Case Report

Nonsurgical Treatment of a Case with Skeletal Class III Malocclusion and Impacted Premolars: A Case Report

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ABSTRACT

This case report describes the nonsurgical, nonextraction therapy of a 18-year-old girl with a skeletal Class III malocclusion, and a reverse overjet and impacted mandibular premolars. The Class III malocclusion was corrected with alignment of impacted premolar and retraction of lower anteriors with fixed appliances, combined with short Class III and vertical elastics in the anterior area. The Class I molar and canine relationships were achieved, and the facial profile improved substantially.

Keywords: Class III malocclusion, Impaction,reverse overjet

INTRODUCTION

Nonextraction camouflage treatment in mild Class III malocclusion is achieved by backward movement of the lower dentition and forward movement of the upper dentition. Many camouflage treatment modalities have been used for distal tipping and distal movement of mandibular posterior teeth. The amount of distal movement

Class III malocclusion is a challenging problem and requires a good diagnosis and treatment planning according to age, amount and direction of growth.[1]

It is easier to treat the developing class III patients with modification of the growth with applainces like functional regulator-III, reverse twin block, chin-cup and reverse pull headgear.[2] However pateints in which the growth is completed the class III malocclusion is either treated with camouflage of teeth or through surgery.

Camouflage treatment is the orthodontic tooth movement relative to their supporting basal bone to compensate for any jaw discrepancy. The class III camouflage involves proclination of the maxillary incisors and retroclination of the mandibular incisors to correct reverse/negative overjet.

An impacted tooth is one that is embedded in the alveolus so that its eruption is prevented or the tooth is locked in position by bone or the adjacent teeth.[3] The prevalence of impacted premolars has been found to vary according to age.[3] The overall prevalence in adults has been reported to be 0.5%.[4,5] Premolar impactions may be due to over retained or infraocclusal ankylosed primary molars, mesial drift of teeth arising from premature loss of primary molars; ectopic positioning of the developing premolar tooth buds; or pathology such as inflammatory or dentigerous cysts.[6,7]

Conservative management invoves surgical exposure of the crown however subsequent premolar eruption is unpredictable. In some cases orthodontic traction and repositioning or even extraction of the teethmay be indicated.

In the case report described here we present a non-surgical treatment approach of an adult skeletal class III pateient with impacted mandibular premolars along with reverse overbite.

CASE PRESENTATION

A female patient of age 18 years came with the complaint of forwardly present lower teeth. The patient had an apparently symmetrical mesoprosopic face with concave profile and competent lips (Figure 1). On intra-oral examination, the patient had an segmental anterior crossbite, class III molar relation on left side and class I molar on right side, retained lower second premolar and missing first premolar on left side, lower incisors are retroclined and forward path of closure and 2 mm of reverse overjet and 40% of reverse overbite(Figure 2).

Orthopantomograph evaluation revealed impacted first and second premolars in lower left region. Cephalometric evaluation showed patient had skeletal class III base with normal maxilla and prognathic mandible and horizontal growth pattern (Figure 3) Dental alveolar findings revealed proclined maxillary incisors and retroclined mandibular incisors .The soft tissue findings revealed retrusive upper and lower lips and acute nasolabial angle.

TREATMENT OBJECTIVES

- Correction of anterior crossbite
- Exposure and traction of impacted premolars in lower left region
- To obtain ideal overjet and overbite
- To obtain ideal esthetics

TREATMENT ALTERNATIVES

In Skeletal Class III malocclusion with prognathic mandible, stable results can be obtained wit orthognathic surgery procedure like bilateral saggital split osteotomy(BSSO). In this case also ideal treatment procedure was BSSO.Since the above patient was not willing for surgery,orthodontic camouflage treatment was conducted.

TREATMENT PLAN

In this case of mild Class III case, non-extraction camouflage treatment plan was conducted.In the lower arch,retained tooth was extracted and impacted premolars were aligned.

