

NECESSITY DOMINATES COOKBOOK APPROACH – A PERFECT EXAMPLE

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Abstract

All malocclusions may not necessarily require a conventional orthodontic treatment for example; supraerupted posterior tooth is an occasional clinical finding in dental practice which may not require a complete strap up of both the arches. Never the less, the treatment of supraerupted tooth becomes mandatory in order to prevent its extrusion in the edentulous space leading to complications like masticatory insufficiency and TMJ disorders. This article discusses an effective, efficient and patient compliant option for molar intrusion with single arch orthodontics.

Key words: Supraeruption, single arch orthodontics, mini-implant, molar intrusion.

Introduction

Loss of teeth in the oral cavity often results in supraeruption of the opposing teeth, resulting in occlusal interference, functional problems, decreased masticatory efficiency, and increased complexity of restoring edentulous space.¹ Intrusion of teeth, particularly posterior teeth, has been a difficult and complex treatment modality throughout the 20th century. Prosthodontic rehabilitation of edentulous space is often complicated with supraeruption of antagonistic tooth and often requires preprosthodontic intervention. Recently, the introduction of mini-implants to the orthodontic armamentarium has widened the scope of intervention.²⁻⁴ Preprosthodontic intrusion of supraerupted tooth with the aid of mini-implants is less invasive.^{5,6} This case report will focus on preprosthodontic intrusion of an supraerupted molar using two mini-implants and partial fixed orthodontic appliance.

Case history

A 21-year-old female of Indian origin reported for irregular placement of lower anterior teeth and replacement of missing lower right and left posterior teeth. Past dental history revealed extraction of upper 13 and 23, five years back as it was concluded to have an unfavourable prognosis due to its mal-alignment (highly placed in the vestibule) and missing 36 and 46, two years back because of decay.

Intraoral examination revealed well aligned upper arch along with supraerupted 16 and 26. Furthermore intra oral examination revealed crowding in the lower arch due to labially positioned 34 and 43, missing lower right and left 1st molar with a midline discrepancy of 3mm shifted towards right side. Her gingival condition was fair. Judging by the clinical evidence of marginal ridge discrepancy, it was concluded that the upper right and left first molars were supraerupted by 3mm and 2.5mm respectively (Fig 1).



Figure 1- Pretreatment records.

Treatment plan

Two treatment plans were decided for this case. The first treatment plan involved a non extraction treatment modality. It was decided to replace the missing lower first molars by the mesialized second molars and end up in a class II molar relation. This was rejected on the basis of missing third molar in the fourth quadrant which could have replaced the second molar. The next treatment plan which was opted, required extracting the lower first premolars to relieve the crowding. Moreover, create sufficient space in the lower arch for the replacement of the missing lower first molars by a dental implant and finally end up in a class I molar relationship. The 2nd treatment modality was chosen.

Treatment progress

Extraction of 34 and 44 was done prior to the start of the fixed treatment. Lower arch was bonded with 0.022" slot MBT brackets and 2nd molars were banded. Levelling and aligning was commenced with 0.012" niti arch wire and gradually reached on the higher grade wire to relieve the crowding and to create the sufficient space for prosthetic implants. Now the goal was made to intrude the supraerupted 16 and 26 with the help of orthodontic mini-implants. Two mini-implants of 1.5mm × 8 mm (S.K. Surgicals, Pune) were utilized for intrusion; bilaterally one implant was inserted buccally in the interdental area between upper 2nd premolar and 1st molar at the mucogingival junction, angulated at 45° to the long axis of the teeth (Fig. 2). Thereafter, the second mini-implant was inserted in the palate in between the 1st and the

2nd molar, at a distance of 7 to 8mm from the alveolar crest on both the sides. All the mini-implants were inserted under topical anaesthesia using the self-drilling mechanism. Next the upper first molars were banded with a buccal and palatal attachment to engage an E-chain bilaterally.



Figure 2- Mid treatment records with insertion of TADs in buccal and palatal side bilaterally.

An E-chain was tied from the head of the mini-implants upto the palatal and well as buccal attachments to generate an intrusive force. Approximately 100 gm of force was applied on each side to intrude both 16 and 26. Time duration of six weeks was maintained to change the e-chains. After 5 months of active treatment, both molars were intruded. Thereafter, it was decided not to bond the upper arch due to its well alignment. Enough vertical clearance was obtained for the replacement of missing teeth in the lower arch. Thereafter the completion of the orthodontic treatment, debonding was done followed by placement of fixed retainer in the lower arch. Finally the missing 46 and 36 were replaced with prosthodontic implants (Fig.3).



