



ORIGINAL RESEARCH PAPER

Dental Science

SUCCESS AND FAILURE OF AUTOTRANSPLANTATION: A CASE REPORT

KEY WORDS:

Autotransplantation, Biodentine , Success , Failure.

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ABSTRACT

Tooth transplantation is a method of repositioning autogenous teeth in another tooth extraction site to replace missing teeth, when a suitable donor tooth is available. Autotransplantation has achieved high success rates and is an excellent option for tooth replacement. The indications for autotransplantation are narrow, careful patient selection coupled with an appropriate technique can lead to exceptionally well esthetic and functional results. This procedure is advantageous since the placement of an implant-supported prosthesis or any other form of prosthetic tooth replacement is eliminated. This case report is an example of a success and failure of tooth autotransplantation.

INTRODUCTION

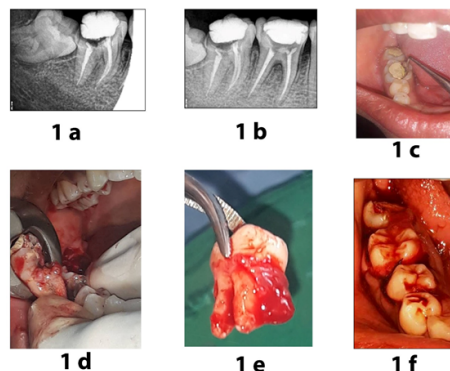
Missing teeth in youngsters are debilitating and replacement is of a particular challenge. One of the treatment options is auto transplantation, which consists of extracting and repositioning a tooth into a different site in the same patient. Indications are in case of developmental anomalies of teeth, in traumatic tooth loss, congenitally missing teeth, tumors, teeth with bad prognosis. This has been a cost effective procedure and also has resulted in better functional adaptation and alveolar ridge preservation. This procedure is contr ai ndicated in patients with cardiac anomalies, poor oral hygiene, insufficient alveolar bone support and lack of self motivation.¹

Ankylosis and root resorption are common complications associated with autotransplanted teeth. Developmental stage of the tooth, donor type, the duration of extraoral exposure of the donor tooth during surgery, damage to the root cementum and the periodontal ligament, and the experience of the oral surgeon are factors influencing the result.² The aim of this case report is to highlight 2 such cases of success and failure of autotransplanted 3rd molars in young patients.

Case report 1 (successful)

An 18 yr old female patient complained of pain associated with food lodgement in lower right back tooth region since 2 months. Patient gave a history of RCT in lower right back tooth region 6 months back. Clinical examination revealed dislodged restoration with secondary caries with 46 and 47 and vertically fractured mesiolingual and distolingual cusp with fracture line extending on root surface with 46 (fig 1c). Radiographic examination revealed obturation extending beyond apex with distal root of 46 (fig 1b) and mesioangular impacted 48 (fig 1a) with incomplete root development. As extraction with 46 was mandatory due to its poor restorability, treatment alternatives such as RPD, FPD, Implant were given to the patient. Due to financial constraints patient could not opt for Implant therapy. Hence an alternative conservative option of auto transplantation was suggested to the patient and informed consent was obtained. Analgesic, antibiotics were given to the patient 1 hr before the procedure to prevent infection, possible resorptive process and postoperative pain. Betadine gargles, local anaesthesia was administered and 46 was extracted without damaging the buccal and lingual cortical plate (fig 1d). Curettage of the socket was

