



An Insight In to the Management of Displaced Root into the Antrum - A Case Report

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ABSTRACT

Closure of oroantral communication (OAC) after extraction of a tooth in the upper jaw is a challenging task for dentists and surgeons. This pathological channel if not addressed during early phases, can cause infection of the maxillary sinus. A thorough radiographic investigation followed by examination of the extraction socket plays a pivotal role in diagnosing the communication which should be managed as early as possible. Plethora of techniques are mentioned in the literature regarding surgical closure of the OAC such as buccal advancement flap, palatal flap etc.

KEY WORDS: Oro antral communication, Flaps, Grafts, Maxillary sinus

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INTRODUCTION

Complications such as Oro-antral communications and fistulas (OAC's & OAF's) are frequently encountered following surgical procedures in the maxillary posterior region. This unnatural communication between the oral cavity and the maxillary antrum, hinders the healing process by serving as a pathogenic tract for bacteria and causes excessive generation of free radicals and oxidative stress [1-3] might affect the healing process [4-5]. Fry et al [6] in his study enlisted the proximity of maxillary posterior teeth to the antrum in the following order the second molar, the third molar, the first molar and the second premolar. The canine and the first premolar were found to exhibit the greatest distance to the sinus. The close relationship of the molar roots to the maxillary sinus is responsible for approximately 50% of oroantral perforations encountered during exodontia in conjunction with the removal of the first molar, while paradoxically the extraction of the second molar accounts for only 25-30 % and premolar teeth accounts for 48% [7].

Defects smaller than 2 mm in diameter can spontaneously repair after the formation of a blood clot and secondary healing in the absence of any infection of the maxillary antrum. However, uncorrected bigger communications can cause sinusitis and other sinus diseases (50 percent of patients within 48 hours, 90 percent of patients within 2 weeks). Treatment of oro-antral communication is crucial to preventing food debris from contaminating the sinuses and causing infection. Wassmund [8] reported development of sinusitis in 60% of cases by fourth day after sinus exposure and indicated the closure of communication within 24 to 48 hours to prevent

chronic sinusitis and development of fistulas. Numerous tests like Valsalva Test, Cheek Blowing Test, Cotton Wisp Test and Water Holding Test play a pivotal role in the diagnosis of oro-antral communication in a clinical setting. The main goal in the treatment of OAC is the closure of the defect either by simple primary suturing of the gingiva with a figure-of-eight suture if at all a small communication and a large communication can be closed using local flaps such as buccal advancement flap (Table 1).

CASE REPORT: A patient aged 54 years reported to the Out Patient Department of Oral and Maxillofacial Surgery with pain in right side of the face for past 3 days. On examination grossly decayed 17 was tender on percussion and the OPG revealed the proximity of its root to maxillary sinus (Fig 1).

An atraumatic extraction was attempted which resulted in the fracture of crown at the CEJ. The distal and palatal root pieces were retrieved by transalveolar extraction and an attempt was made to remove the apical third of the mesial root. Subsequent to the failed attempts with retrieval of fractured apical third of mesial root, the root apex could not be localized within the socket (Fig 2). Therefore, an IOPA X-ray was taken and to the surprise of the operator it was located within the sinus floor in proximity of the

roots of 16 (Fig 3).

OPG was done to aid further localization and treatment planning (Fig 4). Nose blowing test, water holding test were positive suggestive of established oroantral communication. A communication of 3-4 mm in diameter was observed clinically through the socket of 17. Patient was explained regarding the complication and the need for its management to which the patient consented willingly. It was decided to retrieve the root piece by Caldwell Luc procedure. Anterior and posterior releasing incisions were placed in relation to 17 and full thickness flap was reflected to expose the anterolateral wall of the maxillary sinus from region of canine to the third molar. A round bur HP-6 was used to create bony window of 1.5 cm in diameter to enter into the sinus above the region of canine fossa (Fig 5).

