier oral health, through the administration of an ad hoc prepared questionnaire.

Results. The project is still ongoing; nevertheless dental students welcomed it. The training provided the opportunity to experiment and investigate the relationship between the theoretical knowledge and the practical interms of oral health education. The creation of teaching tools has stimulated dental students' creativity as well as it has made them actively involved in an oral health education activity.

Conclusions. This pilot project on oral health education training will become a permanent part of the Community and Preventive Dentistry training at the 6th year of Dental degree.

The dental hygienist's role like a promoter of a correct lifestyle

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Aim. The scientific evidence shows a close correlation between periodontitis and systemic diseases such as cardiovascular disease and diabetes. It's assumed that periodontal disease may have direct systemic effects, through the spread of blood-borne pathogens, or indirect systemic effects such as systemic inflammation. Therefore it's important to point out that both periodontitis and systemic diseases related to it have a mul-

tifactorial etiology with many risk factors in common related to lifestyle such as incorrect oral hygiene, smoking, unbalanced diet and lack of physical activity. The goal of this work is therefore to evaluate the lifestyle and identify possible relationships with the risk factors in a heterogeneous population.

Methods. The data of this study is collected and processed through a survey, through a cross-sectional study. The sample of patients is selected without distinctions between males and females, the sole factor taken into consideration is the age of majority, so the sample can be defined heterogeneous. Patients have been selected into the "Center for Oral Health and Prevention of San Raffaele Hospital". To each interviewee, at the beginning or end of the session, was handed a survey consisting in 4 parts: medical history, dental and oral hygiene anamnesis, evaluation of physical activity daily and nutrition.

Results. 100 patients have been examined and data has been processed using a software. The survey shows that 54% of patients have one or more risk factors. The medical history shows that 37% of patients have a BMI out of the safety range (less than 18.5 or greater than 24.9). In the second part of the survey oral hygiene has been analyzed and it's seen that 47% of patients have a positive PSR. Analyzing the data, however, it's clear that the patients between 20 and 40 years have a good oral health while after 40 years there is a remarkable increase of periodontitis. It's also important to point out the action of smoke that on one side decreases the intake pf oxygen and facilitates bacterial adhesion and on the other side decreases the immune defenses. Among other things, the mechanisms of tissue healing are slowed down by smoking. Regarding physical activity: 56% of patients plays vigorous exercise or moderate physical activities, instead physical activity is insufficient for 44% of patients, exposing these people to a higher risk of metabolic diseases. The last part of the survey regarding the feeding shows that 81% of respondents don't follow the Mediterranean diet.

Conclusion. Dental hygienist is a key figure in the prevention changing unhealthy lifestyles in order to prevent periodontitis, diabetes and cardiovascular disease. Through the collection of the medical history identifies the unsafe situation for the patient, which are often underestimated. So dental hygienist is the medical figure who sees most frequently patients, should provide them some information that aren't limited to dental prevention, but they have to promote a healthy lifestyle. This information regarding healthy diet, elimination of smoking, performing regular physical activity, stress management and other healthy habits. All this because the standard of life has been improved in industrialized countries, the population has more food ad decreasing physical activity, but rather increasing tobacco consumption.

Cleaning effect of mastication of a slab chewing gum with microgranules following the consumption of a chocolate snack

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Aim. The goal of this research was the evaluation of the cleaning effect of mastication of a microgranules added chewing gum following the consumption of one snack.

Methods. 25 healthy adults joined the trial entering into both groups, control and test, in a cross-over design, at different times, after a wash-out period. The test chewing gum was sugar-free and contained microgranules of calcium carbonate (0.46%) embedded in calcium alginate. The weight of each slab was 2,4g (Perfetti Van Melle S.p.A.). The debris index was scored as follows:

A. Occlusal surfaces of premolar and molar teeth:
0 - No debris;
1 - Line of debris in fissure pattern but not outlining whole fissure system;
2 - Fissure system completely outlined by debris;
3 - Oral debris starting to extend out of the fissure system at some sites but with less than 1/3 coverage;
4 - Debris extending out of the fissure system with at least 1/3 but less than 2/3 coverage;
5 - Debris extending to cover 2/3 or more of the surface.

B. Interproximal areas (buccal surfaces):
0 - No visible oral debris;
1 - Separate flecks of debris on the papilla;
2 - Debris covering entire inter-dental papilla;
3 - Debris covering entire papilla and extending onto the tooth surface;
4 - Debris covering the entire inter-proximal area and extending past the cervical margin.

C. Gingival margins (buccal surfaces):
0 - No visible oral debris;
1 - Separate flecks of debris at the cervical margin of the tooth;
2 - A continuous band of debris (up to 1 mm wide) at the cervical margin;
3 - A band of debris wider than 1 mm but covering less than 1/3 of crown;
4 - Debris covering 1/3 or more of the tooth crown.

All scores were reported for the Ramfjord teeth.

Before the test, participants were requested to clean their teeth with toothbrush, toothpaste, dental floss. Both groups were requested to assume a black chocolate snack, Oreo® (12g). After mastication of the snack (1 min), all participants were scored for debris Index and the values were recorded as baselines. The test group was requested to chew for 3 minutes one piece of chewing gum and the control group to rest for 3 minutes. At the end, all subjects were scored again for debris index. Data were statistically analysed with paired two-tailed t-Test.

Results. the mean of the debris index in the test group after chewing gum mastication showed a significant reduction of 85% for all surfaces and 82% for interdental areas ($p<0.001$). Also the mean of the debris index in the control group showed a significant reduction of 64% for all surfaces and 60% for interdental areas ($p<0.001$). Baseline indexes of test and control group were not statistically different. At the end of the trial, the test group showed an increased reduction for debris index vs control group of 34% on all dental surfaces and of 36% on interdental areas only. These differences in reduction between the test and the control groups are statistically significant either for all dental surfaces and for interdental areas only ($p<0.001$).

Conclusion. Both groups resulted in a good cleaning on all dental surfaces but the test chewing gum reported

better cleaning than control group either for all surfaces and the interdental areas only showing a superior clinical efficacy in order to remove oral debris for all dental surfaces and interdental areas.

"A day for smiling together". A pilot prevention protocol for caregivers of children with severe psychological and motor deficit or affected by Peg/Peg J

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Aim. It is estimated that in Italy there are about 2824000 people with disabilities (960,000 male, 1,864,000 female). The number of people with disabilities (of six years or more) who lives in family is about 2615000, accounting for 4.85% of the population (33% male, 67% female). Disabled people under 60 years are 620,000, including 188,000 up to 14 years. If in past the life of a disabled person did not exceed the average of thirty years, today, thanks to the reduction of child mortality, to the improvement of quality of life and to the medical and pharmacological advances, a disabled person lives longer. Hence the need and the duty of the institutions and professionals, to create protocols and to provide the necessary support to these subjects. In the "special needs" patient even more than in the "healthy patient", the prevention, especially the primary one, is important for maintaining and preserving the health of the oral cavity. The aim of the study is to develop an education and motivational plan to improve and maintain the oral health status in patients with disabilities, with motor and cognitive deficit and/or bearers of Peg/Peg J between 3 and 18 years, through sensitization campaign of oral hygiene, addressing parents of patients, family members and/or guardians because they are uncooperative.

