Autotransplantation of Transmigrated Mandibular Canine

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Abstract

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, autoplastic transplantation, or autotransplantation.[1] The purpose of this report was to describe a patient undergoing auto transplantation of an impacted mandibular canine to its normal position in the dental arch and the 1 ½-year follow-up, with no sign of active inflammatory resorption or a periapical lesion. In addition, there was no sign of replacement resorption (ankylosis). The endodontic literature has shown that the prognosis of patients undergoing autotransplantation may

be good under specific considerations. Therefore, the technique may be a treatment option for the replacement of missing teeth whereever applicable.

Introduction

Impacted teeth are important in dentistry and are particularly significant in orthodontics, especially if the impacted tooth is a canine. The occurrence of impacted mandibular canines is rare than maxillary canines.[1] Pre-eruptive migration of mandibular canines across the midline is referred to as transmigration.[1,2] It is unusual and worthy of investigation. Mandibular canines are rarely found in a horizontal position[1,3] and according to Javid, one that has crossed the midline more than half of its length should be considered as transmigrated.[4] However, Joshi[1] felt that tendency of a canine to cross the barrier of the mandibular midline suture is a more important consideration than the distance of migration. Moreover it follows the path of least resistance, in the direction of its long axis, with the crown leading the migration. The intra bony migration commences at an early mixed dentition and may take place over a period of several years and therefore can be traced with serial radiographs.[5] Howard[6] expected the older patient would show a greater distance of travel because a longer time had been available for the migratory canine to travel. Most of the subsequent reports have described single cases, except few cases of bilateral transmigration.[1,7] The left canine is more involved than the right canine.

Mupparapu[7] used five criteria to classify the transmigrated canines. These are summarized as:

Type 1: The canine is impacted mesioangularly across the midline, labial, or lingual to the anterior teeth with the crown portion of the tooth crossing the midline.

Type 2: The canine is horizontally impacted near the inferior border of the mandible below the apices of the incisors.

Type 3: The canine has erupted either mesial or distal to the opposite canine.

Type 4: The canine is horizontally impacted near the inferior border of the mandible below the apices of either premolars or molars on the opposite side.

Type 5: The canine is positioned vertically in the midline with the long axis of the tooth crossing the midline.

Most of the cases reported in the literature are Type-1.[8] The purpose of this article is to report a case of transmigrated mandibular canine and its management with emphasis on saving the tooth and natural dentition rather than surgical removal of the transmigrated tooth usually from an intraoral approach.

Case Report

A 12-year-old girl presented to the orthodontic department of Children's Hospital, The Institute of Child Health, Lahore with complaints of rotated front teeth. On clinical examination she was found to be in her late mixed dentition stage. Her medical history was non-contributory whereas dental history was not supportive of the clinical presentation. Orthodontic diagnostic measures were carried out containing cast analysis, orthopantogramme, occlusal and lateral cephalogramme. It was noted that she had retained both mandibular primary canines and radiographic examination revealed both mandibular canines to be impacted. The orthodontic treatment plan included expansion of maxillary arch and later, dental leveling, alignment and occlusal balancing, while in lower jaw the left mandibular canine though unerupted was in a favorable position. Space was created for the left mandibular impacted canine with compressed coil spring and kept under close observation till the tooth redirected the eruption path and erupted in the arch (Figure 1A). The right side canine showed type 1 pattern and had transmigrated the mid

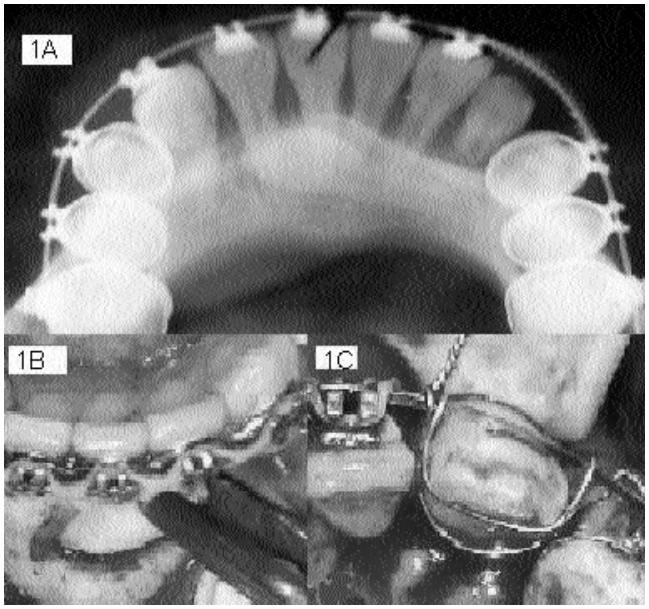

Figure 1A: Lower occlusal radiograph showing pre-eruptive intrabony transmigration of right mandibular canine. 1B: Clinical picture showing position of impacted canine, kept in the socket containing fresh bleeding and periodontal ligament. 1C: Clinical picture presenting wire splinting with the help of orthodontic arch wire after transplantation.

