

Class II division 2 correction with maxillary premolar extractions – a case report

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Abstract: Angle's Class II division 2 malocclusions can be associated with varying skeletal patterns that necessitate customized treatment approaches for its correction. In adult patients, treatment options range from camouflage with or without bicuspid extraction to orthognathic surgeries in severe conditions. This is a case report illustrating the orthodontic treatment of an adult patient with Angle's Class II division 2 malocclusion managed with two maxillary premolar extractions.

Index Terms: Class II division 2, bicuspid extraction, camouflage treatment.

INTRODUCTION

Crowded and protruding teeth have been a problem since time immemorial, and the attempts to correct them. Angle's classification of malocclusion was an important step in the development of orthodontics as it helped in defining the normal occlusion. Based on the occlusal relationships of the first molars he classified [1]:

1. *Class I:* Normal relationship of the molars, but line of occlusion incorrect because of malposed teeth, rotations, or other causes.
2. *Class II:* Lower molar distally positioned relative to upper molar, line of occlusion not specified.
3. *Class III:* Lower molar mesially positioned relative to upper molar, line of occlusion not specified.

Based on the inclination of the maxillary central incisors Angle characterized two types of Class II malocclusions [2].

1. *Class II Division 1:* Show proclined maxillary incisors,
An increased overjet,
A relatively narrow maxillary arch,
Bite may vary from a deep overbite to an openbite.
2. *Class II Division 2:* The maxillary central incisors are retroclined with maxillary lateral incisors overlapping them labially or in some cases, both the central and the lateral incisors are lingually inclined and there is a labial overlap of the canines over the lateral incisors.
Deepbite
Reduced overjet
Exaggerated curve of Spee
Supraocclusion of anterior teeth
Infraocclusion of posterior teeth

Functional considerations in Class II Division 2

The perioral muscles are often well developed and active. There is a forward rotation of mandible, which can result in decreased lower facial height. The combination of the hyperactive mentalis muscle and the reduced vertical height accentuates the chin prominence. An abnormal path of mandibular closure as well as overclosure can occur because of the the retroclined incisors and posterior teeth infraocclusion. The mandible is pushed into a retruded position by the anterior teeth and the condyles are displaced posteriorly and superiorly in the articular fossa [2].

Treatment Considerations in Class II Division 2 Malocclusion [3, 4, 5]

1. *Correction of the axial inclination of the maxillary incisors*

Fixed orthodontic appliances can be used to efficiently correct the root positions of the incisors. This labial tipping of maxillary teeth allows forward mandibular posture. Alternatively, disarticulating the anterior teeth with a bite plane will allow the mandible to move to a position dictated by the musculature. The mandibular incisors also become free by allowing the tongue and lip musculature to establish the position of the lower incisors without the confining influence of the lingually tipped maxillary incisors.

2. *Correction of the deep bite and exaggerated Curve of Spee*

It is a necessity for retraction of maxillary incisors and for the reduction of overjet. Extruding the molars and premolars or intruding the anterior teeth or a combination of both is the method used to level the dental arches. Overbite correction by

extrusion can be achieved by placing a maxillary anterior bite plate and vertical elastics to the posterior segments. Segmented wires will maximize their extrusion. Other methods for correcting the overbite include placing reverse curves or steps in the archwires, bonding and incorporating second molars in the archwires, extruding the upper molars with the use of a cervical pull headgear, and extruding the lower molars by using Class II elastics.

3. *Extraction versus non-extraction*

Class II division 2 is generally associated with retrusive lips. Therefore, non-extraction treatment is favorable to prevent a flat dishd-in profile and deepbite. Maxillary molar distalization is a favorable option. Before considering the extraction of premolars, the several factors have to be assessed including the prominence of the nose and chin, the presence of a functional mandibular retrusion, the patient growth potential and headgear cooperation, the extent of the tooth size-arch length discrepancy, and the periodontal condition of the lower anterior teeth.

