

CASE REPORT

Autotransplantation of a lower third molar germ without its follicle immediately after removal of unrestorable first molar

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Abstract

Orthodontic autotransplantation can be defined as the placement of a tooth or tooth germ, with or without vitality, in a natural alveolus corresponding to another tooth, or in an artificially created alveolus for this end. Careful patient selection coupled with the selection of appropriate techniques are prerequisite for a good functional treatment and proper esthetic outcome. The purpose of this article was to report a case of a seventeen years old female patient who has undergone tooth autotransplantation, in which the patient was operated by replacing a non-restorable left mandibular first molar on the same side with that of lower third molar germ without its follicle from.

Key Words: Orthodontic autotransplantation, molar germ, esthetic dental surgery.

Introduction

Teeth autotransplantation have been considered, since the mid of the 20th century, as viable rehabilitation alternatives. Since then, most studies of the transplanted teeth were more concerned with the effects and changes of periodontium, root development, and other factors influencing pulp and periodontal healing (1-5). Pulp necrosis is more common in teeth with complete root formation, in view of the fact that revascularization of the pulp is not to be expected in most cases (6-8). Accordingly, the American Association of Endodontists recommends that the pulp of teeth with closed apices be extirpated 7 to 14 days after transplantation; otherwise the necrotic pulp and subsequent infection may result in inflammatory resorption and decrease the survival time of the transplanted autografts (9). Although higher success rates are achieved with teeth that have immature roots, these teeth have less root growth formation after transplantation than other auto-grafted teeth that have more mature, although not completely formed, apices (10). Perhaps, this is partially attributed to some rate of destruction of the Hertwig's epithelial root sheath during the orthodontic transplantation procedure (11). We aimed here to report the significance of orthodontic autotransplantation with follow-up of the dental development for up to 9 months post surgically in a seventeen years old patient, highlighting the treatment valuable outcome and the resultant esthetic finish.

Case Report

A seventeen-year-old female patient with excellent general and oral health was referred to the oral surgery department of the Al-Andalus University/Tartous/ Syria.

The patient was complaining about a discomfort and sometimes pain in the area of tooth number 36 Upper or lower jaw. During clinical examination, the lower left first molar presented with its clinical crown destroyed by extensive carious lesion and pulp necrosis which were radiographically confirmed. Also, a periapical lesion with large bone rarefaction was seen in the radiograph and an impacted tooth number 38 with radiographically formed bifurcation and roots developed at half of the total length (Figure 1). Considering the age of the patient and the absence of a contributory systemic disease or any complicating factors, extraction of tooth number

36 and an autotransplantation of tooth number 38 were thoroughly planned. Consent form was clearly explained and then signed by the patient's mother, in which, all surgical treatment's risks and complications were made clear, authorizing the patient's dental intervention and the possibility of autogenous tooth transplantation.

Surgical procedure

Initially, to reduce the risk of infection, the patient was led to gargle an intraoral antiseptic solution of 0.12% chlorhexidinedigluconate for one minute. Subsequently, local anesthesia was commenced with the injection into the inferior alveolar, lingual and buccal nerves sites with 2 tubes of Mepivacaine HCl, 2% containing Levonordefrin 1:20,000 to enhance and localize the anesthesia. The tooth at the recipient site is then sectioned with a dental bur and carefully extracted with preserving alveolar bone intact. Thereafter, the soft tissue at the socket bottom was surgically removed by curettage and the recipient socket is prepared accordingly to match the measurements of donor tooth germ from the panoramic radiograph. Continuing with the dental procedure, the removal of the inter-radicular septum was achieved. The enveloped full-thickness mucosal flap was raised to visualize tooth number 48 upper or lower jaw. Next, after bone removal the tooth germ was then carefully removed without its dental follicle. Subsequently, the dental follicle of tooth number 38 was completely removed from its socket and from the attached covering mucoperiosteal tissue. Once removed, donor tooth was stored in its original socket until further adjustment of the recipient socket is performed. Finally, tooth number 38 was positioned properly in tooth number 36 socket. Gum wound closure was performed with 3-0 size silk, aiming to stabilize the operated tissue and the transplanted tooth in a slight infra-occlusion pattern. Upon completion of the dental procedure, the patient was then prescribed with the followings: Oral antibiotics, combined amoxicillin and clavulanic acid 1000 mg every 12 hours continuously for 7 days. Analgesic and anti-inflammatory treatment with ibuprofen 1800 mg every day for 3 days and oral antiseptic solution of 0.12% chlorhexidinegluconate to be gargled with every 12 hours for 10 days. Moreover, the patient was carefully instructed on the importance of maintenance of oral hygiene and to promptly refer to the dental clinic should any complications come up.

Patient follow up

In the present study, the predictor variable was the Patient first follow-up was carried out 1 week following surgery and suture removal.

Dental radiographic examination was done in the subsequent 3rd, 6th and 9th months and additional sensitivity test to cold sensation was performed on the 9th month post-operatively.

Upon the 9th month follow up examination, it was found that the transplanted tooth was asymptomatic and the radiographic assessment confirmed a healthy periodontal ligament space that was surrounded by lamina dura. Additionally, it was observed that a new bone formation around the bifurcation area took place with normal periodontal pocket depth. Neither root resorption nor ankylosis was noted. Interestingly, the donor tooth showed completely formed apices, however, typical roots development did not occur and the tooth failed to erupt to the occlusal level. Furthermore, the examination revealed the presence of signs of positive regeneration and absence of pulpal infection and complication.

