

PATTERN AND MANAGEMENT OF IATROGENIC DISPLACEMENT OF TEETH IN MAXILLOFACIAL ANATOMICAL SPACES

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ABSTRACT

Iatrogenic displacement of teeth is a rare incidence in expert surgical hands but they are frequently encountered when a difficult surgical extraction of the tooth is attempted by inexperienced dental surgeons. The present study is aimed at knowing the frequency, pattern and the surgical technique of retrieval of such displaced teeth. This study comprised of 21 iatrogenically displaced teeth over a period of 9 years in two hospitals i.e., Sardar Begum Dental hospital and Khyber College of Dentistry and Hospital Peshawar. Iatrogenic displacement was predominantly common in males as compared to females with male to female ratio of 2.5:1; the most common age group of the patient was the third decade of life i.e., 38.06% with age ranging from 19 to 57 years and mean age of 32.381 SD \pm 10.195. Only two patients presented delayed, all the rest of the patients presented the very second day of their previous surgery. Eighteen patients were operated under general anesthesia while the rest of the three were managed under local anesthesia using lignocaine 2% with adrenaline. The surgical approaches used for retrieval were intra oral using three corner flap, extra oral, intra oral through the socket using 3 corner flap and Caldwell luc operation.

Key Words: Displacement of teeth, iatrogenic displacement of teeth, maxillary antrum, infratemporal space, Submandibular space, inferior alveolar nerve canal, Caldwell Luc.

INTRODUCTION

An iatrogenically displaced tooth during extraction is one of seldom anticipated complication of oral surgery. This is challenging for both the primary practitioner and the subsequent surgeon.¹ This complication most often occurs during removal of impacted 3rd molars. Common spaces for displacement of teeth include maxillary sinus, temporal space, infratemporal space, lateral pharyngeal space, sub mandibular space and buccal space.² There are many factors that increase the chance of tooth displacement. These include anatomic considerations, such as distolingual angulation of the tooth or dehiscence in lingual cortical plate, excessive or uncontrolled force, improper manipulation and inadequate clinical and radiographic examination.³ Symptoms arising due to displaced teeth vary. Patient may remain asymptomatic or may present with infection, pain, trismus, psychological distress and medico legal problems.⁴

An initial attempt at retrieval should be attempted after displacement, however this may lead to further displacement of teeth into deeper tissues and further attempts should be halted before proper imaging is utilized and fibrosis has occurred to localize the tooth more adequately.^{5,6} Computed tomography with cone beam reconstruction (CBCT) is ideal but availability is an issue. Thus two radiographs taken at right angle to each other can also be used to localize the displaced tooth.⁷

The aim of this study was to retrospectively analyze the frequency, pattern and surgical management of displaced teeth to various anatomical spaces, in two hospitals of Khyber Pakhtunkhwa Province of Pakistan I.e., Khyber College of Dentistry & hospital and Sardar Begum Dental Hospital Peshawar.

METHODOLOGY

This retrospective study was carried out over a period of 9 years that is from 1st of June 2007 to 31st of May 2015 in two hospitals, Sardar Begum Dental Hospital and Khyber College of Dentistry Peshawar. Only two of the patients had delayed presentation, all the rest of them reported on the second day of surgical attempt by a general dentists or a local dental technician.

The diagnosis in all the patients presenting with iatrogenic displacement of teeth was confirmed on

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the basis, detailed history, clinical Examination and appropriate radiographic confirmation in the form of Peri-apical Xray, Orthopantomogram (OPG) and Paranasal Sinus (PNS) views. The patients were operated by a single operator (first author). Majority of the patients underwent the surgical retrieval under General anesthesia while in three patients; retrieval was done under Local Anesthesia Using Lignocaine 2% with Adrenaline.

The Caldwell Luc Operation was done for Retrieval of the maxillary 2nd and 3rd molar teeth from the maxillary sinus using an incision extending from the maxillary canine region to maxillary 3rd molar, depending upon the extent of exposure required. The displaced maxillary first molars were retrieved through the socket by creating a three cornered flap in the region. For the retrieval of teeth from the submandibular region a flap was raised on the lingual side and either the tooth was retrieved by local digital pressure back into the socket or a complete reflection of the flap and bone cutting technique, in one of the patient the tooth was retrieved by a submandibular Risdon's approach.

For the teeth displaced in the infratemporal space the incision along the margin of the cervical line of the teeth extending from the maxillary first molar to the distal of the third molar with a releasing incision placed at the mesial papilla of the first molar was given the flap was reflected, a great challenge here is the control over the buccal fat pad which sometimes comes out in the surgical field. This is controlled by

avoiding dissection in the soft tissues rather to be as close as possible with the maxillary bone; the teeth were retrieved in each case using the long curved artery clamp taking care of the anatomical structures in the infratemporal space. All the patient were advised the same post operative medications i.e., First generation intra venous cephalosporines, Metronidazole and pain killers in the form of intra muscular Diclofenac sodium, and were discharged on the second post operative day. Stitches were removed on the seventh post operative day. Patients were free of symptoms at the subsequent review appointments at monthly intervals.