Methods. Twenty children were visited, all with disabilities, motor and/or cognitive deficit, with no or low possibility of communication or interaction with us. Despite of the severity of the presented conditions and the lack of active cooperation and communication with children. It was subjected to parents and care givers a questionnaire to find out their knowledge base home oral hygiene that daily apply on their children. Then, it was subjected to their attention a power point with all the information needed to understand: what were the good practice of oral hygiene to apply, the most common manifestations in the oral cavity of epilepsy and diabetes, and finally the correct power to use. Then we visited, educated and motivated the care givers and parents of children always at the Department of Dentistry Institute Holy Family of Cesano Boscone.

Results. The satisfaction towards the program was evident, especially by parents and doctors of the structure. The project gave the input to create a close collaboration between the "Sacra Famiglia" ONLUS U.O General rehabilitation regime in continuous "Santa Maria Bambina" foundation and the Vita-Salute San Raffaele university, inserting in the team the figure of a hygienist who will continue the implementation of our prevention path.

Conclusion. We have provided to parents and caregivers of these patients information and resources necessary to become aware of the importance of having good oral hygiene and maintain a state of health of the oral cavity, so as to avoid problems that would lead, in the worst case, the loss of teeth, preventing proper nutrition and causing disturbances that should add up to the already numerous systemic problems already present. Our study began as a pilot project and will be continued in the coming years by the students of the Center for Oral Health and Prevention at the University Vita-Salute San Raffaele in order to implement our protocols on a sample of patients and more consistent raise awareness of our project is to public facilities both to private structures.

Saliva as potential non-invasive tool for the screening of coeliac disease

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Coeliac Disease (CD) is a lifelong T cell-mediated enteropathy triggered by the ingestion of gluten in genetically susceptible individuals (HLA-DQ2 and DQ8). CD is characterised by a wide range of clinical presentations, including gastrointestinal symptoms which are less common of that atypical, mimicking other diseases; hence, serological screening for CD, based on circulating EmA and anti-tTG antibodies, is an integral part of the routine clinical practice. However, their presence and levels is strictly linked to the severity of the intestinal damage. Consequently, there is an increasing frequency of doubts cases - negative serology/mild intestinal lesions - difficult to diagnose. In these cases, HLA genotyping (with its high negative predictive value) is commonly used in CD research to increase the value of serological tests. Despite these considerations the intestinal biopsy is still considered the corner stone of a definitive CD diagnosis. However, it is an invasive procedure which many asymptomatic or suffering from only mild symptoms patients find hard to accept. So, a study of an easily accessible site to obtain diagnostic samples is most welcome and the mouth could be a site useful for these aims. In fact, not only several oral manifestations have been reported associated with CD, but it has also been shown some histopathological changes into the oral mucosa of CD patients. Furthermore, the oral mucosa is able to produce EMA and anti-tTG in "in vitro" culture systems, confirming its immunologically reactivity in CD patients. On the other hands, as published in the international literature particularly helpful for CD-screening is to assess CD-related antibodies in human saliva, which are easily obtained, by-passing the unpleasant blood sample collection. In particular, it has been showed and high sensibility and specificity of anti-tTG detected in human saliva using a RIA method. On the basis of these considerations we think that the combined evaluation of anti-tTG and HLA-CD-related risk haplotypes in saliva could represent an extremely innovative and non invasive tool to screen patients with suspected or at-risk of CD to be addressed finally to EGDS.

Aesthetic veneers: a multidisciplinary approach of a complex adult patient

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Aim. To use the aesthetic veneers in a complex adult case.

Methods. The aesthetic veneers are in general a prosthetic solution in aesthetic case. In general we apply those in young patients , with a correct occlusion and without other kind of problems (general or cranio mandibular9 in this work we showed the prosthetic treatment of a young female patient 33 yrs old who asked us to treat her teeth in order to correct her aesthetic problems. the patient had teeth destroyed by gastric acid because she was bulimic for a long time during her pregnancy. In general she showed a maxillary contraction with the open bite due to a trouble of swallowing. At a complete analysis of her status , we discovered that this patient suffered from DCM (cranio mandibular disorders) in particular she had pain at masseter muscle during a function and at rest. The anterior temporal muscle was affected too. The pain moves up on the center of head and she need of pharmacological therapy to treat that. During function she had a click on the temporo mandibular joint (she had a previous history of transient locking).we planning her treatment and we proposed her this protocol : first to contact a therapist swallowing in order to correct the tongue posture and reduce the trauma on anterior teeth. The treatment was 6 months long(1 meeting for week) and after only 1 time every 6 months. The second part of treatment started after tongue therapy. We advice her to wear a bite plate on upper arch with a dose of fluorine every night in order to reinforced the enamel of her teeth. The treatment was 6 months long .she continued to use fluorine after veneers application too. At the end of this part of treatment we fixed the veneer of silicate. For the treatment of cranio mandibular disorders we adviced her to wear Michigan bite plate all day and night in order to reduce the clenching on the veneers. The massages and therapy were performed every evening for 1 minute , four times.

Results. The cranio mandibular disorder disappeared after 4 months of treatment. The therapy of swallowing continued after the application of veneers and was 12 months long. The patient wear the bite every night. Veneers are stable. No fractures or detachment occurs.

Conclusion. a correct planning of treatment allows to treat with success the complex cases.

Effect of occlusal-loading of implant abutment connection

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Aim. Failures of implant-abutment connections are a relatively frequent clinical problem. A literature review of Goodacre in 1999 of clinical complications of osseointegrated implants showed that screw loosening or screw fracture varied between 2% and 45% of the implant restorations, with the highest amount in single crown. A recently published meta-analysis of Pjetursson in 2004 on implant-related complications calculated a cumulative incidence of connection-related complications (screw loosening or fracture) of 7.3% after 5 years of clinical service. The formation of a marginal gap between the implant and abutment might lead to increased loss of a marginal bone because of the penetration of bacteria into the implant-abutment interface.

Penetration of oral microorganisms through gaps between these components may add to risk of soft tissue inflammation or be responsible for the failure of peri-implantitis treatment. During chewing and biting, the prosthetic restoration and the implant abutment connection is affected by various physiological forces, e.g on a single molar implant this might be about 120 N in the axial direction.

Purpose of the study is to valuate the marginal adaptation of implant abutment (Megagen) before and after mechanical loading (Chewing simulator CS4, Mechatronik, Feldkirchen-Westerham Germany).

Methods. Six implant (EZ PLUS Megagen diameter 4 mm) were embedded perpendicularly in an acrylic resin (Palapress, Heraeus Kulzer, Armonk, NY, USA) with custom-made stainless teflon ring form. The implants were mounted in the resin to mimic oral conditions, where the bone may absorb some forces transmitted to the implant-abutment screw connection. All standard abutments (EZ Plus Megagen diameter 4.5 mm) were restored with identical single molar crowns. The crowns were casted in a metal alloy and luted to the abutments with a self-adhesive cement (RelyX Unicem, 3M ESPE, St Paul, MN, USA) to minimize the risk of losing crown retention as comparing to conventional cement. After the implant were embedded, the abutment-crown combination were assembled to the implant with an abutment screw according to the manufacturer's protocol. A calibrated electronic implant torque controller (Intrasurg, KAVO, Biberach, Germany) was used to ensure proper seating torque for all abutments. Occlusal loading and thermocycling of specimens were performed in a CS-4.4 equipment (SD Mechatronik GmbH, Germany) (fig. 1) using a stainless steel antagonist (6 mm diameter), 3.5 mm away from the crown's occlusal center on the tapered occlusal area, for 240.000 cycles at 50 N at a frequency of 1 HZ. This dynamic loading contained an additional horizontal sliding motion 2mm rectangular to the implant axis to induce bending moments at the implant-abutment interface. Because of various occurrences of unexpected abutment-screw loosening during the dynamic loading test, the implant-abutment connections were controlled for mechanical integrity at intervals 10.000, 30.000, 60.000, 90.000 chewing cycles.

