



Techniques of Retrieval of Displaced Maxillary 3rd Molar from Infratemporal Fossa

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Abstract

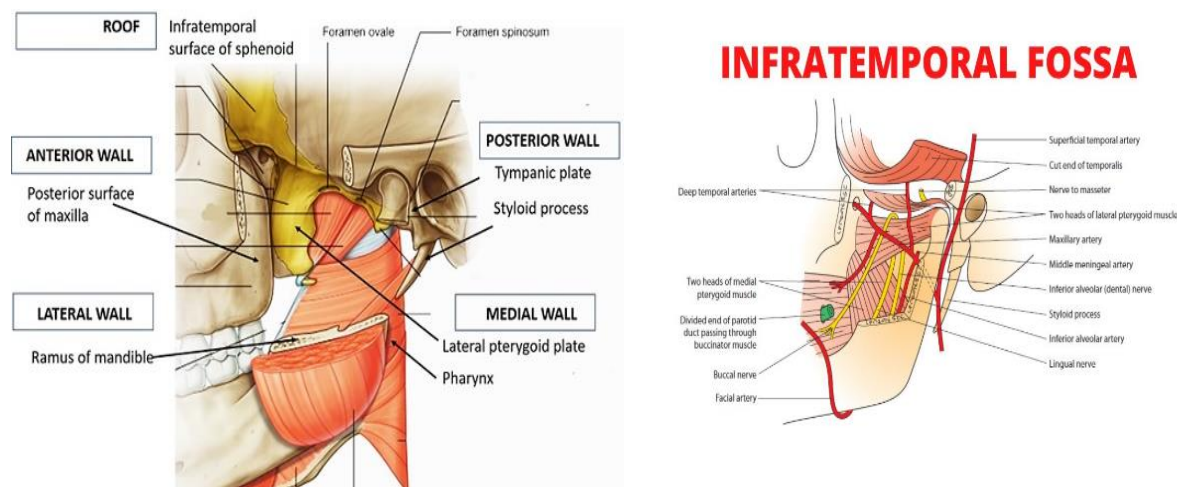
Third molar extractions remain one of the routinely performed procedures by an oral and maxillofacial surgeon. In all surgical procedures, proper preoperative planning and the blending of surgical technique with surgical principles is of importance for decreasing the incidence of complication. Third molar removal is a common procedure sometimes results in relatively rare complications.1 Displacement of third molar into infratemporal space is frequently mentioned but rarely reported. Various procedures are described to retrieve the tooth from infratemporal fossa. This article describes different techniques of retrieval of the teeth from infratemporal fossa.

1,2

Introduction

The surgical removal of impacted 3rd molar is routinely carried out procedure by oral and maxillofacial surgeon and usually associated with low rate of complications and morbidity. Complications related to third molar removal range from 4.6% to 30.9%. they may occur intraoperatively or in postoperative period.⁹ During surgical removal of impacted maxillary third molar accidental displacement may occur into infratemporal fossa or maxillary sinus. Prevention of displacement with the use of distal retractor is recommended when surgically removing the maxillary third molar.^{3,6} Boundries and contents of infratemporal fossa.

The infratemporal fossa is an irregularly shaped space located below the greater wing of the sphenoid bone (containing the foramen ovale), lateral to the ramus of the mandible and the gap between the zygomatic arch and temporal bone (forming the communication to the temporal fossa). The lateral pterygoid plate forms the medial margin while the maxilla forms the medial aspect of this space. The temporalis muscle, medial and lateral pterygoid muscles, pterygoid venous plexus, mandibular nerve and its branches, maxillary artery and its branches, and the chorda tympani nerve are all contained in the infratemporal fossa.⁶ The parapharyngeal space lies medially and communicates with the mediastinum.



Cause of displacement of the tooth in infratemporal fossa includes , lack of the basic principles of surgical technique such as poor anatomic knowledge, inadequate flap and decreased visibility during surgical extraction, incorrect extraction technique, distolingual angulated tooth, third molar crown above the level of the adjacent molar root apices, and limited bone distal to the third molar.^{5,6} Insufficient clinical and radiographic examination, excessive or uncontrolled force applied during extraction, improper manipulation because of the lack of surgical experience and anatomic alterations such as thin cortical bony plate distal to the maxillary third molar, distolingual angulation of the tooth, and inadequate flap design causing limited visibility during extraction are the important risk factors for the displacement of maxillary third molars into the neighboring anatomic spaces.⁴

Clinically patient may be asymptomatic or present with swelling, pain limitation of mandibular motion and trismus. Conventional radiograph examination poses difficulty in locating the tooth due to superimposition of anatomical structures. Recommended radiographic investigation includes ,panaromic ,occipitomenal,occlusal and lateral views.CT and CBCT . CBCT are mostly preferred due to their superiority in quality of images and as they provide exact location of displaced tooth.^{4,5,6}

Discussion

Maxillary third molars usually displace into the maxillary sinus and rarely into the infra-temporal fossa. An oroantral communication may be the sign of the tooth being displaced into the maxillary sinus, whereas a limited mouth opening may probably indicate a displacement into the infratemporal fossa because the tooth would be tightened in between the coronoid process of the mandible and the

posterolateral wall of the maxilla, restricting the mandibular movements.⁴ These teeth usually displace through the periosteum into the infratemporal fossa just adjacent to the lateral pterygoid plate and inferior to the lateral pterygoid muscle.⁶ If excessive force is applied during the attempt to retrieve the tooth that lies in between the periosteum and the posterolateral wall of the maxilla, the tooth may further be displaced upward into the skull base carrying greater risks for morbidity.⁹ Prevention of this complication by the placement of either a finger! or periosteal elevator posterior to the tooth is recommended.

