

# Mini-implant assisted maxillary molar intrusion followed by immediate loading compressive implant placement: A case report

Sana Bint Aziz\*, Gurkeerat Singh, Sonali Walia, Gaurav Saluja

Email: sana.bint.aziz@gmail.com

## Abstract

The mandibular first molars are the most commonly missing tooth due to caries. The early loss of the mandibular first molar often results in the supra-erupted antagonist, i.e. maxillary first molar. The use of mini-implants offers an easy and simple approach to segmentally intrude the supra-erupted tooth, thereby creating enough occlusal clearance for the prosthetic rehabilitation of missing mandibular first molar. The present case report uses a buccal and a palatal mini-implant for maxillary molar intrusion followed by placement of immediate loading compressive implants to replace the missing antagonist tooth. The overall protocol for the management of missing mandibular first molar with a supra-erupted opposite tooth offers an esthetically acceptable non-invasive option with reduced treatment time.

**Keywords:** Mini-implants, Temporary Anchorage Devices (TADs), Compressive Implants, Molar Intrusion

## Introduction

The mandibular first molar is the first permanent tooth to erupt in the oral cavity at the age of six years and hence more prone to caries due to early exposure. Its loss due to decay or poor periodontal health can lead to occlusal interferences and functional instability arising from supra-eruption of the opposite maxillary first molar which may further complicate rehabilitation of the oral function.<sup>1</sup> Prosthetic replacement of the tooth in such cases may require intentional endodontic treatment with extensive prosthodontic reduction of the opposite supra-erupted tooth or surgical impaction or

orthodontic intrusion.<sup>1,2</sup> However, due to aesthetic concerns, most of the adult patients prefer segmental intrusion procedures over a full mouth conventional orthodontic treatment.

The intrusion of molars is difficult to achieve and also leads to undesirable effects on the anchor teeth such as its extrusion.<sup>3</sup> The advent of temporary anchorage devices (TADs) or mini-implants has eliminated these side effects by enhancing anchorage. Park et al.,<sup>4</sup> gave a simple approach to intrude molars using a palatal and a buccal mini-implant or bone plate and an elastomeric chain stretched over the occlusal surface resulting in bodily movement of the molar. Many other methods of molar intrusion using different combinations of mini-implants have been effectively demonstrated.<sup>3,5</sup> Since the mandible has a thicker cortical bone, molars can be more easily intruded in the maxilla using mini-implants up to a range of 2–4mm.<sup>6</sup>

Immediate loading compressive implants have given excellent results in prosthetic rehabilitation when compared to conventional implants, in terms of anchorage, duration of treatment and patient

Sana Bint Aziz<sup>1</sup>, Gurkeerat Singh<sup>2</sup>, Sonali Walia<sup>3</sup>, Gaurav Saluja<sup>4</sup>

<sup>1</sup> Senior Resident, Dental Department, Dr. N.C. Joshi Memorial Hospital, New Delhi, India

<sup>2</sup> Professor and Head, Department of Orthodontics & Dentofacial Orthopaedics, Sudha Rustagi College of Dental Sciences & Research, Faridabad, Haryana

<sup>3</sup> Associate Orthodontist, D32 The Dental Centre, South Extension Part-1, New Delhi, India

<sup>4</sup> PG Student, Department of Orthodontics & Dentofacial Orthopaedics, Sudha Rustagi College of Dental Sciences & Research, Faridabad, Haryana

\* Corresponding Author

**How to cite this article:** Aziz SB, Singh G, Walia S, Saluja G (2020). Mini-Implant Assisted Maxillary Molar Intrusion followed by Immediate Loading Compressive Implant Placement: A Case Report. *MJDS* 5(1), 39-44.

acceptability. These are single piece implants having the following features:<sup>7,8,9</sup>