Before and after dynamic loading the abutment-implant connections were analysed with SEM (Quanta 250; FEI, Hillsboro, OR, USA).

Results. A loss of retention between abutment-implant and fracture was assed as a failure. In particular,

in all cases the failures were caused by abutment screw loosing and later fracture, but not due to destruction of the implant neck or shoulder. Two of six implant-abutment connections failed during dynamic loading. The microgap of the implantabutment connection before and after mechanical loading were found similar under Scanning Electron Microscopy.

Conclusion. The marginal quality of implant-abutment before and after mechanical cycling showed no significant differences. Further clinical research is essential to evaluate if different implant-abutment connection designs exhibite significant differences in survival under dynamic loading.

Laser soft tissue design in aesthetic prosthodontics

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Aim. The use of lasers in dentistry modern aesthetic has been invoked as support implant- prosthetic procedures for shaping the soft tissue . The laser surgical diode is capable of emitting a light beam focused and collimated promoting a direct interaction between the emitted beam and the biological tissue, preventing the dispersion of energy. The aim of this work is to evaluate the application of the laser diode in the oral tissue mucogingival surgery to obtain useful changes to improve the aesthetic and functional results rehabilitations examined. The soft tissue laser design is applied in post diagnostic of prosthetic rehabilitation during provvisorizzazione and preparation of dental elements involved, from the moment the diagnosis aesthetic-functional ports to the choice of the clinician or not to perform resections of tissue (or in other cases the additions tissue) to obtain an ideal harmony of the white component of the dental elements and pink tissue surrounding them.

Materials and methods. In this study 50 natural elements were treated, distributed over 20 adult patients (range 18-68) periodontally healthy undergoing rehabilitation implantoprosthetic and each element was performed surgery laser soft tissue design for aesthetic - functional . The parameter laser used was : fiber 300micron previously activated , power 2 watts , surgical mode CW (Continuous wave) , fiber perpendicular to the fabric to be treated. In particular will be assessed the atraumatic and stability post – surgical resections tissue laser assisted. The parameters examined were : 1- type of gum tissues treated with laser assisted interventions of gingivectomy/ remodeling 2- measuring the amount of gum tissue (adherent) healthy present at t0 = pretreatment ,t1 = post - treatment , t2 : 30 days after treatment 3- Index of bleeding at t0 = pre- treatment and at t1 = 30 days after treatment to evaluate the State of periodontal health and stability.

Results. During these trials we found an excellent tissue postoperative stability both at t0 and at t = 30 days. It has also highlighted the absence of bleeding on probing both immediate that 30 days sign of good healing periodontal tissue treated .

Conclusion. In conclusion, the diode laser has demonstrated excellent both as regards the treatment of gengivectomy tissue , and from the aesthetic point of view that the healing tissue , allowing immediacy of execution and excellent stability of the tissue immediate and postintervention , in addition to guaranteeing a good patient comfort and a reduced biological sacrifice and tissue.

Prosthetic rehabilitation after total resection of the nose and premaxilla for adenosquamous carcinoma

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Aim. To report a case of immediate temporary prosthetic rehabilitation after wide resection of the nose and premaxilla to treat an adenosquamous carcinoma of the nasal cavities (staging T3 NX).

Methods. To perform a first temporary immediate maxillary obturator at the time of surgery, an impression of the nose and palate is detected. We used a modified impression tray with blue ortodontic wax (boxing technique), gauzes as swabs for nasal cavities and alginate as impression material. We realized in the dental lab a provisional prosthesis made of transparent methyl methacrylate, relined directly on the defect with Hydrocast. After 4 months, a satisfying healing of the surgical defect was obtained, and, on the basis of the first prosthesis, a second, pink temporary methyl - methacrylate prosthesis was placed and relined with Permlastic (KERR). Contextually, using a gauze as swab for the nasal cavities, an alginate impression was obtained and covered with wet gauze, we also placed fast plaster to get a useful impression of the nose. A nasal epithesis based on impression and photographic information of the patient was modeled in wax in the dental lab. It has been checked on the patient and modified. Then, It was realized in pink methyl methacrylate. In order to have a support for the temporary nasal epithesis, we decided to fix it with Flexacryl (LANG) to a glasses frame. Temporary epithesis was necessary because the surrounding tissues are still in a healing process and they cannot excessively stressed. During the follow-up, when there will be enough space in the oral cavity, we will realize the definitive prosthesis.

Indeed the patient was instructed to perform exercises at home using a mouth-opener to increase the size of the rehabilitation. So that, in the future we will be able to replace the methyl - methacrylate pink prosthesis with a final silicon one, which is more biomimetic.

Results. Since six months the patient has a temporary restoration that allows good phonetics, proper nutrition and adequate social relationship. The patient well tolerated the prosthesis, and he was able to do a proper oral and nose hygiene. From an oncological point of view, there was no relapse of the pathology. Moreover,

the patient, according to the head and neck surgeons, didn't undergo radiotherapy.

Conclusion. The temporary immediate prosthetic rehabilitation after surgery has an important role in the medium and long-term management of defects, allowing a good tissue healing and dramatically increasing the quality of patients' life. These prosthetic solutions could be replaced with fixed implant-supported prostheses, depending on the patient general conditions.

Immediate loading of fixed prostheses with a pre-fabricated bar system using four implants in the rehabilitation of the edentulous arches

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Aim. Passive fit between implants and superstructure is a valuable factor for long-term successful results. Errors arising from clinical and laboratory processes could affect accuracy and require additional procedures for the adaptation of prosthetic framework, increasing chair time and fabrication costs. The aim of the study was to evaluate the use of a pre-fabricated bar system for immediately loaded implants according to the All-on-four concept up to 24-month follow-up.

Methods. A total of 51 patients (31 males and 20 females) with a mean age of 63.4 year (range, 49 to 75 yr) presenting completely or partially edentulous arches with severe atrophy of the posterior regions were treated with immediately loaded complete-arch prostheses according to the All-on-four technique. Thirty-nine patients (76.5%) were edentulous and 12 (23.5%) were partially edentulous on the day of surgery. Treatment was performed in 28 maxilla (45.16%) and 34 mandibles (54.84%). All patients immediately received full-arch prostheses each supported by 4 implants (2 axial and 2 tilted). For each acrylic prosthesis a bar system was assembled by combining precision-milled abutments, universal ball joints, tube bars and fixation screws. Most final prostheses included 12 teeth, with a maximum of a one-unit cantilever (≤ 10 mm). The mean follow-up period was 29.5 months (range 24 months to 38 months). Outcomes were implant and prosthetic survival and success rates, marginal bone level changes and patient satisfaction. Data were compared by means of the Mantel-Haenszel test.