RESULTS

A total of 21 cases were reviewed over a period of 8 years. Patients presented in age range from 19 to 57 years with mean age of 32.381 ± 10.195 . Out of these 15 were males and 6 female patients making a male to female ratio of 2.5:1. Amongst the displaced teeth, nine teeth were impacted mandibular 3rd molars, 4 were maxillary 1st molar, 3 maxillary third molar and 1 maxillary second molar. The spaces in which these teeth were displaced were infratemporal space in 4 cases, sub mandibular space in 7 cases Inferior Dental canal in 2 cases and 8 teeth were displaced into maxillary sinus.

All the teeth were removed on second post op day except two cases which were presented after a delay of more than two weeks. Teeth and roots from maxillary sinus were either removed through Caldwell luc approach or a three corner flap created in the socket region. Teeth in infratemporal fossa were removed by raising a flap involving 1st and 2nd maxillary molars. Teeth iatrogenically displaced in sub-mandibular space, were retrieved by taking a lingual flap in 8 patients, while extra oral Risdon approach was used for 1 tooth. Patients were symptom free at the subsequent appointments.

DISCUSSION

Accidental iatrogenic displacement of teeth into tissue spaces is a well recognized but a rare complication of extraction. This displacement may be in the form of root or a whole tooth. Whether initial attempt should be made to retrieve the tooth vary from case to case.

TABLE 1: AGE DISTRIBUTION OF PATIENTS WITH DISPLACED TEETH

S.No.	Age Range	No. of displaced teeth (n=21)	Percent-ages
1	11-20	2	9.5%
2	21-30	8	38.06%
3	31-40	7	33.3%
4	41-50	2	9.5%
5	51-60	2	9.5%
Total		21	100%

TABLE 2: PATTERN OF DISPLACEMENT AND RETRIEVAL OF DISPLACED TEETH

S.No.	Space in which the tooth is displaced	Type of the tooth	No. of teeth	Type of Approach for retrieval
1	Infra temporal	Maxillary 3rd Molar	4	Intra oral 3 corner flap
2	Maxillary sinus	Maxillary 3rd Molar	3	Caldwell Luc Approach
3	Maxillary sinus	Maxillary 1st Molar	4	Through existing socket
4	Maxillary sinus	Maxillary 2nd Molar	1	Caldwell Luc Approach
5	submandibular	Mandibular 3rd Molar	7	intra oral (6) extra oral (1)
6	ID canal	Mandibular 3rd Molar	2	Intra oral 3 corner flap
Total			21	

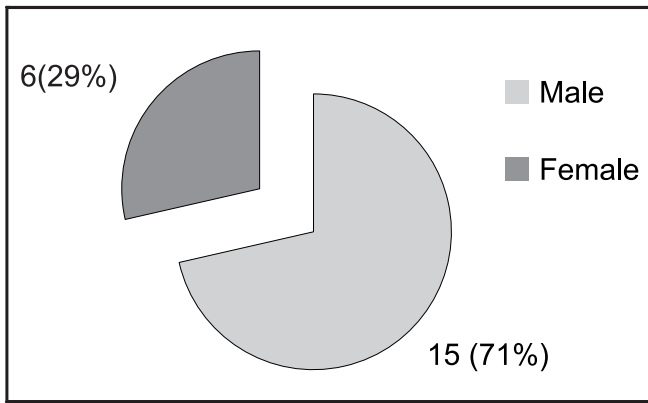


Fig 1. Gender distribution of patients with displaced teeth

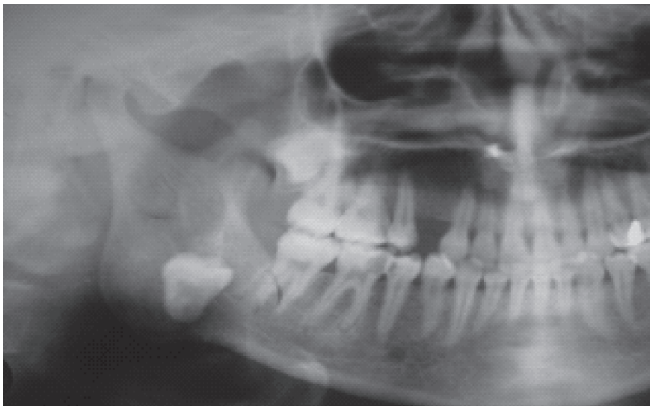


Fig 2: Displaced tooth in submandibular space

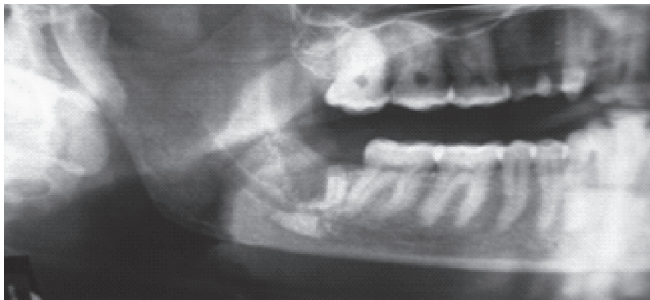


Fig 3: Displaced tooth root in the inferior dental canal



Fig 4: Tooth retrieved from left maxillary sinus

According to some authors attempt at initial retrieval unless the fragment is easily seen and grasped otherwise it can lead to further worsening of condition. Another factor to consider is the expertise of the practitioner.^{8,9}

Gardini et al reported a case in which the dentist persisted for 6 hours to retrieve the tooth leading to severe tissue injury.¹⁰ Thus it is important to refer the patient to oral and maxillofacial surgeon as soon as possible, to prevent un-necessary tissue damage and morbidity.

