

Auto transplantation of A Third Molar: A Case Report

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Abstract

Autogenous transplantation is an economical as well as the most sorted option for the treatment of badly destroyed teeth when a suitable donor tooth is available. This paper presents successful auto transplantation of a mature mandibular left third molar (38) without anatomical variance is used to replace a grossly decayed mandibular left second molar (37). The mandibular second molar was not restorable due to caries destruction of coronal tooth structure and a failed root canal treatment. After extraction of mandibular second molar, root canal therapy was done for the third molar extraorally, and the tooth was reimplanted into the recipient site. After 2 years, clinical and radiographic examination revealed satisfactory outcome with no signs or symptoms suggestive of pathology. In selected cases, autogenous tooth transplantation, even after complete root formation of the

donor tooth, may be considered as a practical treatment alternative to conventional prosthetic rehabilitation or implant treatment.

Keywords: Autologous, auto-transplantation, tooth transplantation.

Introduction

Prosthetic rehabilitation after loss of single tooth may be achieved with fixed or removable partial denture or with osseointegrated implants. An alternative treatment plan for single tooth replacement is auto transplantation provided a suitable donor tooth is available. Autogenous transplantation or autotransplantation is the transplantation of embedded, impacted, or erupted teeth from one site into extraction sites or into surgically prepared sockets in the same person¹. Though it is technically demanding it often saves time and is more economic when compared to implants or conventional

prosthesis. It results in better functional adaptation and preservation of alveolar ridge. Autotransplantation also facilitates dentofacial development, helps to maintain arch form, arch integrity, mastication, and speech².

Factors which may affect the outcome of autotransplantation are preservation of viability of periodontal ligament, extraoral time, developmental stage of root, extraction procedure, and the morphological similarity of donor and recipient teeth. A study by Sugai et al who followed 114 transplants found that at one-year success rate is 96%, and at five years success rate is 84%³. Causes of failure of autotransplantation are inflammatory root resorption and ankylosis. With increasing knowledge about the causes and prevention of root resorption, and healing potential of periodontal tissues, success rates of autotransplantation has increased rapidly.

Autotransplantation can serve as a feasible, fast and economical treatment option for patients provided that case selection is carried out correctly.

This paper presents autotransplantation of a mature mandibular left third molar to replace a mandibular left second molar which was unrestorable due carious destruction of coronal tooth structure and a failed root canal treatment.

Case Report

A 20 year old female patient reported to the department with complaint of pain on lower left posterior tooth. Patient gave a history of root canal treatment of the same tooth four years back. The filling on the tooth was dislodged since two years. Patient experienced pain on that tooth occasionally during chewing. Clinical examination revealed a grossly decayed lower left second molar with dislodged coronal restoration with the gutta percha exposed. On probing caries was extending to

floor of pulp chamber. Patient also experienced tenderness on percussion on the same tooth.

Radiographic examination revealed root canal treated 37 with underfilled obturation, lack of apical seal, loss of coronal restoration and extensive caries, with radiolucency extending upto the furcation area (fig 1). Due to poor prognosis of the tooth, extraction was indicated. Since the patient was not willing for a fixed prosthesis or implant due to the high treatment cost, autotransplantation of 38 was suggested as an alternative treatment option. Radiographic and clinical examination revealed that 38 had fully formed roots with closed apex and its mesiodistal dimensions were almost similar to 37. The root length of tooth 38 was lesser than 37. Root morphology of 38 and 37 also did not show any curvature and minimal risk was anticipated during extraction. Hence 38 was considered suitable for transplantation. After taking the complete medical history, the risks and benefits of the procedure were explained to the patient, and an informed consent was taken. The general health of the patient was good and her young age were favourable factors for healing following the procedure.

