INTERNATIONAL JOURNAL OF CURRENT MEDICAL AND PHARMACEUTICAL RESEARCH

IJCMPR

Available Online at http://www.journalcmpr.com

CASE REPORT

AUTOTRANSPLANTATION OF A LOWER THIRD MOLAR GERM WITH USING AUTOLOGOUS PLATELET-RICH FIBRIN AFTER REMOVAL OF UNRESTORABLE FIRST MOLAR: A CASE REPORT

Al Nashar, A[1]*., Eizouki, A[2] and Khlili,H[3]

[1]DDS, MSc ,OMS, Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Al-Andalus University for Medical Sciences, Syrian Arab Republic
[2,3] Undergraduate student, Faculty of Dentistry, Al-Andalus University for Medical Sciences, Syrian Arab Republic

ARTICLE INFO

Article History:

Received 19th September, 2016
Received in revised form 8th October, 2016
Accepted 4th November, 2016
Published online 28th December, 2016

Key words:

Auto-transplantation, Third Molar germ, platelet-rich fibrin (PRF).

ABSTRACT

The purpose of this article was to report case of autotransplantation for replacing unrestorable left mandibular first molar with lower third molar germ from the same side. The recipient site was regenerated with using autologous platelet-rich fibrin (PRF) to enhance the speed of healing process and to accelerate root formation of the immature donor third molar tooth.

INTRODUCTION

Autotransplantation refers to the repositioning of autogenous erupted, semierupted or unerupted tooth; from one site into another in the same individual (Natiella *et al*, 1970).

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 (Schwartz *et al*, 1985; Monsour and Adkins, 1985; Andreasen *et al*, 1988; Bauss *et al*, 2008). Excellent success rate can be achieved if the donor third molar tooth is transplanted before complete root formation (Hernandez and Cuestas-Carnero, 1988). 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 (Proye and Polson, 1982).

Platelet-rich fibrin (PRF) is the second generation of platelet concentrates after platelet-rich plasma (PRP) and it is widely used to accelerate soft and hard tissue healing (Choukroun *et al*, 2006). It consists of high concentrations of the collected platelets, which allow slow release of growth factors, These GFs include vascular endothelium growth factor (VEGF), platelet-derived growth factor (PDGF), fibroblast growth factor (FGF), epidermal growth factor (EGF), hepatocyte growth factor (HGF), insulin-like growth factor (IGF), and transforming growth factor-β (TGF-β). All of these play a role in replacing lost tissue, resurfacing of the wound, and restoring vascular integrity (Kang *et al*, 2011) PRF has been used in bone augmentation, angiogenesis, wound healing, and periodontal healing, with promising results. (Choukroun *et al*, 2006; Kfir *et al*, 2007)

CASE REPORT

A 18-year-old male patient with excellent general and oral health was referred to the oral surgery department of the Al-andalus University for medical science complaining about a discomfort and pain in the area of tooth #36. At clinical examination the lower left first molar presented its clinical crown destroyed by extensive carious lesion and pulp necrosis which were radiographically confirmed; also, a periapical lesion was seen in the radiograph and an impacted tooth # 38 with radiographically formed bifurcation and roots developed 1/3 of the total length.

Considering the age of the patient and no contributory systemic disease extraction of #36 and an auto transplantation of # 38 was planned. Consent form was signed by the patient, where all treatment's risks and complications were explained.

PRF preparation

The PRF was prepared in accordance with the protocol developed by Choukroun *et al*. Just prior to surgery, 8 ml intravenous blood was collected in a 10-ml sterile tube without anticoagulant and immediately centrifuged in centrifugation machine at 3000 rpm for 10 minutes (Labofuge 400R centrifuge, Heraeus, Hanau, Germany). Blood centrifugation immediately after collection allows the composition of a structured fibrin clot in the middle of the tube, just between the red corpuscles at the bottom and acellular plasma (Platelet-poor plasma) at the top. PRF results from a natural and progressive polymerization which occurs during centrifugation. PRF was easily separated from red corpuscles base [preserving a small red blood cell (RBC) layer] using a sterile tweezers and scissors just after removal from the tube and then transferred onto a sterile dapen dish and stored in refrigerator.

Surgical Procedure

Intraoral antisepsis with 0.12% chlorhexidine digluconate, for one minute; Under local anesthesia of inferior alveolar, lingual and buccal nerves with 2 tubes of 2% mepivacaine with 1:100000 epinephrine. The tooth at the recipient site is sectioned with a bur and extracted preserving alveolar bone. The soft tissue at the socket bottom was removed by curettage and then the recipient socket was prepared considering measurements of donor tooth germ from panoramic radiograph, removal of the inter-radicular septum, Next, envelope Full-thickness mucosal flap was raised to visualize the 38, after bone removal the tooth germ was carefully removed without its dental follicle, the dental follicle of tooth 38 was completely removed from its socket and from the attached covering mucoperiosteal tissue. Once removed, donor tooth is stored in its original socket until further adjustment of recipient socket are performed, and, finally, tooth 38 was positioned in the tooth 36 socket. Closure was done with 3-0 silk aiming to stabilize the tissues and the transplanted tooth in slight infra-occlusion. Fig (1,2)

