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Case Report

Retromolar Region: Anatomical Description and Clinical Impact in Uprising Mandibular Molar

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Abstract

In orthodontic treatment, uprising versed molars always has been a challenge due to the need of a solid anchorage. Multiple methods have been described in the literature and one of the most revolutionary solutions is the miniscrew. It provides an anchorage without interfering with global teeth movements during orthodontic treatment.

Multiple locations can be used to place a mini screw. It depends on the tooth (initial position, angulation) and the anatomical environment, which should be deeply studied.

In this case report the Retro molar region was used as insertion site to up rise the second mandibular molar in the context of an orthodontic treatment.

Keywords: Mini-Screws; Retro Molar Trigone Anatomy; Molar Distalizing

Introduction

In recent times, the use of mini screws to obtain a strong anchorage has gained a momentum in clinical orthodontics as a rigid anchorage modality. Mini screws can improve orthodontic mechanics by providing skeletal anchorage [1]. It has low failure rates [2,3] and a good patient acceptance [4]. Primer stability is a key factor to obtain a long-term successful placement [5].

Anatomical characteristics of the insertion site have an important role, affecting their failure rate [6,7]. Different anatomic sites have been proposed for mini-screws insertion: palatal bone, maxillary alveolar ridge, mandibular buccal shelf, infrazygomatic crest, maxillary and mandibular buccoalveolar cortical plate [8,9]. The mandibular retro molar trigone (RMT) has been also suggested for suitable extra-alveolar mini-screws insertion sites [10]. Mini screws can be

used for orthodontic anchorage in distalizing maxillary and mandibular molars. Through this simple tool, practitioners can avoid the undesirable reciprocal movement that often occurs when teeth are used as anchorage units.

In this article we will present a clinical case in which a mini screw was fixed in the RMT in order to correct the position of the second mandibular molar in the context of orthodontic treatment.

Case Study

A 12-year-old female presented with a mesially angulated mandibular left second molar which was locked under the distal contour of the adjacent first molar (Figure 1). After the first steps of treatment, the alignment and the occlusion of the patient were acceptable. The left mandibular region was explored through orthopantomography (Figure 2) and the extraction of the third molar #38 was indicated to allow the insertion of the mini screw in the retro molar area.

Figure 1: (A) Preoperative view; (B) Retro alveolar x ray.

Figure 2: Pre-treatment orthopantomography.

A single mini screw with a collar diameter of 2mm and a length of 12 mm was inserted under local anesthesia (Figure 3). A metal button was bonded to the occlusal surface of the second molar and an elastomeric thread was attached from the mini-screw head to the button to apply a distalizing force (Figure 4). After the second molar was unlocked, a tube was bonded in the buccal surface of the second molar and a 0.016*0.022 uprighting overlay was attached to the first molar and premolars. In a final phase, it was taken in charge by the principal arch (0.018*0.025).

Figure 3: Peroperative intraoral view (C)incision (D) mini-screw insertion.

Figure 4: Up righting second molar with direct mini-screw anchorage.

Figure 5: Per treatment orthopantomography.

Molar uprighting was completed in 6 months. The mini-screw was removed after careful reflection of the flap.

Postoperative radiographic control is systematically done to evaluate the new position (Figure 5 and Figure 6)

Figure 6: Postreatement evaluation (E) intraoral view (F) retro alveolar Xray.

Discussion

The retromolar trigone in the dry mandibles was a triangular area: bounded by temporal crest on the medial side, anterior border of ramus on the lateral side and base posterior to the socket for the third molar. This is called as a retro molar fossa [11].

On dissection, it was observed that the lateral boundary of retro molar fossa in its upper 1/3rd provides attachment to superficial fibers of temporalis muscle. The medial boundary of the triangle in its upper 2/3rd provides attachment to deeper fibers of temporalis muscle, especially those arising from anterior wall of temporal fossa (Figure 7a). The medial border near its lower end is crossed by the lingual nerve and its middle is crossed by the buccal nerve and artery. Deep to the medial border, medial pterygoid muscle is observed. Along the anterior border of the medial pterygoid, and anteromedial to the triangle, pterygomandibular raphe gives attachment to the buccinator anteriorly and the superior constrictor muscle posteriorly. The raphe itself is attached to the posterior edge of the third molar socket [12].

A variant foramen called the retro molar foramen (RMF) is present in this area (Figure 7b). It has also been described in literature as an anatomic structure of the mandible with clinical importance. It receives a canal branch arising from the mandibular canal behind the third molar and traveling to the RMF in the retro molar fossa. The retro molar canal might conduct accessory innervations to the mandibular molars or contain an aberrant buccal nerve [13].

A sufficient knowledge of the retromolar region's anatomy and its variations is crucial in clinical practice.

In orthodontic treatments, Park and col has introduced using mini-screw anchorage in the retro molar area for molar uprighting [14]. It has been observed that an impacted second molar is usually locked under the distal contour of the first molar. In moderate-to-severe angulations, the reduced distance between the bracket and the centre of resistance generates a deficient moment. Subsequently, a distalizing force is needed to liberate its mesial cusp (Figure 7c). After applying a single pulling force, a spring must be inserted to provide a sufficient tip back moment [15]. The magnitude of force exerted during traction is around 150g. In a retrospective study by Azeem and co, failure rate of retromolar mini implants were found to be significantly lower when force magnitude in less than 100 mg [16].

