MAK HILL Publications Research Journal of Medical Sciences

Case Report
doi: 10.59218/makrjms.2024.2.21.24

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Key Words
Molar intrusion, mini implants, supra eruption

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Received: 20 October 2023
Accepted: 30 October 2023
Published: 1 November 2023

Citation: Mohanasatheesh, Nivedha Menon, Mohan Valiathan and Anitha Balaji, 2024. Intrusion of Maxillary Molar Using Mini Implants for Advancement of Preprosthodontic Space-A Case Report. Res. J. Med. Sci., 18: 21-24, doi: 10.59218/makrjms.2024.2.21.24

Intrusion of Maxillary Molar Using Mini Implants for Advancement of Preprosthodontic Space-A Case Report

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ABSTRACT
To demonstrate a case report using a miniscrew implant in an over erupted molar intrusion as a preprosthodontic treatment. Clinicians face a challenge when treating edentulism because antagonistic teeth frequently supra-erupt into the edentulous site, reducing the vertical dimension available for tooth replacement. As a result, it is necessary to restore the lost vertical dimension before placing the implant prosthesis, either traditionally through endodontic and prosthetic intervention or through intrusion using temporary anchorage devices (TADs). The supra-eruption of antagonist teeth in a patient with missing molars who wanted replacement teeth provided a challenge during prosthetic treatment. In addition to prosthetic rehabilitation, orthodontic intrusion using mini-implants was carried out to restore the lost vertical space. The present case report illustrates the beneficial effects of mini-implants in molar intrusion for establishing an ideal CHS (Crown Height Space) for implant prosthesis to restore masticatory function.

INTRODUCTION

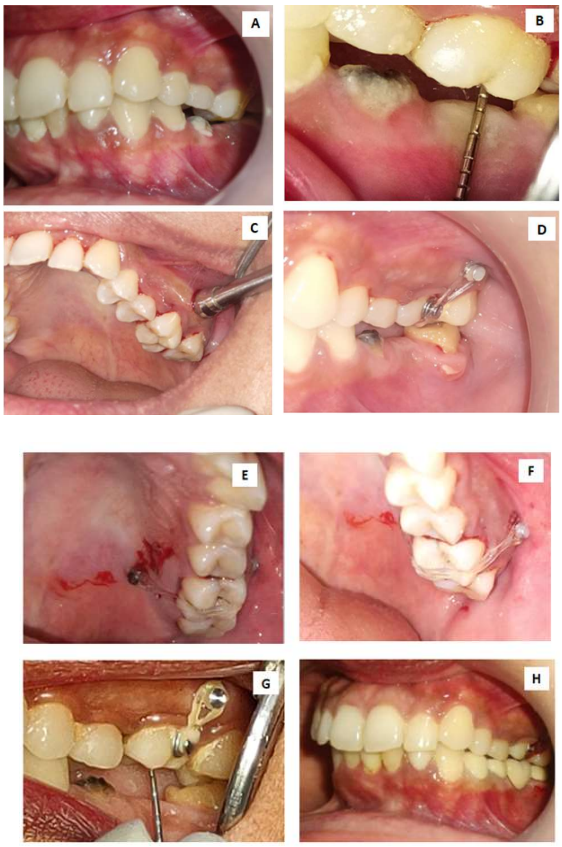
The early loss of opposing teeth typically causes the overeruption of maxillary molars. The elongated dent alveolar process may lead to issues with occlusal interferences and functional disturbances, which could make prosthetic reconstruction extremely challenging [1]. Delaying prosthesis for a missing molar has traditionally involved either modifying the path of intrusion or shortening the crown next to the extruded tooth. More aggressive options include subapical osteotomy or extraction of the extruded molar, but most patients do not consent to such detrimental treatment plans today[2,3]. The intrusion of the maxillary molar is regarded as a challenging orthodontic tooth movement. To avoid unwanted movement and root resorption, several factors, including the strength and direction of the forces and the orientation of the anchorage units, should be taken into consideration during posterior intrusion[4].

Mini-screw implants (MSIs), a modern alternative, are used by dentists as fixed anchorage devices because they offer a wider range of treatment options and a higher chance of successful treatment outcomes. Perhaps most significantly, they aid in increasing patient compliance while receiving treatment. Because they enable the application of light continuous forces with known magnitudes, MSIs are especially suitable for newly erupted teeth. The benefits of MSIs also include quick loading, multiple placement sites, straight forward placement and removal processes and low patient cost[5].

This study includes a case report of a patient whose molars had excessively extruded due to trauma, occlusal forces or the loss of their opposing teeth. It may have been necessary to intrude the molars back into their proper position. For this procedure, a trustworthy anchorage source can be provided by dental implants. However it's important to note that the specific treatment plan for intruding molars using implant anchorage will depend on individual factors and should be determined by a qualified dental professional. They will consider factors such as the patient's oral health the condition of the molars and the presence of any additional dental issues.

Case description: A 40 year old female patient presented to the outpatient Department of Periodontics at Sree Balaji Dental College and Hospital in Chennai, Tamil Nadu, India, with the chief complaint of reduced vertical space for prosthetic rehabilitation.