Discussion

This study presents a case of up to 9 months follow-up autogenous tooth germ transplantation without tooth follicular cyst involvement. According to Tsukiboshi, successful dental transplants must show normal pocket depth, physiological mobility, no clinical discomfort, and normal periodontal ligament (PDL) space and lamina dura (9). Thus, according to these criteria, the outcome of our case study can be concluded to be successful. Our examination findings of the present case showed complete apices formation of the donor tooth without typical roots emergence. Such finding come in tandem with previous studies' outcome, in which dental transplantation of teeth with immature roots offered high achievement rates (12), with teeth having less root growth post-transplantation than other auto-grafted ones, and with the auto-grafted teeth having more mature but not completely formed apices (10,13). Continued root development after transplantation can be expected if the donor tooth is immature and Hertwig's epithelial root sheath is preserved around the apices (15). It is well established that the concept of the dental follicle which forms the supporting tissues of the tooth, the cementum, the periodontal ligament and alveolar bone, plays a very important role in tooth eruption (15-17). Studies suggest that the coronal half of the dental follicle regulates bone resorption (osteoclastogenesis), while the basal half regulates bone formation (osteogenesis) (16-21), this perhaps explains, in our case, the failure of transplanted tooth to erupt to the occlusal level. The autotransplanted tooth should be held in the recipient site for periodontal healing. Some of the most controversial factors are type and time of splinting of the transplanted tooth, although there is coincidence in the fact that the aim is to obtain

adequate primary stability during the healing period (20). This is impacted by the use of a rigid splinting which in turns promotes complete immobilization of the tooth and stimulates tooth resorption. According to the literature, non-rigid splinting seems not to negatively interfere in the periodontal ligament as it allows a certain mobility that is considered to be an important factor for periodontal fibers regeneration and hence, favors the transplantation prognosis (21). In our case, the transplanted tooth was fixated for 1 week with silk sutures through the gingivae, crossing the occlusal surface labio-lingually. The rationale behind this is that flexible splinting allows functional movements of teeth, which stimulates activity of PDL cells and enhances the functional arrangement (22). Tsukiboshi also reported that splinting is not essential but beneficial in most of the autotransplantation cases, and that the tooth is to be fixed for a period of time around 2 weeks - 2 months, depending on whether the orthodontic mobility is reduced or not (9,23).

Conclusion

Based on the case presented here, it can be concluded that autogenous transplantation of non-follicular tooth germ, can be viable, valid and predictable treatment option, despite the fact that typical roots may never develop. However, for optimal autogenous transplantation, the orthodontic treatment should be clinically well-indicated, planned and executed.

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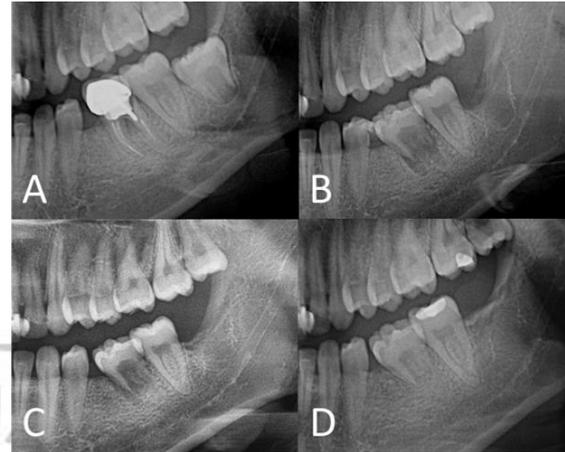


Figure 2 Panoramic radiographs of the patient jaw surgical site of (A) Prior to tooth extraction, (B) immediately after tooth implantation, (C) Three months post-operatively, (D) Nine months post-operatively.

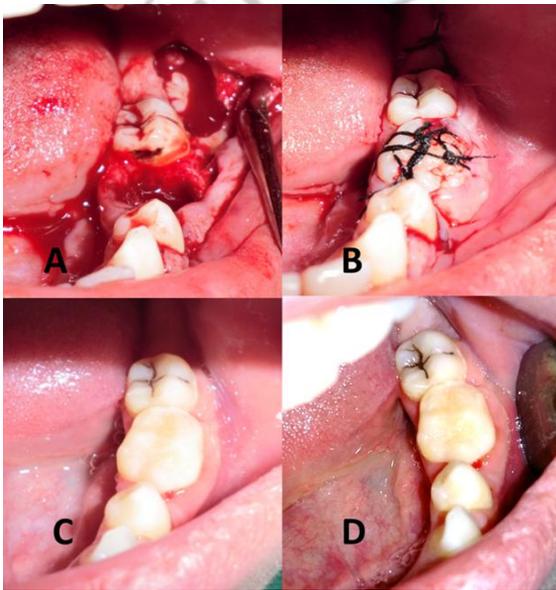


Figure 1 (A) Following the patient dental extraction, (B) splinting donor tooth, (C) One week post dental surgery, (D) Six months post dental surgery.