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Intra Alveolar Method of Root Fragment Retrieval using High-Pressure Suction and Its Sequelae: Case Report

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Dental, Maxillary Sinus, Oro Antral Communication, Quality of Life, Bichat's Fat Pad

ABSTRACT:

Displacement of tooth roots into the maxillary sinus is not an uncommon scenario encountered by a dental surgeon. Early identification and retrieval prevent sequelae like infection and chronic maxillary sinusitis. However, after retrieval of the tooth root, the created OAC needs careful evaluation and appropriate treatment. We are reporting a unique case of Intra alveolar method of retrieval of palatal root from the maxillary sinus using high-pressure suction followed by primary closure. On the third postoperative day, the patient reported a complaint of nasal regurgitation, and blood clot dislodgement was noticed in the extracted tooth socket. The patient was taken into the operating theatre, and OAC was managed with a combined bichat's fat pad and buccal advancement flap. The present article aims to document the complication of the intra-alveolar method of palatal root fragment retrieval using high-pressure suction and reinforce the importance of a soft tissue barrier between the oral cavity and antrum in the management of OAC. This combined method ensured the dual layer soft tissue barrier, hence satisfactory healing was achieved in the postoperative phase.

1. Background

An oroantral communication (OAC) can be defined as a breach in the bony continuity between the maxillary antrum and oral cavity following extraction of maxillary posterior teeth, infection, or several different complications. According to the available literature OAC occurs during the fourth decade of life and its prevalence is more common in men [1]. Dental extraction is the foremost etiological factor and incidence for first premolars noted for about 5.3% of Oroantral communication. Third molars noted for 30% followed by the first molar accounting for 27.2%. The prevalence of second molars was most with incidences of 45%. It was also reported that about 2.2% of the first molars apices perforated the maxillary sinus floor, followed by the second molars 2% [2].

The symptoms of oro antral communication are the escape of fluid into the nose or air from the mouth into the nose, and the enhanced column of air resulting in alternating vocal resonance. Contamination of the maxillary sinus can occur resulting in chronic sinusitis or infection. Therefore, a supporting diagnosis should be made at the earliest for the successful closure. Treatment of oroantral communication within 48 hours of incidence is significantly important for the management of OAC [3]. Bichat's fat pad grafts give exquisite vascularization and results. 93% success was accomplished in the closure of OAC with the help of a buccal advancement flap (Rehrmanns's flap) [4].

We are reporting a unique case of Intra alveolar method of retrieval of palatal root from the maxillary sinus using high-pressure suction followed by primary closure. On the third postoperative day, the patient reported nasal regurgitation, and blood clot dislodgement was noticed in the extracted tooth socket. The patient was shifted to the operating room, and OAC was managed with a combined bichat's fat pad and buccal advancement flap. The present article aims to document the complications of the intra-alveolar method of extraction and reinforce the importance of the soft tissue barrier between the oral cavity and antrum in the management of OAC.

2. Materials and Methods

A thirty-five-year-old female reported to the Department of Oral and Maxillofacial Surgery with a chief complaint of pain in relation to the left upper back tooth for one week. On extraoral examination, the face was

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symmetrical with no extraoral swelling, the skin was normal in colour and no extraoral sinus or discharge was noted. On intra-oral examination, deep proximal caries (mesial side) with temporary filling material was present in the left upper maxillary first molar teeth. Tender on percussion was positive in the respective tooth. On radiographic examination, apical periodontitis was noticed in the left upper maxillary first molar teeth. It was planned for dental extraction under local anesthesia. During the forceps method of extraction, the palatal root got fractured (Figure 1), during the attempt to remove of the fractured root which was inadvertently displaced into the maxillary sinus.

On radiographic examination using intraoral periapical radiograph revealed a vertically lying radiopaque fragment in the low level of maxillary antrum suggestive of displaced palatal root of left maxillary first molar. As the root fragment was situated in the low level of antrum and vicinity to the extraction socket, it was decided to retrieve via intra alveolar method using high-pressure suction. Under aseptic precaution, the high-pressure suction tip was introduced in the squeezing motion in the palatal socket after repeated attempts were made to remove the root fragment (Figure 2). During the fourth attempt, we were able to visualize a white tooth-like structure in the indirect vision of a mirror, so with the help of small curved mosquito forceps, tooth root was retrieved and figure of eight closure was done with 3-0 silk suture to stabilize the blood clot in the socket.

On the third postoperative day, the patient reported to the outpatient clinic with a complaint of nasal regurgitation from the left side nostril. On intraoral examination revealed a dislodged blood clot and communication between the oral and antral cavities. The patient was shifted to the operating theater, and closure of OAC with combined bichat's fat pad and buccal advancement flap was planned. Trapezoidal shape mucoperiosteal flap raised from left premolar to molar region. A stab incision was given in the raised periosteum, underlying bichat's fat pad was exposed. It was squeezed out gently while maintaining the vascular pedicle and secured with palatal mucosa using 3-0 vicryl. In addition to that raised mucoperiosteal flap was advanced and water-tight closure was done using 3-0 vicryl. A double-layer soft tissue barrier was created using this combined method between the oral and antral cavities (Figure 3). There is no complaint of nasal regurgitation in the post-operative phase. Wound healing was satisfactory in the follow-up period.

