

## “Intrusion of Overerupted Posterior Teeth Using Orthodontic Mini Implants”

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**Abstract:** Overeruption of maxillary molar(s) because of loss of the opposing teeth creates occlusal interference and functional disturbances. To restore proper occlusion, intrusion of the overerupted molars becomes essential before reconstruction can be initiated. A plausible procedure is orthodontic intrusion, which demands calibrated anchorage support from intraoral & extraoral units.

The purpose of this case report is to demonstrate the use of orthodontic mini implants in the intrusion of overerupted molars. The purpose of using implants as anchorage was to eliminate the need for patient compliance for headgear wear and to overcome the difficulty resulting from the shortage of anchor units. The results showed that the biological responses of the teeth and the surrounding bony structures to the intrusion appeared normal and acceptable. Furthermore, the periodontal health and vitality of the teeth were well maintained even after one-year follow-up.

**Keywords:** Overeruption, intrusion, implants, anchorage, maxillary molar.

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### I. Introduction

Prosthetic rehabilitation of edentulous space is often complicated with overeruption of antagonistic tooth and often requires pre-prosthetic intervention [1]. Supra-erupted maxillary molars are a common clinical finding in dental practice. Early loss of the mandibular first molar often leads to extrusion of the opposing maxillary first molar into the edentulous space. Re-establishing a functional posterior occlusion requires a comprehensive dental treatment plan involving full-arch braces, headgear, surgical impaction or iatrogenic root canal therapy with significant occlusal equilibration [2, 3]. Orthodontic temporary anchorage devices (TADs) provide a minimally invasive treatment alternative; one that does not require the patient's compliance, for molar intrusion. In this context, orthodontic intrusion of the overerupted antagonistic tooth to facilitate prosthetic rehabilitation is a desirable strategy.

Here, we report a case with overerupted upper left second premolar and first molar treated by intrusion using a partial-fixed orthodontic appliance in conjunction with mini-implants. Subsequently, the occlusal clearance was sufficient to rebuild the posterior occlusion by an implant prosthesis placed in the area of the missing antagonistic tooth. As the intraoral strap-up was minimized, the patient was able to follow and maintain good oral hygiene.

### II. Case Report

A 22-year-old male patient was seeking restoration of his lower left back teeth. He presented with missing mandibular left second premolar and first molar that were extracted three years ago due to caries. As a result, the maxillary left second premolar and first molar were overerupted and there was insufficient occlusal clearance for placement of dental implants [Figure 1]. The patient was medically fit and healthy and presented with a Class I skeletal relationship with normodivergent facial pattern. Minor maxillary crowding was evident. His gingival health was fairly good. Judging by the marginal ridge discrepancy, the maxillary second premolar and first molar had overerupted 3 to 4 mm occlusally, encroaching upon the antagonistic missing dental space. The objective of the treatment was to intrude the overerupted teeth utilizing mini implant anchorage and subsequently regain the appropriate dental space for prosthesis.

Pre-treatment cephalometric radiograph was taken and accordingly, prosthetic treatment was started by inserting two lower implants into the mandibular left missing molar positions.

The orthodontic treatment plan consisted of initial partial braces in the maxillary left quadrant supported by two orthodontic mini-implants for intrusion of the maxillary left second premolar and first molar.

Two orthodontic mini implants (Osteocare UK, 1.3 mm "Ø" and 8 mm in length), were placed in the maxillary buccal dentoalveolus and palatal slope [Figure 2]. The palatal interradicular space between maxillary second premolar and first molar, just medial to the greater palatine nerve was selected for mini implant insertion. A 1.3 mm by 8 mm miniimplant was threaded 7 mm from the alveolar crest apically at an angle of about 30°-40° to the dental axis using self-drilling mechanism (finger tightening). Prior to mini implant placement, a slight purchase point was made by drilling a small pilot hole with a round bur using slow-speed contra-angle hand piece. This facilitated accurate directional control when threading the mini implant into the bone. The buccal mini implant was inserted between the first and second molar, at the level of the mucogingival junction. Both mini implants were placed using only topical anesthesia. Sterile saline irrigation and strict antiseptic protocols were followed.

