

Adequacy of molar distalization after second and third molar eruption- a case report

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Abstract

Adult patients with class II malocclusion can be treated routinely by extraction therapy. In the recent decades there was increasing popularity towards non-extraction treatment. Distalization of maxillary molars is one of the prime treatment modality to correct mild to moderate class II malocclusion cases with esthetically acceptable profile. A 16 years old female patient reported with irregularly placed upper front teeth and was diagnosed as Angle's Class II malocclusion with orthognathic maxilla and mandible, average growth pattern. Treatment was planned to distalize the entire maxillary arch using mini implants as skeletal anchorage. 4.0 mm of maxillary molars were distalized, class I molar and canine relation were achieved bilaterally within span of 10 months without altering the patient's existing profile.

Keywords: Class II; Distalization; Mini Implants; Zygomatic Buttress; Third Molars

1. Introduction

The foremost aim of an orthodontist is to give esthetic and harmonious profile to the patient. Class II malocclusion is one of the most commonly encountered problem among orthodontic patients. Previously, extraction is considered as a prime modality to gain space and correct this discrepancy. But the need for extraction has been reduced with the recent advances and developments in material, mechanotherapy & changes in concepts. In patients with straight profile having dentoalveolar discrepancies, extraction of premolars and retraction may lead to dish in profiles. In such conditions, distalization provides scope to correct without affecting the profile.

The success of molar distalization mainly depends upon timing of treatment, which should be ideally, prior to the eruption of second molar. With the advent of newer techniques, successful distalization can be achieved even after the eruption of second molars. (Ghosh, J.& Nanda RS 1996, Flores-Mir C *et al.* 2012). Several intraoral and extraoral appliances are advocated to distalize the molars, which requires patient compliance and with some intraoral appliances, anchor loss at premolar and incisor regions is inevitable. We could overcome by the introduction of the skeletal anchorage devices. They can produce tooth movement or growth modification without resulting in adverse effects on the anchor units with minimal patient cooperation (Yamada K 2009 *et al.*, Fudalej P *et al.* 2011).

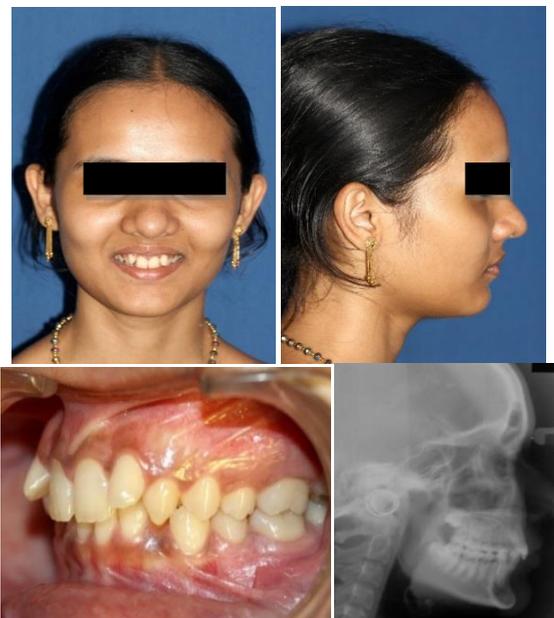


Figure 1: Pretreatment: Class II Malocclusion

2. Case report

2.1. Diagnosis

A 16-year-old female patient presented with the chief complaint of irregularly placed upper front teeth. Extraoral examination revealed mesoprosopic facial form and mild convex profile with competent lips. Intraoral examination showed end on molar

relation bilaterally, retroclined maxillary central incisors and labially inclined maxillary lateral incisors with 5mm overjet and 4mm overbite (Fig.1). Panoramic radiograph examination showed presence of fully erupted teeth upto second molars, upper third molars in Nolla's stage 6 and lower third molars in Nolla's stage 7 with adequate bone levels and without any malformations. Cephalometric analysis confirmed skeletal class I relationship ($ANB = 4^\circ$) along with average growth pattern ($GoGN=27^\circ$ and $FMA = 25^\circ$). Treatment objectives were to achieve class I molar and canine relation and relieve the crowding in both maxillary and mandibular arches without altering the facial profile. Treatment plan was to distalize the maxillary second molars with cantilever spring followed by distalization of entire maxillary segment with NiTi coil spring by placing miniimplants at zygomatic maxillary buttress. Since the patient profile is esthetically acceptable, non extraction was planned.

