Autogenous maxillary canine transplantation: A therapeutic alternative to Dental Implant.

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ABSTRACT
Background: Since there is no previous study in Kurdistan region of Iraq concerning the autotransplantation, therefore, the study is designed to evaluate (14) case of impacted maxillary canines autotransplanted in young patients.

Materials and Method: Fourteen healthy young patients with partially erupted or impacted maxillary canines were taken. The tooth was extracted and placed in the recipient prepared socket and stabilized with wire splint. The patients followed up clinically and radiographically for two years.

Results: At the end of this period, (12) cases showed that the clinical tooth mobility was similar to that of the adjacent teeth, radiographically showed normal lamina dura and periodontal ligament space, and two cases showed inflammatory resorption with widening of the periodontal space and tooth mobility.

Conclusion: Autotransplantation is a useful alternative treatment which should be considered as a viable option for treatment of impacted and partially erupted canines.

Key words: Autogenous, Canine, transplantation.

INTRODUCTION
Autogenous tooth transplantation, or autotransplantation, is the surgical movement of a tooth from one location in the mouth to another in the same individual. Careful patient selection coupled with an appropriate technique can lead to exceptional esthetic and functional results (1,2).

It is thought that Ambrase Pam in (1562) was the first author to describe the "replantation of teeth". He detailed the replacement of a tooth for a women of nobility which was provided from the mouth of her ladies in waiting, this is allogenic transplant and have not been shown to be very successful (3).

Hunter in 1771 laid down the principles for the transplantation of teeth like: The use of only healthy teeth, the transfer should be with the least possible delay, the tooth must be immobilized with silk or wire and frequent recall to check the tooth (4). Widman in 1915 autotransplant unerupted maxillary canines into their correct positions with good results (5).

Since this time a considerable number of papers have been published describing the results of the autogenous transplantation of canines with and without root filling. When the transplanted tooth has open apex, the vital component within the pulp chamber have potential of being totally replaced through a process of revascularization. Once a root approaches apical closure, the potential for complete revascularization becomes compromised, irreparable necrosis places the tooth at risk for infection and rejection. For this reason, endodontic treatment is always required for transplants of mature teeth with complete root formation (1-3).

Impacted maxillary canine causes a great problem in treatment planning and it is a common reason for referral to both the orthodontist and oral surgeon. Autotransplantation is a useful alternative treatment in selected patients, many patients reject the orthodontic treatment because of esthetic, cost, long treatment time. In addition, some of deeply impacted maxillary canines fail to be treated orthodontically (6).

Since there is no previous study done in Kurdistan Region, especially in Erbil city, regarding this subject, the study was designed to evaluate 14 cases of maxillary canines’ autotransplantation in young patients.

MATERIALS AND METHODS
A. Clinical and radiographic examination
This study was conducted on 14 healthy patients with partially erupted or impacted maxillary canines at Department of Oral Surgery, College of Dentistry, University of Salahaddin. They were five males and nine...
females with the age ranged from (17-30) years. The candidates must be in good health, non smoker, able to follow post-operative instructions, available for follow up visits, demonstrate an acceptable level of oral hygiene and must have a suitable recipient site and donor tooth. 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. The donor tooth should be positioned such that extraction will be as atraumatic as possible. Abnormal root morphology was contraindicated. The radiographic examination was performed by Orthopantomograph (OPG), occlusal and periapical radiographs. The position of canine in the alveolar process (labial, palatal and transversal direction), the angulations, the relation to the neighboring teeth and the root anatomy, were analyzed.

B. The surgical technique

Local anesthesia was sufficient for the surgical procedure once sufficient anesthesia was obtained, the tooth extracted and the recipient socket prepared with dimensions similar to those required for the donor tooth. Care must be taken to avoid the adjacent root structures by at least (1-2mm) when preparing die recipient site, it is also helpful to have about (0.5-1 mm) of bone both labial and lingual to die transplant tooth. When the donor tooth is unerupted, extraction involves flap elevation and bone removal (labial approach for the labially impacted canines, palatal approach for the palatally impacted canines, labial and palatal approach for the transversal teeth which present between the roots of adjacent teeth). The donor tooth is carefully removed to ensure minimal trauma to the periodontal ligament by touching the crown only. The tooth is placed in the recipient socket, minimal delay needed to ensure maintenance of periodontal ligament vitality. If further adjustment of the recipient socket is required, the donor tooth stored in it's original socket.