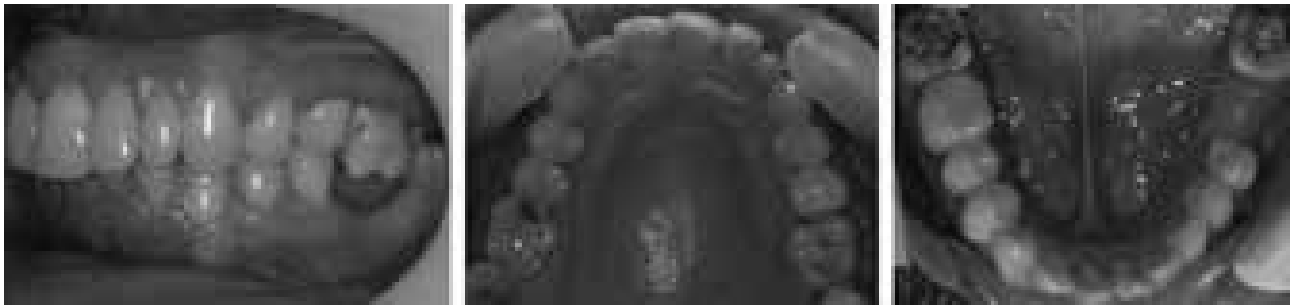
1. thin penetrating tip for quick soft tissue healing
2. smooth polished surface for improved peri-implant soft tissue health
3. implant bending property for better survival
4. deeply anchored in basal bone for high stability

This case reports presents a simple method of molar intrusion using a combination of two mini-

implants followed by prosthetic rehabilitation using immediate loading compressive implants which further reduces the treatment duration.

### Case Report

A 49 year old male patient reported with the chief complaint of difficulty in chewing food and missing lower left back tooth. On intraoral examination, the mandibular left first molar was found missing with supra-erupted maxillary left first molar (Figure 1).



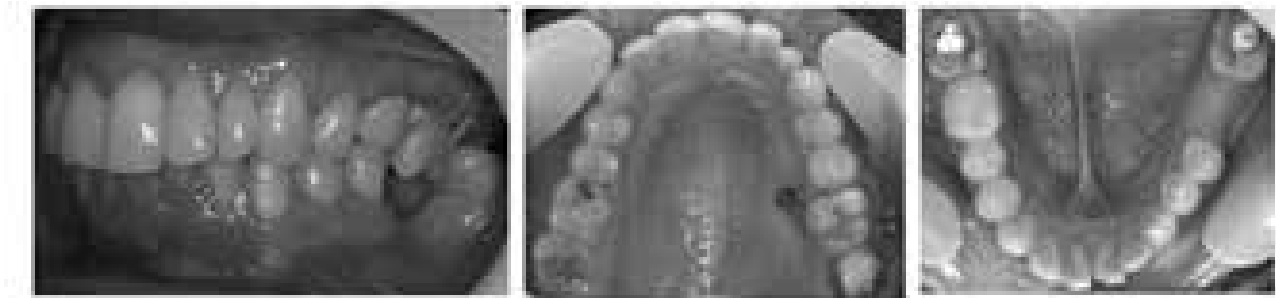
**Figure 1.** Pre-treatment Intra Oral Photographs, (a)Lateral View, (b) Maxillary Occlusal View, (c) Mandibular Occlusal View

It also presented with carious 16, restored 27, 37 and 47. Fixed prosthesis were also present, i.e., porcelain fused to metal (PFM) bridge with respect to 44, 45, 46 and post and core treatment done in 25. (Figure 2)



**Figure 2.** Pre-treatment OPG

There was no relevant medical history and the patient was advised to undergo oral prophylaxis followed by composite restoration in 16. The treatment plan involved intrusion of the maxillary left first molar so as to create occlusal space for prosthetic rehabilitation with respect to mandibular left first molar. Segmental intrusion of the maxillary left first molar was planned. A mini-implant of 1.4 mm head size and 8 mm length was placed between the maxillary left first and second molar on the buccal side at the level of mucogingival junction. Another mini-implant of the same dimension was inserted on the palatal slope between the maxillary left second premolar and the first molar.



**Figure 3.** Mid Treatment Molar Intrusion (a)Lateral View, (b) Maxillary Occlusal View, (c) Mandibular Occlusal View



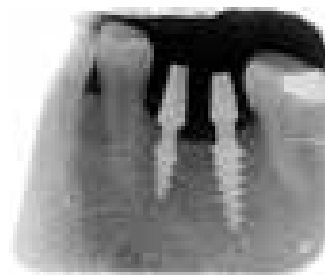
**Figure 4. Post Molar Intrusion (a) Lateral View, (b) Maxillary Occlusal View, (c) Mandibular Occlusal View**

An elastic was attached on the mini-implants that passed over the occlusal surface of the maxillary left first molar from the buccal to the palatal side, applying an intrusive force on the tooth (Figure 3). The patient was advised to change the elastics daily. A composite stop was given on the occlusal surface of the maxillary left first molar to prevent slipping of the elastic.