3. Results and Discussion

Displacement of tooth roots into the maxillary sinus is not an uncommon scenario encountered by surgeons in dentistry. Early identification and retrieval prevent sequelae like infection and chronic maxillary sinusitis. However, after retrieval of the tooth root, the created OAC needs careful evaluation and appropriate treatment. Oroantral communication can hinder the healing process of the extraction site as OAC being an unnatural communication being the oral cavity and sinus paves the way for bacteria resulting in infection. As mentioned earlier it occurs frequently in maxillary molars and premolars. Development of oro antral fistula (OAF) may also be seen in implant cases after sinus lift surgery, cyst enucleation [5], and maxillofacial trauma [6]. Various tests can be done to examine OAC like the Nose blow test, Mirror test, and Butterfly test. Defect size <2mm heal simply due to blood clot formation post-extraction and secondary healing while larger defects over 3mm should be managed surgically to eradicate future complications. Prompt closure of larger defects is highly recommended [7]. A success rate of 95% was found when OAC was closed immediately while a 67% success rate was noted if OAF was formed.

Long-standing untreated and undiagnosed OAC develops manifestation due to continuous contact with the oral cavity and improper sinus drainage. This patient can report the symptoms of acute sinusitis like fatigue, fever, and loss of appetite. In these situations, antibiotics like Augmentin 625mg or clindamycin 300mg 3 times for 5 days should be prescribed to treat the infections. The nasal decongestant should also be prescribed to shrink nasal mucosa. Even after the eradication of acute sinusitis, it is mandatory to treat oro-antral communication otherwise it may develop into permanent OAF transforming sinus mucosa into non-self-developing polyps, ulcerations, epithelial metaplasia, and fibrosis. Even though the general condition is minimally affected, in this stage patient is compliant with persistent nasal regurgitation, nasal obstruction or discharge, and cacosmia. All these clinical findings confirm the diagnosis of chronic oro-antral fistulas with sinusitis. But their quality of life is affected they need proper evaluation and treatment at the earliest [8].

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Radiographic features of oro-antral communication are interruption of bony continuity in the maxillary antrum floor. Among the two-dimensional radiographs, the intraoral periapical film (IOPA) provides better clarity about the maxillary sinus floor compared to panoramic films. Dimensions of defects can be measured better with the help of three-dimensional radiographic methods like cone beam computed tomography. Whenever a root fragment is displaced into the sinus in the vicinity of the antral floor, IOPA is helpful to visualize the root fragment.

Various techniques were reported for retrieval of fractured root/fragments from maxillary sinus like the intra-alveolar (via extraction socket) method, the Caldwell-Luc approach, and functional endoscopic sinus surgery. Each technique has its pros and cons. In the intra-alveolar method,

the root was grasped with the narrow high-pressure suction tip when the root was displaced in the maxillary antrum. Another method used was socket packed with ½ inch wide sterile dry gauze. The packed sterile gauze was pulled out in one stroke and this removed the root. In the following scenarios, the intra-alveolar method of root retrieval was cumbersome: (i) If the level of displaced root is too high, (ii) If the root is bulky, (iii) If the root is not loose. In all these clinical situations, the Caldwell-Luc approach will be performed for the retrieval of roots. It is a safe, simple, and fast method with minimal complications. However, large intraoral incisions, removal of bone from maxillary antrum, and temporary infraorbital nerve paresthesia are the few reported complications with this technique. Functional endoscopic sinus surgery is considered one of the least invasive methods used to remove the root fragments from the maxillary sinus. Complex armamentarium, cost, high technique sensitivity, and steep learning curve are the limitations of endoscopic-assisted surgery.

Largest OAC defects, >5 mm need soft tissue flaps like Bichat's fat pad, Buccal advancement flap, and Palatal rotational flap. Palatal island flap to cover the defect area. In the literature alloplastic materials like human fibrin glue (Tissucol®) [9], and beta-tricalcium (RootRéplica®) [10] were also used in the management of OAC to create the seal between the maxillary antrum and oral cavity. Due to the extensive vascularity of the tongue, a tongue flap was used to cover the OAC site. The major disadvantage is the complicated post-operative recovery as the patient maxillomandibular fixation is followed by another surgery to set the flap back [11]. The simplest technique is the buccal advancement flap technique but the major disadvantage is its poor blood irrigation and decrease in the vestibular depth in the respective area. Taking this into consideration, the palatal rotation flap has good blood irrigation but still limits as the recovery process is painful for the patient post operatively. Thus, some authors suggested the palatal island flap be used [12]. But eventually studies and research have mentioned complications of the palatal rotation flap like the formation of an oroantral fistula and partial necrosis of the flap [13]. Most authors recommended using a Bichat's fat pad graft according to the results obtained [14]. The major reason attributed is the excellent vascularisation it provides via branches of the maxillary artery. The buccal fat pad graft technique is easy to use having a low failure rate and minimal discomfort to the patient [15]. In the present case report, authors have performed a combination of bichat's fat pad and buccal advancement flap. This technique ensured the dual layer soft tissue barrier between maxillary antrum and oral cavity, hence satisfactory healing was achieved in the postoperative phase.

4. Conclusion

In the present case report the intra-alveolar method was used to successfully retrieve the displaced palatal root, but the patient reported complications of nasal regurgitation in the postoperative period. In the second stage, OAC was managed with a combined bichat's fat pad and buccal advancement flap. To conclude, it is mandatory to evaluate the size of OAC after tooth retrieval and appropriate treatment options to be considered. A combination of bichat's fat pad with a buccal advancement flap can be considered as one of the suitable options to create a dual soft tissue barrier between the maxillary antrum and oral cavity.

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