

Delayed removal of maxillary third molar displaced into the maxillary sinus

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SUMMARY

Introduction. The present article reports the late removal of a wisdom tooth displaced into the maxillary sinus associated with the curettage of the adjacent infection tissue, under general anesthesia.

Case description. A male patient, 42 years-old, was forwarded to remove a right wisdom tooth which was displaced into the right maxillary sinus for 10 months. The patient reported that the tooth was tried to be removed using odontosection in two moments without any success. Since then, the patient has been having (applicants) episodes of sinusitis. It had been planned to remove the tooth and the cleaning of the right maxillary sinus. The surgical procedure was done through the Caldwell-Luc access, followed by the removal of the dental fragments which were into the maxillary sinus and curettage of the cavity in order to remove the granulation tissue, associated to copious irrigation.

Conclusion. The surgical removal of the tooth displaced into the maxillary sinus associated with the sinus curettage was successfully achieved, solving the patient complaints.

Keywords: maxillary sinus, third molar, case study, oral surgery, intraoperative complication.

INTRODUCTION

The most frequent procedure conducted by the oral maxillofacial surgeons are the surgically removal of third molars (1). The complication rates associated with this procedure are between 2.6% to 30.9% (2, 3). Referring to the superior third molars, complications could occur, mainly, the tuberosity fracture, root fracture, oroantral communication and displacement of the tooth into the adjacent paranasal structures (1, 4). Third molars displaced into the maxillary sinus have been related to 0.6% to 3.8% of frequency in literature (5).

The maxillary sinus is a pyramid shaped cavity with its base adjacent to the nasal wall and apex pointing to the zygoma. The average dimensions of the adult sinus are 2.5 to 3.5cm wide, 3.6 to 4.5cm high, and 3.8 to 4.5cm deep. Anteriorly, it extends to the canine and premolar area. The sinus floor usually has its most inferior point near to the first molar region (6). The presence of a tooth inside the sinus may lead to complications such as infection,

and thus its surgical removal is strongly recommended (7).

The maxillary sinusitis is an inflammatory and/or infectious process originating by bacterial, fungal or viral infection developed in the maxillary sinus. It can be presented in isolation or associated with processes that affect one or more adjacent sinuses (8). From the total, cases of maxillary sinusitis, approximately 10–12% are exclusively sinusitis of the home tooth (9, 10).

Acute bacterial sinusitis usually occurs following an upper respiratory infection that results in the obstruction of the osteomeatal complex, impaired mucociliary clearance and overproduction of secretions. Among the signs and symptoms that use to increase the likelihood of a correct diagnosis of acute sinusitis are “double sickening” (biphasic illness), pain with unilateral prominence, purulent rhinorrhea by history, purulent secretions in the nasal cavity on examination, a lack of response to decongestant or antihistamine therapy, facial pain above or below both eyes on leaning forward, and maxillary toothache. The term “double sickening” refers to patients who start with a cold and begin to improve, only to have the congestion and discomfort returned (11). Traditionally, sinusitis has been classified by