Figure 3- Post treatment records.

Discussion

Supraerupted maxillary molars are occasionally encountered in the clinical practice. Its correction via mini-implants supported intrusion should currently be considered state of the art because it can deliver predictable results without relying heavily on patient compliance or including other dental specialties. Although there are usually multiple solutions to a problem in orthodontics, we accept that the final choice of how a problem is corrected will ultimately depend on the preferences of the treating clinician, who will diligently weigh the advantages and disadvantages of the various approaches.⁷

Branemark introduced the concept of osseointegrated pure titanium threaded implants in the clinical treatment of the edentulous patient; the conventional implants replacing missing teeth have been utilized as skeletal anchorage for the correction of molars intrusion.

Umemori et al. were the first to use miniplates as temporary skeletal anchorage for molar intrusion in managing the open bite malocclusion. Molars can be intruded approximately 2-4 mm using skeletal anchorage, with better results in the maxilla than mandible.^{8,9}

Lee and Shuman used a different approach to intrude the posterior teeth. He utilized a single mini-implant, segmental wire and transpalatal arch for intruding maxillary molar.¹⁰

Sivakumar on the other hand demonstrated intrusion of maxillary molar with a single palatal mini-implant and 0.017" x 0.025" TMA helical spring.¹¹

Kravitz used two mini-implants i.e. one buccal and one lingual for true and predictable intrusion of the first molar in the maxillary arch.⁵

This case demonstrated an effective mechanism using two mini-implants and partial fixed attachments to intrude supraerupted upper right and left 1st molar. One mini-implant was placed in the buccal dentoalveolus region between 2nd premolar and 1st molar at the level of the mucogingival junction while the second was placed in the palatal slope in between the first and the second molar which results in true intrusion of upper first molar without affecting the adjacent tooth (Fig 4).

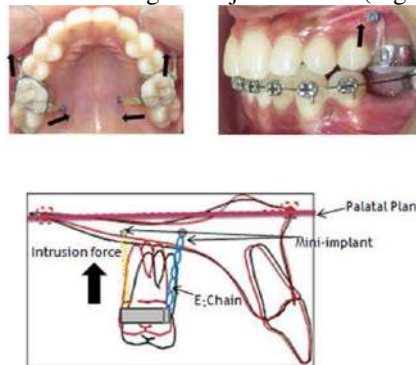


Figure 4- Site of placement of TADs and direction of resultant force.

Before applying the intrusive force few precautions are often recommended. Mesial surfaces of adjacent teeth are found to be leaning against the distal surfaces of

supraerupted teeth. (Fig. 5).⁵ This door-wedge effect as called often decreases the intrusion of supraerupted teeth and creates problems like pain in the concerned teeth. To minimize the door wedge effect separators are placed before attempting intrusion of posterior teeth. These separators create an artificial space between the teeth and exaggerate the tooth intrusion.

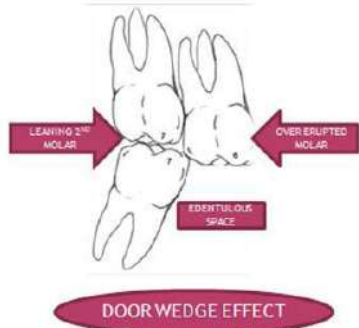


Figure 5- Door wedge effect.

We should use two implants, i.e. buccal and lingual implants simultaneously because this causes true intrusion and decreases the chances of buccolingual tipping of teeth. Regarding the optimum force for intrusion, Burstone¹² suggested 20 gm force while Gianelly and Goldman¹³ predicted 15 to 50 gm force for intruding single rooted teeth. Kalra et al¹⁴ suggested about 90 gm per tooth for molar intrusion in growing children. However when we consider intrusion in adults, force levels 2-3 times more are recommended by most of the clinicians because of the bone structure and increased root architecture of the teeth. We used 100 gm of total intrusive force bilaterally for both right and left 1st molar and obtained 0.5 mm of intrusion per month.

Conclusion

Supraerupted teeth in the oral cavity can be intruded by using the mini-implants. The treatment results after using these mini implants is predictable and extremely useful for the progress and successful completion of the case.

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