After eight months of treatment, the patient presented with an intruded maxillary left first molar which was within the level of the maxillary occlusal plane (Figure 4).

The mini-implants were removed and prosthetic rehabilitation was planned with respect to the mandibular left first molar. Two compressive implants, (mesial: 3.5 x 8 mm, distal: 4.5 x 12 mm, GenXT) were carefully placed 3 mm apart from each

other and at least 1.5 mm away from adjacent teeth (Figure 5).

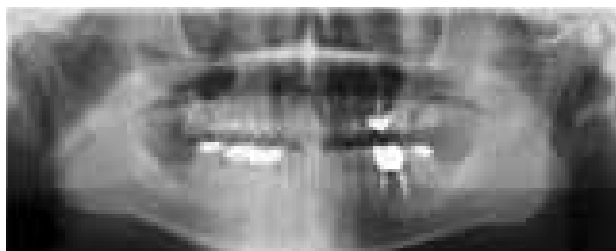


**Figure 5. IOPA showing placement of two compressive implants**

An all-ceramic prosthesis was fabricated and cemented over single piece compressive implant abutments and lateral occlusal interferences were removed (Figure 6, 7).



**Figure 6. Immediately after Implant placement (a) Lateral View, (b) Maxillary Occlusal View, (c) Mandibular Occlusal View**

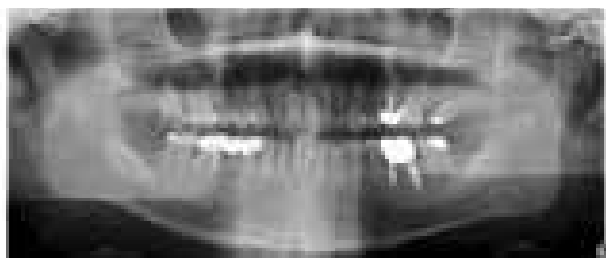


**Figure 7. Post Treatment OPG**



**Figure 8. 2-year Follow-up Photographs (a) Lateral View, (b) Maxillary Occlusal View, (c) Mandibular Occlusal View**

The patient was advised to consume a relatively soft diet for three months and was recalled for regular follow-ups. On 2-years of follow up, a good functional occlusion (Figure 8) and excellent periodontal healing around the implant site were observed (Figure 9).



**Figure 9. Post Retention OPG**

The pre-treatment and post-treatment 3D models were superimposed to visualize and assess the amount of molar intrusion (Figure 10). The superimposition of the maxillary arch showed an effective and significant amount of intrusion of the maxillary left first molar of up to 3mm thereby creating enough occlusal clearance for the placement of the prosthesis in place of a missing antagonist tooth.

**Discussion**

Two mini-implants were used to intrude the maxillary first molar, one on the buccal side and one

on the palatal side. The mini-implant was placed mesial to maxillary first molar on the palatal side to prevent damage to the greater palatine foramen. The intrusive force was applied using an elastic that could be changed by the patient every day, thereby eliminating the need for reactivation and also facilitating oral hygiene maintenance. Kravitz et al.,<sup>1</sup> showed a significant amount of maxillary first molar intrusion without any root resorption, using two mini-implants and an elastomeric chain stretched over the occlusal surface which was later on replaced by a NiTi coil to deliver a more constant force and prevent repeated reactivation.

Conventional orthodontic treatment for the intrusion of molars requires more treatment time and also compromises aesthetics, thereby rendering it infeasible for adult patients who are more conscious of their appearance. The simple method of molar intrusion using two mini-implants is not only aesthetically acceptable but also more comfortable for the patient and convenient for oral hygiene maintenance, especially in patients with poor periodontal health. This method gives predictable results using only mini-implants without any wire component.



**Figure 10. 3D Model Superimposition**

However, the palatal mini-implant may irritate the tongue or cause initial discomfort in some patients. Park et al.,<sup>3</sup> placed mini-implants at different locations to intrude molars and found out that the palatal mini-implants were the most stable. Also, for bodily movement of the molar and to prevent molar rotation, force should be applied from the buccal and palatal side simultaneously. In the present case, the elastic was attached on both the buccal and palatal mini-implant leading to force application on both the sides and hence preventing any unwanted movements.

