

Surgical approach of transmigrated mandibular canine preserving midline of the mandibular symphysis: report of a case

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Abstract

Transmigration, is an intraosseous displacement of an unerupted tooth in which a movement phenomenon causes it to cross midline by more than half. There are some complications associated with its extraction like, inflammation, mild to moderate pain, and alterations of the contour of the mandibular symphysis. Periosteum and symphysis cortical midline preservation, as well as, grafting with particulate bone mixed with Platelet-enriched fibrin glue and FRP membrane, improve bone regeneration and decrease aesthetic complications associated. In this article, we aim to discuss a case report of a transmigrated mandibular canine with symphysis cortical midline preservation to decrease aesthetic sequelae on the soft tissue.

Keywords: mandibular canine, platelet-rich fibrin (PRF), tissue regeneration

Abbreviations

PRF, platelet-rich fibrin; MSCs, mesenchymal stem cell; hDPSCs, human dental pulp stem cells

Introduction

Transmigration, is an intraosseous displacement of an unerupted tooth in which a movement phenomenon causes it to cross midline by more than 50%.¹ This is an unusual phenomenon with a prevalence up to 0.31% and the etiology of canine transmigration differs from one case to another.² Several authors have reported genetic predisposition, tumors, abnormal displacement of the dental lamina during the embryonic life, traumatic fracture near the site of mandibular canine eruption, and other local factors.³

Mupparapu et al.¹ classified transmigrated mandibular canines, taking into account inclination, relationship with the midline, adjacent teeth and contralateral erupted canine. Type 1: Canine positioned mesioangularly with the crown portion of the tooth crossing the midline within the jaw bone. Type 2: Horizontal impacted canine next to the lower border of the mandible and below the incisors. Type 3: Mesially or distally eruption of the canine according to the opposite canine. Type 4: Impacted horizontal canine below of premolars or molars on the contrary side and next to the lower border of the mandible. Type 5: Vertical Canine positioned in the midline (Figure 1).



Figure 1 Representation of the unilaterally transmigrated mandibular canines classification according to Mupparapu.¹

Impaction of canines is more common in the maxilla with an incidence ranging from 0.92% to 5.1% and transmigration is more common in the mandible with an incidence ranging from 0.1% to 0.31, mostly

affecting the lower canines than the uppers and usually existing unilaterally more commonly than bilaterally.^{3,4} Presently, there are several treatment options available to address transmigrated canines, including radiographic observation, autogenous transplantation, orthodontic treatment and tooth extraction when there is inadequate space to realign the tooth.⁵ There have been incidences of complications associated with the extraction of impacted teeth like trismus, inflammation, mild to moderate pain, hematoma and bony defects.⁶ Different studies have reported that some patients who have been operated on the symphysis, suffered changes in their facial contour and aesthetic changes in the symphysis zone.⁷

Case report

A 22years old symptomatic male patient, was referred to our dental clinic presenting a transmigrated mandibular canine. During oral examination, crowded mandibular incisors, as well as a missing right permanent canine (27) and an over-retained right deciduous canine (R), were observed. Panoramic examination revealed a mesio-angular transmigrated mandibular caninetype I (Figure 2). Due to the crowded incisors and insufficient space in the arch, surgical extraction with local anesthesia was performed. Under informed consent of the patient and strict aseptic conditions, a traditional bilateral inferior alveolar nerve block was administered to anesthetize the mandibular nerve 1.2mL of Roxicaina® (2% Lidocaine with 1:80.000epinephrine). Semilunar incision and dissection of the flap was performed. Pericoronolostectomy and cross-sectioning of the crown was done. An additional surgical window was performed to preserve midline and tooth extraction was carried out. The socket was filled with particulate bone mixed with Platelet-enriched fibrin glue and a PRF membrane was placed on the grafting (Figure 3). Finally, healing by first intention was facilitated by continuous suture. After 8days, control was done and the patient reported mild pain, swelling, trismus and hematoma in the mental region. Orthopantomography was taken 6months after procedure (Figure 4).



Figure 2 OPG showing Type I mesio-angular transmigrated mandibular right permanent canine (27).

Discussion

Mandibular canine transmigration is a very uncommon anomaly which reportedly occurs in about 5% of cases.⁸ It can be associated with several postoperative complications like pain, swelling, trismus and hematoma similar to that of a common impacted tooth extraction.⁹ Likewise, several authors have reported that surgical approaches performed in the chin area can develop bone defects and a negative correlation in the thickness of the chin's soft tissue related to the center

of the defect.¹⁰ According to Verdugo et al. in their clinical study, they revealed that bone defects <0.5cc showed an 81% of bone fill during a period of healing of 34.2 months, whereas those >0.5cc with a period of 7.2 months showed a repair of 63.8% ($P < 0.05$) and this can be influenced by many factors like age, as well as periosteum and symphysis cortical midline preservation of the chin.¹¹ However, full repair of the sites did not occur.

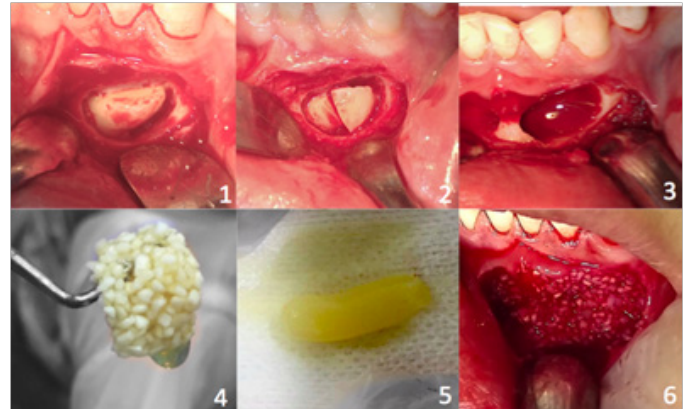


Figure 3 Semilunar incision and dissection of the flap was performed. 1) Pericoronolostectomy. 2) Cross sectioning of the crown. 3) *Additional surgical window. 4) Particulate bone mixed with Platelet-enriched fibrin glue 5) PRF membrane. 6) Grafted socket.



Figure 4 OPG taken 6 months after procedure.

Different approaches of tissue regeneration have been used, in which an ideal bone graft should allow for new bone formation, including osteoconduction, osteoinduction and osteogenesis. Autogenous bone graft has those properties; however, it is indispensable to perform another surgical procedure, and it can increase infection risk, cost and time of the procedure.¹² The improvement of common postoperative complications, osseous defects and commitment of mandibular symphysis contour with platelet-enriched fibrin glue and platelet rich fibrin (PRF) has been seen as an excellent scaffold for tissue engineering due to the initial stability, biocompatibility, biodegradability and constant release of growth factors of the PRF, which allows mesenchymal stem cell (MSCs) migration, mineralized differentiation and faster angiogenesis.¹³ Likewise, according to Kökdere et al.¹⁴ combination of particulate bone graft with PRF promotes a greater mean area of newly formed bone compared with the PRF alone.¹⁴ To have better outcomes in procedures of this nature, one should perform sulcular incisions, periosteum and symphysis cortical midline preservation and grafting with bone substitutes and

PRF. This approach can be improved with the incorporation of the human dental pulp stem cells (hDPSCs) whose osteogenic potential is the highest in our body.

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Disclosures

Conflict of interest: The authors report no conflicts of interest related to this study.

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Ethical disclosures

- i. Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.
- ii. Confidentiality of data. The authors declare that no patient data appear in this article.
- iii. Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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