

CASE REPORT

Auto transplant of Impacted Maxillary Canine with Extraoral RCT - A Case Report

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ABSTRACT

Autogenous tooth transplantation is the surgical movement of a tooth from one location to another in the same individual. This case report shows successful transplantation of impacted maxillary canine to their original anatomical site. Therefore, auto-transplantation of impacted tooth may be a treatment option for the replacement of missing teeth where ever applicable.

Key words: Impacted Maxillary Canine, Extraoral RCT, tooth trans-plantation.

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INTRODUCTION:

Transplantation is the transfer of tissue or an organ from one site to another in the same person or between different persons. A transplantation in which donor and recipient are the same individual has been termed as autogenous transplantation, autoplasmic transplantation, or autotransplantation.¹ Autogenous tooth transplantation or auto transplantation, is the surgical movement in one individual of a vital or endodontically treated tooth from its original location in the mouth to another site.² Autogenous tooth trans-plantation was first well documented in 1954 by M.L Hale. The major principles of the technique are still followed today.³The transplantation of a tooth is considered a conservative alternative approach of oral rehabilitation to more invasive methods. The rehabilitation of a missing tooth in a young patient can usually be done by either fixed prosthesis or dental implant. The transplantation of a tooth is considered as a conservative alternative approach of oral rehabilitation to more invasive methods. Fixed prosthesis always impart detrimental effects on adjacent teeth due to tooth preparations whereas dental implants are contraindicated in growing patients and also it cannot be used in patients with little financial condition to afford the costly dental implant treatment.^{4,5} Auto-transplantation should be considered when the degree of mal-position is too severe to correct by orthodontic alignment⁶. Thus, auto-

transplantation may be considered as a most effective alternative to any other oral rehabilitation method in young growing patient. The purpose of this paper is to describe the autologous transplantation of a right maxillary canine to replace the non-vital deciduous canine in the same quadrant preserving the aesthetics and function.

CASE REPORT

A 17 year old male presented to the Department of Dentistry, Dr RPGMC Tanda (H.P) complaining of pain in right side of upper jaw since one week. Clinically blackish colored crown of 12 & 53 with sinus periredicular swelling i.r.t 12 & 53 and intraoral periapical radiograph shows impacted 13. (figure1) Patient had a history of trauma 6-7 year back, his 11 was avulsed on that trauma. After treating infection with antibiotics, an orthopantomograph (OPG) (figure 2) was obtained to evaluate the level of impaction of canine. Impacted maxillary canine which were impossible to be erupted orthodontically with completely developed roots were chosen for auto-transplantation to their actual position with extraction of deciduous canine.

After taking a complete medically history (patient was in good health and a routine examination found no systemic or local contraindications to surgical treatment)and explaining the risks and benefit of the procedure to the patients, informed consent was obtained. The procedure

was performed in one stage under local anesthesia. A mucogingival flap was elevated, deciduous canine was extracted and the alveolar bone covering crown of the impacted canine was resected and tooth were extracted carefully so as not to damage the healthy periodontal ligament remaining on the root surface. Root canal treatment of maxillary canine done outside the mouth (figure 3), the recipient site was prepared with surgical carbide round bur in a low speed hand-piece under sterile saline irrigation. The donar tooth was then placed into the recipient socket. In our case buccal cortical plate was missing, so we decided to use bone graft to cover the root surface of donar tooth and fill the bone defect created with extraction of impacted canine. Splinting of donar tooth with adjacent teeth was done with arch bar and 26 gauge s.s. wire. Closure of surgical site done with 3-0 silk suture. Root canal treatment of 12 also done.

For the post operated period, the patient was prescribed with an antibiotics (Amoxycalv-625mg every 8 h for 7 days), an analgesic (Diclofenac 50mg+ Paracetamol 500mg every 6h for 3 days), mouth rinses with a 0.12% chlorhexidine solution for one week. The auto-transplanted tooth remain splinted for 4 weeks. (Figure 4) The patient was seen weekly intervals for first month then monthly for next six months. (Figure 5)



Figure 1: IOPA showing impacted 13



Figure 2: OPG showing impacted right maxillary canine



Figure 3: showing extected maxillary deciduous and permanent canine. RCT was done in permanent canine



Figure 4: splinting removed after 4 weeks.



Figure 5: after 4 months

DISCUSSION

The science of autotransplantation has progressed, as evidenced by the high success rates reported in studies over the past decade. Successful tooth transplantation offers improved esthetics, arch form, dentofacial development, mastication, speech and arch integrity⁷.

Successful transplantation depends on specific requirements of the patient, the donor tooth, and the recipient site. Patient selection is very important for the success of auto-transplantation. Candidates must be in good health, able to follow post-operative instructions, and available for follow-up visits. They should also

