

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

Ortodontik hastada premolar ototransplantasyonu ve 2 yıllık takibi: olgu sunumu

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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

## Özet

Gelişmesi devam eden premolar dişlerin ototransplantasyonu son yıllarda popüler olan bir tedavi yöntemi haline gelmiştir. Bu vaka raporu üst sol 2. premolar dişin, konjenital eksik olan alt sol 2. premolar diş soketine yerleştirilmesini içermektedir. 10.5 yaşında Sınıf II Bölüm 1 malokluzyona sahip ve 35 numaralı dişi eksik olan erkek hasta kliniğimize yönlendirildi. Tedavi sonunda sağ tarafta Sınıf I, sol tarafta Sınıf II molar ilişkisine sahip olarak bitirilmesi planlandı. Tedavi planına göre 25 ve 75 numaralı dişler çekildi, ve aynı operasyon sırasında üst sol 1. premolar diş, alt sol daimi 2. molar diş soketine ototransplante edildi. Yarı sabit fiksasyon prosedürleri **uygulandı**. Diş vitalitesinin belirlenmesi için soğuk test (braketler ağızda iken) ve elektrikli pulpa testi (Parkell Electronics, Farmingdale, USA) uygulandı. Dişin sabitlemesinin ve vitalite testinin ardından normal ortodontik kuvvet uygulanmasına başlandı. Sağ tarafta Sınıf I molar ilişki, sol tarafta Sınıf II molar ilişki sağlandı. Ototransplante edilen dişin normal pozisyonunda olduğu, lamina dura'nın devamlı olduğu ve diş apeksifikasyonunun düzgün bir şekilde tamamlandığı gözlemlendi. Ototransplantasyon eksik dişleri olan genç hastaların tedavisinde alternatif bir tedavi yöntemi olarak kullanılabilir. Bu teknik sayesinde ortodontik malokluzyonlar, ağır tedavi metotları yerine problemin dental arkın bir taraftan diğerine transferiyle, kolaylıkla çözülebilir hale getirilebilir.

**Anahtar kelimeler:** Ototransplantasyon; konjenital eksik diş; ortodonti

## 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.

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Auto-transplantation of developing teeth is a treatment modality that has received increasing attention in recent years (2-5). Andreasen and his colleagues (6-9) had explained the techniques deeply with a number of auto-transplantation cases and confirmed that the technique had developed a lot and when indicated, it would be a great option to use transplants instead of other alternative dental treatment ways.

Zachrisson (10) declared that because of the root of an auto-transplanted 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).

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.



**Figure 1.** The initial records of the patient. (A,B,C,D) The intraoral photographs of the patient. (E) The initial panoramic radiograph. (F) Congenital absence of tooth 35 can be seen from this initial periapical radiogram. The place of the deciduous left second molar is used for auto-transplantation of the tooth 24. Written permission for use of photos was obtained from his parents.

#### Treatment Progress

The extraction socket was prepared with using burs 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 adjunct 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.

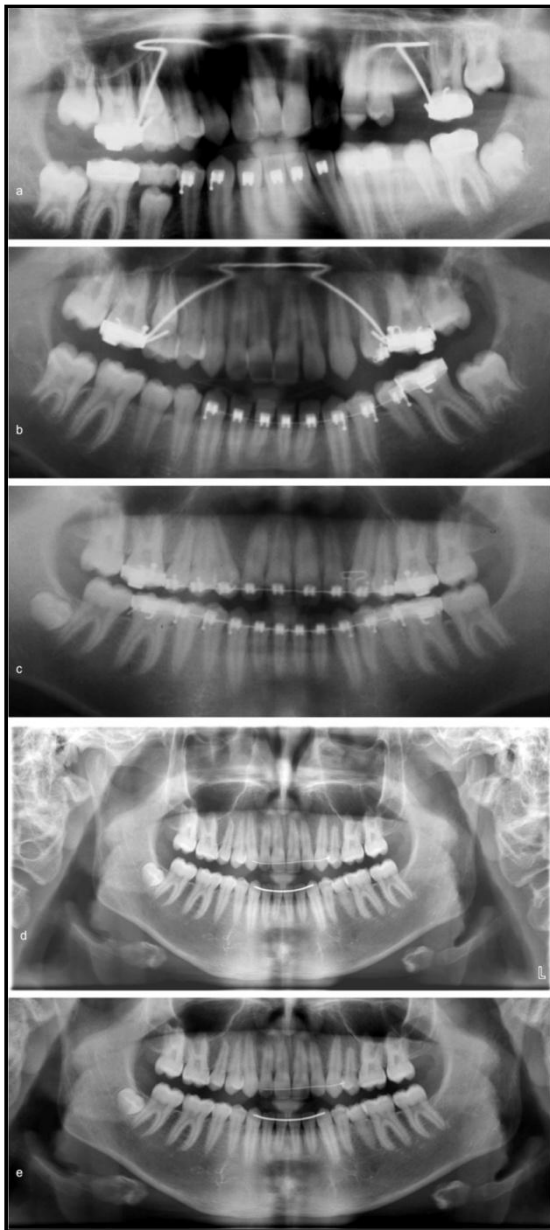


**Figure 2.** Follow-up Panoramic radiograms of the patient. (A) Just after the surgical operation. Note that the splint wasn't applied yet. (B) 5 months after the operation, semi-rigid fixation was performed. (C) 14 months; (D) 19 months at the end of the treatment, (E) 44 months (25 months after debonding).

#### 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



**Figure 3.** Final records of the patients after 44 months after the auto-transplantation surgery. (A,B,C,D) Final intra-oral photographs of the patient. (E) C I molar relationship at the right side and C II molar relationship at the left side was achieved. (F) Periapical radiogram of the patient just after the lingual retainers was put. (G) Periapical radiogram of the patients taken 25 months after debonding. Note that the "lamina dura" can be seen clearly and no sign of root resorption was noticed. Also the trabeculation of the alveolar bone is in good condition.

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 auto-transplanted 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.

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