Using an external light source and careful suctioning, the apical third of mesial root was visualized and retrieved (Fig 6, 7). The above was confirmed by repeating the OPG X-ray. Sinus was irrigated with betadine and saline and closure was done using a buccal advancement flap (Fig 8). Post operative instructions were explained and patient was advised against coughing, sneezing and nose blowing. Patient was advocated a strict sinus regimen for one week.

RESULT AND DISCUSSION

OAC is an undesirable complication following the removal of maxillary posteriors and is distressing to both surgeon and patient. Spontaneous closure occurs most likely in the cases of healthy sinus, where after antrum perforation, healing in the socket occurs by normal blood clot formation. However, surgical closure is at risk in larger perforations which are > 4 mm in diameter and >5 mm in depth. There are reports in literature that suggest predisposition and anatomical relationship between extraction of maxillary posterior teeth and creation of oro-antral communication [9]. The displacement of a root piece into sinus is a common complication and is serious if not removed from the sinus. The displaced root can be retrieved by widening the orifice of the sinus through the extraction socket followed by forceful copious irrigation and pulling out packed gauze in one stroke from the maxillary sinus [10]. Other modalities such as Caldwell-Luc approach, can be used when the displaced root piece is higher up in the air space of maxillary sinus. Minimally invasive technique includes FESS endoscopic transantral/transnasal surgery which are commonly used procedures for the retrieval of foreign bodies from the maxillary.



Fig 1: Pre-Op OPG



Fig 2: Communication



Fig 3: Proximity to the maxillary sinus



Fig 4: Intra operative OPG



Fig 5: Intra operative OPG



Fig 6: Root Retrieved



Fig 7: Buccal advancement



Fig 8: Post op OPG

Table 1: Available options for closure of OAC

Local soft tissue flaps	Buccal flaps	Buccal flap (Rehrmann flap) Móczáir flap, Buccal advanced flap, Buccal fat pad flap, Pedicled buccal fat pad, Buccal flap combined with displacement of the buccal fat pad
	Palatal flaps	Palatal rotation-advancement flap, Palatal pedicled flap, Anteriorly based palatal flap, Palatal hinged flap, Palatal mucoperiosteal rotation flap, Palatal straight advancement flap, Palatal pedicled island flap, Modified submucosal connective tissue flap, Submucosal connective tissue pedicle flap, Submucosal island flap, Random palatal flap
	Grafts	Free mucous graft Subepithelial connective tissue graft
Autogenous distant flaps		Tongue flap, Auricular cartilage, Septal cartilage, Temporalis muscle flap
Autogenous fibrin		Platelet-rich fibrin Allogenuous Fibrin glue Dura
Xenografts		Collagen Gelatin film Bio Gide/Bio Oss
Synthetic materials/metals		Gold, Aluminum , Tantalum Polymethylmethacrylate Hydroxyapatite Root analogue Titanium dental implant
Other techniques		Tooth transplantation Interseptal alveolotomy Guided tissue regeneration Prolamin gel Splint Biostimulation with laser light

Sinus Various modifications to the buccal flap have been made over the years. The pedicled buccal fat pad, described in 1977, Rehrmann [11] described the sliding flap which is till date considered the workhorse surgical technique for the management of OACs. High success rate (93%) has been attributed to presence of a broad base ensuring optimal blood supply. Incision is usually made usually from the distobuccal depth of the tuberosity. Full-thickness muco-periosteal buccal flap is raised. This method has a low failure rate and low morbidity. Buccal advancement flap is usually indicated, in those cases, with a small opening and deep buccal sulcus. Kilic et al [12] have mentioned some disadvantages of buccal advancement flap. However, Desai. et al [13] mentioned that these issues related to the advancement flap are not permanent. The patient model used by these authors, before and after surgery and showed that the reduced depth became normal after 8 weeks. According to Kruger this procedure is very common, simple and satisfactory which can be performed under local anesthesia. Studies suggested that the palatal flap can be best used in the cases where communication is present in premolar region, and if the communication is located in the third molar region the combination of buccal fat pad with buccal flap can be used. Sometimes, the buccal fat pad is insufficient for closure of OAC, so in those cases a buccal advancement flap technique can be considered. There are instances where the failure of local flaps has been reported for closure of large defects. Closure of large defects can be successfully carried out with distant flaps and bone grafts [14].