performed followed by irrigation with metronidazole IV solution to disinfect the recipient site. This was followed by atraumatic disimpaction of 48 with minimal luxation so as to preserve maximum PDL on the root surface (fig 1e). Preparation of the recipient socket was carried out atraumatically with the use of surgical burs and the donor tooth (48) was tried into the recipient site (socket of 46) with light pressure and occlusion was evaluated. 48 was then transplanted into prepared socket of 46 (fig 1f). 3-0 silk sutures were used for close approximation of the flap. Non rigid intraradicular splinting was done with malleable orthodontic wire for adequate fixation (fig 1g). Post-operative oral hygiene and dietary instructions were given to the patient. Antibiotics and analgesics were prescribed, along with rinses with 0.2% chlorexidine. The sutures were removed after 7 days. Healing was found to be satisfactory and occlusion was found to be in maximum intercuspation. Hence no occlusal adjustment was required. Splint was held in place for 2 months. 3 months follow up radiograph revealed signs of resorption with mesial root of auto transplanted 48 (fig h). Hence intentional root canal therapy with transplanted 48 was planned keeping the splint intact. Cleaning and shaping was done and calcium hydroxide dressing was given for 2 weeks to initiate periapical healing and to stop root resorption (fig 1i, 1j, 1k). After 2 weeks of calcium hydroxide dressing, radiographs showed no sign of further root resorption. This was followed by obturation of 48 with Biodentine (fig 1k). Patient follow-up was done after 6, 9 and 12 months period and healing was evaluated clinically and radiographically. The tooth is still in full function after 12 months (fig 1l).



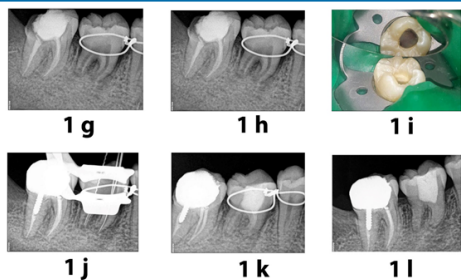


fig 1a: Mesioangular impacted 48, **fig 1b:** Obturation extending beyond apex with distal root of 46, **fig 1c:** Vertically fractured mesiolingual and distolingual cusp, **fig 1d:** Extraction with 46, **fig 1e:** Disimpaction of 48, **fig 1f:** 48 transplanted into prepared socket of 46, **fig 1g:** Intraradicular splinting of autotransplanted 48, **fig 1h:** 3 months follow up radiograph revealing signs of resorption with mesial root of transplanted 48, **fig 1i:** Access opening, **fig 1j:** wl determination, **fig 1k:** Obturation with biodentine, **fig 1l:** 1 Yr follow up

Case 2 (failure)

A 24 yr old male patient's clinical examination revealed grossly decayed 37 with subgingival caries extension and poor restorability (fig 2a,2b). Intentional endodontic therapy was performed with 38 (fig 2c) prior to extraction with 37 (fig 2d). To eliminate the apical 3mm of the apex, root end preparation was done with angulation of 90° to the long axis of tooth using surgical bur and 3mm of depth penetration and was restored with proRootMTA (fig 2g). Then transplantation of 38 in the socket of 37 was completed (fig 2h). Nonrigid splinting was done (fig 2i). 1 month and 70 days follow up was done. 70 days follow up RVG revealed external root resorption associated with cervical region of distal surface of distal root (fig 2k). Hence a periodontal surgery was planned. Crevicular incision was given and a full thickness mucoperiosteal flap was raised. The defect was surgically exposed, curettage was carried out and entire granulation tissue was removed. Biodentine was condensed into the defect, PRF was placed followed by closure of defect by suture placement (fig 2l). 3 week follow up RVG after biodentine placement revealed continued resorption in the apical area of distal root (fig 2m). Hemisection of distal root fragment was performed (fig 2n). The retained mesial root of 38 later showed signs of resorption (fig 2o) and extraction was carried out with the same. Several procedures were carried out meticulously to save the tooth which ultimately failed and resulted in loss of tooth structure.



