

Molar Intrusion With a Modified Transpalatal Arch : A Case Report

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Introduction

In recent years patient awareness & changed lifestyles have increased the demand for adult orthodontic treatment. Multidisciplinary dental therapy has allowed better management of the more complicated & unique requirements of adult patients, thereby greatly improving quality of care, as well as treatment prognosis. The orthodontist treating adult patients often encounters a dentition that was neglected after premature extractions of posterior teeth. This early loss of posterior teeth and a delay in replacing the missing teeth results in over eruption of antagonist teeth¹. This situation can complicate the placement of prosthetic restoration and may lead to lateral occlusal interferences.

Molar intrusion is particularly difficult to carryout in adults because of histological changes of alveolar bone, smaller marrow spaces and a reduced blood supply compared with growing patients

Opinions have been divided regarding the efficacy of orthodontic intrusion of posterior teeth. Norton & Lopes (Austr. Dent J, 1980) suggested that intrusion of over erupted tooth was problematic. They proposed grinding of crown before full coverage restoration. Mostafa et al (J Clin Orthod, 1985) used a subapical osteotomy procedure to avoid unwanted side effects of intrusive mechanics. Birte Melson et al (J Clin Orthod, 1996) used an full coverage acrylic splint with labiolingual appliance and a cantilever spring to produce an intrusive force. Young chel park et al (Am J Orthod Dentofacial Orthop 2003) have used skeletal anchorage system with mini screw implants as anchorage device to intrude the over erupted molar.

Salem & Mc Carthy (J Clin Orthod, 2005) used a modified trans palatal arch along with buccal step up bend in 0.016 stainless steel arch wire mesial to the tooth to be intruded. Bacetti et al (J Clin Orthod, 1996) used a

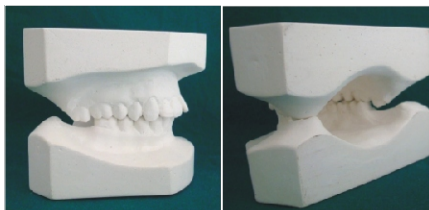
removable acrylic bite plate with elastic stretched between the hooks and across the over erupted molar. Youn sic chun et al (J Clin Orthod, 2000) used molar intrusion arch with rigid cross palatal bar which was bonded to the anchor teeth. Shick and Hwang et al (Am J Orthod Dentofacial Orthop 2001) showed intrusion of overerupted molar by corticotomy and rare earth magnets in repelling mode. Enacar et al (J Clin Orthod, 2003) demonstrated molar intrusion with palatal arch. To counteract the rotational moment torquing bends have to be given.

Case Report

A 33 year old male patient reported to our department with a chief complaint of forward placement of front teeth and also desired to have replacement of lower missing teeth.



On clinical examination, patient had Angle's Class I molar relation on right side, End on molar relation on left side, with proclination of anteriors. Moderate crowding was noted in the anterior region. Upper second molar was extruded. Patient's periodontal status was good.



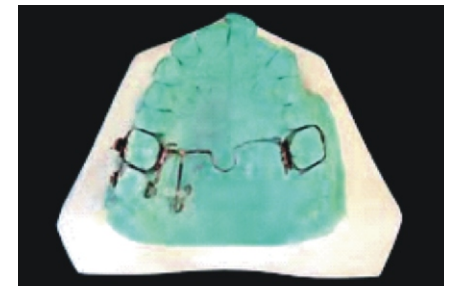
Treatment aim was to achieve intrusion of upper second molar to facilitate prosthetic replacement of lower second molar.

The treatment plan was, extraction of upper & lower first bicuspid, extraction of upper third molars and intrusion of upper second molar.

Bonding was done with pre adjusted edgewise appliance system using Roth prescription of 0.018 inch slot.

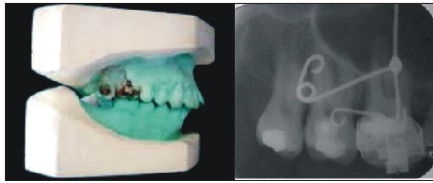
Appliance Construction

The trans palatal arch is made of 0.036" stainless steel wire. Each end of the palatal arch is doubled over for insertion into the cleats on the lingual surface of upper first molar bands. A wire of same dimension is soldered to the TPA and is made parallel to the palate. The wire ends in an apical hook which is in line with the lingual button on the tooth to be intruded.