TREATMENT PROGRESS

The treatment was started with preadjusted edgewise (MBT-0.022" × 0.028" slot) appliance by bonding and alignment of the upper arch with0.016,0.018 and 0.020 nickel titanium wire. Levelling and alignment was completed in the upper arch with 0.019 × 0.025 rectangular stainless steel wire.

In the lower arch, retained tooth was extracted and impacted 1st and 2nd premolars were exposed and bonded in the lower left region. The alignment was initiated with 0.016, 0.018, 0.020 nickel titanium wire followed by rectangular stainless steel wire. Traction forces were applied on the impacted teeth at 0.019x0.025 stainless steel wire. Alignemnt of lower arch was completed. Class III elastics were used to close the residual space and obtain ideal overjet and overbite.

POST TREATMENT RESULT

Post treatment extraoral photos showed esthetic straight tissue profile (Figure 4) Improvement in smile was observed with correction of crossbite. Intra-oral

Figure 1 Pretreatment extra-oral photographs

Figure 2 Pre-treatment Intra-oral photographs

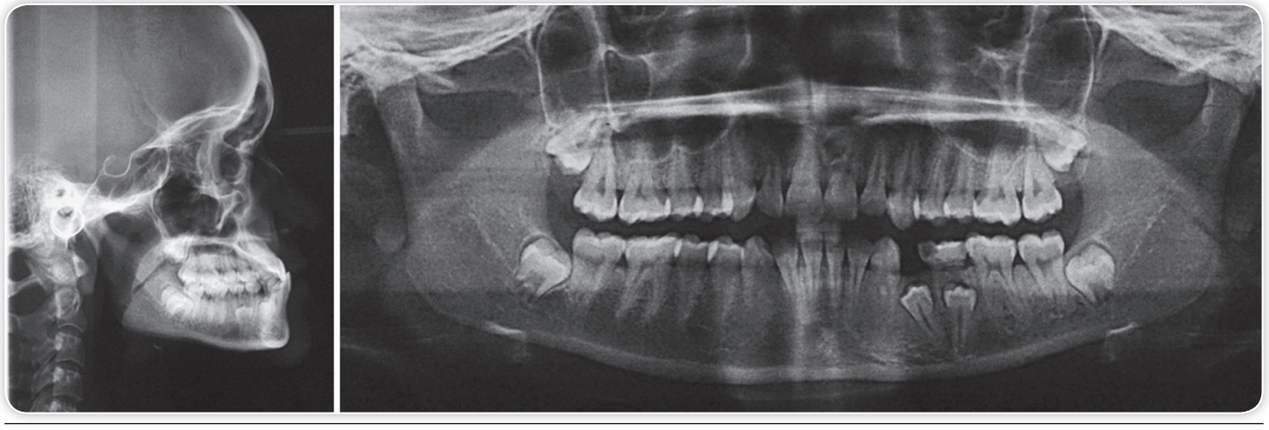

Figure 3 Pre-treatment Radiographs

Table 1
Cephalometric analysis

Parameters	*Pre-treatment*	*Post-treatment*
SNA	83°	83°
SNB	88°	86°
ANB	–5°	–3°
FMA	14°	14°
Gonial angle	120°	119°
Upper anterior facial height	48°	48°
Lower anterior facial heighlt	52°	52°
Mx 1 to NA:	7 mm	6 mm
Mx 1 to NA:	44°	44°
Md 1 to NB:	3 mm	2.4 mm
Md 1 to NB:	30°	30
IMPA	90°	89

Figure 4 Post treatment extra-oral photographs

features showed good alignment of upper and lower arch with correction of segmental anterior crossbite. Class I molar relation was observed bilaterally with ideal overjet and overbite. Good occlusion was observed with good intercuspation between upper and lower arches. Impacted premolars were exposed and well aligned. (Figures 5 and 6)

DISCUSSION

Management of skeletal class III malocclusion usually involves surgical intervention. Patients are always doubtful about undergoing surgery and want a non-surgical alternative. Orthodontic camouflage is an alternative for the treatment of the mild to moderate skeletal discrepencies of the maxillary and mandibular structures with the aim of correcting the occlusal and incisal relationship.

