Autotransplantation of a premolar tooth in an orthodontic patient with 2 year follow-up: a case report

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Abstract
Auto-transplantation of developing premolars is a treatment modality that has received increasing attention in recent years. This report describes a case of auto-transplantation of upper left second premolar tooth of an orthodontic patient to the space of congenitally missing lower left second premolar space. A young boy, 10.5 years of age, referred to our clinic having a C II div 1 malocclusion and tooth number 35 was missing. According to the treatment plan, tooth number 25 and 75 was extracted, and in the same operation, upper left first premolar tooth was auto-transplanted into the socket of lower left second deciduous molar. Semi-rigid fixation procedure was performed. Four months were the latency period before applying orthodontic forces. In determining the vitality of tooth, cold test method when brackets were on and electrical pulp vitality tester (Parkell Electronics, Farmingdale, USA) after debonding were used. After stabilizing the tooth in its space and making sure that the tooth was vital, normal orthodontic forces were applied and the treatment continued. C I molar relationship at the right side, and C II relationship at the left side was obtained. Auto-transplanted tooth was in normal position, lamina dura was clearly seen and apex-fixation of the tooth was finished properly. Auto-transplantation should be given consideration as a reasonable option for the treatment of missing teeth in young patients. It is understood that by means of this technique, a complicated treatment problem can be transferred to easier treatment alternatives to be done instead of very heavy clinical procedures and time-consuming extraction options.

Keywords: Autotransplantation; congenital missing teeth; orthodontics

Introduction
Missing teeth in children are a particular problem. There are many reasons in the etiology of lacking teeth, such as genetic factors, pathological conditions (syphilis, tuberculosis etc.), vitamin deficiencies (1). The replacement should preferably adapt to growth and developmental changes in the oral region. Furthermore, the substitute should have the potential for long-term, even lifelong, survival.

Zadhrissn (10) declared that because of the root of an auto-transplanted premolar continues to develop

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and a normal periodontal ligament is established, such teeth can be moved orthodontically like any other tooth that has erupted into occlusion. It is generally recommended to wait for an observation period of 3 to 4 months before orthodontic treatment is started (10).

Kristerson et al. (11) mentioned that the optimal time for auto-transplantation of premolars to the maxillary anterior region is when the root development has reached two thirds to three fourths of the final root length. Ozdemir et al. (12) reported that the maxillary impacted canine teeth was successfully auto-transplanted with multidisciplinary treatment and emphasized this technique more faster and more practical than conventional methods.

This report describes a case of auto-transplantation of upper left second premolar tooth of an orthodontic patient to the space of congenitally missing lower left second premolar space.

**Case Report**

**Diagnosis and Treatment Plan**

A young boy, 10.5 years of age, referred to our clinic having a C II div 1 malocclusion and tooth number 35 was missing (Figure 1). C I molar occlusion at the right side and C II molar relationship at the left side at the end was planned. According to the treatment plan, tooth number 25 and 75 was extracted, and in the same operation, upper left first premolar tooth was auto-transplanted into the socket of lower left second deciduous molar. Two thirds of the root of the tooth was observed right before the transplantation operation.

**Treatment Progress**

The extraction socket was prepared with using burrs until the auto-transplanted premolar tooth came to the desired position approximately 2 mm under occlusion plane to prevent from occlusion trauma. Semi-rigid fixation was performed with bonding of 0.0195 inch diameter, 3 strand heat-treated Twist flex wires (Wildcat; GAC International, Bohemia, NY) to the lingual side of the teeth including adjacent premolars and molars. Four months were the latency period before applying orthodontic forces. In determining the vitality of tooth, cold test method when brackets were on and electrical pulp vitality tester (Parkell Electronics, Farmingdale, USA) after debonding were used. After stabilizing the tooth in its space and making sure that the tooth was vital, normal orthodontic forces was applied and the treatment continued (Figure 2). The final records received from 44 weeks after surgery was shown in Figure 3.

C I molar relationship at the right side, and C II relationship at the left side was obtained. Auto transplanted tooth was in normal position, lamina dura was clearly seen and apex-fixation of the tooth was finished properly. Using the electrical pulp tester, the vitality of the tooth was confirmed.

**Discussion**

This case report has shown that the auto transplantation after two thirds of the root formation was successful. This method may use as an
alternative method to restorative treatment. The time of the transplantation is one of the key factors for success. The root formation of the tooth, which inserted to the extraction socket is very critical. The previous researches reported that propitious transplantation time for a tooth is when the root development has reached to two thirds or three fourths of the final root length (13). The characteristic of tooth is also important factor about donor teeth. For instance abnormal root morphology, which causes traumatic extraction and destruction of periodontal tissues, reduces success for this operation (14). The most important factor for success is conditions of the recipient area. There must be adequate bone support, attached keratinized gingiva and this area should be non-inflammatory (14). Therefore, the attention to these criteria was perfectly given in terms of selection of patient, tooth and recipient area.

The orthodontic treatment time of auto transplanted teeth is after several months of surgery. Zachrisson (10) declared that because of the root of an autotransplanted premolar continues to develop and a normal periodontal ligament is established, such teeth can be moved orthodontically like any other tooth that has erupted into occlusion. It is generally recommended to wait for an observation period of 3 to 4 months before orthodontic treatment is started (10). There are many studies that support this time period in the literature (15). Consequently this process was preferred in present study.

In conclusion, auto-transplantation allowed normal alveolar bone development and a future option of permanent restoration without implants or partial dentures. Auto-transplantation should be given consideration as a reasonable option for the treatment of missing teeth in young patients. It is understood that by means of this technique, a complicated treatment problem can be transferred to another site in the dental arch where it is easier to solve orthodontically. The survival and success rates for auto-transplanted teeth are better when the root is partly developed and the apex of the root is not closed, thus giving one the ability to have favourable long term post-op follow up results when compared with other treatment modalities for substituting missing teeth.

References


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