The need for a retention protocol after achieving the desired amount of molar intrusion was eliminated since immediate loading compressive implants were placed to replace the antagonist missing mandibular first molar. Compressive implants have lately become popular mainly due to its advantage of immediate prosthetic loading that can be done as early as three days or sometimes even less and also because of its flapless placement.<sup>10</sup> Also, patient acceptance increases due to the possibility of early treatment completion.<sup>11</sup>

These implants are cortically anchored providing better stability with decreased chances of peri-implantitis. Lazarov<sup>9</sup> has reported a high success rate with immediate loading compressive implants on follow up of 4 or more years along with no incidence of peri-implantitis around these implants. Del Fabbro et al.,<sup>12</sup> in his study showed excellent survival rates of immediate loading dental implants. However, the outcome depends on the implant micromorphology and proper patient selection.

The present case provides an easy non-invasive solution for intruding supra-erupted molar, which hampers the prosthesis placement of the antagonist tooth, without compromising the patient's aesthetics followed by placement of compressive implants that can be loaded immediately reducing overall treatment duration.

### Conclusion

With a wide range of applications of mini-implants in orthodontics, efficient segmental tooth movement can be carried out in cases that require

an interdisciplinary approach and where the patient is not ready for conventional orthodontic treatment. A supra-erupted maxillary molar can be effectively intruded using two mini-implants and long term stability is achieved with placement of immediate loading compressive implants in place of the missing antagonist tooth.

### References

1. Kravitz ND, Kusnoto B, Tsay PT, Hohlt WF. Intrusion of overerupted upper first molar using two orthodontic mini-implants: A case report. *Angle Orthod* 2007; 77(5):915-22.
2. Jane Yao CC, Wu CB, Wu HY, Kok SH, Frank Chang HF, Chen YJ. Intrusion of the overerupted upper left first and second molars by mini-implants with partial-fixed orthodontic appliances: a case report. *Angle Orthod* 2004; Aug;74(4):550-7.
3. Park HS, Jang BK, Kyung HM. Maxillary molar intrusion with micro-implant anchorage (MIA). *Aust Orthod J* 2005; Nov;21(2):129.
4. Park YC, Lee SY, Kim DH, Jee SH. Intrusion of posterior teeth using mini-screw implants. *Am J Orthod Dentofacial Orthop* 2003; Jun 1;123(6):690-4.
5. Baumgaertel S, Smuthkochorn S, Palomo JM. Intrusion method for a single overerupted maxillary molar using only palatal mini-implants and partial fixed appliances. *Am J Orthod Dentofacial Orthop* 2016; Mar 1;149(3):411-5.
6. Hakami Z. Molar intrusion techniques in orthodontics: A review. *Journal of International Oral Health* 2016; Feb 1;8(2):302.
7. Ihde S and Ihde A. Immediate Loading: Guideline to Successful Implantology, International Implant Foundation, Munich, 2010.
8. Singh M, Batra R, Das D, Verma S, and Goel M. A novel approach for restoration of hemisected mandibular first molar with immediately loaded single piece BCS implant: a case report. *Journal of Oral Biology and Craniofacial Research* 2017;7(2):141-6.
9. Lazarov A. Immediate functional loading: results for the concept of the strategic

- implant®. *Annals of Maxillofacial Surgery* 2019; 9(1):78-88
10. Pathak C, Walia S, Aziz SB, Singh G. Compressive Implants: A Boon for Immediate Loading Protocol (Case Report). *Acta Scientifica Dental Sciences* 2020; 4(3): 1-4.
  11. Ihde S, Sipic O. Dental implant treatment and immediate functional loading (1). Case report and considerations: Extended treatment options using the strategic implant® and indications and objectives for comprehensive dental implant treatment. *Ann Maxillofac Surg* 2019; 9:465-9.
  12. Del Fabbro M, Testori T, Francetti L, Taschieri S, Weinstein R. Systematic review of survival rates for immediately loaded dental implants. *Int J Periodontics Restorative Dent* 2006 Jun 1;26(3): 249-63.