Results. All implants achieved primary stability at placement with a minimum torque of 35 N/cm and were immediately loaded supporting 62 fixed provisional prostheses. The mean (SD) implant length was 12.61 mm (± 1.24 mm) for the axial and 13.81 mm (±1.22 mm) for the tilted implants. During the first 4 months after implant placement, 2 tilted implant failed (maxillary) due to mobility. The failed implant was immediately replaced with implants of the same length and larger diameter without affecting prosthetic function. The overall implant survival rate was 100% and 98.38% for the axial and the tilted implants respectively. None of the 62 fixed prostheses were lost during the observation period accounting for a cumulative prosthetic survival rate of 100%. No statistically significant differences in crestal bone loss between tilted and upright implants was detected at 24month follow-up evaluation in either jaw. All participants were functionally and aesthetically satisfied with their restorations.

Conclusion. The preliminary 24-month results indicate that immediate loading of axial and tilted implants using the evaluated pre-fabricated bar system may be a viable solution for edentulous arches rehabilitation. However more long-term prospective clinical trials are needed to affirm the effectiveness of the surgical-prosthetic protocol.

An alternative prosthetic protocol for the all-on-four immediate function concept in completely edentulous mandibles treated with guided surgery: a 3-year retrospective clinical study

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Aim. The purpose of this clinical study was to evaluate an alternative prosthetic protocol for the rehabilitation of completely edentulous mandibles treated with immediately loaded fixed dentures supported by axial and tilted implants with guided surgery after 3 years of function. The null hypothesis was that clinical and radiological outcomes after 3 years of function with the definitive prostheses would be the same regardless of whether straight or angulated abutments were screwed into distal tilted implants since the immediate loading.

Methods. A total of 85 patients (36 males and 49 females; mean age 56.5 years) presenting completely or partially edentulous mandibles with severe atrophy of the posterior regions were treated according to the All-on-four concept. Computer guided implant placement was performed. Seventy-two patients (84.7%) were edentulous and 13 (15.3%) were partially edentulous on the day of surgery. All patients immediately received an interim prosthesis screwed onto distal tilted implants by means angulated (control group n=42) or straight abutments (test group n=43). After 4 months definitive milled high-precision titanium (40) and zirconium (45) prostheses was fabricated and screwed into the implants. The mean follow-up period was 42.7 months (range 36 months to 58 months). Outcomes were implant and prosthetic survival and success rates, marginal bone level changes, patient satisfaction and clinical time. Student's t test at a significance level of P 0.05 was used to assess the influence of the prosthetic protocol on crestal bone - level changes around implants.

Results. The overall implant survival rate was 98.21% and 98.83% for the control group and the test group respectively. None of the 85 fixed prostheses were lost

during the observation period (prosthetic survival rate of 100%). Statistically significant differences (pvalue = 0.0068) in crestal bone loss were found between control and test groups. All participants were functionally and aesthetically satisfied with their restorations. Clinical time averaged 50 min and 30 min for control and test group respectively.

Conclusion. The tested surgical-prosthetic protocol should be considered a reliable alternative to the traditional All-on-four protocol. The implant and prosthetic rehabilitation can be simplified and shortened, since the use of the angulated abutments is avoided.

Different techniques for polishing teeth restored with ceramic veneers: roughness changes of the restorative material surface

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Aim. In case of major defects of shape, color and alignment of the frontal teeth, an indirect approach with ceramic veneers may be indicated to reach a satisfactory functional and aesthetic result. It has already been demonstrated in vitro that the maneuvers performed for the supportive periodontal maintenance can alter the surface of ceramic restorative materials. Thus, it may be postulated that less aggressive procedures are preferable for teeth restored with ceramic appliances, especially in case of veneers, which can be particularly thin and frail especially in their cervical portion. The present study assessed the effect of several polishing protocols on the surface roughness of feldspathic ceramic veneers cemented on extracted teeth.

Methods. Forty intact maxillary central incisors were selected from a pool of freshly extracted teeth and prepared for ceramic veneer restorations (2 mm incisal reduction, 0.7 mm buccal reduction, cervical margin 0.5 mm coronal to the cemento-enamel junction). After impressions with polyether materials (Permadyne Perma L, Impregum, 3M ESPE), master casts (Fuji Rock, GC Corp.) were obtained. Feldspathic ceramic veneers were built by a single experienced dental technician and the inner surfaces of the restorations were conditioned by acid etching and silanization. A self-adhesive resin luting agent (Clearfil Esthetic Cement EX, Kuraray Medical) was used accordingly to conventional adhesive cementation procedures. The restoration margins were carefully polished with hand instruments and silicon rubbers. One group of specimens (n=10) was left untreated and served as control group. By following a standardized protocol, the other specimens were subjected to air abrasion with glycine (n=10) or sodium bicarbonate powder (n=10), or abraded with an aluminum oxide paste used with a prophylaxis rotary rubber cup (n=10). Specimens were analyzed with a rugosimeter to determine the mean linear surface roughness. Roughness data underwent statistical analysis with one-way ANOVA and Tukey post hoc test for pairwise comparisons ($p<0.05$).

Results. The mean linear roughness values and standard deviations were: control group, 0.061±0.017 µm; air abrasion with glycine, 0.113±0.034 µm; air abrasion with sodium bicarbonate, 0.116±0.026 µm; polishing with aluminum oxide paste, 0.083±0.020 µm. The two tested systems for air abrasion produced significantly rougher surfaces than control specimens ($p<0.001$), whereas polishing with aluminum oxide paste did not alter the surface roughness of the cemented veneers ($p=0.225$). The qualitative analysis of the threedimensional reconstructions of the surface readings showed images reflecting the trend of the linear rugosimetric findings.

Conclusion. Under the conditions of the present study, the use of a prophylaxis rotary rubber cup and aluminum oxide paste did not cause detectable damages to the surface of cemented ceramic veneers. Air abrasion with both glycine and sodium bicarbonate worsened the surface luster of the restoration. Among the multitude of available instruments, the clinician should choose the most effective technique for an effective periodontal debridement, keeping in mind that ceramic restorations are more susceptible to being damaged to some of them.

Effects of simulated manual periodontal maintenance on the marginal gap of nanohybrid composite crowns

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Aim. For the permanent rehabilitation of the single tooth, the approach of choice is represented by metal ceramic and all-ceramic restorations; nonetheless, there has been growing interest in the use of composite resin crowns, at least as interim restoration. Composite resin materials benefit nowadays from the application of nanotechnology to their fabrication, so that nanofilled and nanohybrid resins are considered the state of the art of filler formulations. Furthermore, the production of composite resin crowns requires lower expenses, simpler procedures and shorter time than conventional prosthetic appliances. The restorative process can be further simplified with the use of self-adhesive resin cements, which are modern materials that are advocated also for the cementation of indirect restorations. The aim of the present study is to evaluate the influence of the marginal finish line for the preparation of nanohybrid composite crowns in determining the resistance to gap formation after simulated periodontal scaling.

Methods. Sixty-four intact extracted third molars were randomly divided into two groups according to the marginal finish line preparation: G1, feather edge (n=32); G2, chamfer (n=32). Preparations were standardized and performed by using diamond burs mounted a milling machine; the margin of the preparation was finished with rotary Arkansas stones. After polyether impression (Permadyne Perma L, 3M ESPE), master casts (Fuji Rock, GC Corp.) were obtained and a dental technician created nanohybrid com-

posite crowns (Adonis, Sweden & Martina). Crowns were luted with self-adhesive cement (BisCem, Bisco). High-magnification digital pictures of the cemented restorations were taken before and after root scaling procedures simulating five years of semestral scaling and root planing. An oral hygienist used Gracey curettes with the aid of a dedicated device to impart 2-mm-long strokes under the control of a digital dynamometer (5 N). The marginal gap was measured on ten equidistant points along the adhesive interface of each face of master casts of the restored teeth; the mean was calculated and regarded as statistical unit. Data underwent statistical analysis by means of paired and independent samples t-tests (α=0.05).

