

# Autogenous Tooth Transplantation: A Case Report with Three-Year Follow-Up

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## ABSTRACT

In Thailand, it is commonly considered that autogenous tooth transplantation can only be performed by oral surgeons. Though the author is an oral surgeon, a general dental practitioner who can carry out simple surgery can also perform autogenous tooth transplantation with good functional results and significant cost savings over other options for carefully selected patients. This report presents a case of a 16 year-old Thai male patient who underwent autogenous tooth transplantation following the surgical technique recommended by Clokie CM, et al. The right mandibular third molar was transplanted to the right mandibular second molar showing successful results with radiographic follow-up for three years.

**Keywords:** Autogenous tooth transplantation, incomplete root formation

Siriraj Med J 2015;67:245-247

E-journal: <http://www.sirirajmedj.com>

## INTRODUCTION

Autogenous tooth transplantation is defined as the replacement of an absent tooth by another one, usually the third molar in the same person.<sup>1</sup> This is considered a viable tooth replacement technique for carefully selected patients, as demonstrated by other studies, due to its high success rate with relatively low cost. Tooth loss as a result of dental caries is the most common indication for autogenous tooth transplantation, especially when mandibular first or second molars are involved. First and second molars erupt early and are often heavily restored. Autogenous tooth transplantation in this situation involves the removal of a third molar which may then be transferred to the site of an unrestorable first or second molar.<sup>2-7</sup>

## CASE REPORT

A 16-year-old male presented to the Dental Department Clinic at Nakhon Pathom Hospital with the chief complaint of a spontaneous pain in his mandibular right second molar (tooth 47). A clinical examination showed tooth 47 with extensive caries. The tooth was also sensitive to percussion. The radiograph showed a widening periodontal ligament space of root apices. The diagnosis of tooth 47 was symptomatic irreversible pulpitis with acute periapical periodontitis.

Endodontic treatment was advised, but his mother opted for extraction. The author performed autogenous tooth transplantation, because he was in good health and routine examination demonstrated no systemic or local contraindication to surgical treatment. His radiograph also showed the mandibular right third molar (tooth 48) with incomplete root formation which was suggestive as a suitable donor. The author carried out the autogenous tooth transplantation by extracting tooth 47 and using tooth 48 as a donor tooth. The

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Received 14 January 2015

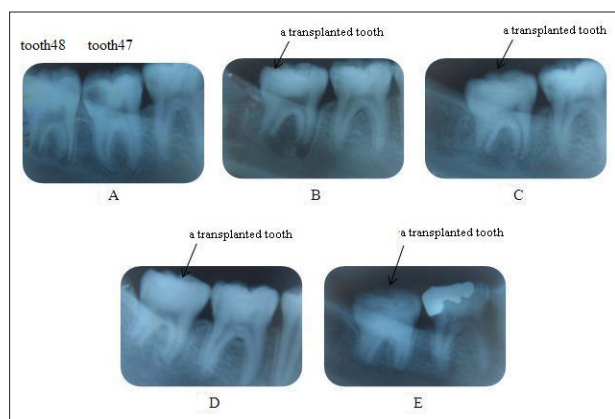
Revised 31 March 2015

Accepted 22 April 2015

surgical technique with suture splinting recommended by Clokie CM, et al was followed.<sup>8</sup> An informed consent was obtained from the patient and his parent.

## RESULTS

One week after transplantation, the sutures were removed. On a radiograph taken two weeks after transplantation, the transplanted tooth was seen in a wide tooth extraction socket. After one month, the morphology of the transplanted tooth and surrounding gingiva were similar to that of the adjacent teeth. After six months, the transplanted tooth was firm in its socket, and the gingival appearance was excellent. On the radiograph, no pathologic radiolucency or root resorption was seen. After one year, the radiograph showed signs of closed root apices. After three years, the radiograph showed pulp obliteration with a continuous periodontal ligament space around the tooth. The tooth also responded positively to electric pulp testing with a normal percussion sound suggestive of good prognosis. Besides, the transplanted tooth still had good appearance and function.



