A Case of Oro-antral Communication Closed by Autotransplantation of Third Molar

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Abstract A number of surgical treatment modalities have been described in literature for closure of oro-antral communications. None of the methods however provide for immediate prosthetic rehabilitation of the communication site. We describe a case of oro-antral communication treated using autogenous third molar transplantation. At 18 months of follow-up, the transplanted tooth was functioning well with radiographic evidence of lamina dura and periodontal ligament. Its root-tip was still seen projecting into the maxillary sinus. This report suggests that when possible, autotransplantation of third molar can be a simple and excellent choice for closure of oro-antral communications.

Keywords Oroantral fistula · Autotransplantation · Third molar · Rehabilitation

Introduction

An oro-antral communication (OAC) is an opening between the oral cavity and the maxillary sinus. It results commonly due to extraction of maxillary posterior teeth. The reported incidence is low and varies from 0.31 to 4.79 % [1]. Treatment of this condition depends on a number of factors like (1) the size of the communication (2) time of diagnosis (3) presence of infection (4) future prosthetic rehabilitation of the site and (5) the condition of buccal and palatal tissues [2]. Surgical treatment is

necessary if (1) the opening is more than 4–5 mm (2) if a diseased sinus is present or if (3) the OAC is persistent [3]. Various surgical modalities have been discussed in literature for closure of OACs [2, 4]. But none of the popular methods provide for immediate prosthetic rehabilitation of the communication site. We present a case of OAC which was successfully treated with autogenous third molar transplantation. To the best of our knowledge this is only the second report [5] of OAC treated with this method.

Case Report

A 22 year old female patient reported to the Department of Oral and Maxillofacial Surgery for routine extraction of maxillary left 1st molar with advanced crown loss. There was no relevant medical history. The patient had no history of abusive habits. An orthopantomogram available with the patient showed the 1st molar to be in close relation to the maxillary sinus (Fig. 1). Extraction was done under local anaesthesia. Careful curettage of small periapical pathology related to the tooth led to inadvertent OAC of around 5 mm. Since the panorex demonstrated impacted upper 3rd molars, it was decided to autotransplant a 3rd molar to close the OAC. Right 3rd molar was selected as it was more easily retrievable than the left. The inter-radicular bone at the 1st molar site was carefully removed using a surgical drill to create a four-walled socket since the 3rd molar was single rooted. Saline soaked gauze was then placed at the 1st molar site till the donor tooth was harvested (Fig. 2).

A mucoperiosteal flap was reflected to expose the right maxillary 3rd molar. Small amount of bone overlying the crown portion of the tooth was removed. Damage to the tooth root was prevented. The 3rd molar was extracted

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Fig. 1 Orthopantomogram showing left maxillary tooth with advanced crown loss in close proximity to maxillary sinus with impacted maxillary third molars

Fig. 4 Immediate post-operative IOPA following splinting of the transplanted tooth. Roots of the third molar are seen projecting into the maxillary sinus

Fig. 2 Harvested maxillary third molar for transplantation

Fig. 5 Good clinical health of the transplanted tooth at 18 months follow-up

Fig. 3 Donor third molar initially fixed with sutures at the 1st molar site

atraumatically and placed at the 1st molar site. Tight interdental suturing was done to closely adapt the gingiva around the tooth (Fig. 3). Since the 3rd molar was not stable at the recipient site, it was splinted using composite resin and stainless steel wire with the adjacent teeth (Fig. 4). Amoxicillin 500 mg thrice a day, an antihistamine and an analgesic were prescribed for 3 days. Patient was instructed to have only semi-solid diet for 3 weeks. Sutures were removed after 1 week and splint was removed after 3 weeks. Since the third molar had completely formed roots, root canal treatment was carried out after 3 weeks. This was followed by crown placement at 6 months from the transplantation. After 18 months, the patient was asymptomatic with healthy tooth at the site (Fig. 5). Intra oral periapical radiograph showed a lamina dura and

Fig. 6 IOPA at 18 months showing lamina dura and periodontal ligament space with tooth root still projecting in the sinus

periodontal ligament (PDL) space (Fig. 6). The apex of the tooth was still seen projecting into a clear maxillary sinus.