Results. The mean gap values and standard deviations (expressed in mm) were: G1 at baseline, 0.13±0.03; G1 after simulated periodontal treatment, 0.41±0.10; G2 at baseline, 0.12±0.02; G2 after simulated periodontal treatment 0.25±0.04. Before scaling and root planing, the two finish lines did not differ in terms of marginal gap (p=0.130). The simulation of periodontal maintenance yielded a significant increase of marginal gap for both feather edge and chamfer finish lines (p<0.001); however, the latter resisted significantly better to the mechanical damage than the former (p<0.001).

Conclusion. Restoring a molar tooth for a composite crown prepared with feather edge or chamfer marginal finish line was not influent on the marginal gap immediately after cementation. The analysis after the equivalent of five years of semestral mechanical supportive periodontal treatment revealed that the composite crowns with feather edge margin are more prone to being damaged by the hygienic maneuvers. The likely explanation for this finding is that the feather edge margin offers insufficient thickness for the restorative material to resist fragmentation when exposed to mechanical forces. The clinician must keep in mind that adequate thickness of composite resin at the interface level must be warranted when preparing a tooth for a composite crown.

The use of 980-nm diod laser for gingival retraction in fixed prosthodontics, comparison with double cord technique

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Aim. The present study was intended to evaluate tissue retraction and gingival healing using 980-nm diod laser in laser assisted impression taking technique, comparing both parameters with conventional double cord technique.

Methods. 50 adult patients aged 18 to 65 years, with healty periodontium, were recruited for the study and underwent implant prosthetic rehabilitations. They were randomly divided into two groups (group A - diod laser technique, 25 patients; group B - double cord technique, 25 patients) for a total of 140 different dental elements prepared for the prosthetic phase. For group A gingival retraction was carried out with 980-nm diod laser following this protocol: 300 micron previously activated fiber, 2 watt power, CW surgical method (Continuous Wave), laser fiber parallel to the treated tooth. For group B were used two cotton fiber of different diameter inside the sulcus, the first one with smaller diameter, the second one bigger and removable during the relining of the impression. Particular attention was paid to the force applied in packing the retraction cord. The impression material used was polyvinyl siloxanes, the same for each group, employing monophasic method with duble material (putty-light) and an individual tray. The retraction parameter was observed at 30 days postoperatively while gingival healing was measured immediately after impression taking and 30 days later.

Results. Excellent postsurgical tissue stability was noticed in group A both immediately and after 30 days without statistically significant variations of this parameter. Absence of bleeding at probing was immediately founded after impression taking as well as signs of good tissue healing after 30 days. Otherwise, in group B, were noticed few cases of both bleeding immediately after the impression and gingival retraction after 30 days. Some patients complained discomfort during the procedure using double cord technique while none of them with laser technique.

Conclusion. Diod laser assisted impression taking technique is a certainly valid and proposable technique in fixed prosthesis restorations, able to ensure the capability of correctly conditioning the crevicular sulcus all around the tooth as well as conventional double cord technique. Gingival retraction achieved was adequate for a correct and precise reading of the finish line with impression materials and assured, thanks to atraumacity on periodontal structures, less work delays or functional and esthetics failures than with conventional double cord technique. Moreover, treatment speed and painless procedure improved patient comfort.

Effect of periodontal instrumentation with different manual scalers on the surface roughness of ceramic veneers

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Aim. The use of ceramic veneers represents a modern conservative approach for the restoration of anterior teeth presenting discoloration, misalignment, fractures or major shape aberrance. Ceramic veneers can surely offer an excellent short-term esthetic result. Nonetheless, their long-term success can be potentially impaired by the risk of chipping, fracture or debonding. These complications are more likely to occur in case of occlusal trauma or mechanical iatrogenic insults. Furthermore, one could speculate that –even in absence of visible damage– other factors may alter the surface of ceramic veneers, for instance manual scalers used for periodontal maintenance, thus jeopardizing their clinical success. The aim of the

present study was to assess whether the maneuvers performed during supportive periodontal treatment with different manual instruments could affect the surface characteristics of feldspathic ceramic veneers.

Methods. A single experienced prosthodontist prepared 50 caries-free maxillary central incisors extracted for periodontal reasons to receive a ceramic veneer restoration. Preparation criteria were standardized as follows: 2 mm incisal reduction with butt-joint palatal margin; 0.7 mm buccal reduction at the middle and incisal thirds of the crown; 0.5 mm buccal reduction at the cervical level; preparation margin 0.5 mm coronal to the cementoenamel junction. Polyether impressions (Permadyne Perma L, Impregum, 3M ESPE) of the prepared teeth were taken and master casts (Fuji Rock, GC Corp.) obtained. A single experienced dental technician built all the feldspathic ceramic veneers. The veneers were cemented with a self-adhesive resin luting agent (Clearfil Esthetic Cement EX, Kuraray Medical) accordingly to conventional adhesive cementation procedures. The restoration margins were carefully polished with hand instruments and silicon rubbers. Under standardized condition of controlled force (5 N), angulation and number of strokes, the restored teeth were randomly divided in 5 groups of 10 specimens each and underwent scaling either with stainless steel, titanium, polyurethane or teflon curettes or no treatment at all (control group). Surface roughness was measured with a rugosimeter for the determination of linear mean roughness. Roughness data were compared statistically with one-way ANOVA and Sheffè post hoc analysis ($p<0.05$).

Results. The lowest mean roughness values were recorded in the control group, which did not differ significantly from groups treated with plastic curettes, viz. polyurethane and Teflon curettes. Scaling with both stainless steel and titanium curettes led to a two-fold increase of surface roughness mean values, which was significantly different from the other three groups ($p<0.001$). No ceramic chipping was observed in any of the experimental groups. The three-dimensional surface images obtained by means of a reconstruction software showed roughness aspects in accordance with the mean profilometric linear values.

Conclusion. Under the condition of the present study, metal curettes did not cause major damage to cemented veneers but significantly roughened their surface. This drawback can have relevant clinical and aesthetic implications, such as the increased risk of plaque accumulation, secondary decay or staining. Although scaling with plastic curettes is theoretically less effective for periodontal debridement, it appears the safest method for the periodontal maintenance of teeth restored with feldspathic ceramic veneers.

Influence of different materials for prosthetic abutments on peri-implant soft tissues: a randomized clinical trial

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Aim. The aim of the present randomized clinical trial was to assess the effect of 3 different prosthetic abutments (titanium, titanium nitrurate and zirconia) on peri-implant soft tissues after 2 years of clinical service in partially edentulous patients.