demonstrate an acceptable level of oral hygiene and be amenable to regular dental care. Most importantly, the patients must have a suitable recipient site and donor tooth. Patient cooperation and comprehension are extremely important to ensure predictable results. The recipient site must have adequate bone support. There must be sufficient alveolar bone support in all dimensions with adequate attached keratinized tissue to allow for stabilization of the transplanted tooth. In addition, the recipient site should be free from acute infection and chronic inflammation. Once sufficient anesthesia is obtained, the tooth at the recipient site is extracted and the recipient socket is prepared. Next, the donor tooth is carefully removed to ensure minimal trauma to the periodontal ligament. When the donor tooth is unerupted, extraction involves flap elevation, bone removal, and gentle removal of the follicle from around the crown. Traumatic injury to the root surface of the donor tooth will impair the success of the transplant due to inadequate periodontal ligament regeneration. This is important for integration at the recipient site.^{2,8} Once removed, the donor tooth should be handled as little as possible and the practitioner should be careful to touch only the crown. The tooth is then placed in the recipient socket. Minimal delay between extraction and transplantation is important to ensure maintenance of periodontal membrane vitality. If further adjustment of the recipient socket is required, the donor tooth can be easily stored in its original socket. Once the transplanted tooth is in its final position, occlusion is checked and, if needed, adjusted using a high-speed finishing bur. The tooth should be in slight infraocclusion to allow it to erupt into proper occlusion over the next few months. When proper positioning is obtained, the tooth can be stabilized with a suture splint for 1 to 2 weeks.⁹ Alternatively, adhesive resin, light polymerizing resin, or a temporary bridge of autopolymerizing resin and wire splint can be used.¹⁰ Post-operative instructions and sequelae are similar to those following the removal of an impacted tooth.¹¹

A soft diet should be followed for a couple of days after surgery and the patient should be instructed to avoid mastication on the transplanted site. Patients should be instructed to maintain optimal oral hygiene. Some investigators feel that the patient should rinse with chlorhexidine gluconate mouth rinse.

The advantages of autotransplantation include the possibility of maintaining the viability of the periodontal ligament, orthodontic movement and proprioception, and preservation of the alveolar bone and gingival graft with a natural contour. Moreover, autotransplantation can be performed in growing patients. The cost of autotransplantation is low compared to that of osseointegrated implants because the procedure is performed in one stage and no prosthesis is required.¹²

Success rate of autotransplantation can be increased by following some simple biological principles. The critical factor for success is favorable periodontal

ligament healing, which depends on the number of viable cells preserved on the root surface.¹³ To increase the success rate of autogenous tooth transplantation, a healthy periodontal membrane should be present on the transplanted tooth, and the root morphology of the transplanted tooth should be simple. In addition, infection should be absent in the recipient site. During surgery, the extra oral period should be short, and trauma should be minimized.¹⁴

An extraoral time of less than 15 minutes were associated with significantly higher tooth survival. An immediate transplantation after the extraction of the tooth from the recipient's site and a low initial stability were associated with a significantly lower incidence of ankylosis.¹⁵ Tsukiboshi et al, reported that the tooth should be fixed for between 2 weeks and 2 months depending on whether the mobility is reduced.¹⁶ In our series. In this case, the transplant was performed within 10 minutes and, the fixation was removed after 4 weeks when any vertical mobility had disappeared.

The pulp of a completely mature tooth cannot regenerate. Therefore, if the tooth to be transplanted is accessible, endodontic treatment should be completed before transplantation. Otherwise, the endodontic treatment should be initiated 1 to 2 weeks after autogenous tooth transplantation. The 1- to 2-week interval is very important because if endodontic treatment is performed too early after autogenous tooth transplantation, additional injury to the periodontal ligament may occur, whereas after 2 weeks, inflammatory resorption may develop from the infected root canal.¹⁷

In autogenous tooth transplantation, the initial stability affects the prognosis, because sufficient initial stability can avoid dislocation of the auto transplanted teeth.¹⁷ Fixation with splint and sutures has been used to stabilize the auto transplanted teeth.¹⁸ One of the most controversial factors is 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. Depending on the case, a rigid splint with composite and wire may be used for 4 weeks or a more elastic splint with cross-stitch suture for 1 week.¹⁹

The literature reports excellent success rates following autogenous tooth transplantation when the appropriate protocol is followed. *Andreasen* found 95% and 98% long-term survival rates for incomplete and complete root formation of 370 transplanted premolars observed over a period of 13 years.²⁰ *Lundberg and Isaksson* had success in 94% and 84% of cases for open and closed apices respectively in 278 autotransplanted teeth over 5 years.²¹ *Kugelberg* achieved success rates of 96% and 82% for 45 immature and mature teeth transplanted into the upper incisor region over 4 years.²² *Kvint et al.* performed auto-transplantation in 215 patients with a mean follow-up of 4.8 years and reported an overall success rate of 81% and a 100% success rate of premolars auto-

transplanted to the maxillary incisor region.²³ Similar findings were reported by *Bae et al.*, who obtained a success rate of 84% in a case series.²⁴ *Yoshino et al.*, in a retrospective study of 614 autotransplanted teeth reported that the cumulative success rate of transplanted teeth with mature roots was 90.1% at 5 years, 70.5% at 10 years, and 55.6% at 15 years.²⁵

The transplanted tooth can serve and function as a normal tooth. Therefore, in addition to improved esthetics and mastication, successful tooth transplantation offers arch space maintenance and preserves the volume and morphology of the alveolar bone. The cost is also considerably reduced in comparison to advanced treatment options such as dental implants and/or prosthetic replacements; moreover, it can be performed as a single-step surgical procedure.²⁶

CONCLUSION

Auto-transplantation of impacted maxillary impacted tooth, when well indicated, planned and performed, can be a viable alternative mainly in young patients, allowing the reestablishment of the functionality (mastication) and aesthetics (maintaining the cornerstone of mouth).

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