Nielsen, Ib Leth (2021) recommended eight rules for success with upper bicuspid extraction in Class II, Div. 2 cases:

1. The patient should be post puberty with minimal growth potential
2. The sagittal jaw relationship (ANPog) should be 5 degrees
3. The sagittal apical base relationship (ANB) has to be 6 degrees
4. Minimal proclination of the lower incisors
5. Mild to moderate crowding of the lower incisors (5 mm)
6. Adequate distance between the palatal cortical plate for maxillary incisors torque
7. Normal tooth sizes of the upper incisors (no Bolton discrepancy)
8. No excessive curve of Spee

I.CASE REPORT

A 21-years-old adult female patient came with the chief complaint of irregular front teeth. The patient has prominent nose and chin with retruded lip position. Profile was mild convex with deep mentolabial sulcus, negative lip step, average nasolabial angle, low clinical FMA, and reduced lower anterior facial height. Intraoral exam revealed square shaped dental arches with Class II molar relation and Class II canine relation. Maxillary incisors were retroclined except 11 that was labially positioned. Maxillary canines showed mild labial overlap on the maxillary lateral incisors. Mesiolabial rotations of maxillary premolars and mild mandibular anterior crowding were present. Overjet was 2mm with respect to the retroclined maxillary incisor and overbite was 80%. Curve of Spee was exaggerated. Maxillary midline was shifted to right by 3mm. All the features were typical of Angle's Class II division 2 malocclusion.

Treatment objectives:

1. Maxillary and mandibular teeth alignment
2. Overbite reduction with relative intrusion of maxillary and mandibular anterior teeth
3. Maxillary midline correction
4. Obtain Class 1 canine relation
5. Establish good smile esthetics



Fig 1: Pre treatment extraoral photos



Fig 2: Pre-treatment intraoral photos

Treatment progress:

Maxillary arch was banded and bonded with 0.022" MBT brackets. Alignment was initiated with 0.012" Niti wire. The wire was not engaged in #12 bracket initially. Alignment progressed with 0.016" Niti and 0.016" S.S wires. On 0.016" S.S wire, Niti opencoil spring was placed between #13 and #11 to create space for the alignment of #12, simultaneously correcting the midline. After sufficient space was obtained for #12, it was brought into the arch using a piggyback 0.012" Niti wire tied completely in #12 bracket slot. Maxillary arch alignment progressed with sequential wire changes from 0.016" Niti to 0.019"x 0.025" S.S wire.

Labial tipping of the maxillary anterior teeth increased the overjet allowing for the lower arch bonding. GIC bite blocks were placed on #16, #26 to open the bite before lower arch bonding. Mandibular arch alignment was achieved with sequential wire changes from 0.012" Niti to 0.019"x 0.025" S.S wire.

The patient was reassessed at the end of alignment. Visual treatment objective (VTO) was negative because of the prominent chin. Extraction of #14, #24 was considered to reduce the overjet. For space closure 0.019"x 0.025" S.S wire with curve of Spee was used and crimpable hooks were placed between upper lateral incisors and canines. En- masse retraction of maxillary teeth was done with friction mechanics using E – chain from crimpable hooks to the molars.

Proximal stripping of 0.5mm per contact was performed in the lower anterior region and 0.017"x0.025" RCS Niti was ligated to correct the Curve of Spee and anterior deepbite.

Finishing and detailing was achieved with selected bracket repositioning. Because of the tooth anatomy there was a black triangle between the maxillary central incisors that was eliminated with proximal stripping on the mesial surfaces of #11, #21 followed by space closure. Debonding was done and fixed retainer was bonded from #12 to #22. Removable clear retainers were also given in both the arches.



Fig 3: Black triangle between upper central incisors

Good occlusion was achieved with a final overjet of 2mm, overbite reduced to 25%, maxillary midline corrected, first molars in Class II and canines in Class 1 relation. Because of the extrusive mechanics used, there was mild improvement in the lower facial height, mentolabial sulcus, lip step and smile esthetics. Facial esthetics was maintained.

CONCLUSION

Extraction of two maxillary premolars for correction of Class 11 division 2 malocclusion is a valid and a stable treatment option that can be used to correct the dental malocclusion in adults with mild to moderate skeletal discrepancy without major changes in facial esthetics. Proper diagnosis is essential. Periodic reassessment of the facial esthetics, mandibular position, teeth positions and inclinations should be undertaken during the course of treatment to meet the planned treatment objectives.



Fig 4: Post treatment extraoral photos



Fig 5: Post treatment intraoral photos

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