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Aim: Mastication is one of the most important functional activity of the stomatognathic system. It is a rhythmic movement characterized by a diversity of jaw patterns, established by the integration between the peripheral and cortical inputs and the pattern generator in the brainstem. It has been observed that mastication is involved in cognitive processes and the preservation of the physiological chewing pattern is important for the quality of life of elderly subjects. In edentulous patients, the loss of teeth, the loss of periodontal mechanoreceptors and the alveolar bone resorption without new bone formation, require an important adaptation of the neural motor control. Nevertheless, the functional aspect of the single implant mandibular overdenture is still little known even though the balance of the masticatory function is important for avoiding damage to the stomatognathic system and for maximizing efficiency. Aim of this study was a within-subject comparison of chewing pattern kinematics in complete denture wearers with and without a single implant retention during an observation period of 5 years after the prosthetic connection.

Methods: The within subject trial has been conducted on edentulous elders at the Dental School of Turin. Treated in the same facility and wearing complete denture for at least 1 year, they have been invited to participate to the trial. Exclusion criteria were cranio-mandibular disorders, local and systemic contraindications to implant surgery, neurological degenerative progressive diseases, multiple sclerosis, lateral amyotrophic sclerosis. Single symphyseal implants were inserted in all patients. Delayed load protocol has been followed and prosthetic connection realized after three months, with Locator® attachments (Zest Anchors). Stability and precision were double checked and in case relinings performed. All patients underwent the recording of the chewing cycles with a kinesiograph K7 (K7-I; Myotronics, Tukwila, WA, USA), using a gelatinous semi-solid (20x20x20mm) bolus. The kinematic signals were analyzed using a custom-made software and were recorded three months after the anchorage of the lower denture to a single-tooth implant and at 5 years follow-up.

Results: 15 patients were included in the study, following exclusion and inclusion criteria. 10 patients completed at this time the 5 years follow up. The results showed a significant decrease of the anomalous percentage of the reverse chewing patterns at 5 years follow-up ($P < 0.03$) and a significant improvement of the parameters involved in the chewing efficiency: total number of chewing cycles ($P < 0.01$) (closure angle $P < 0.03$, pattern

width $P < 0.01$, height $P < 0.01$, duration $P < 0.001$, closure duration $P < 0.004$).

Conclusion: A denture anchored with a single implant is more retentive and for this reason patients subjectively feel more comfortable during mastication. This study showed that beyond the subjective sensation, significantly the anomalous pattern decreased and the chewing patterns objectively improved the parameters of efficiency; accordingly, the neural control of the masticatory function becomes more stable with positive influence on the maintenance of the cognitive activity of the elderly.

Retention strength of metallic posts with ball-attachments for tooth-supported overdentures

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Aim: The aim of this study was to evaluate the retention strength (pull-out) of metallic posts with ball attachment (Pivot Block, Rhein 83, Bologna, Italy), undergone to three different surface treatments and luted with a self-etching, self-adhesive cement. The null hypothesis was that neither the sandblasting of the post surface, nor the retentive notches made on the post, nor both treatments increase the pull-out force (N) of the post from the tooth ($p = 0.05$).

Methods: Sixty human teeth extracted for orthodontic or periodontal reasons were selected and stored in 0.02% thymol solution. The teeth, cleaned of calculus and debris, were sectioned with a diamond bur at the level of the most coronal cement-enamel junction. Once the root canals were shaped, the post-spaces were prepared at a depth of 10 mm. The roots were embedded in resin cylinders so that the canals were coaxial to the cylinders. The Pivot Block metallic posts were randomly divided into 4 groups: A) untreated surface (control); B) sandblasted surface; C) retentive notches; D) retentive notches and sandblasted surface. The notches of groups C and D were 3 semicircular shaped notches at 3 mm, 5 mm and 7 mm from the coronal plate of the post; they were 0.4 mm. deep, made with a 0.8 mm diamond bur. The sandblasting of groups B and C was performed with 50µm particles (aluminum oxide powder). The posts were luted with RelyX Unicem 2 Automix cement, light cured for 40 seconds. The pull-out test was performed with Instron 4301 machine at a pulling speed of 0.5 mm/min; the maximum values for post removal were recorded. The Kolmogorov-Smirnov (KS) test was used for normality of distribution; ANOVA and Bonferroni-Dunn test for pairwise comparisons were used to determinates

differences in the pull-out force measurements. The level of significance was set at $p < 0.05$.