The transplant should be placed deep to allow the surrounding gingival tissue to be placed coronal to the cementoenamel junction with respect to occlusion and articulation. The occlusion is checked and if needed adjusted using a high speed finishing bur. The tooth should be in slight infra-occlusion to allow it to erupt into proper occlusion over the next few months. When proper position is obtained, the flap was sutured in it's original position, the stabilization of the transplanted tooth was performed with wire splint and postoperative antibiotic and analgesic (Amoxicillin capsule 500mg, and paracetamol tablet 500mg, three times daily for five days). A soft diet should be followed for two days after surgery and the patient should be instructed to avoid mastication on the transplant and maintain optimal oral hygiene. The patients must be seen the day after surgery to ensure that the transplant has retained it's new position, the splint is stable and the swelling, edema, and hematoma formation are within normal limits, and after one week for removal of suture. The patients then seen after one, two months and every six months for two years follow up.

However, endodontic treatment is always required for transplants of mature teeth with complete root formation; endodontic therapy begins approximately one month post operatively with instrumenting of the canals. Gutta percha filling is completed two months post transplantation, and the wire splint is removed in this time.

RESULTS

The sample used in this study was 14 patients consisted from five males (35.71%) and nine females (64.29%), age of the individuals ranged between 17-30 years. The number and percentage of partially erupted and impacted canines with it's position in the alveolar ridge is seen in table 1. The percentage of impacted canines was 71.43% and for the palatally positioned canine was 64.29% is higher than the other types.

No post operative complications such as infections or severe pain were observed in the day after transplant and most patients were suffered from either mild or moderate pain. After two months, the appearance of the mucosa around the transplanted teeth was normal and the gingiva was free from inflammation and firmly attached to the
teeth, the wire splint was removed (figure 1). The periapical radiograph of the same tooth before obturation showed that the alveolar bone had been developing in the vicinity of root (figure 2). The observation was continued in the following months and at the end of two years, (12) cases showed that the clinical tooth mobility was similar to that of the adjacent teeth. Radiographically there was normal lamina dura and periodontal ligament space (figure 3), and two cases showed inflammatory resorption about (2-3mm) with widening of the periodontal space and tooth mobility.

<table>
<thead>
<tr>
<th>Position</th>
<th>No. impaction</th>
<th>No. partial eruption</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>palatal</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Labial</td>
<td>1</td>
<td>7.14%</td>
<td>3</td>
</tr>
<tr>
<td>Transversal</td>
<td>2</td>
<td>14.29%</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>71.43%</td>
<td>14</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Although auto transplantation has not been established as a traditional means of replacing a missing tooth, the transplant can replace missing teeth after appropriate patient selection, presence of a suitable donor tooth and recipient site. The average age of patients on whom auto-transplant was
performed was similar to that recorded in most other studies because most patient in late teens or early twenties become a ware of a misplaced tooth\(^1\).

If tooth transplantation is to succeed, it is crucial to preserve the vitality of the cells on the root surface of the tooth transplant. Insufficient postoperative nutrition to the cells on the root surface of the tooth transplant was thought to contribute to their devitalization of these cells. Impaired nutrition may be a result of poor contact between the recipient bed and the root surface of the transplanted tooth and the development of an interposed blood clot \(^{12}\). The current study indicates that there was complete bone healing regardless the amount of bone removed, if the cementum of the tooth is not injured. This comes in agreement with the result of Nethander \(^{12}\).

The root canal therapy is not attempted at the time of surgical procedure in order to reduce handling of the tooth during the procedure. Therefore it's better to postponed for about two months, in addition, the absence of infection in the root canal in the majority of teeth, the risk of contact with saliva and exposure to microorganisms is minimal with the operative procedures and thus, there was also less need of immediate root canal treatment \(^{13}\). In this study, the formation of lamina dura was considered an important radiographic finding and was equated with healing to reform a normal periodontal ligament. All the teeth formed a complete lamina dura were those which did not show resorption radiographically. These findings are in agreement with most reports like Graham and Peter \(^{14}\).

REFERENCES