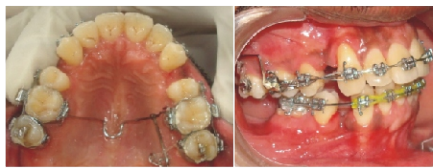
On the buccal side, a power arm was made in 0.018 × 0.025 rectangular stainless steel wire. It is soldered over the molar tube of first molar (It can be welded also). The apical hook should be in line with the buccal button of the molar to be intruded. Both buccal and lingual button should be at the same height. If the power arm on the buccal side impinges on

the tissue, a sleeve can be inserted.



A section of Elastomeric chain is stretched from the buttons to the apical hooks on both buccal and lingual side. Activation is done at every 4 weeks interval. The buccal activation helps to guide and support palatal activation and prevents rotation¹¹.

Teeth consolidated with rectangular arch wire in the upper arch provides the anchorage.



The concept of optimal force is important for molar intrusion, though studies regarding its magnitude are rare. Gianelly recommended 15-50 gm for the intrusion of small teeth. Burstone suggested an intrusive force of 20gm for incisors.

An optimum force value however has not been established for molar intrusion. Dellinger reported that a force of 50 gm was adequate to intrude posterior tooth.

In 16 weeks of time, 3 mm intrusion of upper second molar was noted.

The amount of intrusion was measured from the centre of resistance of molar to the palatal plane. Much like incisors, neither cusp tips nor root apices are ideal reference points to evaluate molar intrusion as they could create a false perception of intrusion.

The molar centroid, is a point on the longitudinal axis of the tooth that is independent of any changes in inclination; this makes it the ideal reference point¹²

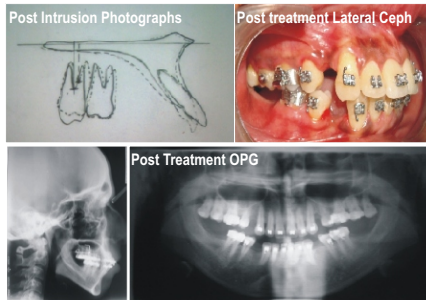
An adequate plane of reference is also important because the changes in these planes during treatment can clinically alter our perception of the intrusion attained.

The palatal plane for maxillary molar and mandibular plane for the mandibular molar are most commonly used because they represent the basal osseous bone for their

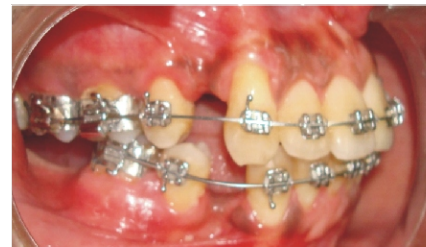
respective teeth.

Superimposition

Palatal plane was used to superimpose the pre & post intrusion cephalograms.

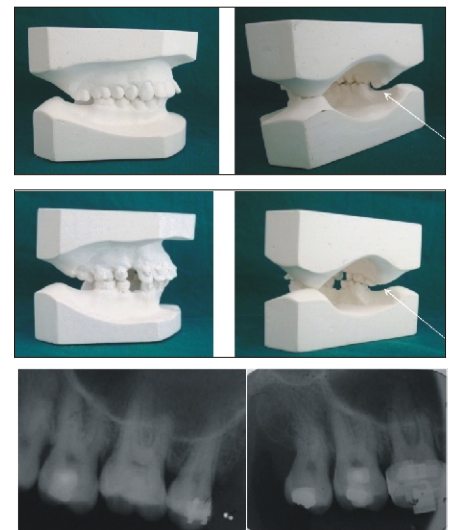


Once the required amount of intrusion was achieved, buttons on the II molar were removed, tooth was banded. Intrusion was retained by including the II molar in the upper archwire.



Discussion

Biomechanics : The most critical factor in the intrusion of maxillary molars is the point of force application. Orthodontic intrusion has been thought impossible to achieve with a force application on one side of the tooth .The center of resistance of a molar is located near the furcation point. For pure intrusion, the line of force should be parallel or pass through the center of resistance. To pass through the center of resistance the force must be simultaneously applied both buccally and lingually. Here, with the help of the hooks on buccal and palatal aspect the forces has been applied from both sides enabling the line of force to pass through the center of resistance.



Conclusion

Molar intrusion in adults with our technique is a simple and convenient procedure. It can be used simultaneously with fixed mechanotherapy for other problems like proclination crowding, thereby decreasing the treatment time. The advantages of this technique include good control over the tooth to be intruded because of simultaneous & uniform buccal & palatal force application. It is comfortable for the patient and cost effective.

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