Clinical examination On clinical examination, the patient had an ideal overjet, overbite and class I molar relationship on the right side and a mutilated occlusion on the left. The marginal ridge discrepancy showed that the maxillary first molar (No. 26) [Fig A] had over-erupted occlusally and encroached upon the



antagonistic missing dental space. As a result the interocclusal distance decreased in the vertical space by less than 2 mm [Fig B] Invading the over erupted molar with the help of a miniscrew implant anchorage was the treatment's main goal, with the secondary goal of regaining the necessary dental space for prosthesis.

Surgical technique: Prior to the insertion of the miniscrew and the application of biomechanical forces, the patient's overall periodontal tissue condition should be carefully assessed and in good health. Following the administration of local anaesthesia, a small pilot hole was drilled with a round bur using a slow-speed, contra-angle hand piece before the miniscrew was inserted. This made it easier to thread the miniscrew implant into the bone with precise directional control. Strict antiseptic guidelines and sterile saline irrigation were used.

For the positioning of the miniscrew implant the buccal interradicular space between the maxillary first molar and second molar was chosen. Using a self-drilling mechanism (finger tightening) [Fig C], a miniscrew implant measuring 1.6 mm by 8 mm was threaded 7 mm from the alveolar crest apically at an angle of roughly 30°-40° to the dental axis on the buccal aspect.[Fig D]. The best places to insert the miniscrew are into keratinized or attached gingiva or at the point where attached gingiva meets mucosa.

Keratinized gingiva is abundant on the hard palate but usually limited on the buccal or labial alveolus. When the attached gingiva band is thin or the level of attached gingiva is coronal to the mid-root, an apically directed insertion is advised.

Between 25 and 26 on the palate, a 1.6 mm by 10mm mini-implant (J.J.Orthodontics) was positioned. After a week the patient was called back to check on the implant's stability. [Fig E] Once the implant was secure, an E-chain was used to apply a force of 100 to 150 gm which crossed 26 occlusally [Fig F]. Every two weeks the patient was called back to assess the intrusion. A 5-6 mm increase in the restorative space [Fig G], which may have included the space created by the buccal tipping of the tooth, was attained in 6 months with an additional 1-month retention period to prevent relapse until crown placement in 36. Hence an achievement of 3mm intrusion was achieved through this procedure. The FPD was then cemented and oral hygiene instructions where given. [Fig H]

DISCUSSION

Compared to traditional orthodontics, the molar intrusion made possible by the mini-implants causes the least amount of neighboring teeth to extrude. Utilizing mini-implants is a great alternative to the conventional method and can successfully achieve adequate level of maxillary molar intrusion[6]. Correct diagnosis and case selection are crucial before deciding to intrude an extruded posterior tooth. It is necessary to take into account the overall periodontal health as well as the marginal bone level of the extruded molar and its neighboring teeth[3]. Melsen *et al.* stated that periodontal tissue is recovered by new attachment through intrusion in regards to the intrusion of molars with periodontal disease and Vanarsdall argued that the tooth should be extruded rather than intruded for the health of the periodontal tissue because bone deposition occurs with tension but not with pressure.[7,8].

Before beginning any intrusion, those who have mild periodontal disease receive adequate periodontal care. After determining that the inflammation is under control and oral hygiene is being practiced regularly, orthodontic treatment is initiated. Other factors to take into account include the degree of intrusion required the length of the treatment the condition of the opposing narrow edentulous region and the patient's general health[3]. Clinicians can now gain anchorage from a variety of sites for balanced intrusion with few adverse effects thanks to temporary anchorage devices. Researchers are very interested in miniscrew-supported molar intrusion because it may be possible to do so without significantly resorbing the roots of the teeth or perforating the sinus floor. A TAD is a titanium-alloy miniscrew which is momentarily fixed to bone to improve orthodontic anchorage. Its length and diameter range from 6 to 12 millimeters. Placement is minimally invasive and frequently only requires local anesthesia to be applied.[9]

Instead of Osseo integration, mechanical gripping to the cortical bone is used to achieve stationary anchorage. As a result the dentists are able to load the TAD right away and unload it with just a turn of the hand driver. However, Between 9 and 30 percent of TADs subjected to orthodontic loading confront stationary anchorage failure. The potential risks of mini implant placement, consisting of Root trauma, Stationary anchorage failure, Soft-tissue irritability, Nerve injury, Sinus perforation and Relapse, must be clearly understood by the clinician and the patient [10]. In conclusion, TADs have made it possible for dentists to work around anchorage restrictions and complete challenging tooth movements predictably and with little help from the patient. When offering patients options for treating occlusal issues, restorative dentists, periodontists and surgeons should be sure they are well-versed in the numerous applications of orthodontic TADs.

CONCLUSION

Therefore, in summary intrusion of over erupted molar using miniscrew implant as a preprosthodontic tooth movement is a predictable treatment strategy. Miniscrew implants might offer a balanced force system for efficient molar intrusion. In terms of biomechanics the choice of the miniscrew implant placement site and the construction of the auxiliary appliance are crucial.

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