**Fig 1.** Periapical radiographs show A (first visit), B (two weeks), C (six months), D (one year), and E (three years) after surgery.



**Fig 2.** Three-year follow-up photographs show the transplanted tooth (black arrow) F (occlusal view), G (lingual view), and H (teeth in occlusion).

## DISCUSSION

Loss of one or more teeth may be treated by prosthetic therapy, implants, autogenous tooth transplant, or orthodontic treatment. Adult patients with no expected further bone growth are frequently treated with bridge-work or implant therapy. If implants are placed in patients treated before pubertal growth, they act as ankylosed teeth and do not erupt with adjacent teeth, resulting in infra-occlusion with functional and esthetic problems.<sup>9-10</sup> When an unrestorable tooth requires extraction, and an ideal donor tooth is present, immediate transplantation with extraction at the recipient site provides significant time saving compared to implants. Healing is rapid and function is obtained almost immediately. The transplanted tooth with its periodontal ligament has osteoinducing properties which result in bone regeneration of the bony defects around the transplant without graft materials and the natural emergent profile and the natural beauty of enamel and crown form is maintained.<sup>9,11</sup> Usually the total cost is much lower than implant treatment. In Thailand, especially in government hospitals with the national health policy, patients get an autogenous tooth transplantation free of charge but have to pay 45,000 Baht on average for a dental implant. A conventional fixed bridge could also be used. However, for adolescents preparation of abutment teeth might need to be delayed due to pulp size and treatment can impair the longitudinal, vertical and transverse growth of the alveolar process. Thus, transplantation is indicated.<sup>7</sup>

Reported survival rates of autogenous tooth transplantation vary from 81-98%.<sup>3-5,7,12</sup> A predictor of lower success was patient age older than 20 years as the optimal time for transplantation is before final root development. The most significant determinant for transplant survival is continued vitality of the periodontal membrane. Therefore, the donor tooth should be positioned such that extraction will be as atraumatic as possible. Abnormal root morphology, which makes tooth removal exceedingly difficult and may involve tooth sectioning is contraindicated.<sup>2</sup> When the periodontal ligament is traumatized during transplantation, inflammatory resorption and

replacement resorption is often noted. Incidence of both types of resorption can be decreased with atraumatic extraction of the donor tooth and immediate transfer to the recipient site.<sup>1,13</sup>

The root formation stage of the tooth bud to be transplanted represents one of the main factors to transplantation prognosis. Teeth with an open apex will remain vital and continue their root development after transplantation, while the teeth presenting complete root formation may or may not revascularize and will require endodontic treatment.<sup>8-9,14</sup> Success rates are highest when the root development is two-thirds to full root length with an open apex.<sup>3,14-16</sup>

Excessive time or rigid splinting of the transplanted tooth will adversely affect its healing outcome. Most reports advise flexible splinting for seven to ten days, with sutures placed through the mucosa because this permits some functional movement of the transplant and stimulates periodontal ligament cellular activity and bone repair.<sup>17</sup>

In the case reported here, the author selected a young patient with incomplete root formation of the donor tooth. The tooth was transplanted by following the recommended surgical technique, and splinted by suturing placed through the mucosa. After three years, the tooth still had good appearance and function. The success of this case can be attributed to the atraumatic surgical technique, the immature stage of the donor tooth and flexible splinting.

## CONCLUSION

Autogenous tooth transplantation has achieved high success rates and is an excellent option for tooth replacement, especially in young patients. It is an extremely successful treatment modality for carefully selected patients with exceptional esthetic and functional results as well as significant savings in time and cost compared to placement of an implant-supported prosthesis or other form of prosthetic tooth replacement. This method may be used as a viable treatment option in present day clinical practice by oral surgeons as well as general dental practitioners.

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