

Miniscrew Implants for Intrusion of Supraerupted Molar: A Noninvasive Approach for Space Regaining

Abstract

Inadequate interocclusal space often leads to difficulty in prosthetic rehabilitation. Dental implant-indicated sites are governed by various factors which include bone availability, adequate mesiodistal width, and most importantly, adequate interocclusal space for proper prosthetic design on the dental implant. The use of miniscrew implant with coil spring for regaining interocclusal space would be an advantageous procedure for biomechanical intrusion of supraerupted teeth, rather than treating the same with invasive clinical crown reduction/intentional endodontic treatment. This case report describes the use of miniscrew implant with coiled spring on a supraerupted maxillary molar for interocclusal space regaining, to facilitate proper prosthetic rehabilitation in the dental implant site.

Keywords: *Edentulous space discrepancy, miniscrew implant, molar intrusion, preprosthetic therapy, temporary anchorage device*

Introduction

Dental implant therapy has taken over conventional fixed dental prosthesis as an alternative treatment modality for the last few decades. The predictability, success, and esthetics are better when compared to conventional fixed dental prosthesis. The long-term success of a dental implant however depends on an accurate diagnosis and proper treatment planning, which includes clinical and radiological examination for evaluating maxilla-mandibular relationship, available mesiodistal width, and interocclusal space.

Diagnostic assessment of available interocclusal space is of prime importance in the treatment planning, implant selection, and prosthesis design before the surgical placement of dental implant. At least 6 mm of interocclusal space is required when measured from the shoulder of the implant to the occlusal surface of the opposing tooth.^[1]

Inadequate or improper evaluation of the available interocclusal space will result in an esthetically and functionally compromised prosthesis and patient dissatisfaction. Therefore, adequate interocclusal height

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

is an important criterion for a successful implant restoration therapy.^[2]

Long-term edentulism often results in supraeruption of the opposing tooth which leads to occlusal interference, functional disturbances, compromised periodontal health, and difficulty in placement of prosthesis.

Increasing the interocclusal space requires invasive prosthodontics reduction with intentional endodontic therapy, surgical intervention, or demanding orthodontic therapy.

Hence, a minimally invasive technique using temporary anchorage device like miniscrew implant with coil spring, for the intrusion of the opposing tooth, overcomes the conventional technique of tooth reduction/intentional endodontic therapy, thereby regaining appropriate interocclusal space for implant-supported prosthesis on the antagonist tooth.

Case Report

A 32-year-old male patient reported to the Department of Periodontics and Oral Implantology, Institute of Dental Science, Bhubaneswar, for the replacement of his missing tooth in the right lower jaw. On examination, the patient presented with an

How to cite this article: Purkayastha A, Mohanty R, Panda S, Das U. Miniscrew implants for intrusion of supraerupted molar: A noninvasive approach for space regaining. *Contemp Clin Dent* 2019;10:158-60.

**Adrita Purkayastha,
Rinkee Mohanty,
Sourav Panda,
Utkalika Das**

*Department of Periodontics
and Oral Implantology,
Institute of Dental Sciences,
Siksha O Anusandhan,
Bhubaneswar, Odisha, India*

Address for correspondence:

*Dr. Sourav Panda,
Department of Periodontics and
Oral Implantology, Institute of
Dental Sciences, K-8, Kalinga
Nagar, Bhubaneswar - 751 003,
Odisha, India.
E-mail: srv_panda@yahoo.co.in*

Access this article online

Website:

www.contempclindent.org

DOI: 10.4103/ccd.ccd_444_18

Quick Response Code:



infected root stump in relation to 46. Further, due to the long-term edentulism and supraeruption of 16, the region was found to have compromised interocclusal space for prosthetic restoration [Figure 1]. The orthopantomograph suggests the area of edentulism with root stumps #46 with availability of sufficient bone height for implant placement in relation to 46 [Figure 2]. Accordingly, the treatment plan aimed at removal of root stump followed by immediate implant placement with the delayed loading in relation to 46 after regaining of interocclusal space. The patient was informed about the detailed procedure and consent was taken.

The patient was administered with a dose of 2% lignocaine HCl with 1:200000 adrenaline for adequate local anesthesia. Miniscrew implant, sized 1.5 mm × 9 mm length (S. K. Surgical, Pune, India), was placed using self-tapping mechanism by use of a hand screwdriver after positioning a pilot osteotome, with a slow speed micromotor round bur at 45°–90° angulation to the long axis of the tooth. Two miniscrew implants were placed both in the buccal and in the palatal aspect, exactly in the interdental region between 15 and 16, respectively. A Ni-Ti coil spring was passed through the occlusal surface of the maxillary first molar and both free ends of the coil spring were anchored to the mini-implant on the either side, thereby delivering a mild, continuous intrusive force of about 50 g to 70 g^[3] till the supraeruption was corrected, up to a period of 6 months [Figure 3]. One month post-miniscrew implant placement, the replacement of 46 was planned by immediate implant placement following extraction of root stump in relation to 46. An implant sized 4.5 mm × 13 mm (Myriad Plus implant system, Equinox Medical Technologies, Netherlands) was placed after the atraumatic extraction of root stump in relation to 46 [Figure 4].