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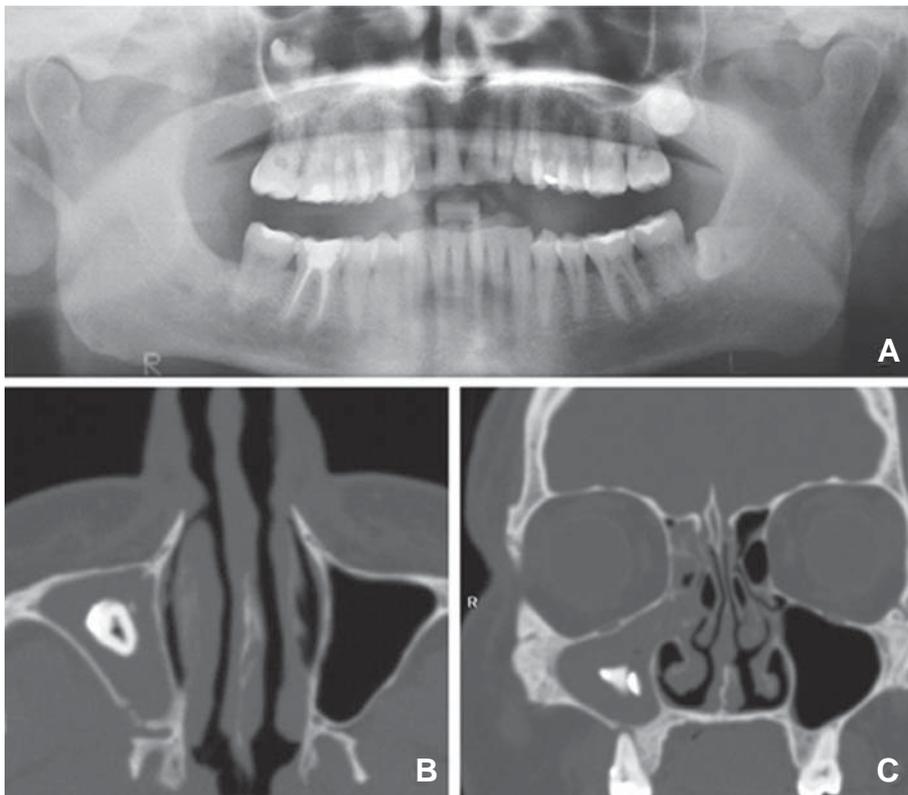


Fig. 1. Panoramic radiograph with the third molar displaced into the maxillary sinus (A). Cone Beam tomography with the right maxillary sinus filled with material with soft tissue attenuation inferring an infectious process and the presence of two tooth fragments (B and C).

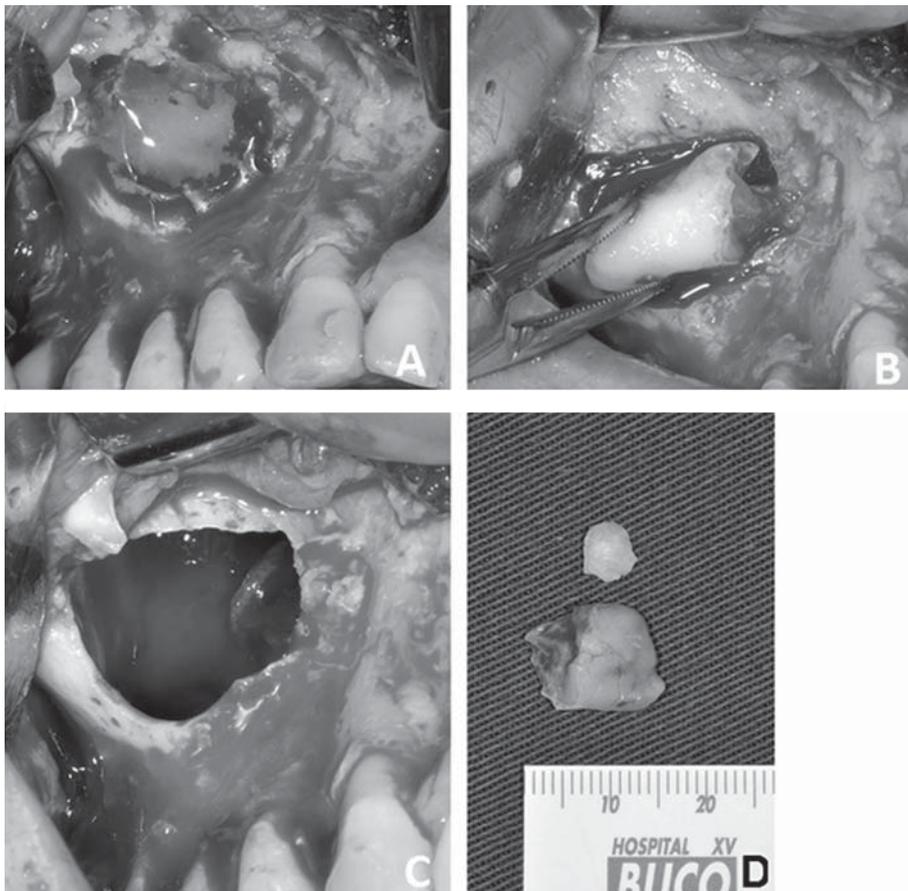


Fig. 2. Presence of soft infected tissue inside of the maxillary sinus, after the Caldwell-Luc Access (A). Tooth removed (B). Interior of the cavity after irrigation and debridement (C). Fragments removed (D).

symptom duration: acute (less than 4 weeks), subacute (4–12 weeks), or chronic (more than 12 weeks, with or without acute exacerbations) (12).

