

# SIMPLIFIED TOOTH MOVEMENT WITH MINI IMPLANTS AND ORTHODONTIC ELASTICS - A PROSTHODONTIC APPROACH

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## ABSTRACT

Mini screw implants, as temporary anchorage devices, are accepted components of orthodontic treatment. Different methods exist in respect of the comparatively simple techniques of placement of these mini screws. While the technique is of primary relevance to the orthodontists, the use of mini screws as an aid for pre-prosthodontic tooth movement is also of relevance to the prosthodontists. Modifications of these techniques are always made by the individual prosthodontist to suit their plan of treatment in order to curtail interdependence. Examples of appliances used in conjunction with mini screws are described in this article.

**KEYWORDS:** Mini-screws, Orthodontic extrusion, Hydrocolloid impression.

## INTRODUCTION

To reduce the occurrence of complication for a planned restorations, the position and the alignment of teeth must be assessed and corrected<sup>1</sup>. There are many definitive treatment modalities for tooth repositioning.

In selected cases where orthodontic repositioning is considered, we prosthodontist have to refer the cases to an orthodontist. The orthodontist will follow his own treatment modalities and protocol which may take months to a year<sup>2</sup>.

While using fixed orthodontic appliances, undesirable side effects can occur, even when using several tooth for anchorage<sup>3</sup>. This paper, will review various treatment modalities in which removable prosthodontic appliances used for tooth repositioning and promote correction of malocclusion which are cost effective and also gives us independence from interdependence.

## ORTHODONTIC INTRUSION OF TEETH IS ASSOCIATED WITH 3 MAIN CONCEPTS

1. First, in order to obtain anchorage the appliance should be rigid and include as many teeth as possible.
2. Second, the force application point must be through the center of resistance.
3. Third, the recommended amount of force to intrude a single rooted tooth is 10 g to 20 g (0.098 N to 0.196 N).

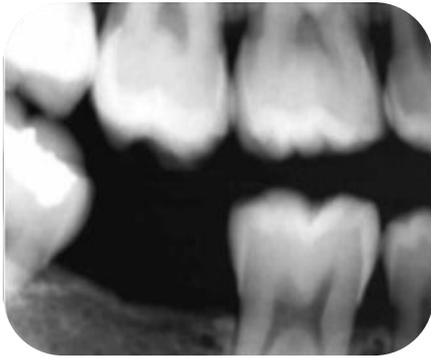
## INTRUSION BY REMOVABLE INTEROCCLUSAL DEVICE

Interdisciplinary therapy is used to treat a patient missing a single posterior tooth opposing an extruded tooth. The simple technique uses a removable inter-occlusal device and elastic band for orthodontic intrusion over a 2-month period.

**TECHNIQUE:** Complete periodontal and radiographic examinations to identify vertical defects and increased sulcular depths (Fig 1)<sup>4</sup>. Place separators for 2 weeks. Place resin retention buttons with sufficient undercut to assist in the retention of the removable device on the buccal and lingual surfaces of adjacent maxillary right first and third molar teeth (Fig 2)<sup>4</sup>. Make a maxillary irreversible hydrocolloid impression and fabricate a cast. To obtain a clear path of intrusion, block out undercuts on the cast apical to the height of contour of the tooth to be intruded. Fabricate the device from a 2 to 3 mm thick clear thermoforming copolymer that encompasses the entire arch to increase stability and retention. At placement, attach an elastic (Bummer 3/16", 6 oz. Intraoral Elastic) to the slot modifications on the device (Fig 3)<sup>4</sup>. Ensure equal and evenly distributed occlusal contacts to counteract any dislodging forces of the device (Fig 4)<sup>4</sup>. Instruct the patient to wear the device at all times except during meals and to change the elastic frequently (at least 3 to 4 times a day). Evaluate the patient every 2 to 3 weeks to monitor periodontal health, device integrity, and amount of intrusion. Once sufficient intrusion is complete, make a maxillary

irreversible hydrocolloid impression<sup>4</sup>. Fabricate a retainer for the arch in which intrusion is complete. Require full-time wear of the retainer during fabrication of the definitive prosthesis. Post-operative radiograph

shows molar extruded with opposite tooth with implant (Fig 5)<sup>4</sup> and polished tooth surface after removing the retention buttons (Fig 6)<sup>4</sup>.



