



ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2018; 4(4): 280-281
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www.oraljournal.com
Received: 03-08-2018
Accepted: 08-09-2018

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Role of maxillary third molar in le fort i orthognathic surgery: A mini review & case report

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Abstract

The role of third molars in the oral cavity has been extensively studied over the years. Literature includes numerous diagnostic and treatment alternatives regarding the third molars. However, an issue that has not been discussed at the same level is involvement of maxillary third molars in maxillary orthognathic surgery. The aim of this case report is to present an unusual complication of presence of maxillary third molar in maxillary Le Fort I orthognathic surgery.

Keywords: Maxillary third molar, orthognathic surgery, Le fort I osteotomy, complication

Introduction

The development of third molars and their interaction with the rest of the dentition has been of great concern to general dentists and dental specialists for a long time. Third molar is a tooth characterized by variability in the time of its formation and calcification, its crown and root morphology, its course of eruption and final position, presence or absence in the oral cavity [1, 2]. Third molars start appearing on radiographs as early as the age of 5 years and as late as the age of 16 years, usually erupting in the oral cavity between the ages of 18 and 24 and they present the highest rate of impaction [3-5]. The posterior part of the maxilla is formed by a fusion of several facial bones including the maxillary bone, palatine bone, and pterygoid plates of the sphenoid bone [4]. The junction of the maxillary and palatine bones creates the descending palatine canal and the sphenopalatine fossa, with several vessels and nerves running through the area. It is paramount importance to avoid unnecessary manipulation of these vital structures during a Le Fort I osteotomy. Although, in the majority of cases, third molars are not directly involved in orthognathic surgery, the fact that, in some cases, they can influence the latter or be influenced it, dictates their direct involvement in treatment planning or post treatment effects. The bone cuts in commonly used orthognathic surgeries, mandibular sagittal split osteotomy, and Le Fort I osteotomy, traverse the third molar anatomic regions.⁶ Maxillary Le Fort I surgeries necessitate separation of maxilla from its posterior attachment and are performed in a complicated anatomical region. However, the issue of third molar in maxilla is sparsely reported in the literature. Unlike in mandible, Champy's lines are not observed in maxilla, as it is a cancellous bone and pierced by several vessels and nutrient canals. The space constriction in third molar region usually brings about a change in the position. It could be either buccally or palatally placed in the arch. If buccally placed, the amount of bone overlying the tooth is thinned, on the contrary, if the third molar is placed palatally, the thickness of bone is increased. When the third molar is placed in an oblique fashion, in three dimensions, a combination of such effect could be anticipated.

Case Report

A 16-year young female with maxillary retrognathism was operated for Le Fort I maxillary advancement. In follow-up patient use to complaint for mild pain on the right region while normal jaw movements. An OPG was advised which showed a maxillary third molar tooth which got dislodged from the socket and moved distally during the pterygoid disjunction because it was impacted and not removed prior to orthognathic surgery. (Figure 1A & B) Prophylactic removal of mandibular third molars are considered for mandibular orthognathic surgery but maxillary third molar removal is not a compulsion criterion for every perspective

of surgeons. If removed it finds difficult for a surgeon to find the posterior limit of maxillary tuberosity and perform the posterior pterygomaxillary disjunction with burs and pterygoid chisel. It is better to remove the maxillary third molars also prior to orthognathic surgery to avoid complications and free space to perform surgical procedure.



Discussion

The main issues, concerning the third molars that are related to orthognathic surgery and have been most extensively reported throughout the literature are: the possibility of their eruption or impaction in relation to genetically predetermined factors, the possible repercussion of orthodontic treatment extractions in their position but a rare entity is never spoken which is their influence in post-treatment scenario. In attempt to identify risk factors for maxillary third molar impaction, examined the radiographs of 132 adolescent patients. According to the results of their analyses, the most predictive parameters of impaction were a mesial angulation and a distal angulation of more than 30 degrees of the maxillary third molars relative to the occlusal plane [7]. The only available evidence of influence of maxillary third molar on Le Fort I osteotomy in the literature is a study by Cheung *et al.* in 1998 [8]. They used computerized cephalometric analysis and computed tomography scans. They arrived at a finding that the presence of maxillary third molar influences the transverse angulation of the cut through the tuberosity. In cases where third molar was present, the angulation of the tuberosity cut relating to the mid palatal plane varies from 84.5° with a cut behind the preserved wisdom tooth, to 64.33° with extraction of the third molar, with the osteotome going through the socket. In the absence of third molar, the cut goes slightly anteriorly just behind the second molar at a mean angle of 76.23° preserving the involvement of the greater palatine foramen through which the descending palatine artery exits as the greater palatine artery. If the pterygomaxillary junction is involved in the cut, it will increase the mean angulation to 98.24° without third molar and 102.43° when the third molar is present. The Trans alveolar approach for Le Fort I osteotomy of Trimble reduced the height of the vertical cut and increased the distance from the sphenopalatine fossa. This would increase the safety margin. Moreover, when the tuberosity osteotomy is the choice, when the cut is placed behind the second molar, through the middle part of the third molar socket, with the osteotome positioned at a slightly upward angulation, coinciding the curvature of the palatal vault. This place would coincide with the tuberosity, just in front of pterygomaxillary fissure [9]. It is a routine and stable

radiographic landmark used to identify the maxillary tuberosity. In young individuals, it appears on cephalometric films as an "inverted teardrop" just behind the tuberosity, which is caused by the naturally occurring gap between the pterygoid plates and the maxilla. When synostosis of the bones occurs, the inverted teardrop is obliterated. During postnatal growth, the biomechanical force producing this maxillary movement involves the developmental expansion of all the enclosing soft tissues which, attached to the maxilla, carry the maxillary complex anteriorly. The placement of the maxilla is primarily by the basicranium but adjustive capacity occurs in sutural growth potential, both intrinsically and clinically. The final remodeling of the tuberosity occurs with the formation and positioning of third molar [10]. During osteotomy, the vertical cut is modified as per the presence of third molar. However, till date there is no systematic analysis of the effect of the presence of third molar influencing the Le Fort I osteotomy.

Conclusion

The presence of third molar along the vertical cut appears to be a favorable factor. When a third molar is impacted, it could be harnessed by surgeons by minimal bone reduction, so that the surgical manipulation of the area, especially the nerves and vessels palatally will be minimal. This report presents a mini review and rare complication of distal tooth dislodgment from socket during Le Fort I osteotomy during orthognathic surgery which enlightens us to be more careful during procedure or prophylactic removal. Further studies and data are required for clear cut views in the same topic.

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