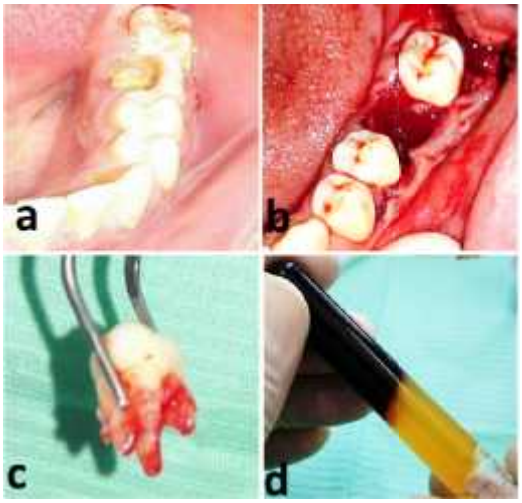

Figure 1 (a), before extraction (b), after extraction (c), the third molar germ (d), PRF

The follow up

Post-operatively the Patient was given antibiotics (amoxicillin and clavulanic acid 1000mg every 12 hours for 7 days), oral anti-inflammatory treatment (ibuprofen 1800 mg every day for 3 days) and 0.12% chlorhexidine gluconate rinses every 12 hours for 10 days. The patient was given instructions on the importance of maintenance of oral hygiene. First follow-up is carried out in 1weeks for suture removal and radiographic examination is done in, immediately, 3and 6 months and additional sensitivity test to cold in 6 months postoperation. At the 6 month follow up, the transplanted tooth was asymptomatic and the radiographic examination confirmed healthy periodontal ligament space surrounded with lamina dura. In addition, new bone formation around the bifurcation area was observed and periodontal pocket depth is normal. Neither root resorption nor ankylosis was noted. The donor tooth showed formed apices but typical roots didn't develop and the tooth failed to erupt to the occlusal level. There was signs of positive regeneration and absence of pulpal infection fig (3).

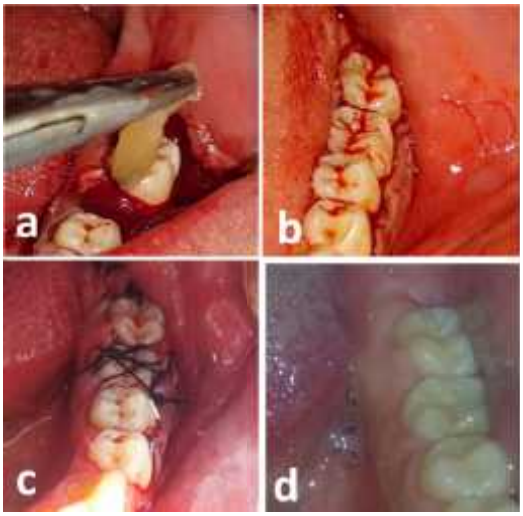

Figure 1 (a), placing PRF (b), placing third molar germ (c), suturing (d), after 6month.

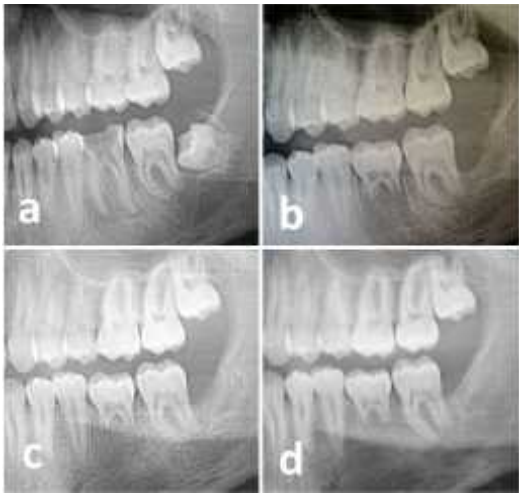

Figure 3 Panoramic radiograph of surgical site of : (a) before extraction, (b) immediately after implnation (c), after 3 months (d) after 6 month

DISCUSSION

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 (Thomas *et al*,1998). Perhaps, this is partially attributed to some rate of destruction of the Hertwig's epithelial root sheath during the transplantation procedure (Bauss *et al*, 2008). Currently, PRF has been successfully tested in a number of

procedures including maxillofacial surgery, and implantology (Sharma and Pradeep, 2011).