Methods. Baseline data concerning thickness of the buccal peri-implant soft tissue, soft tissue thickness above the bone crest, depth/length of the transmucosal pathway and periodontal biotype at adjacent teeth were collected. The final sample consisted of 47 subjects (21 males, 26 females) for a total of 97 implants. A CONSORT statement for improving the quality of reports of parallelgroup randomized trials was followed (Clinicaltrials.gov NCT02090647). Participants have to satisfy strictly inclusion criteria to be recruited. Implant placement for single tooth replacement with a 2-stage surgical technique was performed (Osseo Speed Dentsply Implant System). Four to 6 months later, a second surgical procedure was performed and a trans-mucosal healing abutment was inserted (Time 0). Two weeks after surgical re-entry, an implant-level impression was taken for the fabrication of a screw-retained temporary restoration (Time 1). The provisional restoration was inserted 1 week after implant level impression (Time 2). After 8 weeks of soft tissue conditioning by means of the provisional restoration, a definitive implant level impression was taken and a precise record of the soft tissue dimensions was recorded (Time 3). The pick-up impression coping was modified adding a flowable resin composite material (G-aenial Universal Flow), in order to transfer the emergence profile of the provisional restoration to the master cast. Subjects were randomly allocated to receive one of the 3 customized abutment (Atlantis, Dentsply) types: titanium (Group 1), nitrurate titanium (Group 2) and zirconia (Group 3): zirconia. The following baseline clinical measurements were taken at each implant site by a blinded examiner: recession depth at the central buccal site, 6-point probing depth Before abutment connection (T4), the following clinical measurements at the experimental abutments were taken: thickness of the buccal peri-implant soft tissue at the level of the implant neck using a caliper, soft tissue thickness above the bone crest, depth/length of transmucosal pathway, periodontal biotype at adjacent teeth. At the placement of the final restoration (T5) and at the final follow-up (T6), the following measurements were taken on periapical x-rays: distance from the implant shoulder to the bone at the mesial and distal sites; the mean amount of bone loss was then calculated. In order to verify whether a statistically significant relationship existed between the abutment type and the peri-implant biotype, the Fisher's Exact test was applied. In order to identify possible predictors of gingival recession (outcome variable), a 2-level statistical model was applied; the patient and the implant levels were analyzed. The level of significance was set at $\alpha=0.05$.

Results. At the 2-year clinical observation, recession of the gingival margin was observed only in 13% of implants irrespective of the type of abutment. No significant correlation between periodontal biotype at adjacent teeth and peri-implant biotype was observed. Furthermore, none of the investigated variables at patient level (age, gender, implant type, periodontal biotype) or at implant level (keratinized tissue thickness, probing depth, soft tissue thickness) was identified as a significant predictor of recession.

Conclusion. The present study pointed out that abutment type was not able to influence periimplant variables after 2 years and caution should be used in

considering periodontal biotype at patient level as a possible indicator of the future peri-implant biotype (39.12% of peri-implant biotypes do not corresponded to the periodontal biotype of the patient).

Evaluation of nutritional status in edentulous patients

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Aim. In literature, the nutritional status of edentulous patients has been often studied with inconsistent results. To elucidate the relationship between oral and nutritional status is therefore an important task in dental clinical research. Our purpose was to evaluate the nutritional intake of a convenient number of edentulous patients referred to the dental Prostheses Department of the Dental School of the University of Turin with a standardized method.

Methods. Twenty totally or partially edentulous patients (mean age: 65) rehabilitated with dental prostheses at least two years prior to the test were enrolled. Composed of simple measurements, BMI (body mass index) values and brief questions about general health and food intake, the MNA test (mini nutritional assessment) was used for the nutritional screening and global evaluation. Based on the MNA score, three categories dealing with elderly patients are assessed: adequate nutritional status (MNA 24); protein-calorie malnutrition (MNA < 17); at risk of malnutrition (17< MNA < 23.5). The nutrient deficiencies were evaluated with hematological parameters like glycemia, total cholesterol, serum albumin, transferrin and serum total protein. We also considered the impact of oral condition on the quality of life by OHIP-14 (oral health impact profile), a short questionnaire designed to measured self-reported functional limitation, discomfort and disability attributed to oral conditions.

Results. The MNA score was greater than 24 in 16 patients, showing an adequate nutritional status, while it was between 17 and 23.5 in 6 patients that were at risk of malnutrition. The arm circumference was greater than 22 cm and the calf circumference was greater than 31 cm in all patients. The BMI values were between 19.43 and 35.5. The hematological parameters investigated resulted within the normal range. Only the fasting glycemia seemed to be higher than normal, suggesting possible dismetabolic disorders. According to the OHIP-14, almost all patients reported a general discomfort while eating certain types of food, so as to be forced to interrupt their meals.

Conclusion. A thorough series of tests were proposed as a routine structured clinical story to evaluate the nutritional status of dental patients. With regard to WHO statements about importance of the quality of life, OHIP-14 questionnaire reveals how functional limitations make unsatisfactory patient health. According to ADA (American dietetic association) the dental professionals play an important role in screening the elders that could be at risk of malnutrition, possibly referring them to nutritionists, whenever appropriate.

Prosthetic rehabilitation of cleft lip and palate patients: our experience

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Aim. The aim of this study is to present our experience in management of cleft lip and palate patients with different prosthetic options.

Methods. Sixty-three patients were enrolled in this study, 44 female (69,84%) and 19 male (30,16%) with a mean age of 34,93±7.04 years (age range 21-53), all treated for cleft lip and palate. Conventional prosthetic rehabilitation was realized in thirty-eight patients, both with removable partial dentures (10) and fixed partial prostheses (28) while dental implants were placed in 25 subjects, manufacturing implant-supported prosthesis.

Results. Cleft lip and palate is a malformation, which affects approximately one in seven hundred births, with a multifactorial etiology, comprising both genetic and environmental factors. Treatment of cleft lip and palate requires a multidisciplinary approach: maxillofacial surgeons, orthodontists, oral surgeons, prosthodontists , otorhinolaryngologists , speech-language pathologists, neurologists and psychologists are all involved. The prevalence of dental anomalies in patients suffering from cleft lip and palate is significant.

Most common abnormalities include agenesis of the upper lateral incisor, dental inclusion of the upper canine, insufficient arc development and microdontia.

The ideal treatment of patients with cleft palate would begin with closure of the cleft area via bone graft and orthodontic treatment. Where this is not possible, there are a variety of prosthetic treatments, which can be implemented on a case-by-case basis.

Conventional prosthetic treatment includes both removable partial dentures (RPDs) and fixed partial dentures (FPDs).

Removable dentures are usually realized in patients with tissue deficiency, when the lip support is impaired or inexistent, and/or when palatal closure with surgical repair is not feasible. When both fixed tooth-supported or implant-supported prostheses are not possible, RPDs represent an important alternative, although patient satisfaction is often found reduced due to the fact that the removable structure accentuates its artificial nature.

Fixed partial dentures (FPDs) represent a good option for prosthetic rehabilitation of cleft lip and palate patients, especially when alveolar bone graft are failed and implant placement is not possible.

Before implant placement, alveoloplasty is performed with donor sites usually from the iliac crest or the mandibular ramus in order to obtain a proper alveolar ridge. After an ideal period of time between four to six months dental implants are inserted in the cleft area and, after a proper osseointegration, implant-supported prostheses are performed.

Conclusion. According to our experience, nowadays, the gold standard for prosthetic rehabilitation of cleft lip and palate patients is represented by implant-supported dentures with a proper management of soft-tissue in order to improve the aesthetic of implant region.

