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Case Report

Oroantral fistula: Radiodiagnostic lessons from a rare case

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ABSTRACT

An unnatural communication between the maxillary sinus and oral cavity is known as oroantral communication (OAC). If this communication fails to close spontaneously, it gets epithelialized to form an oroantral fistula (OAF). The most common cause of an OAC/OAF is the extraction of a maxillary molar or premolar. Spontaneous healing may occur in defects which are smaller in size, but for larger communications, it requires immediate attention and should be treated without delay to avoid sinusitis or any such further complications leading to patient discomfort.

KEY WORDS: Complication of exodontia, maxillary sinus, oroantral communication, oroantral fistula

INTRODUCTION

The term oroantral fistula (OAF) is understood to mean a fistula canal covered with epithelium which may or may not be filled with granulation tissue or polyposis of the sinus mucous membrane and most frequently occurs because of iatrogenic oroantral communication (OAC) [1]. Depending on the location, it can be classified as alveolo-sinusal, palatal-sinusal, and vestibulo-sinusal [2].

OAC/OAF arise mainly after extraction of the posterior maxillary teeth due to the proximity between the root apices of the molar and premolar teeth and the sinus floor [2]. Closing this communication is important to avoid food and saliva contamination that could lead to bacterial infection, impaired healing, chronic sinusitis, and such various complications. [3]. Hereby, we present a case of a 55-year-old male patient with a long-standing case of an OAF.

CASE REPORT

A 55-year-old male patient was referred to our department with a complaint of seeping of liquid through the nose while consuming liquid diet and a sporadic intraoral drainage in the posterior right maxillary region. The patient had undergone an extraction 6-8 months prior in the same region and reported the complaint since. Intraoral examination revealed an unhealed opening in the region along the alveolar ridge. A gutta-percha (GP) cone was inserted [Figure 1], and a cone-beam computed tomography was advised which confirmed the diagnosis as OAF.

The radiographic images revealed a discontinuity of the sinus floor with a GP cone extending into the maxillary sinus located about 10.5 mm from the distal aspect of tooth 15 and about 5 mm from the mesial aspect of tooth 18 [Figure 2a-c]. It also revealed a radiopaque mass inferior to the sinus floor located distal to the inserted GP cone and medial to the maxillary third molar, suggestive of retained root piece measuring about 3.5-4 mm in size [Figure 2d and f]. The size of the opening into the sinus was about 3 mm [Figure 2c and e]. Surgical closure of the OAF was done using a buccal fat pad graft (BFP). The patient was recalled after 1, 3, and 6 months with complete disappearance of symptoms, and a normal healing was observed.

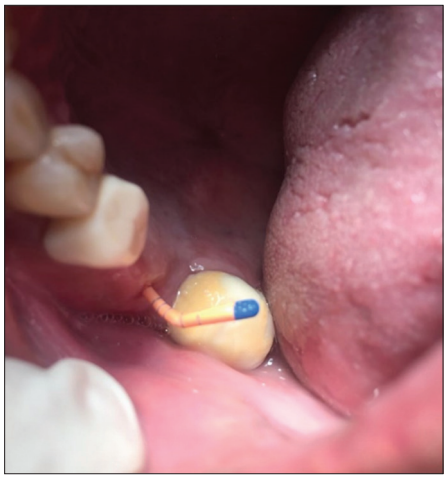


Figure 1: The alveolar socket of the region of 17 with the insertion of gutta-percha cone

DISCUSSION

One of the clinical complications often encountered by dental practitioners and mostly ignored is OAC with subsequent formation of OAF [4]. An OAF is an epithelialized pathological unnatural communication between the oral cavity and maxillary sinus. It develops when the OAC fails to close spontaneously, remains patent, and gets epithelialized. This epithelialization usually occurs when the perforation persists for at least 48-72 h [4,5].

These complications occur most commonly during extraction of upper molar and premolar teeth (48%) as seen in this case. Various causes of OAC/OAF are enlisted in Table 1 [5].