The typical management of displaced third molar teeth involves an initial, conservative attempt to remove the tooth from the area in which it is believed to be displaced. If initial retrieval fails then the region is irrigated and closed, and the patient is placed on antibiotics. Imaging is obtained to localize the tooth. in 3 dimensions. Imaging is recommended soon after the event to determine whether displacement of the tooth may affect function of another anatomic area (eg, the orbit). If the tooth is displaced into a critical anatomic area such as the orbit, early removal may be indicated. In most other instances, the tooth is left in position until initial scarring occurs over several weeks, preferably to wait approximately 6 weeks.

Observation may be chosen but can require secondary removal in the setting of infection, limited range of motion, or a patient's wishes to have the tooth removed. Removing a displaced tooth from the infratemporal fossa can entail serious hemorrhage of the maxillary artery blood vessel and neurologic injury of the maxillary nerve. Even more severe complications such as diplopia are reported. Therefore a proper planning of the operation taking possible complications in the account is mandatory.

Most of the clinicians have reported Gilles approach through a small incision to remove the displaced tooth from the infratemporal fossa to the intraoral incision.

In cases with very high impacted upper wisdom teeth, a marginal incision from the maxillary tuberosity to the mesial papilla of the first molar is recommended. To provide good visibility, a vertical incision from the mesial papilla of the first upper molar to the point between the root tips of the first and second premolar is helpful. This flap design provides good visibility to the posterior maxilla. Elevating the mucoperiosteal flap, attention should be paid to preserve its continuity as herniation of the Bichat fat pad is the may result in losing of the proper surgical plane.

If dislocation of the upper third molar occurs, the position of the tooth may change due to other muscular loges. Radiographic examination is necessary to identify the displaced tooth. Thereby, a clear view on the surgical field is achievable.

Various other approaches to retrieving a tooth in the infratemporal space have also been described, including an intraoral approach from a sagittal split osteotomy incision, a hemicoronal approach, and manipulating the tooth via a straight needle placed cutaneously in an inferior direction and delivering it through an intraoral incision.⁴

In one more approach A full flap was mobilized via the intraoral extended incision marginal on the first molar under general anesthesia. The Bichat fat pad was distracted and the tooth recovered. Technique of easy retrieval using an active navigation image guidance system is also described. This specific indication has not been well reported, which uses latest technology the Stryker System II Navigation image guidance apparatus (Stryker, Kalamazoo, MI). The Stryker System II uses a light emitting diode (LED) mask to register the CT data with the patient in the operating theater and correlates the data with the hand-held probe/suction device. An accuracy of 0.5 mm was anticipated after calibrating the system. Multiple views allowed localization of the tooth within minutes . A small vestibular incision was made beneath the zygomatic buttress, and a suction/probe was used to determine the exact location of the medial and lateral aspects of the occlusal surface of the tooth. After precise localization the tooth was bluntly dissected freely and removed. ⁵

The use of image intensifying cineradiography and a temporal approach to facilitate removal of a displaced maxillary third molar is also described. The tooth was located with blunt dissection and image-intensifying cineradiography, with a 3-cm temporal incision was made and the temporalis muscle was exposed after the technique of Gillies. A Howarth's nasal raspatory was passed through the muscle and advanced on its deep surface. Again with the aid of image-intensifying cineradiography, the tooth was identified. Using the Howarth's raspatory, the tooth was pushed inferiorly and delivered through the oral wound.¹⁰

Conventional retrieval procedures use an intraoral approach through a long incision in the superior buccal sulcus, thereby exposing the posterior maxilla. They are inconsistently successful [9], as they do not provide a predictable access to the displaced tooth [6]. Most of the alternative intraoral

techniques use a trans-sinusal approach requiring two osseous windows made through, respectively, the anterior and posterior walls of the maxillary sinus.¹¹

Endoscopy has been used through either a trans- sinusal approach or the extraction socket. If such a technique enables appropriate visualization of the tooth, it does not allow tooth stabilization for retrieval.¹¹

Other various procedures for tooth retrieval as mentioned by authors include Gulbrandsen SR et al., used a combined intraoral and hemicoronal approach and successfully removed the tooth from the infratemporal fossa. Dawson K et al., reported the successful removal of maxillary thirdmolar from infratemporal fossa by a temporal approach and the aid of image intensifying cineradiography . Lipa Bodener et al., and Selvi F et al., successfully retrieved maxillary third molar via extended intraoral approach under local anesthesia.⁶

Delayed removal after fibrosis takes place around the tooth also has been advocated because it can more readily be localized radiographically and intraoperatively. This secondary procedure is often done in the operating room under general anesthesia after a CT scan is obtained to precisely locate the tooth position.³ In case delayed extraction, waiting for the formation of scar tissue around the tooth to facilitate localization and removal was recommended.⁶

Conclusion

Despite the fact that displacement of a maxillary third molar into the infratemporal fossa is a rare occurrence, the oral and maxillofacial surgeon is expected to know the surgical techniques available for management of this complication. There is no universal treatment applicable to maxillary third molars with displacement in the infratemporal fossa, a surgeon can choose which treatment is most appropriate for each case. The decision should be guided by the precise location of tooth, the signs and symptoms presented by the patient, the surgeon's knowledge and skill, and the patient's wishes.

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