Charcot disease: a prosthetic solution for palatal lift

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Charcot disease or ALS (Amyotrophic lateral sclerosis) induces a progressive and ascending sclerosis to the anterior horn and pyramidal sheaf of the spinal marrow's motor neuron, with a possible bulbar involvement to the cranial nerves nucleus level. The bulbar lesion induces the classical labial-gloss-faryngeal paralysis that involves a nasal voice, tongue atrophies, and palatal paralysis that causes deglutition diseases. The palatine veil's incompetence due to the motor compromising of soft palate can be temporally compensated with a prosthesis anchored to the teeth.

The application of a lift for the soft palate, still distensible, to a removable denture can be able to improve deglutition and phonetics. This kind of rehabilitation just need abutment teeth with adequate retention, both in partially edentulous and in dentate patients. The palatal lift is realized with an extension of the metal structure of the denture covered with a button of acrylic resin. The lift prosthesis has subjectively improved the deglutition and phonetic function of this patient.

Conventional methods of retention for facial epithesis

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Aim. A successful facial prosthesis depends on several factors, of which retention is a primary component. Prostheses can be retained by anatomic-mechanical, adhesive, or biomechanical means. The selection of a facial-prosthetic adhesive can be perplexing because little information is available to the consumer. It is for this reason then that we aim to discuss here the properties and behaviour of adhesives in the retention of prostheses.

Methods. Review of literature to evaluate the basic principles of adhesion (mechanical, chemical and physical bonding), the requirements of a good adhesive system and the different types of skin adhesion (paste adhesives, double-sided tapes, liquid adhesives and spray-on adhesives).

Results. Several tests have been carried out both in vivo and in vitro. Developing a standardized method of testing of maxillofacial prosthetic materials is essential.

Conclusion. Traditionally, most facial prostheses have been retained by either mechanical or adhesive means. Maxillofacial prosthodontics are left with the problem of selecting the optimum method of retention (mechanical or chemical adhesion) and in relation to the latter, selecting which type is the most suitable for individual patients' needs.

The procedure of risk management in dentistry in a hospital setting

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Aim. The clinical risk management is a management methodology that allows to analyze, through logical progressive steps, to communicate and to eliminate the risks associated with any activity or process so as to minimize losses and maximize opportunities.

The concept of "Risk Management" has also been introduced in dentistry.

A system of risk management increases the quality of services offered to the patient, including improving the image of the structure that adopts the process. In dentistry, in the hospital setting, this system is applied in managing dental and prosthetic risks associated mainly with intubation for narcosis and hospitalization.

Method. In dentistry, there are two ways to implement this procedure, one preventive and one healing.

The "preventive" procedure is accomplished before the patient undergo a surgery that could, mainly through intubation maneuvers, damage the dental and prosthetic structures:

1- Anesthesiological visit: a preliminary dental assessment is performed at this stage for identifying possible dental problem (mainly mobility in the anterior sector) and prosthetic situation. during which the patient makes us know their dental problems
2- Dental examination by dentists (Form A): the patient is informed about relevant dental problems, and, if necessary, subjected to radiological examinations (Form B and C).
3- Dental treatment: removal of mobile teeth or unstable prosthetic restorations that can be further damaged during intubation maneuvers and / or inhaled while the patient is under total anesthesia.

The "healing" procedure takes place after the patient has undergone surgery, during which there has been eventually an adverse event:

1- The hospital department, in which the damage occurs, fills the form E, which is sent to the predisposed offices (S.C. Qualità, Risk Management e Accreditamento agli odontoiatri) and sends the patient to the Dental School
2- During the dental visit the clinical assessment is performed, and the treatment planning and the economical evaluation presented to the patient.
3- The patient can chose where performing the rehabilitation, and anyway he will claim the refund to the hospital offices designated (SC Patrimonio – Servizi e Tutele Assicurative, Inventario e movimentazione beni, Contratti Utenze e amminstrazione beni) presenting the preventive budget prepared by the public or the private dentist).

Results. We report cases treated in the period from 2010 to 2014 (108 dental assessments). The most frequent damage was the avulsion or rupture of a tooth (25%) and 37% of them were 1.1; then the loss of dentures (10.18%) , dislocation of the upper and lower central incisors

(7.40 %), fracture or fixed partial denture (4.62%), loss of removable partial dentures (2.77%), fracture of complete denture (0.92%).

Conclusion. The advantages offered by the development and application of a system of risk management are multiple and involve:

- the quality of care, reducing the risks associated with the diagnostic process, therapeutic care, with greater guarantees of safety for the patient (improved image of the hospital and ameliorment of relationships with the patients;
- the clinicians, protecting from accusations of malpractice (reduction of controversies).

Perimplantitis therapy with laser assisted oral surgery

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Aim. Use of two types of laser for the treatment of implants affected by deep perimplantitis.

Methods. eight patients (for a total of 15 implants) suffering from perimplantitis were treated. The procedure involves the use of laser assisted surgical methods aided by the PhotoLase system. The treatment was carried out in local anesthesia and followed by biostimulation laser in a single session. Erbium laser Er: YAG 2940 nm for mineralized tissues and diode laser 810 nm for the mucous membranes were used.

Results. 13 implants obtained clinical ad radiological healing. All the implants were controlled by probing depth during professional hygiene session.

Conclusion. This method allows biological and functional recory of implants affected by perimplantitis thanks to the decontaminant and biostimulative activities of different wavelengths.

Evaluation of low-level laser therapy in the treatment of temporomandibular disorders

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Aim. use of low-level laser therapy in patients with temporomandibular disorders and pain.

Methods. 40 patients were treated divided in two groups: 28 with predominantly muscle disorders and 12 with predominantly articular disorders. Eight sessions (once a week) were made. We used a diode laser 810nm, in CW (continous wave) mode, 1W power, three applications of 20 seconds per side. The pain was measured with the VAS (Visual Analogic Scale) at the beginning and the end of the treatment.

Results. In both groups, it was found a lowering of the pain of 2/3 points on the VAS scale with improved quality of life. Conclusion. The diode laser has analgesic, anti-inflammatory and bio-stimulant effect in patients with temporomandibular disorders with or without the bite therapy.

Application of innovative technologies in aesthetic fixed prosthodontic

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Aim. Aesthetics of the cranio-facial district is a discipline that deals with the recovery of the patient's functions and natural harmony of hard and soft tissues.

In detail, the aesthetics of the mouth aims for the same goal, with the same care: the restoration of function, in respect of the natural dental-tissue harmony. Purpose of this work is the evaluation of the applicability in an aesthetic perspective of new technologies, sequentially applied to a single case report, in order to verify the clinical efficiency of these technologies, since the diagnostic to the end of the treatment.

Methods. For diagnostic and therapeutic planning we used the Dental digitized design technique (Digital Smile Design), followed by a traditional objective and functional evaluation to confirm the diagnostic project. So we used a Laser Soft Tissue Design through the surgical protocol: 980 nm laser diode, previously enabled optical fiber 300 micron, continuous wave 2 watts power, putting the instrument at 90 degrees from the tissue's surface.

Then we took an optical impression using an Intraoral Scanner (Carestream).

The technical construction of the prosthodontic elements was processed via CAD/CAM.

The patient is an adult, female, 24 years old, who needs restoration of the natural elements 11 and 21, for both functional and aesthetic purpose. The element 11 is not vital, already reconstructed and needs an aesthetic crown in Lithium disilicate adhesively cemented. For the element 21, which is vital, an adhesively cemented Lithium disilicate aesthetic veneer was planned.