After a follow-up of 6 months, an adequate intrusion was achieved for the supraerupted #16. Radiographically, there was no periapical radiolucency #16. The interocclusal space was reevaluated and found to be ~5 mm, which was adequate for the prosthetic rehabilitation of the dental implant #46 [Figure 5]. The implant site was then restored with a prosthetic crown of adequate height and esthetics.

Discussion

This case demonstrates an effective mechanism for the intrusion of the overerupted tooth using an interdisciplinary approach in cases seeking restorative care without crown reduction. With the help of the miniscrew implant-supported intrusion, the need for the possible crown reduction and endodontic treatment of the antagonist tooth as preprosthodontic modality could be avoided.

In recent years, the use of miniscrew implant before prosthodontics management has gained a great interest.



Figure 1: Preoperative photograph – clinical view



Figure 2: Preoperative – orthopantomographic view

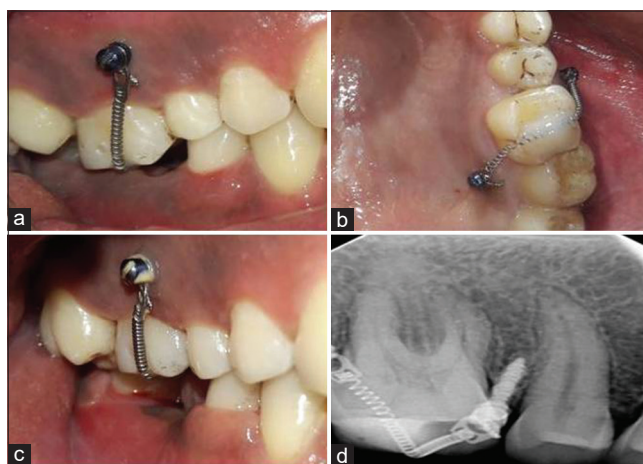


Figure 3: Miniscrew implant placement; (a) buccal view, (b) occlusal view, (c) post-6 months miniscrew implant placement, (d) intraoral periapical post-6 months miniscrew implant placement, suggesting no periapical pathology

The use of the miniscrew implant is associated with few complications.^[4,5] The potential complication related to the mini-implant includes contact with adjacent tooth root, implant breakage, implant loosening, and damage to the anatomic structures involved.

In this case, two miniscrew implants were placed, one buccally and other palatally to achieve an intrusion of the maxillary molar. Simultaneous buccal and palatal



Figure 4: Dental implant placement in relation to 46

force should be applied on the coiled spring to direct the intrusive force toward the center of resistance.^[5,6]

Both miniscrew implants were placed at an angulation of 45°–90° to the occlusal plane in the interdental region. It is believed that the oblique angulation of miniscrew implant placement reduces the risk of adjacent root perforation.^[7] SLOB technique was employed to detect any risk of adjacent root perforation.

The important factor for delivering a mild, continuous intrusive force is governed by the primary initial stability of these implants. These implants need to be screwed at a torque of at least 7–10 N·cm to withstand uprootment or loosening while delivering intrusive force.^[8,9]

Conclusion

The evaluation of interocclusal space before implant placement is very vital when treatment options are being considered. Among the several treatment options, miniscrew implants serve the purpose in a noninvasive manner. Therefore, miniscrew implants serve to be an effective procedure for increasing the interocclusal space by intruding supraerupted antagonist, to help fabricate a functionally esthetic prosthetic restoration.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and



Figure 5: Postoperative view suggesting proper restoration after space regaining by miniscrew implant placement

other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Misch CE. Contemporary Implant Dentistry. 3rd ed. St. Louis: Mosby-Elsevier, 2008.
2. Chaimattayompol N, Arbree NS. Assessing the space limitation inside a complete denture for implant attachments. *J Prosthet Dent* 2003;89:82-5.
3. Quinn RS, Yoshikawa DK. A reassessment of force magnitude in orthodontics. *Am J Orthod* 1985;88:252-60.
4. Kravitz ND, Kusnoto B, Tsay TP, Hohlt WF. The use of temporary anchorage devices for molar intrusion. *J Am Dent Assoc* 2007;138:56-64.
5. Sohn DS, Lee JK, An KM. Minor tooth movements using microimplant anchorage: Case reports. *Implant Dent* 2008;17:32-9.
6. Park HS, Jang BK, Kyung HM. Maxillary molar intrusion with micro-implant anchorage (MIA). *Aust Orthod J* 2005;21:129-35.
7. Chun YS, Woo YJ, Row J, Jung EJ. Maxillary molar intrusion with the molar intrusion arch. *J Clin Orthod* 2000;34:90-3.
8. Carano A, Velo S, Leone P, Siciliani G. Clinical applications of the miniscrew anchorage system. *J Clin Orthod* 2005;39:9-24.
9. Motoyoshi M, Hirabayashi M, Uemura M, Shimizu N. Recommended placement torque when tightening an orthodontic mini-implant. *Clin Oral Implants Res* 2006;17:109-14.