

ACCURACY EVALUATION OF DENTAL MOVEMENTS IN CLEAR ALIGNER THERAPY

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Aim: in the last decade, the use of orthodontic aligners has been growing. This work aimed to evaluate the predictability of tooth movements obtained with these devices thanks to data analysis in literature.

Methods: this systematic review was carried out following the PRISMA guidelines and analysing both electronic databases (i.e. PubMed) and orthodontic journals (i.e. Angle Orthodontist, American Journal of Orthodontics) from 2009 to the present day. Invisalign was the aligner company considered in 80% of articles analyzed. Keywords used were: “clear aligners” “predictability” “accuracy” “orthodontic tooth movements”.

Results: 10 articles were analysed after passing a strict selection and each one received quality evaluation. In the past an accuracy of 41% was attributed to the aligners, whereas today it has increased to 73.6%, but it still does not reach 100%, in fact not all the results obtained with clear aligners were found to be accurate in the same way. Linear movements (mesiodis-

tal and vestibulingual tipping) were more predictable, arch expansion was tested with different outcomes, while extrusion and angular movements (rotation) were more difficult to achieve with clear aligners. In particular, the least predictable movement was the rotation of the mandibular canines (54.2%), followed by the rotation of the lower premolars or all the other teeth. Moreover, rotation $> 15^\circ$ were considered less predictable. While moderate and severe crowding could be successfully resolved with clear aligners. Among authors, there is certain agreement on the clinical irrelevance of the discrepancies between projected and real dental movements, which brings them to believe that overall results are predictable.

Conclusion: all of the papers analysed showed that some movements are more predictable than others are. Nevertheless, considering the high heterogeneity of the available publications, it is strongly needed to produce some homogeneous clinical data that will allow to draw more reliable conclusions.

SINERGY BETWEEN CLEAR ALIGNERS AND AUXILIARY FEATURES IN DEEP BITE RESOLUTION: A CASE REPORT

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Aim: in this work, we tested the efficacy of Invisalign auxiliaries during treatment of deep bite malocclusion with crowding and implant space opening needed. Severe deep bite resolution can be challenging and require long-lasting treatments even when complete control of biomechanics is maintained throughout the therapy. Often, when aligners are used, several refinements are needed to complete overbite correction.

Methods: a 31 years-old female patient came to our attention complaining about poor aesthetics of her smile and absence of one tooth. After evaluation of photos, 3D casts and cephalometry execution, we observed deep bite, moderate crowding in lower arch and need for opening the implant space for reposition of tooth #3.5. Initial Little's Irregularity Index was calculated to be 8,5 and initial dental overbite was 77%, while the space for tooth repositioning started with a width of 3,2mm. Given treatment complexity, case resolution needed the employment of several auxiliary features as bite ramps, power ridges, precision cut for elastic use and different types of attachments.

Results: deep bite and crowding resolution and implant space opening were obtained through 17 upper and 28 lower aligners (changed every 7 days) and took 7 months to complete.

At the end of the treatment, which needed no refinements, Little's Irregularity Index passed from 8,5 to 0,5, dental overbite from 77% to 31% and we obtained a 7,1 mm-wide implant space.

The use of auxiliaries significantly improved aligners' biomechanics. In particular, power ridges allowed performing incisor intrusion maintaining correct torque, while bite ramps provided fundamental adjunctive force to deep bite opening. II class elastics supported space opening by countering unwanted distalization of tooth #3.6.

Conclusion: authors believe that combining aligners with correct prescription and use of auxiliary features was a key factor in reaching treatment goals in a short time-frame without need for refinements and giving to the patient the comfort and aesthetics typical of clear aligners.