Results. The clinical case has been dealt with innovative methods and there has been a good match of the digital design with the functional and aesthetic needs of the patient, both verified in the oral cavity in the provisional as well as in the definitive stage. The result has been an ideal healing of the tissues post laser guided surgery and precision in the ultimate artifacts.

Conclusions. The use of new digital and surgical technologies both in diagnostics and through the treatment, aims to maximize the final result, prosthetically as well as aesthetically.

Diod laser soft tissue surgery and laser biostimulation: applications in aesthetic prosthesis

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Aim. The diode laser is commonly used in soft tissues surgery, in many areas of modern dentistry. The use of diode laser in fixed prosthodontics and its application as a surgical tool for the execution of gingivectomy for aesthetic-functional gum tissue management with the spe-

cific aim of preserving the tissue residue and to obtain good tissue healing, as well as to optimize the working times and to improve the comfort of the patient, is now known. Pain and post-operative inflammation are often correlated to the surgical maneuvers and their complexity. Purpose of the following case report is the application of an experimental protocol using the laser biostimulation following the surgical laser treatment of gingival tissue, in order to improve the rates of pain of the patient and to reduce the healing time of the treated tissues.

Methods. This case report is made on an adult patient, male, 64 years old, candidate to a complex fixed prosthetic rehabilitation in aesthetic area. The patient is treated with complete fixed prosthesis in the upper arch with functional and aesthetic purposes by twelve aesthetic crowns on the elements from 1.6 to 2.7.

We made a laser soft tissue design on elements from 1.2 to 2.2 using a diode laser at 980 nm with surgical protocol: optical fiber 300 microns, power 2 watts, surgical mode in CW (continuous wave) activated fiber. After the surgical procedures, we applied to experimental laser biostimulation protocol at the baseline, at 3 days, 7 days ad 14 days, using a 645 nm diode laser power of 0.5 watts with defocused handpiece. Were assessed the following parameters: pain perceived by the patient on the VAS scale and clinical indices of healing tissue: probing depth and bleeding index.

Results. The use of the experimental biostimulation protocol allowed us to obtain a good result in terms of the absence of pain and reduction of inflammation after the gingival surgery. Laser application has allowed to obtain a good tissue healing in terms of clinical indices of optimal post-surgical outcome.

Conclusion. The application of new technologies for the improvement of tissue healing and patient compliance in surgical and prosthetic rehabilitations is definitely to be considered valid in view of minimally invasive prosthetic dentistry.

The laser fits into this landscape as valid instrumentation both in terms of the surgical instrument and the biostimulation of the healing tissues.

Analysis of oral microbiota and its correlation with salivary NO and prosthetic rehabilitation

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Aim. The aim of this study has been to investigate the microbial species present in supragingival and subgingival plaque and to evaluate the possible differences between the subgingival plaque on teeth and one on the prosthesis. Moreover, salivary nitric oxide concentrations was evaluated and correlated with dietary intake and plaque composition.

Methods. 57 patients, aged between 60 and 90 years, have been recruited for this study. Sterile paper tips have been used for plaque samples. For each patient three samples have been taken: supragingival plaque sample on natural tooth, subgingival plaque on natural tooth and subgingival plaque on fixed partial denture. All samples have been delivered to Department of Biomedical Sciences for genomic DNA extraction. DNA isolation has been performed using a specific kit according to the manufacturer's instructions. Real-time polymerase chain reaction (PCR) has been used to detect and quantify the periodontal bacteria. The bacterial DNA levels have been quantified by real-time PCR and then converted to theoretical cell numbers.

Saliva samples were collected from all subjects, from 9:00 to 11:00 AM, to minimize circadian variations of salivary biomarkers. Subjects refrained from eating, drinking or smoking for at least 2 hours prior to sampling. Saliva samples were collected using Salivette. The swab with the absorbed saliva was subjected to centrifugation (2750 rpm for 2 minutes) to facilitate the collection of saliva in the bottom of tube. A second centrifugation was performed (1000 rpm for 10 minutes) to obtain the cell supernatant that was analyzed for nitric oxide concentrations.

Results. The results of this study showed that in the subgingival plaque on the fixed partial dentures the concentration of bacteria is much higher than the subgingival plaque on the natural teeth and to the supragingival plaque. However, the analysis of the plaque composition revealed that this is true for specific bacteria as Tannerella forsythia, but not for others as Prevotella intermedia that displayed a similar concentration.

Analysis of saliva samples showed that there is an inverse correlation between hypertension values and nitric oxide concentrations. In turn, it was observed a correlation between high concentrations of nitric oxide and high intakes of vegetables, which are more associated with presence of plaque Veillonella.

Conclusion. Even if further microbial studies are needed to evaluate all the microbial species in relation to systemic and local factors, present results suggested that the microbial population in the oral cavity is varied depending on periodontal health status and site of sample collection. Therefore, in patients with fixed partial dentures, careful oral hygiene is recommended. Moreover, it seems that an higher intake of vegetables may be a protecting factor against high blood pressure modifying the oral microbiota composition.

Direct method for realizing a tongue depressor for mandibular irradiation

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Aim. In the radiotherapy of the floor of the mouth, sublingual fold and tongue there is the need to shield the maxilla and to ensure mandible and tongue immobility during mandibular irradiation. The mobility of the structures involved may affect the maxilla, and thus increasing the risk of osteoradionecrosis. The stabilization of the mandible, the floor of the mouth and the tongue may improve the reproducibility of external radiotherapy and preserve the maxilla from

radiation damage. Adverse effects (osteoradionecrosis, radioinduced mucositis) are potentially decreased. To spare the maxilla and immobilize tongue and mandible a custom made device (tongue depressor or lingual stent) has to be prepared before the preirradiation planning and radiotherapy get started. The treatment begins very quickly after the diagnosis of the cancer and thus the device has to be implemented in a very short time.

Methods. The device is composed by two bites modeled on the dentate arch or edentulous ridge, a hollowed horizontal plate over the tongue to keep the tongue low and immobile, and two lateral wedges meant at keeping the mouth open in a comfortable and reproducible position. The plate must always cover the tongue because blocking the tongue in a low position prevents movements and swallowing. It also increases the space between the maxilla and the mandible, and thus making it possible to focus the radiation more precisely and totally prevent damage to the maxilla. Usually the device was realized in two clinical sessions because of the need of the dental laboratory for making the device from the stone cast mounted on the simulator. Using light curing resin plates it is possible to realize the device directly, without the need of the dental laboratory and in just one clinical session, immediately when the patient arrives from the radiotherapists with the prescription for the tongue depressor. The procedure is very simple: 1 the dental splint/bites are modeled on the top of dental arches and cured in the mouth 2 the lingual surface of the mandibular splint is brushed with universal adhesive and the lingual plate is positioned in the inner part of the mandibular arch and cured 3 a wedge is positioned between the arches on one side of the dental arches until the desired vertical height is obtained and a small roll of light curing resin is positioned and cured on the other side at that height 4 another roll is adapted and cured on the other side 5 the device is then cured in a dedicated laboratory lamp for implementing the curing process and the finished 6 the device is ready for the delivery.

Results. The design and the undergoing principles of the tongue depressor obtained directly are exacltly the same as the indirect one, but the timing for realize it is shorter: just one clinical session for the delivery.

Conclusion. Timing allowed by radiotherapists usually is very short and delivering the device in one session is a very good advantage for the health of the patients. This technique may be used even in edentulous patients.