2.2. Treatment progress

In both maxillary and mandibular arches, preadjusted edgewise appliance 0.022"x0.028" were bonded. Second molars on either side were distalized with the help of cantilever spring for 3 months (Fig. 2a). The cantilever spring was made of 21 gauge stainless steel wire. After 4.5mm of second molar distalization, the molar was stabilized with nance palatal button. Simultaneously both upper and lower arches were levelled and aligned with 19" x 25" stainless steel rectangular archwire.



Figure 2a: Distalisation with Cantilever spring

Later Dentos titanium mini-implant of 1.2mm diameter and 8.0mm length was inserted at zygomatic buttress area on either side and NiTi closed coil spring was placed from these implants to canine hooks to distalize the entire arch till the class I molar relation was achieved (Fig. 2b).



Figure 2b: NiTi Closed coil springs

The retraction was completed within 7 months and final occlusion settling was carried out with elastics for 3 months. After 13 months of active treatment, the fixed appliances were removed and upper and lower Hawley retainers were delivered to wear full time for one year post treatment and night time for subsequent years.

2.3. Treatment results



Figure 3: Post treatment

After visualizing the post treatment records, full-cusp class I molar and canine relationship was achieved on both the sides (Fig. 3). Both maxillary molars were distalized without proclining the anteriors with the use of mini implants and crowding was relieved, ideal overjet and overbite was also achieved without significant profile change. Panoramic radiograph showed ideal root parallelism without significant root and alveolar bone resorption. Since the patient was cooperative treatment results were stable even after 2 years follow up.

Table 1: Cephalometric Analysis during Orthodontic Treatment

Measurements	Before distalization	After distalization	After treatment	2 Years post retention
SNA	85°	84°	84°	84°
SNB	81°	81°	81°	81°
ANB	4°	3°	3°	3°
Wits (mm)	3	2	2	2
FMA	25°	26°	26°	26°
SN - GoGn	27°	28°	28°	28°
UI to SN	98°	103°	102°	102°
UI to NA	14°	23°	22°	22°
UI to NA (mm)	3	5	4.5	4.5
LI to NB	27°	30°	29°	29°
LI to NB (mm)	5	4	4	4
IMPA	95°	99°	98°	98°
U1-PtV (mm)	57	59	59	59
U6-PtV (mm)	25	21.5	21	21
Overjet (mm)	5	2	2.5	2.5
Overbite (mm)	4	3	3	3
Lower lip - E-line (mm)	-5	-4	-4	-4
Upper lip - E-line (mm)	-7	-6.5	-6.5	-6.5
Nasolabial angle	97°	100°	98°	98°

3. Discussion

Distalization of entire arch is often challenging with routinely used intraoral appliances. They often cause undesirable side effects like proclination of anteriors and reciprocal mesial movement of molars during retraction of anteriors which occurs in the later stage of treatment. (Park HS *et al.* 2005, Keles A. 2000). To minimize these side effects skeletal anchorage devices were used in the present case for entire maxillary arch distalization.

As the implant was positioned in the zygomatic buttress away from the posterior teeth, distal movement of teeth was not hampered (Patil. N *et al.* 2016). In this case 4mm of molar distalization was achieved and 0.5mm of relapse was observed, similar to the studies conducted by Suguwara *et al* (Sugawara J *et al.* 2004). The average amount of distalization achieved in their study was 3.78mm in maxilla and in mandible 3.5mm. Similarly, Kizinger *et*

al also used miniscrew anchorage to distalize the molars with distal jet, they observed 3.92mm of distal movement of molars with 0.53mm of relapse (Sugawara J *et al* 2006, Kinzinger GS *et al* 2009)

With these minimally invasive procedures, we can distalize the entire maxillary arch without any soft tissue alterations, molar rotations and posterior cross bites which are the potential side effects of other intraoral distalizers. Therefore, molar distalization with mini implants is one of the beneficial treatment option to manage non-extraction borderline cases and adolescent growing patients even after eruption of the second molars. Hence, skeletal anchorage provides an excellent resource to bring about the desired movements within short interval.

4. Conclusion

Distalization is one of the viable treatment option in mild to moderate class II malocclusions with acceptable profile. So skeletal anchorage devices can be successfully used to distalize the molars bodily without anterior anchorage loss.

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