The RMT, as an extra-alveolar insertion site, offers clinical advantages compared with the dento alveolar interradicular

Figure 7: a) Schematic view of the retromolar area and its relations, b) Mandible showing presence of proximity to retro molar foramen in temporal crest, c) Molar uprising mechanism.

insertion site. Considering that screw-roots impaction is one of the most frequent causes of mini-screws failures. Consequently, its absence during insertion potentially improves the success rate of this procedure. First, a deep evaluation of bone depth, thickness, and vestibulolingual bone dimension of RMT through CBCT must be led [17].

Conventional indirect anchorage can cause unwanted movement of anchorage unit. This side effect is avoided when using retro molar mini-screw. Frequently, the third molar can be left in place when it is easy to insert the mini-screw in the retro molar area. Thus, the up righting will involve pure rotation around the centre of resistance.

In this case, third molar extraction is required because of the inaccessibility of the second molar.

Melsen and colleagues have proved that extracting the third molar can affect the centre of resistance of the second molar leading to unwanted distal movement [18].

Furthermore, direct anchorage system requires few components and causes less discomfort for the patient. It is also simpler to design reducing considerably chair time.

Despite its advantages, retro molar mini-screws have also some limitations. In presence of rotation or lingual version, a single force system is not sufficient to correctly upright the second molar. Altering mechanics and careful monitoring of the movement is required. Also, in cases of molar extrusion, it is not indicated to apply direct mini-screw anchorage because of the lack of intrusive component.

Conclusion

Mesially tipped mandibular molars are commonly seen in dental practice. Direct application of a distalizing force system using a retromolar minis crew is an effective method to correctly upright the molar. Before starting the procedure, a good knowledge of the anatomical con- figuration of this area is required. Using this system is a significant method to avoid the loss of posterior anchorage, thus, improving treatment predictability.

Conflict of Interest

Declare if any financial interest or any conflict of interest exists.

Bibliography

1. Papadopoulos MA and Tarawneh F. "The use of mini-screw implants for temporary skeletal anchorage in orthodontics: a comprehensive review". *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology* 103 (2007): e6-15.

2. Papageorgiou SN., *et al*. "Failure rates and associated risk factors of orthodontic miniscrew implants: a metaanalysis". *American Journal of Orthodontics and Dentofacial Orthopedics* 142 (2012): 577-595.

3. Papadopoulos MA., *et al*. "Clinical effectiveness of orthodontic miniscrew implants: a meta-analysis". *Journal of Dental Research* 90 (2011): 969-976.

4. Zawawi KH. "Acceptance of orthodontic miniscrews as temporary anchorage devices". *Patient Prefer Adherence* 8 (2014): 933-937.

5. Baumgaertel S. "Cortical bone thickness and bone depth of the posterior palatal alveolar process for mini-implant insertion in adults". *American Journal of Orthodontics and Dentofacial Orthopedics* 140 (2001): 806-811.

6. Nucera R., *et al*. "Bone and cortical bone thickness of mandibular buccal shelf for mini-screw insertion in adults". *The Angle Orthodontist* 87 (2017): 745-751.

7. Baumgaertel S and Hans MG. "Assessment of infrazygomatic bone depth for mini-screw insertion". *Clinical Oral Implants Research* 20 (2009): 638-642.

8. Poggio PM., *et al*. "Safe zones": a guide for mini0-screw positioning in the maxillary and mandibular arch". *The Angle Orthodontist* 76 (2006): 191-197.

9. Chang C., *et al*. "Primary failure rate for 1680 extraalveolar mandibular buccal shelf mini-screws placed in movable mucosa or attached gingiva". *The Angle Orthodontist* 85 (2016): 905-910.

10. Poletti L., *et al*. "Dentoalveolar class III treatment using retromolar mini- screw anchorage". *Progress in Orthodontics* 14 (2013): 7.

11. Berkovitz BKB. "Skull and Mandible. In: "Grays anatomy (Anatomical basis of clinical practices)". S Standring, H Ellis, JC Healy, D Jhonson, A Williams (Eds.); 39th Edition.; Churchill Livingstone; New York (2005) : 482.

12. SA Athavale., *et al*. "Bony and Cadaveric Study of Retromolar Region Kotgirwar". Department of Anatomy, *All India Institute of Medical Sciences, Bhopal and People's College of Medical Sciences and Research Institute, Bhopal (2013).

13. Von Arx T., *et al*. "Radiographic study of the mandibular retromolar canal: an anatomic structure with clinical importance". *Journal of Endodontology* 37.12 (2011): 1630-1635.

14. Park HS., *et al*. "A simple method ofmolar uprighting with Micro-Implant Anchorage". *Journal of Clinical Orthodontics* 36 (2002): 592-596.

15. Lee KJ., *et al*. "Up righting mandibular second molars with direct miniscrew anchorage". *Journal of Clinical Orthodontics* 41.10 (2007): 627-635.

16. Azeem M., *et al*. "Failure rates of mini- implants inserted in the retromolar area". *International Orthodontic* 17.1 (2019): 53-59.

17. Riccardo Nucera., *et al*. "Bone and cortical bone characteristics of mandibular retromolar trigone and anterior ramus region for mini-screw insertion in adults". *American Journal of Orthodontics and Dentofacial Orthopedics* 155.3 (2019).

18. Melsen B., *et al*. "Up righting of lower molars". *Journal of Clinical Orthodontics* 30 (1996): 640- 645.