The timing of retrieval of displaced tooth has also been debated in literature. Early retrieval is favorable as delay of more than 24 hours lead to swelling, pain, trismus and psychological problems. However some authors recommend waiting so that fibrosis and stabilization has taken place.⁸ In the present study majority of the patients reported on the second day, while two of the patients reported late one with discharging sinus in the submandibular region and the other with nasal stuffiness on the ipsilateral side.

In the current study, 9 out of 21 cases were displaced mandibular teeth while 12 were maxillary teeth. All the displaced mandibular teeth were impacted 3rd molars. Among these teeth 7 were displaced into submandibular space as a whole through the lingual cortex, while in 2 cases roots were displaced into ID canal. The incidence of displaced mandibular impacted 3rd molars is reported to be 1% by Brauer and Dent.¹¹ Huang et al carried out a literature review of displaced mandibular impacted teeth and found out that out of 5 tissue spaces, sub mandibular space was the most common space involved.¹²

Management plan for displaced teeth in sub mandibular space depends upon fragment size and palpability. Immediately if the tooth slips away during extraction, it can be stabilized by placing a finger on the medial side. The extraction socket may then be widened with help of fissure bur avoiding ID canal and the tooth can be teased back through the socket. Fragment may also be removed by taking a flap intra orally; if that is unsuccessful extra oral approach may be utilized by giving sub mandibular incision. A modified approach also exists in which lingual plate is osteotomized to retrieve the tooth or fragment of tooth.¹³

In the current study, 12 cases of displaced teeth belonged to upper arch. Out of these 8 were displaced into maxillary sinus. The teeth displaced included maxillary 3rd molar and also roots of 2nd molar and 1st molar leading to oro antral communication. This post extraction complication is seen during extraction of upper molars and second premolar. Peri apical pathology, widely divergent roots, excessive peri apical pressure and sinus pneumatization are some of the precipitating factors leading to displacement of teeth into sinus.¹⁴ Another factor is the thinness of antral floor in this region approximately 1 to 7 mm.¹⁵ In case of displacement to maxillary sinus the tooth should be visualized through open socket. Use of suction and irrigation can sometime be helpful in retrieval. It is recommended that the tooth or root should be removed immediately as there is chance of development of sinus infection if left as such.¹⁶ However If not successful the patient should be informed of the complication and the tooth or root can be later removed through caldwell luc

approach. Patient should be placed on sinus precautions and antibiotics should be prescribed along with analgesics and decongestants.¹⁷

Another space into which maxillary teeth can be displaced is the infratemporal space. The infratemporal fossa is located below the greater wing of the sphenoid bone, lateral to the ramus of the mandible and the gap between the zygomatic arch and temporal bone. The lateral pterygoid plate forms the medial margin while the maxilla forms the medial aspect of this space.¹⁸ In the present study, 4 impacted maxillary molars were pushed into infratemporal space during exodontias. Factors associated with this complication include lack of surgical expertise, incorrect use of force, improper direction of elevation, use of wrong instruments, decreased bone on distal side of 3rd molar, disto-lingual inclination and increased depth of impaction.¹⁹

Once the tooth has been displaced into infratemporal fossa it should be removed to prevent future infection and other consequence. It has been suggested that the tooth if palpable should be stabilized by placing a finger extraorally in the temporal area, and retrieval should be attempted intraorally through the extraction socket. Other authors recommend waiting for 10-14 days for stabilization and fibrosis.²⁰ This delayed approach has been favored by selvi et al.²¹ The specific approach to infratemporal fossa varies in literature. Options include intraoral access with Caldwell-Luc technique or resection of the coronoid process²², combined or exclusively extraoral access (hemicoronal approach)²³, or the Gillies approach.²⁴ Another technique described in literature is to introduce a K-wire through lateral orbital rim, engage the tooth and attempt to guide it back to oral cavity.²⁵ Our approach was to take an intraoral three cornered flap. One of challenges was the control of buccal pad of fat which was done by avoiding dissection in the soft tissues rather to be as close as possible with the maxillary bone.

CONCLUSION AND RECOMMENDATION

A displaced tooth is a rare but potentially serious complication of tooth extraction. Careful pre-operative planning/evaluation, proper radiographs, adequate access and visibility, proper technique and controlled use of force should be utilized to prevent a tooth from getting displaced. In case of complication proper management and timely referral to oral and maxillofacial surgeon should be done to avoid un-necessary damage to both hard and soft tissues of the maxillofacial region.

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