

Correction of Class II Malocclusions in Growing Patients by Using the Invisalign Technique: Rational Bases and Treatment Staging

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Abstract

Over the past two decades, several articles have demonstrated that the prevalent skeletal feature in Class II patients consists of mandibular retrusion. For such reason, an effective universally accepted treatment strategy is based on promoting a mesial repositioning of the mandible to correct the Class II relationship. Moreover, from a dental analysis, it has been shown that up to 85% of Class II patients' present mesial rotation of their maxillary 1st and 2nd molars. One cause for displacement of molars is the mesial movement into the leeway space left during transition from mixed to permanent dentition. This creates a loss of arch length and results in mesial rotation of the remaining dentition anteriorly, creating a Class II cuspid relationship and increased over jet. In Class II div. 2, there is a palatal version of the central upper incisors with reduced over jet and limited mandibular advancement. Hence, any appliance that demonstrates the ability to significantly stimulate mandibular growth would be an important asset to a clinician's armamentarium. More recently, clear aligner technology has evolved over the past 10 years with such appliances continuously being modified to broaden the range of tooth movements they can achieve. Nowadays, it is possible to correct every type of malocclusion by using aligners: deep bite, open bite, cross bites, severe crowding, and Class II and Class III malocclusions. In literature, a number of scientific articles including case reports show proper correction of Class II malocclusions by using aligners. However, treatment protocols are not so clearly evidenced at times so as to allow for a standardization and simplification of such orthodontic treatments, which would implement success rate. The aim of this work is to show how it is possible to treat Class II malocclusions by means of aligners according to suggested treatment protocols herein.

In our experience with aligners, orthodontic correction of mild to moderate Class II malocclusions may be managed both predictably and efficiently by complying to the same biomechanical requirements as in conventional orthodontics. Furthermore, aligners can provide an additional advantage allowing greater freedom of movement of the mandible and, thus, facilitating a

mandibular mesial repositioning. Obviously, it is important to carefully evaluate the etiology of Class II relationships. If one determines that the malocclusion does not depend on a real skeletal discrepancy but rather on dental-skeletal problems, it is possible to plan the strategic biomechanical steps to correct it by using aligners. The treatment protocol for Class II malocclusion treatment with aligners includes the same 5 steps mentioned above:

1. Correct any mesial rotation of upper 1st and 2nd molars. The correction of mesial rotations may open up to 2 mm of space per side for subsequent distalization of bicuspid and canines. Request the buccal surfaces of the upper molars to be nearly parallel to each other on the ClinCheck. Subsequently, determine the treatment plan and consider that molar rotation with aligners alone is a highly predictable movement
2. Expand the maxillary arch form to gain any further space needed for possible distalization of bicuspid and canines into Class I relationships. Class II malocclusions have a relative maxillary transversal discrepancy related to the mandibular arch. According to the aforementioned mechanics required for Class II correction, the maxillary teeth need to be directed towards a wider section of the dental arch during treatment. Our experience suggests to ask for 2 mm of buccal overjet on all teeth, excluding a "socked-in" occlusion at the end of the ClinCheck treatment plan. The reasoning behind this preference is that the amount of expansion indicated on the ClinCheck treatment plan may not clinically occur, especially when using a lot of Class II elastic wear, which exerts a constrictive force on the maxillary arch

Biography

It have more than 15 years of experience in oil and gas industry (incl. Subsea, off-shore and on-shore) as well as other industries in issue such as fracture mechanics, forensic engineering, integrity, corrosion management, FEED, design and materials.