CONCLUSION

Management of oro-antral defects like OAC is challenging in the field of oral and maxillofacial surgery. A comprehensive clinical and radiographic examination followed by evaluation of criterias such as the location of the defect, its size, the height of the alveolar ridge, vestibular depth, the persistence of the defect, sinus inflammation or infection, and the patient's overall health should be considered prior to

choosing an appropriate surgical approach to close an oroantral communication.

REFERENCES

1. Verma M.K, Jaiswal A, Sharma P, Kumar P, Singh A.N. (2019). Oxidative stress and biomarker of TNF- α , MDA and FRAP in hypertension. *Journal of Medicine and Life*. 12(3):253-259.
2. Grover S.S., Doda A., Gupta N., Gandhoke I., Batra J., Hans C., Khare S. (2017). New Delhi metallo- β -lactamase-type carbapenemases producing *Escherichia coli* isolates from hospitalized patients: A pilot study. *Indian Journal of Medical Research*. 146:105-110.
3. Bhatnagar A., Tripathi Y., Kumar A.(2016). Change in oxidative stress of normotensive elderly subjects following lifestyle modifications. *Journal of Clinical and Diagnostic Research*. 10(9):CC09-CC13.
4. Hassan O, Shoukry T, Raouf AA, Wahba H. (2012). Combined palatal and buccal flaps in oroantral fistula repair. *Egypt J Ear, Nose, Throat Allied Sci*. 13: 77-81.
5. Logan RM, Coates EA. Non-surgical management of an oro-antral fistula in a patient with HIV infection. *Aust Dent J*. 2003; 48(4):255-8.
6. Fry RR, Patidar DC, Goyal S, Malhotra A. Proximity of maxillary posterior teeth roots to maxillary sinus and adjacent structures using Denta scan®. *Indian J Dent*. 2016 Sep;7(3):126-130.
7. Hajgi k, Kust, t., Farka, l. g. & Feiolorov, (1967): Sinus maxillaris. *Morphol. Anthropol*. 59: 185-197.
8. Jung YH, Cho BH. Assessment of the relationship between the maxillary molars and adjacent structures using cone beam computed tomography. *Imaging Sci Dent*. 2012;42:219-24.
9. Harrison DF. (1961) Oro-antral fistula. *Br J Clin Pract*. 15:169-74
10. Hirata Y, Kino K, Nagaoka S, Miyamoto R, Yoshimasu H, Amagasa T. (2001) A clinical investigation of oro-maxillary sinus-perforation due to tooth extraction. *KokubyoGakkai Zasshi*. 68(3):249-53.
11. Parvini P, Obreja K, Sader R, Becker J, Schwarz F, Salti L. (2018) Surgical options in oroantral fistula management: a narrative review, *Int J implant Dent*. 4(1):40
12. Kilic C, Kamburoglu K, Yuksel SP, Ozen T.(2010). An assessment of the relationship between the maxillary sinus floor and the maxillary posterior teeth root tips using dental cone-beam computerized tomography. *Eur J Dent*. ;4:462-7.
13. Desai PD, Dutta K, Sarakar S.(2015). Multidetector computed tomography dentascan analysis of root canal morphology of maxillary canine. *Indian J Dent Res*. 26:31-7.
14. Tian XM, Qian L, Xin XZ, Wei B, Gong Y. (2016). An Analysis of the Proximity of Maxillary Posterior Teeth to the Maxillary Sinus Using Cone-beam Computed Tomography. *J Endod*. ;42(3):371-7.

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