The patient can present with variable immediate or delayed symptoms. The reason for a delayed response is because the

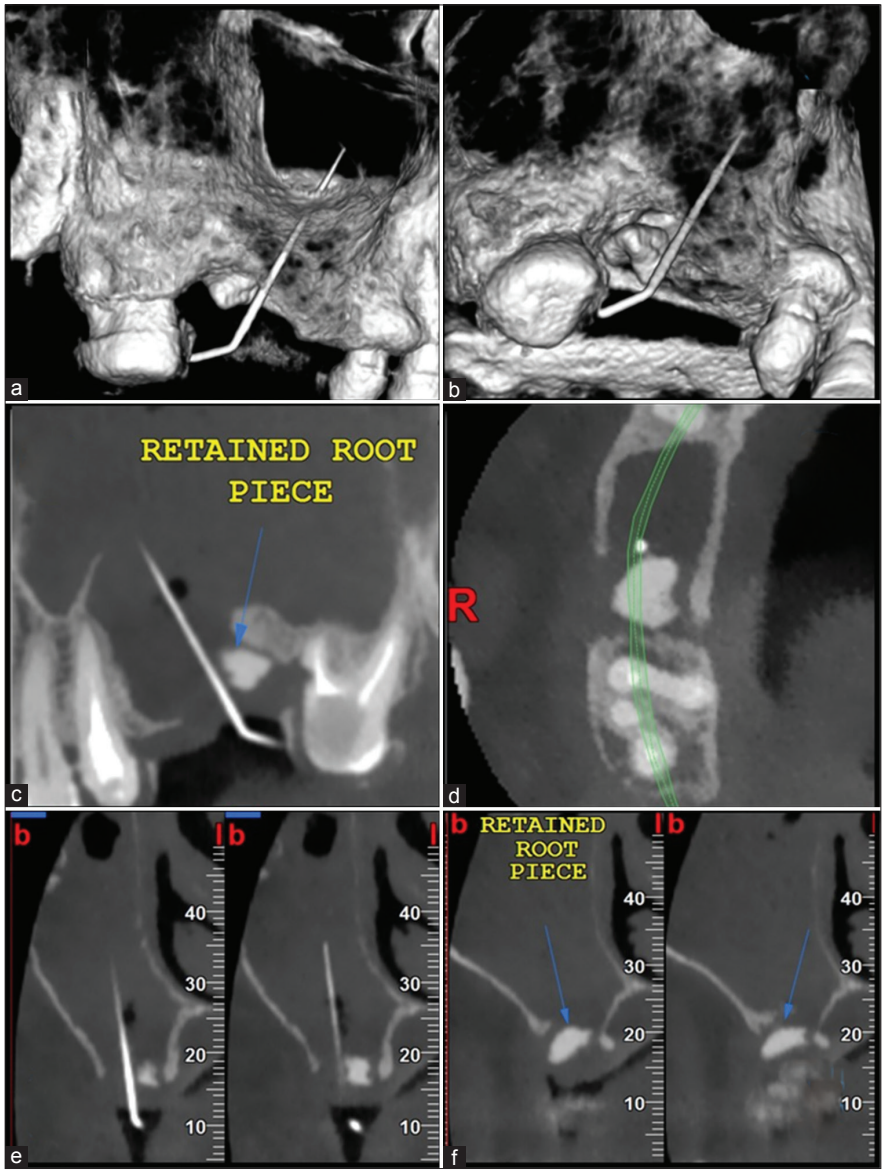


Figure 2: (a-f) 3-dimensional, panoramic, axial, and cross-sectional cone-beam computed tomography images revealing the retained root piece and the extension of the gutta-percha cone into the maxillary sinus

oroantral defect must have been completely occluded by blood clot post-extraction and it is only when this plug disintegrates the communication is established. The classic signs and symptoms are listed in Table 2 [6-8].

In this case, the patient had reported with complaints of fluid flowing into the nose, while drinking, feeling of air rushing into the mouth through the socket region while breathing, halitosis, and often unpleasant taste in the mouth.

Various literatures have shown that various tumors and carcinomas such as ameloblastoma, adenoid cystic carcinoma, and squamous cell carcinoma have shown to mimic an OAF on intraoral findings. However, differential diagnosis can usually be easily narrowed down to an OAC or OAF based on patients signs and symptoms and with the aid of the chairside, radiographic investigations and ultimately the histopathological picture [9-11].

In terms of diagnosis, vivid options ranging from intraoral examination, chairside tests, and radiographic imaging can help diagnose the condition. The wide range of investigation options is enlisted in Table 3 [6,12].

The Valsalva test is performed by asking the patient to pinch his nostrils together, open the mouth, and then blow gently through the nose; whistling sound can be heard as air passes through the fistula. The cotton wisp test is performed by placing a wisp of cotton near the orifice and checking for the escape of air as the patient exhales. In the mouth mirror test, a mouth mirror is placed at the OAF causing fogging of the mirror. However, probing or irrigating the site is not recommended because it may lead to sinusitis or push foreign bodies, such as contaminated fragments or oral flora further into the antrum. Hence, leading to the formation of a new fistula or widen an existing one [6,7].