She had a limited mouth opening and had a limited access to 38 for root canal therapy, hence endodontic therapy of the tooth was planned extraorally. Extraction of 38 was done with minimal trauma holding the tooth only by the coronal part and care was taken to prevent any damage to periodontal ligament (PDL) cells (fig 2). The roots of 38 were kept moist with sterile gauze soaked in coconut water. Root canal therapy was done extraorally using ProTaper NiTi rotary files and irrigation with sodium hypochlorite and saline. Obturation was done using gutta-percha and AH plus sealer using lateral condensation technique. Occlusal reduction of the tooth was done. While root canal treatment for 38 was being done, 37 was extracted atraumatically by another clinician.

The tooth 38 was gently placed into the extracted socket of 37 without giving much apical pressure. Proper cervical adaptation of the tooth to the extracted socket was ensured. The soft tissues and the transplanted tooth were stabilized by suturing with silk thread. Transplanted tooth was splinted to the adjacent tooth using nonrigid intraradicular occlusal splinting with orthodontic wire and composite resin. The patient was prescribed antibiotics and analgesics. She was advised to have soft diet for a week and instructed to perform daily mouth rinsing with 0.2% Chlorhexidine gluconate, twice a day for seven days. Sutures were removed after a week and soft tissue healing appeared satisfactory. The splint was removed after two weeks. Patient was reviewed once in every three months for one year.

During review visits patient was asymptomatic. Mobility of the tooth was within physiologic limits. Periodontal probing depth was within normal limits and percussion showed normal response. Radiographic examination revealed normal periapical area with no widening of periodontal ligament space (fig 3). There were no signs suggestive of root resorption or other pathological process. After one year 38 was restored with porcelain fused to metal crown (fig 4).

Clinical and radiographic outcomes were satisfactory even after two years of follow up(fig 5).

Case Discussion

Autotransplantation. is a possible treatment option for the replacement of permanent teeth which needs to be extracted due to carious destruction, failed endodontic treatment, congenital deformity or lost due to traumatic injury, provided a suitable donor tooth is available.

The primary purpose of autotransplantation is to recreate a functional tooth.. Autotransplantation of teeth, has certain advantages compared to conventional prosthesis. It maintains the viability of the periodontal ligament,

proprioception is possible and maintains the alveolar bone volume^{4,5}. Attached gingiva is also maintained with a natural shape. Autotransplantation can be performed in growing patients and orthodontic tooth movement is possible⁶. The cost of autotransplantation is low compared to that of osseointegrated implants.

Autotransplantation is a technique sensitive surgical procedure and presents various challenges. Firstly a donor tooth compatible with the recipient socket must be available. Abnormal root morphology may complicate the extraction procedure and such teeth may not be suitable candidates for the procedure. There are chances of causing irreversible damage to the periodontal ligament during extraction. Also in cases of donor teeth with fully developed roots, endodontic therapy is required. Complications such as ankylosis, and inflammatory root resorption may occur. The outcome of autogenous tooth transplantation depends on proper case selection and treatment planning.

In the present case the lower left second molar had a poor prognosis due to failed root canal treatment and was indicated for extraction. The patient was given options of fixed prosthesis and single tooth implant for prosthetic rehabilitation. Since patient was concerned about the treatment costs, autotransplantation of third molar was suggested as a more economic option.

The donor tooth and recipient site should be examined for suitability and appropriate dimensions. It was reported that the receptor bed must be approximately 2 mm deeper and 1 mm wider than the donor-tooth to ensure the clinical success of autotransplantation⁷. The recipient socket is prepared a little larger than the donor using surgical round bars at low speed and cooling with saline^{8,9}. In this case the root length of 38 was lesser than 37 and hence surgical preparation of the socket was not necessary. There should be adequate bone support with sufficient attached

keratinized tissue at the recipient site to allow tooth stabilization and prevent infection and/or inflammation¹⁰. This criteria was also satisfied in the present case. The donor as well recipient teeth had almost similar morphology and no sharp curvatures in the root were present which could complicate the extraction procedure.