This report describes an unusual case of impacted maxillary third molar that was accidentally displaced into the maxillary sinus causing chronic maxillary sinusitis caused by the displacement of right maxillary third molar.

CASE DESCRIPTION

Male patient, 42 years-old, was referred to a Service of maxillofacial surgery to remove a right superior third molar displaced into the maxillary sinus for 10 months. During the anamnesis, the patient denied allergies and systemic alterations. He said that the tooth extraction had been tried twice without any success, and that the displacement into the sinus occurred at the second time when the professional tried to remove the tooth after its section. Since then, he had recurrent episodes of sinusitis, and was medicated by the otorhinolaryngologist. No change was found during the extraoral examination. The patient intraoral examination, during palpation of the region, accused pain.

In the X-ray image, it could be seen the radiopacity of the cavity, discontinuance of the right maxillary sinus floor, the presence of two fragments compatible with the third molar inside the right maxillary sinus, bone fragments and bullous images in the region which leads us to an infectious process in the cavity (Figure 1).

The possibilities of treatment (removal of the tooth with local or general anesthesia)

were discussed with the patient. He preferred the removal to be done under general anesthesia, once it would facilitate the drainage and curettage of the maxillary sinus. Furthermore the patient was extremely anxious because of the previous attempts to remove the tooth, which could interfere into the result of the procedure.

The procedure was done through a linear incision into the mucogingival line in the right superior premolar and molar region. After the displacement and exposure of the anterior and lateral wall of the maxilla, the Caldwell-Luc access was done using drill stem taper number 701 (Figure 2 A). The tooth fragments were found inside the maxillary sinus and with the aid of a Kelly grip, they were removed. (Figure 2B). Proceeded with the curettage of the cavity and clearance of the granulation tissue (Figure 2 C, D, E), followed by copious irrigation. After, it was done a continue suture with Vicryl 3-0 (J&J Ethicon, EUA).

The patient was discharged from the hospital at the same day. He was medicated with cephalexin 500mg every 6 hours for 7 days, ibuprofen 600 mg every 8 hours and paracetamol every 6 hours either for 3 days. Pantomography radiograph was done one week after the procedure confirming the complete removal of the tooth (Figure 3).

Afterwards 8 months, the patient had no functional complains.

DISCUSSION

A well-known complication associated with extraction of maxillary molars is accidental displacement of roots or dental fragments into the maxillary sinus (13). The palatal root of the 1st molar is most frequently involved, although anatomically it is not the closest to the sinus. Dislodgement of an entire tooth into the maxillary sinus involves almost exclusively the third maxillary molar (14).

The anatomic relationship of the superior premolars and molars with the sinus cavity is well known (15). Therefore, an opening into the sinus could happen during the extraction procedure. When the included superior third molars is analyzed into the height of the roots of the second molar, it could be observed that the third molar is part of the posterior wall of the maxillary sinus (16). In this situation, the complete displacement of the tooth into



Fig. 2. Panoramic radiograph with the complete removal of tooth fragments

the sink does not necessarily turn into an infection, once the tooth displaced, is healthy. The sinus infection is frequently associated with the displacement of roots that are already infected, associated with periodontal disease or apical lesions (17, 18). Soon, it is prudent the settlement of preventive measures by the surgeon based on the anatomic knowledge of the region, the appliance of the correct movement for dental dislocation as well as the knowledge of the surgical techniques that are involve the access to the maxillary sinus.

As all surgical procedures, the preoperative planning, the use of correct technique and the right surgical principle are very important, in order to achieve the treatment success. Negligence in the clinic and radiograph exam, apply of excessive strength during the extraction, the use of incorrect technique, thin cortical bone in the superior third molar region, inadequate access leading into poor visibility during the extraction, crown of the third molar above of the apex of the adjacent tooth and absence of root formation, are the risk factors that could cause a superior third molar displacement into the adjacent anatomic spaces (19, 20).