Discussion

Traditionally, local soft tissue flaps have been the cornerstone for the treatment of OACs. Most commonly used is the Rehrmann's buccal flap [6] wherein a broad-based trapezoidal flap is used to close the communication. The disadvantage is that it can decrease the buccal sulcus depth at the site; which can hinder prosthetic rehabilitation. If a palatal flap is used it can leave a large denuded area which granulates secondarily and causes significant pain and discomfort [2]. Pedicled buccal fat pad have also been used with predictive results. This simple procedure allows closure of large defects up to 10 mm × 10 mm with minimal donor site morbidity [7]. However it is not usually used for closure of OACs through a single extraction socket.

With increasing demand of prosthetic rehabilitation at the communication site, the use of such soft tissue flaps has become a problem. Watzak et al. [8] have described the use of monocortical bone grafts from retromolar or interforaminal regions for closure of chronic oro-antral fistulas. This was done to facilitate subsequent sinus floor elevation and implant placement. Recently Sandhya et al. [9] used guided tissue regeneration (GTR) membrane and freeze dried mineralized bone (FDMB) allograft for closure of oro-antral defects. They noted excellent bone formation at the site. This helped in subsequent implant placement without the need for donor site surgery for bone grafting.

All of these surgical procedures involve a significant amount of time and cost for prosthetic rehabilitation. In our case however we were able to successfully close the communication as well as provide for prosthetic rehabilitation of the patient immediately. The transplanted tooth healed well with formation of PDL. With a donor tooth of adequate shape and size present, it was possible in our case to perform the procedure immediately without any major

surgical procedure. The most important step was, adequately removing the inter-radicular bone at the recipient site and careful atraumatic extraction of the donor tooth. The periodontal healing of transplanted teeth depends on the presence of viable cells on the donor tooth root [10]. Therefore the tooth should be transplanted with minimal extra-oral time and without any damage to the PDL so as to achieve predictable results. The gingiva at the recipient site should closely adapt the donor tooth to prevent seepage of bacteria and saliva which could cause pocket formation [11]. This would not only cause transplant failure but could also lead to secondary infection of the sinus and persistence of OAC. The stability of the tooth is also of utmost importance if healing has to take place. If the tooth cannot be stabilized with frictional contact with adjacent teeth, the use of splinting is necessary, as in our case. While traditionally, third molars with developing roots have enjoyed high success following transplantation [12]; Bae et al. [13] have shown, excellent results are achievable following transplantation of third molars with complete root development. However as revascularization is not possible, it is necessary that root canal treatment of such teeth be carried out after a minimum of 2 weeks. This is to allow for initial periodontal healing and subsequently crown placement is carried out [11].

The result of our case is similar to that of Kitagawa et al. [5] where 2 cases of OACs were closed by immediate tooth transplantation. Like our case, no root resorption or ankylosis was observed and the patients were asymptomatic for any sinus disease. Previous techniques have focussed on providing good bone for implant placement at the OAC site which involves significant cost and time. Immediate auto-transplantation of tooth in our case was not only cost-effective as compared to an implant but also provided for proprioception which cannot be obtained by any other prosthetic treatment modality. Also, they provide good aesthetics, allow for orthodontic movement, can be performed in growing patients and have a long survival time.

Tooth transplantations, have some limitations: requirement of sufficiently developed third molar of appropriate shape and size, risk of ankylosis and root resorption if not carried out with proper technique and the need for root canal treatment in developed donor teeth. It can only be used to close OACs restricted to a single tooth and is not suitable for large defects. Also it is suitable for only immediate communications and not for long-standing oro-antral fistulas.

To conclude, our report suggests that when possible, autogenous third molar transplantation is a simple and excellent treatment option to close small OACs following tooth extraction. Long term studies comparing it with other treatment modalities would provide better evidence of its success.

Conflict of interest None.

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