One week after placement, the mini implants were loaded with 100 -150 g of intrusive force using elastomeric chains (Ortho Technology, USA) anchored in the mini-implants, passing through the occlusal surface of the first molar crown. [Figure 3]. To prevent the elastic chain from slipping off the occlusal surface, the chain was made taut by twisting. The chain was cut, leaving one remaining link, which would be used to grab and reactivate the chain at the subsequent appointment two weeks later. Left maxillary partial braces were placed with 0.016 nickel-titanium sectional wire (Nitinol 3M Unitek) [Figure 4]. The elastomeric chains were changed every four weeks and intrusion force was checked at each appointment.

### **III. Results**

After 3 months of orthodontic treatment with two mini implants placed in the maxillary left quadrant—one buccally and one palatally together with partial-arch upper orthodontic appliance, approximately 1.5 mm of intrusion was achieved [Figure 5a]. A segmental 0.016 X 0.022-inch TMA wire was placed along with 0.014 Niti sectional wire from the premolars to the molars to align the posterior segment [Figure 5b].

After five months of treatment, approximately 3.0 mm of intrusion was achieved [Figure 6]. The mini implants were removed. Following this, the brackets were bonded on the other side of the arch and a 0.016 Niti wire was placed to help bring the teeth into better arch alignment. Subsequently, the occlusal clearance was sufficient to rebuild the posterior occlusion by a prosthesis placed in the area of the missing antagonistic tooth.

The following month, the caps on the implants were exposed and abutments were placed [Figure 7]. Subsequently the prosthetic restoration of missing teeth was done. [Figure 8].

Thus, a functional occlusion was established in the left posterior dentition by intruding the left posterior teeth. A digital panoramic radiograph showed intact lamina dura around the roots of the upper left second premolar & first molar with no radiographically observable root resorption. [Figure 9]. The total treatment time was five months to achieve intrusion of upper second premolar and first molar and an additional month to align the buccal segment.

### **IV. Discussion**

Molar intrusion is a challenging task, and it is more so in adult patients with restorative concerns. Use of mini implant in pre-prosthetic management has drawn great interest in recent years among clinicians. Recent studies have revealed that the average intrusion of maxillary molars is between 3 and 4 mm and a combination of mini implant and fixed appliance (partial) is a predictable and effective procedure to achieve maxillary molar intrusion. [4, 5]

Recently, mini-screws have been the focus of much attention in orthodontics when absolute anchorage is needed [5]. Mini-screws solve some problems associated with previous intrusion devices, and they have other advantages. Their simple design makes them comfortable to the patient; side effects, such as extrusion of adjacent teeth, are minimized, so that results are more reliable; and the implantation technique is relatively simple, as is controlling the direction and amount of force [6].

### **V. Conclusion**

Orthodontic correction via mini-implant-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. By simply implanting mini-implants and controlling the direction and amount of force, successful molar intrusion can be obtained, Mini-implants are thought to have many advantages, such as versatile placement sites, little bone trauma, immediate loading and patient comfort. Hence, restorative dentists, periodontists and oral surgeons should have a clear understanding of the many applications of orthodontic TADs when presenting patients with options for correcting occlusal problems.

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### Legends for Figures



**Figure 1:** Intraoral left lateral view demonstrating overerupted maxillary left second premolar and first molar.



**Figure 2:** Mini implant placed Palatally & Buccally.



**Figure 3:** Elastomeric chain anchored between the mini implants passing through the occlusal surface of the First molar crown



**Figure 4:** Orthodontic appliance – Left maxillary partial braces



**Figure 5:**

- a) After 3 months of treatment, approximately 1.5 mm of intrusion was achieved
- b) Maxillary left quadrant showing segmental TMA arch wire



**Figure 6:** After 6 months of treatment, approximately 3.0 mm of intrusion was achieved



**Figure 7:** Intraoral left lateral view showing the dental implant abutment



**Figure 8:** prosthetic restoration of missing teeth



**Figure 9:** Panoramic radiograph showing intact lamina dura in relation to Intruded teeth.

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