The accepted treatment of a displaced tooth is surgery removal, in order to prevent future infections. Pogrel *et al.*, (21) in 1990, stated that the initial attempt at retrieval should be a suction placed at the opening into the sinus. If suction applied to the opening does not allow delivery, then the sinus may be irrigated with saline and the suction tip reapplied to the opening. If the second attempt is unsuccessful, further attempts should be stopped and the patient placed on a course of antibiotics and nasal decongestants. Retrieval can be accomplished with a Caldwell-Luc approach at a second procedure in concert with closure of the oroantral fistula and an intranasal antrostomy to facilitate maxillary sinus drainage (21).

The literature shows different types of surgical treatment to remove third molar or a root displaced

into the maxillary sinus, even with local or general anesthesia, using intraoral access (Caldwell-Luc access) or trough endoscopy (13, 14, 22). For Peterson *et al.*, (16) in 2000., the tooth displaced into the maxillary sinus should be removed 4 to 6 weeks later, in as much as in this initial healing period occurs a fibrosis around the tooth which leads into stabilization of the same into a more unmoved position.

Whichever it is the treatment option, the surgeon must have to be conscious of the anatomic potential damage. The blood supply to the maxillary sinus is primarily derived from the posterior superior alveolar artery and the infraorbital artery, both being branches of the maxillary artery. There are significant anastomoses between these 2 arteries in the lateral antral wall. The greater palatine artery also supplies the inferior portion of the sinus (23). However, because of the blood supplies to the maxillary sinus being from terminal branches of peripheral vessels, significant hemorrhage during the sinus lift procedure is rare. Nerve supply to the sinus is derived from the superior alveolar branch of the maxillary (V2) division of the trigeminal nerve (24).

If the professional suspect that the tooth was displaced into adjacent space during the surgery is advisable to extend the incision in order to try to remove it, avoiding another surgery and decreasing the morbidity. If the professional could not see the tooth or judge incapable to remove it at that moment it is wise to abort the surgery and perform the suture to provide hemostasis, prescribe an antibiotics and the use of nasal descongellant to avoid the accumulation of secretions at the cavity.

Svezut *et al.* (22) in 2005, stated that the removal should be accomplished during the same procedure but indicated that delayed treatment does not always precipitate active sinus disease and that this asymptomatic interval can last several months.

In this particular case, the patient was forwarded with the tooth already displaced 10 months ago and with complains of chronic sinusitis. The patient was followed up with medication without success.

Sinusitis is a common medical problem with significant symptoms that interferes with patient's quality of life as well as loss of work productivity, which presents major medical and social concerns. The principles involved in the treatment of chronic sinusitis involve identification and treating the underlying causes. Goals of treatment include reduction of mucosal edema, reestablishment of sinus ventilation and eradication of infecting pathogens (25). In this case, the patogenic agent, originating the sinusitis was the tooth displaced into the maxillary sinus, being indicated the surgical removal and curettage of the infectious material. The goal of this procedure is to restore sinus ventilation and normal function of the mucociliary clearance system.

CONCLUSIONS

The prevention of dental displacement into the adjacent cavity is obtained from identification of the anatomical relationship of the maxillary sinus and nasal cavity, adequate operatory visibility trough vestibular flap and tissue separation. The surgical removal of the tooth displaced into the maxillary sinus, at this rate, was done with success under general anesthesia with a drainage and curettage of the infectious process, solving the patient complaints.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest

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REFERENCES

1. Bouloux GF, Steed MB, Perciaccante VJ. Complications of third molar surgery. *Oral Maxillofac Surg Clin North Am* 2007;19:117-28.
2. Bui CH, Seldin EB, Dodson TB. Types, frequencies, and risk factors for complications after third molar extraction. *J Oral Maxillofac Surg* 2003; 61:1379-89.
3. Sisk AL, Hammer WB, Shelton DW, Joy ED Jr. Complications following removal of impacted third molars: the role of the experience of the surgeon. *J Oral Maxillofac Surg* 1986;44:855-9.
4. Primo BT, Stringhini DJ, Klüppel LE, Rebellato NLB, Moraes RS, Costa DL. Delayed removal of maxillary third molar displaced into the infratemporal fossa. *Rev Esp Cir Oral Maxillofac* 2014;36:78-81.
5. Bouquet A, Coudert JL, Bourgeois D, Mazoyer JF, Bossard D. Contributions of reformatted computed tomography and panoramic radiography in the localization of third molars relative to the maxillary sinus. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2004;98:342-7.
6. van den Bergh JP, ten Bruggenkate CM, Disch FJ, Tuinzing DB. Anatomical aspects of sinus floor elevations. *Clin Oral Implants Res* 2000;11:256-65.
7. Patel M, Down K. Accidental displacement of impacted maxillary third molars. *Br Dent J* 1994;177:57-9.
8. Guiliand L, Laurent S. Sinusites maxillaires. *EMC Oto-Rhino-Laryngologie* 2005;2:160-73.
9. Brook I. Sinusitis of odontogenic origin. *Otolaryngol Head Neck Surg* 2006;135:349-55.
10. Costa F, Robiony M, Polini F. endoscopic surgical treatment of chronic maxillary sinusitis of dental origin. *J Oral Maxillofac Surg* 2007;65:223-8.
11. Fagnan LJ. Acute sinusitis: a cost-effective approach to diagnosis and treatment. *Am Fam Physician* 1998;58:1795-802, 805-6.

12. Chan Y, Kuhn FA. An update on the classifications, diagnosis, and treatment of rhinosinusitis. *Curr Opin Otolaryngol Head Neck Surg* 2009;17:204-8.
13. Chandrasena F, Singh A, Visavadia BG. Removal of a root from the maxillary sinus using functional endoscopic sinus surgery. *Br J Oral Maxillofac Surg* 2010;48:558-9.
14. Oberman M, Horowitz I, Ramon Y. Accidental displacement of impacted maxillary third molars. *Int J Oral Maxillofac Surg* 1986;15:756-8.
15. Punwutikorn J, Waikakul A, Pairuchvej V. Clinically significant oroantral communications--a study of incidence and site. *Int J Oral Maxillofac Surg* 1994;23:19-21.
16. Peterson LJ, Ellis E III, Hupp JR, Tucker MR. Contemporary oral and maxillofacial surgery. 3rd ed. St. Louis: CV Mosby Co.; 2000.
17. Yamazaki Y, Muto M, Umezawa Y, Hirabara M, Kawashima Y. [Clinical studies of correlation between tooth diseases and maxillary sinus diseases]. *Nihon Jibiinkoka Gakkai Kaiho* 1970;73 Suppl:1028-9. Japanese.
18. Yasuma K. Relation between chronic maxillary sinusitis and tooth diseases. The conservative treatment of teeth penetrating the maxillary sinus. *Nippon Koku Geka Gakkai Zasshi* 1971;17:2-12.
19. Selvi F, Cakar S, Keskin C, Ozyuvaci H. Delayed removal of a maxillary third molar accidentally displaced into the infratemporal fossa. *J Craniofac Surg* 2011;22:1391-3.
20. Sverzut CE, Trivellato AE, Sverzut AT, de Matos FP, Kato RB. Removal of a maxillary third molar accidentally displaced into the infratemporal fossa via intraoral approach under local anesthesia: report of a case. *J Oral Maxillofac Surg* 2009;67:1316-20.
21. Pogrel M. Complications of third molar surgery. *Oral Maxillofac Surg Clin North Am* 1990;2:441-51.
22. Sverzut CE, Trivellato AE, Lopes LM, Ferraz EP, Sverzut AT. Accidental displacement of impacted maxillary third molar: a case report. *Braz Dent J* 2005;16:167-70.
23. Solar P, Geyerhofer U, Traxler H, Windisch A, Ulm C, Watzek G. Blood supply to the maxillary sinus relevant to sinus floor elevation procedures. *Clin Oral Implants Res* 1999;10:34-44.
24. Woo I, Le BT. Maxillary sinus floor elevation: review of anatomy and two techniques. *Implant Dent* 2004;13:28-32.
25. Chan Y, Kuhn FA. An update on the classifications, diagnosis, and treatment of rhinosinusitis. *Curr Opin Otolaryngol Head Neck Surg* 2009;17:204-8.

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