fig 2a: Grossly decayed 37, **fig 2b:** Subgingival caries extension with 37, **fig 2c:** Intentional RCT with 38, **fig 2d:** Extraction with 37, **fig 2e:** Prepared recipient site, **fig 2f:** Extraction of 38, **fig 2g:** Restored with proRootMTA, **fig 2h:** 38 transplanted 37, **fig 2i:** Nonrigid splinting, **fig 2j:** 1 month follow up, **fig 2k:** 70 days follow up RVG revealed external root resorption associated with cervical region of distal surface of distal root, **fig 2l:** Biodentine and PRF condensed into the defect, **fig 2m:** Continued resorption in the apical area of distal root, **fig 2n:** Hemisection of distal root fragment, **fig 2o:** Retained mesial root of 38 later showing signs of resorption

DISCUSSION

Auto transplantation is a routinely carried out procedure in dental practice especially in children and young adults.² From therapeutic and economic perspectives this procedure is considered as a feasible alternative to conventional prosthetic and implants rehabilitation. 74% to 100% success rates of auto transplantation have been reported over the past decade.⁴ Extra circumstances in which transplantation can be carefully included are tooth agenesis, shocking tooth loss, atopic outbreak of canines, root resorption, large endodontic lesions, cervical root fractures, localized juvenile periodontitis as well as other pathologies. Autotransplantation of teeth ensures that alveolar bone volume and proprioception is maintained, due to physiological stimulation of the periodontal ligament, improved esthetics, arch form, dentofacial development, mastication, speech and arch integrity.³

A multitude of factors influence the success rate; including developmental stage of the root, type of tooth, surgical trauma, the extraoral time, the shape/site of the recipient socket, and vascularity of the recipient bed. Pulp regeneration only occurs in developing teeth. Viability of PDL cells may be affected during extraction or by extra-oral factors such as variable pH, osmotic pressure, and dehydration. Thus, special attention should be paid to preserving the PDL as it plays critical role in success.³

The extraoral time should be between 3 to 16 mins and during this interval donor tooth should be kept moist, or else leads to inflammatory root resorption. Hank's balanced salt solution and coconut water are the best storage media for such tooth. The understanding of the healing process of a transplanted tooth is vital to its success as it reduces the occurrence of root resorption and ankylotic complications. Reattachment between the PDL connective tissues of the donor root surface and the wall of recipient socket occurs in about 2 weeks after transplantation.³

If transplantation of immature teeth is done under ideal conditions, and the diameter of the apical foramen is more than 1 mm radiographically pulp healing response or pulp regeneration can be predicted. Blood capillaries can enter the pulp through the wide apical foramen resulting in differentiation of invading replacement cells into a functional pulp. If a donor's tooth is immature, continued root development can be predicted if Hertwig's epithelial sheath is well preserved around the apices.³

In the replacement of young patient's missing teeth, transplantation plays a key role. The use of osseointegrated implants in growing patients with missing teeth is contraindicated as at this age, the alveolar bone is not yet completely formed. If implants are placed in patients with residual facial growth, infra-occlusion of the implant takes place as the implant can get ankylosed to the bone. Alveolar bone growth results in poor esthetic. The possibility of using autogenous transplanted teeth in children thus requires further consideration.³

In comparison to the use of implants, bone induction around a transplanted tooth is a noteworthy additional benefit. The

differentiated osteoblasts may generate bone around the transplant that is perceived as a rapid bone regeneration and appearance of lamina dura.³

Recent development like CBCT, two stage transplantation and 3D prototyping have facilitated the fabrication of accurate surgical templates can be used to prepare the recipient site immediately prior to transplantation resulting in diminished extra oral time and better prognosis.³

CONCLUSION

From these two case reports, it is established that autogenous transplantation should be considered as a treatment option when indicated. Nevertheless, patient selection, presence of the appropriate donor and proper recipient site adds to its success. All these requires proper planning, good knowledge of exodontia, competence in surgical technique and patient compliance. In this new era of implants and fixed partial denture, auto transplantation becomes a cost effective way to replace a tooth when the posterior abutment is not suitable for support. If carried out correctly auto transplantation results in improved functional adaptation, biocompatibility in the oral cavity and preservation of the alveolar ridge, hence should be considered as a prime option.

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