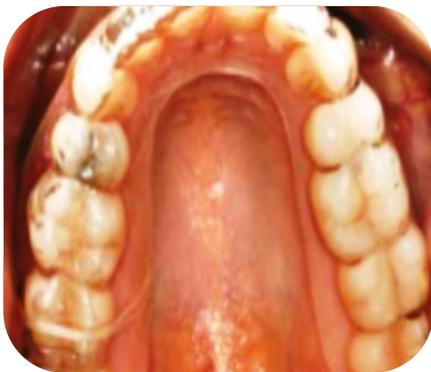
**Figure 1: Radiographic Examination**



**Figure 2: Resin Retention Buttons**



**Figure 3: Bummer 3/16", 6 Oz. Intraoral Elastic**



**Figure 4: Evenly Distributed Occlusal Contacts**



**Figure 5: Post-Op Molar Extruded With Opposite Tooth With Implant**

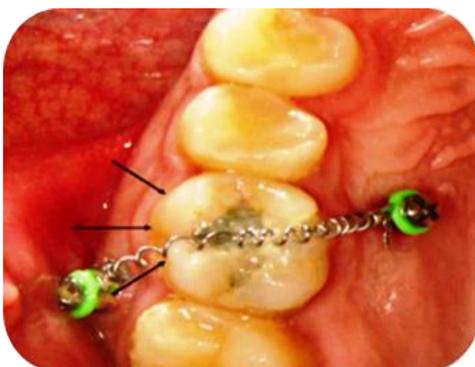


**Figure 6: Polished Surface After Removing The Retention Buttons**

### INTRUSION BY TEMPORARY ANCHORAGE DEVICE

**TECHNIQUE:** For maxillary molar intrusion using two TADs, one miniscrew should be placed in the buccal region between the first and second molar<sup>5</sup>; the other in the palatal slope between the second premolar and first molar just medial to the greater palatine nerve (Fig 7)<sup>2</sup>. This will allow the elastic chain or nickel-titanium coil to pass diagonally across the occlusal table

(Fig 7)<sup>2</sup>. TAD supported molar intrusion is controlled and timely and may be accomplished without the need for full-arch brackets and wires<sup>6</sup>. Supraerupted maxillary first molars can be intruded 3 to 8 millimeters in 7.5 months (approximately 0.5-1.0 mm per month)<sup>7</sup> (Fig 8)<sup>2</sup>, without loss of tooth vitality, adverse periodontal response or radiographically evident root resorption<sup>2</sup>.



**Figure 7: Elastic Chain.**



**Figure 8: Post-operative**

### EXTRUSION BY INTRA-OCCLUSAL DEVICE

**TECHNIQUE:** An interocclusal appliance was fabricated to facilitate the orthodontic extrusion. Intraoral adjustment of the appliance was performed to allow function without occlusal interference<sup>8</sup>. Orthodontic hooks were bonded with composite resin at the buccal and lingual cervical regions of the right central and lateral incisors (Fig 9)<sup>2</sup>. Radiograph shows extruded central incisor (Fig 10)<sup>9</sup>. The incisal edges of the incisors were reduced by approximately 1 mm and elastic bands were connected to the hooks over the appliance for activation of tooth movement. The parameter used to determine slow orthodontic extrusion was 1 week of activation per millimeter, during which time period, an eruptive force was maintained on the

tooth, and 3 weeks for retention or stabilization, during which time the extruded tooth was maintained in the new position<sup>9</sup>.