PRF has also been shown to stimulate the growth of osteoblasts and periodontal ligament cells, both of which are significant for the regeneration of periodontal defects (Sharma and Pradeep, 2011; Ehrenfest *et al*, 2010; Simonpieri *et al*, 2011). In this case, Autologous platelet-rich fibrin (PRF), a second generation platelet concentrate placed at the recipient site to enhance the speed of healing process and also to accelerate root formation of the immature donor third molar tooth. The successful transplants must show normal pocket depth, physiological mobility, no clinical discomfort, and normal PDL space and lamina dura (Tsukiboshi, 1993). In our case bone formation showed significant difference between the first and third months. Complete bone formation was found after six month of surgery and the donor tooth showed formed apices but typical roots didn't develop and this compatible with previous studies (Vriens and Freihofer, 1994; Thomas *et al*,1998;Ustad and Ali, 2013). According to these studies, 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 (Proye and Polson, 1982). In present case the transplanted tooth is fixated with silk sutures through the gingivae, crossing the occlusal surface labio-lingually for 1 week. Flexible splinting allows functional movement of teeth, which stimulates activity of PDL cells and functional arrangement (Teixeira *et al*, 2006). Tsukiboshi reported that splinting is not essential but beneficial in the most autotransplantation cases, and the tooth should be fixed for between 2 weeks and 2 months depending on whether the mobility is reduced (Tsukiboshi,1993;Tsukiboshi, 2002).

CONCLUSION

It can be concluded that, PRF is efficacious clinically and radiographically in the treatment of auto transplantation.

References

Andreasen JO, Kristerson L, Andreasen FM,(1988) . Damage of the Hertwing's epithelial root sheath: effect upon root growth after auto-transplantaion of teeth in monkeys. Endod Dent Traumatol, 411:145-51.

Bauss O, Zonios I, Rahman A,(2008). Root development of immature third molars transplanted to surgically created sockets. *J Oral MaxillofacSurg*, 66:1200-11.

Bauss O, Zonios I, Engelke W,(2008) . Effect of additional surgical procedures on root development of transplanted immature third molars. *Int J Oral MaxillofacSurg*, 37:730-5.

Choukroun J, Diss A, Simonpieri A,(2006). Platelet-rich fibrin (PRF): A second-generation platelet concentrate. Part IV: Clinical effects on tissue healing. Oral Surg Oral Med Oral Pathol Oral Radiol Endod ,101:e56.

Choukroun J, Diss A, Simonpieri A, Girard MO, Schoeffler C, Dohan SL, Dohan AJ, Mouhyi J, Dohan DM,(2006) . Platelet-rich fibrin (PRF): a second-generation platelet concentrate. Part V: histologic evaluations of PRF effects on bone allograft maturation in sinus lift. Oral Surg Oral Med OralPathol Oral RadiolEndod ,101: 299-303.

EhrenfestD, Corso M, Diss A, Mouhyi J, Charrier J, (2010). Three-dimensional architecture and cell composition of a Choukroun's platelet-rich fibrin clot and membrane. *Journal of Periodontology* ,81: 546-555.

Hernandez SL, Cuestas-Carnero R, (1988) . Autogenic tooth transplantation: A report of ten cases. *J Oral MaxillofacSurg* ,46:1051-5.

Kang Y, Jeon S, Park J, (2011). Platelet-rich fibrin (PRF) is a bioscaffold and reservoir of growth factors for tissue regeneration. Tissue Engineering ,17 :349-359

Kfir E, Kfir V, Kaluski E,(2007). Immediate bone augmentation after infected tooth extraction using titanium membranes. *J Oral Implantol* ,33: 133-8.

Monsour FNT, Adkins KF,(1985) . Aberration in pulpal histology and dentinogenesis in transplanted erupting teeth. *J Oral MaxillofacSurg* ,43:8-13.

Natiella JR, Armitage JE, Greene GW,(1970) . The replantation and transplantation of teeth.A review. OralSurg Oral Med Oral Pathol, 29:397-419.

Proye MP, Polson AM,(1982). Repair in different zones of the periodontium after tooth reimplantation. *J Periodontol* , 53:379-89.

Schwartz O, Bergman P, Klausen B,(1985) . Autotransplantation of human teeth: life-table analysis of prognostic factor. *Int J Oral Surg*,14:245-58.

Sharma A, Pradeep A, (2011). Treatment of 3-wall intrabony defects in chronic] clinical trial. *Journal of Periodontol*, 82: 1705-1712.

Simonpieri A, Choukroun J, Corso M, Sammartino G ,Ehrenfest D, (2011). Simultaneous sinus-lift and implantation using microthreaded implants and leukocyte and platelet-rich fibrin as sole grafting material: a six-year experience. Implant Dentistry, 20 2-12.

Teixeira CS, Pasternak B Jr, Vansan LP, Sousa-Neto MD,(2006).Autogenous transplantation of teeth with complete root formation: two case reports. *Int Endod J*,39:977- 985.

Thomas S, Turner SR, Sandy JR, (1998). Autotransplantation of teeth: is there a role? *Br J Orthod*, 25(4):275–82.

Tsukiboshi M, (1993). Autogenous tooth transplantation: a reevaluation. *Int J Periodontics Restorative Dent*, 13:120-149

Tsukiboshi M, (2002). Autotransplantation of teeth: requirements for predictable success. Dent Traumatol ,18:157-180.

Ustad F, Ali FM,(2013).Autotransplantation of teeth: A review. *Am J Med Dent Sci*, 1:25-30.

Vriens JP, Freihofer HP,(1994). Autogenous transplantation of third molars in irradiated jaws a preliminary report. *J CraniomaxillofacSurg*, 22(5):297–300.