symphyseal line. The tooth was asymptomatic and the treatment options included orthodontic traction of the impacted canine with elastic ligatures or piggyback arch wires, auto transplantation or extraction of both the primary and the impacted tooth with implant prosthesis. The treatment plan options were presented to the patient and her parents, and they decided to follow the plan of autotransplantation of the impacted canine, consent was taken from patient and parents. With presurgical

orthodontics, necessary space was created for the canine transplantation. For surgery, local anesthetic (lidocaine 2% with epinephrine 1:100,000) was administered and incision was made at the level of the mucogingival junction and full thickness flap reflection was performed followed by bone cutting to uncover the crown of canine. The tooth was luxated and extracted but kept in the socket[9] containing fresh bleeding and periodontal ligament. (Figure: 1B) Then, the primary canine was extracted and recipient site was prepared by using sterile stainless steel burs. Canine was transplanted in the recipient site (Figure: 1C) and secured in place via wire splint taking help of the orthodontic arch wire, passing through the orthodontic brackets. Buccal surface of the root was covered with bone chips, taken from the cortical bone plate at the side of the impaction. Silk 4/o suture was used to close soft tissue flap securing the bone graft. (Figure: 2A).

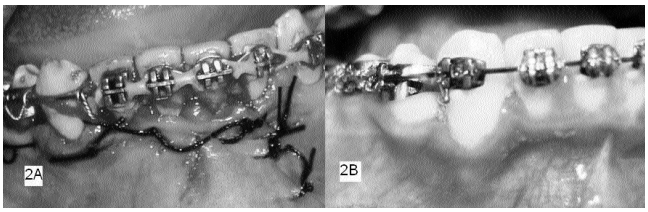

Figure 2A: Clinical view after closing soft tissue flap with Four-o silk suture.
2B: Clinical view of transplanted canine at 1 ½ year follow up.

The postoperative medication included: amoxicillin 500 mg (3 times a day for 7 days), pain medication (as needed), and chlorhexidine gel 0.2% (twice a day). Patient was recalled a week later the healing was progressing normally, sutures were removed and oral hygiene instructions were given. A month later orthodontic bracket was applied to the transplanted tooth and piggyback wire was introduced. Sequentially the tooth was engaged in main arch wire and extra spaces were closed. At that time, the mandibular anterior teeth were tested for pulp vitality, the response of the pulp was within normal limits. At 1 ½years follow up, periodontal examination revealed normal gingival color and texture around transplanted tooth 2-mm probing depth and no bleeding on probing or gingival recession observed. (Figure: 2B).

Discussion

Intrabony migration of mandibular canines may not be discovered on routine periapical radiographs because the tooth is horizontal in position and usually inferior to the root apices of anterior teeth therefore it is recommended to use panoramic radiograph as diagnostic tool more frequently and special emphasis is given to the tooth angulations so that the earlier intervention and orthodontic means can be used to change the path of eruption and prevent damages to neighbouring roots of the teeth. Furthermore it's less traumatic and has better prognosis with orthodontic traction if intervened earlier then after transmigration where the literature usually presents extraction as convenient treatment option followed by prosthesis or space closure.[8] The transmigrated tooth specially the one migrated half the length of root across midline is not a good candidate for orthodontic traction. It's advisable to perform the procedure with care as it is technique-sensitive and one of the factors responsible for survival of transplant is the continued vitality of the periodontal membrane. In cases where periodontal ligament is traumatized during transplant, external root resorption or ankylosis is often observed.[10]

Conclusion

Mandibular canine transmigration emphasizes the need to supplement periapical radiographs with a panoramic radiographic examination in patients with over-retained deciduous canines or missing permanent canines.

Autotransplantation is an alternative for replacing missing teeth then prosthesis and needs consideration.

Success rate is approximately similar to implants, with proper technique applied.

Failure of auto transplant further leaves an option of prosthetic replacement if required.

Acknowledgement

We are thankful to Dr. Usman Akhtar, Maxillofacial surgeon for his expertise in management of the surgical part of treatment for this case.

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