Preservation of the viability of periodontal ligament (PDL) cells is critical for the success of autotransplantation of tooth. Hence extraction procedure was carried out atraumatically with special care.

Teeth with either open or closed apices may be donors; and the most predictable results are obtained with teeth showing one-half to two-thirds of root development. In permanent teeth with fully developed roots pulpal revascularization or revitalization is not expected after autotransplantation¹¹. Therefore, root canal therapy or root resection with retrograde filling has been advised to prevent pulpal infection and/or inflammation and subsequent root resorption¹²⁻¹⁴. Lundberg and Isaksson reported a success rate of 94% in cases with incompletely formed roots and 84% in cases with completely formed roots¹⁵. In this case 38 was a mature tooth with root formation complete hence root canal therapy of the tooth had to be done. Root canal therapy is generally performed a few weeks after transplantation. However, Bae et al. recommend that if the donor tooth is easily accessed, root canal therapy should be performed before transplantation¹⁶. In this case restricted mouth opening of the patient and limited access presented further challenges to perform endodontic therapy. Hence root canal therapy was done extraorally.

The periodontal ligament cells are extremely sensitive, and their survival ability is significantly reduced if the extraoral dry time is prolonged. The increased length of the extra-alveolar time increases the possibility of inflammatory replacement resorption, reduces the healing

capability of the periodontal ligament cells which in turn induces unfavourable consequences such as inflammatory external root resorption. Previous studies showed that the viability of periodontal ligament exposed to the extraoral space decreased rapidly after 18 minutes^{17,18}. Hence the extraoral time of the tooth was kept to a minimum and restricted to 15 minutes. During the entire root canal procedure the roots were wrapped with sterile gauze soaked in coconut water. Coconut water is an excellent storage media for avulsed teeth, as it has a PH and osmolality compatible to PDL cells¹⁹.

Young age of the patient, absence of infection and adequate bone support at the donor site were favorable conditions for the procedure.

Nonrigid intraradicular occlusal splinting with malleable orthodontic wire and composite resin was done and maintained for two weeks. Long-term rigid splinting of transplanted teeth may negatively affect the healing process. Occlusal reduction of the transplanted tooth was done to protect the tooth from any occlusal trauma and to allow proper healing of the periradicular tissues.

Both clinical, and radiographic outcomes were considered satisfactory after 2 years.

Conclusion

Auto transplantation is a relatively simple, low-cost treatment option for missing teeth with good success rates provided careful case selection and treatment planning is done. In the present case, factors such as young age of the patient, atraumatic extraction of teeth, endodontic therapy of 38 done with minimal extraoral time were all favourable for the procedure and the technique was to be effective in restoring function with a follow up of two years.

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Legends Figures

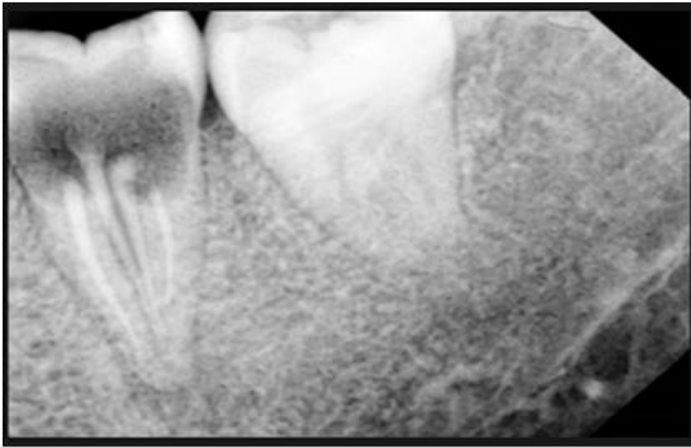


Fig 1. Pre operative radiograph



Fig 4 crown placed after one year



Fig 2.Extracted socket of 38



Fig 5: radiograph at two years review



Fig 3 review after one month (after removal of splint)