### EXTRUSION BY FIBER REINFORCED COMPOSITE RESIN

**TECHNIQUE:** The Goal of this technique is to increase the crown length (Fig 11)<sup>9</sup>. Here J hook is luted with resin cement on the remaining crown portion of the tooth which is need to be extruded (Fig 12)<sup>9</sup>. Fibre reinforced on the palatal aspect of 21,12 teeth at an appropriate position of 6mm distance from J hook in the maxillary right central incisor and finally j hook is activated (Fig 13)<sup>9</sup>. Post-Operative the patient was reviewed at weekly interval for 4 weeks. After 4 weeks 3mm eruption was evident clinically and radiographically.



**Fig 9: Orthodontic Hooks Were Bonded With Composite Resin At The Buccal And Lingual Cervical Regions**



**Fig 10. Radiograph Shows Extruded Central Incisor.**



**Fig 11: Pre Treatment Tooth For Extrusion.**



**Fig 12: J Hook Is Luted With Resin Cement**



**Figure 13: Fibre Reinforced On The Palatal Aspect Of 21,12 Teeth**

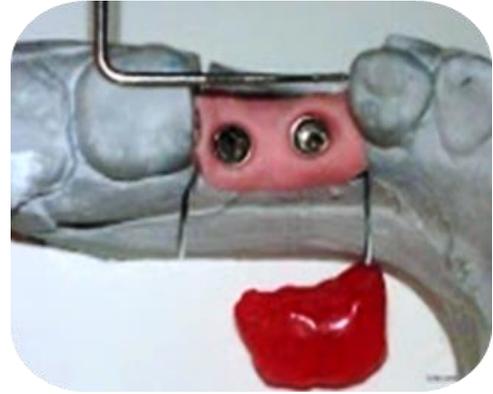
### DISTALIZATION VIA ACRYLIC WEDGE

The goal is to fit a longer disto-mesial crown on the back implant that tilts the second molar back to a more upright angle (Fig 14)<sup>5</sup>. Acrylic wedge is kept in place as show in the (Fig 15)<sup>5</sup>. Width of acrylic wedge is increased in increments. Temporary crown is used to keeps the wedge in place (Fig 16)<sup>5</sup>. Patient should be instructed not to overload the implant by biting

hard on them and the molar will move back gently in a few days or weeks, depending upon different factors. Post-Operative there would be moments, days or weeks later, when the crown can be placed on the abutment and fits in more or less pressure. Normally it is the crown itself that pushes the tooth back the last tenths of millimeter and falls right in place (Fig17, 18)<sup>5</sup>.



**Figure 14: Implant That Tilts The IInd Molar Back To More Upright Angle**



**Figure 15: Acrylic Wedge Is Kept In Place**



**Figure 16: Temporary Crown Is Used To Keeps The Wedge In Place**



**Figure 17: Buccal View Of Temporary Crown**



**Figure 18: Final Restoration (Post-operative).**

**DISTALIZATION BY INTERIM SCREW RETAINED CROWN AND SEPARATOR ELASTIC**

Common mistake during implant therapy include inadequate consideration of the available mesiodistal space and /or the presence of proximally inclined in teeth at the implant site. Here separator elastic is placed in contact point area between first and second molar with

Implant supported screw-retained provisional crown (Fig 19)<sup>1</sup>. Figure shows open contact point of 1.5mm distally, at 2-week follow-up appointment (Fig 20)<sup>1</sup>. Implant-supported final restoration is shown in (Fig 21)<sup>1</sup>. Pretreatment dental implant showing mesial angulation of second molar (Fig 22)<sup>1</sup>. Post treatment dental implant showing final restoration (Fig 23)<sup>1</sup>.



**Figure 19: Seperator Elastic In Place.**



**Figure 20: Open Contact Point Of 1.5mm Distally At 2-Week Follow-Up**



**Figure 21: Implant-Supported Final Restoration**



**Figure 22: Mesial Angulation Of Second Molar**



**Figure 23: Post treatment dental implant showing final restoration**

## CONCLUSION

The techniques are conservative, minimize the need for surgical intervention, and are inexpensive. Lastly, the technique allows for simpler prosthodontic treatment and no interdependence. Some of the pictures have been taken from reference articles for illustration purposes.

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