In this case orthodontic camouflage was favourable with space management in the lower arch. With the non-extraction treatment excessive retroclination of lower incisors was avoided. Class III elastics were effectively used for closure of residual spaces and correction of overjet and overbite.

Battagel[8] observed that Significant lingual inclination or distal movement of the incisors after mandibular premolar extractions can negatively affect the concave profile compared with nonextraction and can even induce unwanted complications such as root exposure and resorption of the incisors.

A case was reported by Guilherme et al[9] reported a case where they used asymmetric intermaxillary class III elastics to correct the unilateral class III molar relationship. Proffit and Ackerman[10] in their concept of the "3 envelopes of discrepancies", suggested that

Figure 5 Post treatment intra-oral photographs

the degree of maxillary incisor protrusion relative to mandibular incisor retrusion are critical limitation for differentiating between orthodontic and combined orthodontic-surgical treatment.

Impacted teeth treatment may include observation, relocation, intervention or extraction.[7] In selecting an appropriate treatment option, the underlying etiological factors, space requirements, need for extractions of primary molars, degree of impaction, and root formation of the impacted premolar should be considered. Various patient related factors like patient's medical history, dental status, oral hygiene and attitude towards and compliance with treatment will influence choice of treatment options.[10-12]

In this case, the impacted first premolar was positioned approximately 40° to the long axis and crown of the tooth and was positioned above the root apices of the first permanent molar with complete root formation. The impacted second premolar was positioned vertically below the retained deciduous E. The position of both the premolars were favourable thus a exposure and traction plan was made.

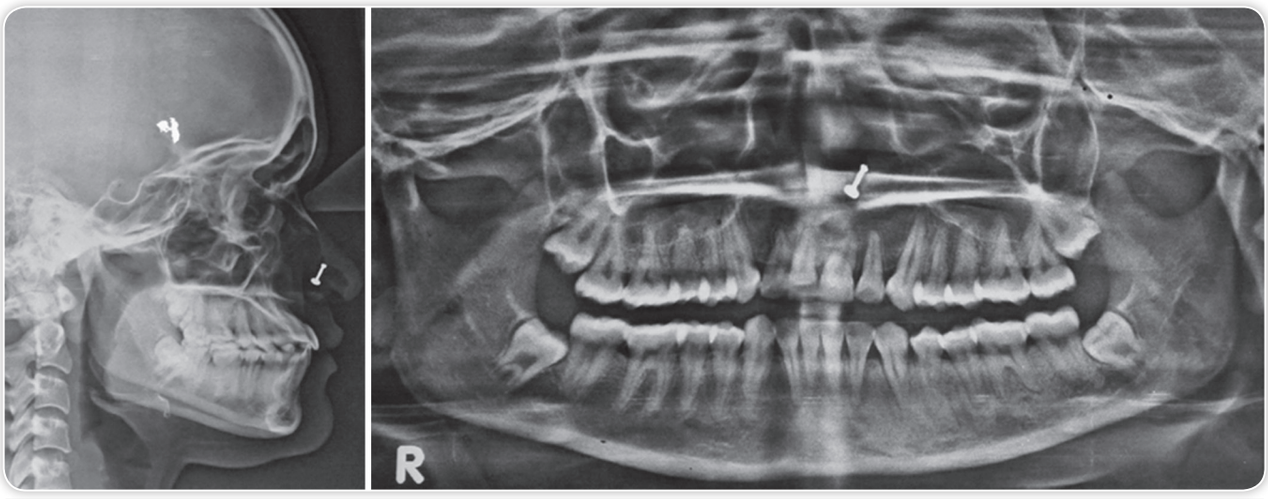

Figure 6 Post treatment Radiographs

Andreasen et al.[13] suggests that surgical exposure should be confined to cases, both maxillary and mandibular with no more than 45 tilting and limited deviation from the normal position, and hence this case definitely involved traction rather than removal of the impacted tooth.

CONCLUSION

Treatment of class III patient with non-extraction treatment plan alongwith successful alignment of impacted lower premolars was reported. The proposed treatment objectives acheived good alignment and stable occlusion.

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