OACs must be treated as soon as possible to avoid sinus conditions, which can prevent the treatment of the lesion and the resolution of the case. Most importantly, the infection must be resolved before any surgical procedure for OAC closure is undertaken, and sinus irrigation along with systemic antibiotic therapy should be administered [13].

In the case of small perforations of the sinus, when there are no signs of sinusitis, spontaneous healing is possible, while in the case of larger perforations, the chance of spontaneous healing is less. This is in agreement with Hanazawe, who reported that an OAF of <2 mm diameter has the possibility of spontaneous healing, while in the case of a larger diameter, spontaneous healing is hampered [14]. In 1957, Martensson, in contrast to Hanazawe, considered that there is less possibility of spontaneous healing when the OAF has been present for 3-4 weeks, or when its diameter is <5 mm [14,15].

Numerous surgical methods have been described for the treatment of OAFs although only a few have been accepted in daily practice. Some of these methods are listed in Table 4 [15].

Table 1: Causes for OAC/OAF [5]

Extraction of maxillary molar/premolar
Tuberosity fracture and post-surgical complications
Dentoalveolar/periapical infections of molars
Implant dislodgement into maxillary sinus
Dehiscence following implant failure
Osteomyelitis
Osteoradionecrosis
Flap necrosis
Trauma
Presence of maxillary cysts or tumor
Sometimes as a complication of the Caldwell-Luc procedure

OAC: Oroantral communication, OAF: Oroantral fistula

Table 2: Signs and symptoms of OAC/OAF [6-8]

Socket blood clot disappear in the days immediately following extraction
Fluid flowing from the mouth into the nose when drinking
Feeling of air rushing through the socket when breathing
Change in voice
Affected taste perception
Halitosis
Post-nasal drip will often lead to unpleasant taste
Pain should not be experienced unless there is acute maxillary sinusitis
Nocturnal cough, earache, or catarrhal deafness
Sometimes even epistaxis on the affected side

OAC: Oroantral communication, OAF: Oroantral fistula

Table 3: Investigations for OAC/OAF [6,9]

Chairside	Imaging
Extraoral and intraoral examination	IOPA
Patency of communication test (rinsing the mouth)	OPG
Valsalva test	PNS
Cotton wisp test	Occipitomental view
Mouth mirror test	CBCT
Gentle suctioning test (check for hollow sound)	Paranasal CT
Probing test (not recommended)	
Irrigation test (not recommended)	

IOPA: Intraoral periapical radiograph, OPG: Orthopantomogram, PNS: Paranasal sinus view, CBCT: Cone-beam computed tomography, CT: Computed tomography, OAC: Oroantral communication, OAF: Oroantral fistula

Table 4: Surgical methods for treating OAC/OAF [12]

Year	Described by	Method
1936	Rehrmann	Buccal flap
1939	Ashley	Palatal flap
1961	Goldman *et al.*	Gold foil in flap
1974	Takahashi and Henderson	Modified the palatal flap by the
1980	James	application of a mucosal palatal island flap
1974	Choukas	Modified palatal flap
1980	Ito *et al.*	Palatal submucosal flap
1985	Yamazaki *et al.*	Submucosal palatal island flap
1992	Zide and Karas	Used blocks of hydroxylapatite during plastics of an oroantral fistula
1995	Hanazawa *et al.*	P-BFP

P-BFP: Pedicled buccal fat pad graft, OAC: Oroantral communication, OAF: Oroantral fistula

Furthermore, at times the use of a combination technique such as a BFP with a buccal advancement flap can give more stability than using any conventional method alone [16]. On the other hand, OAF closure only by soft tissue can be a major

problem in implant or pre-implant surgical procedures. It can cause matting of the mucosa and the Schneiderian membrane. Placing bone graft deep to the soft tissue closure can prevent this situation [17].

CONCLUSION

It would not be inappropriate to say that OAC/OAF are mostly an outcome of insufficient knowledge and preparation before undertaking tooth extraction. As it is aptly said, "Hope for the best, but prepare for the worst", so it is not only crucial that necessary measures are taken to avoid it during any invasive procedures but also fundamentally decisive that timely management and the appropriate treatment plan are devised to ensure a good prognosis.

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