Results: The mean values of pull-out strength were the following: group A (control): 113.12 ± 51.32 N; group B: 224.63 ± 42.54 N; group C: 485.37 ± 68.36 N; group D: 355.80 ± 118.47 N. The KS test showed a normal distribution of values for the 4 groups (group D: $p = 0.089$, groups A, B and C: $p = 0.15$). The ANOVA and Bonferroni-Dunn test showed significant differences ($p < 0.0002$) among the 4 groups.

Conclusion: the null hypothesis was rejected; the results suggest that the retention of the posts may be improved through surface treatments such as sandblasting and/or retentive notches.

Complications in full-arch implant supported prostheses

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Aim: Implant prosthesis generally present more complications than teeth's ones. Many studies confirmed this tendency, but in the literature there isn't a consensus on considered data. In details, in the literature there's a lack of standardized data about implant - supported full - arch prosthetic complications in relation to different variables, such as structure and layer materials. The aim of this study was to retrospectively evaluate the frequencies of different complications after treatment with implant - supported screw retained full-arch fixed prosthesis. The main aim was to evaluate the frequency of prosthetic complications of the structure. The second aim was to evaluate the frequency of prosthetic complications of resin versus the ceramic layer.

Methods: The study group comprised 98 patients who had been treated with implant-supported screw retained full-arch prosthesis from 1 to 5 years earlier. For each case records like treated arch (maxillary or mandibular), number of implants used, implant connection type (external or internal), structure type (titanium CAD/CAM, chrome -cobaltium CAD/CAM, fusion) and layer type (ceramic or resin) were scrutinized: The following notes of office and laboratory complications in association with implants and superstructures were registered.

- C1: tooth break;
- C2: screw access opening;
- C3: occlusal adjustments;
- C4: pigmentation;
- C5: biologic complications (es.:mucositis, gingival inflammation, ...);
- C6: opening of the gum space to facilitate cleaning;

- L1: prostheses relining;
- L2: tooth or layer fixing;
- L3: bar break;
- L4: teeth reassembling;
- L5: prosthesis remake;
- L6: fixing after an implant loss;

A Kaplan Meier statistic evaluated the prosthesis survival rate of the ceramics one and of the resin ones. The two layers results had been compared with a Mantel - Cox statistic.

Results: Among 483 implants, 9 failed (6 in the superior maxilla and 3 in the inferior maxilla). During the follow - up period, an average of 36% of all prosthesis resulted free of complications. The most common interventions made in the office were the restoration of the layer of the prosthesis and the closing of the screw access (47 events). Considering the laboratory complications, the most common was the reassembly of teeth (13 events). Laboratory complications were significantly more common among the ceramic layered prosthesis.

Conclusion: Clinical and laboratory prosthetic complications are common. Regular follow - ups to maintain optimal function and health in patients treated with this type of prosthesis are thus mandatory.

Prosthetic rehabilitation of velopharyngeal incompetence: a case report

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Aim: Velopharyngeal incompetence is the dysfunction of an anatomically intact velopharyngeal mechanism occurring in patients with neuromuscular disorders, such as Amyotrophic Lateral Sclerosis (ALS). The primary consequence is an incomplete velopharyngeal closure causing serious communication and psychological disorders. Velopharynx incompetence is a contributing factor to speech disorders, such as dysarthria, and implies the presence of hypernasality and inappropriate nasal escape. It also decreases air pressure during speech. Furthermore, it often causes tongue atrophy and soft palate paralysis, leading to deglutition disorders. One prosthetic option of treatment is Palatal Lift Prosthesis (PLP); it can achieve velopharyngeal closure by moving the soft palate superiorly and posteriorly, ensuring a correct velopharyngeal closure and a consequent decrease of hypernasality. The aim of this report is to present the prosthetic rehabilitation of three patients with velopharyngeal incompetence.

Methods: Three dentate patients were considered; three appointments have been assigned. 1) A preliminary impression was made with alginate and diagnostic casts