Alveolar Preservation with Mandibular Symphyseal Graft Following Surgical Extraction of Impacted Maxillary Canine

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ABSTRACT

Palatally impacted maxillary canines need to be diagnosed early and a comprehensive management includes surgical removal followed by alveolar preservation. This paper reports the management of a palatally placed maxillary canine impaction in a 15 years old female patient by surgical extraction and alveolar ridge preservation using mandibular symphyseal graft.

Keywords: Impacted Maxillary Canine; Symphyseal Graft; Autogenous Graft

Introduction
Maxillary canine impaction has a reported incidence of 0.92%. Among the patients having maxillary canine impactions, palatally displaced canines occur three times more frequently than those found buccally. Hitchen and Rayne found that palatal impactions account for 85% and labial impactions 15%. When considering ways to preserve adequate bone volume, following the surgical extraction of impacted teeth, filling bone defects such as alveolar post extraction sockets with resorbable osteoconductive material is warranted. Although allogenic bone and alloplastic materials have been used, autogenous bone because of its osteoconductive and osteoinductive properties is still considered as a gold standard for grafting procedure. This paper reports the management of a palatally placed maxillary canine impaction in a 15 years old female patient by surgical extraction and alveolar ridge preservation using mandibular symphyseal graft.

Case Report
A 15 years old female patient with a chief complaint of spacing and irregular placement of anterior teeth reported to the Department of Orthodontics, Al Badar Dental College and Hospital, Gulbarga, Karnataka, India. The patient was referred to the Maxillofacial Department for the surgical extraction of the impacted maxillary canine with preservation of bone volume. Clinical and radiographic examination by orthopantomogram and intraoral object localisation with cone shift technique revealed the palatally impacted maxillary left canine (Figure 1-3). Routine preoperative investigations were performed. Surgical extraction followed by autogenous mandibular symphyseal bone grafting was planned. Ethical clearance from the local ethical review committee and an informed/written consent from the patient were obtained.

Followed by a standard surgical preparation and draping, local anesthesia was established using 2% lignocaine with 1:80,000 epinephrine by left infra orbital and nasopalatine nerve blocks. Palatal crevicular incision was placed and a mucoperiosteal flap was reflected from second bicuspid of one side to the other across the midline. The crown portion of the impacted tooth was exposed (Figure 4) and a semicircular incision was placed labially to expose the root portion. The tooth was luxated and palatally retrieved following which the adjacent lateral incisor was found to be luxated. After achieving hemostasis, autologous bone grafting was planned and the mandibular symphysis was chosen as the donor site. Bilateral mental nerve anesthesia was secured and vestibular incision was used to expose the donor site (Figure 5). A 1cm x 1cm cortico-cancellous graft was harvested using rotary cutting under copious saline irrigation. The graft was fragmented manually and was used as a particulate graft to fill the defect of the recipient site and a primary water tight closure was achieved. Composite dental splinting using 0.3mm soft stainless steel wire was done and was retained for four weeks. Post operative evaluation on 3rd, 5th and 7th postoperative days revealed a satisfactory soft tissue healing. Regular radiographic assessment was done. Radiographic assessment on the eighth postoperative month shows a satisfactory result (Figure 6) and the orthodontic tooth movement was commenced. There was no evidence of bone resorption and the alveolar height and width were maintained.

Discussion
The treatment options for the impacted cuspid include, frequent radiographic monitoring, interceptive removal of primary canine, surgical exposure followed by orthodontic alignment, simulate the physiological eruption pattern that occurs at the centre of the alveolar ridge, performing tunnel traction of infaosseous impacted maxillary canines, autotransplantation of the canine and surgical removal of the canine. Surgical removal is indicated when there is poor position for orthodontic alignment, there is early evidence of resorption of adjacent teeth, patient is too old for exposure and the degree of displacement does not allow for surgical reposition or transplantation. Orthodontic tooth movement of the adjacent following the surgical removal of the impacted tooth, although might trigger the bone remodelling, a substantial amount of bodily movement is needed which may result in the formation of a large hyalinised layer that in turn induces root resorption. Thus filling the defect with osseous volume may be considered as a promising option prior to attempting orthodontic tooth movement following surgical extraction of impacted teeth. Although allogenic bone and alloplastic materials have been used, autogenous bone because of its osteoconductive and osteoinductive properties is still considered as a gold standard...
for grafting procedure. In our case, surgical extraction of the canine followed by alveolar preservation was planned. Those most commonly used include the ilium, rib, calvarium, tibia, maxilla, and the mandible which is more promising as a local donor site. The main advantage of using a local donor site is convenient surgical access. This translates into reduced operative and anesthesia time in a single team effort. The decreased morbidity of local donor sites over distant sites and the use of a transoral approach which does not result in a cutaneous scar makes this procedure more easily acceptable to the patient. Mandibular symphyseal bone grafts have been used successfully in a variety of clinical applications. Advantages of the mandibular symphysis transplant are short healing period, minimal resorption, maintenance of osseous density, intraoral access, proximity to the recipient site, low morbidity, minimal discomfort and no cutaneous scar.

Conclusion
In conclusion, this case prognosis strengthens the significance of the mandibular symphysis graft for the alveolar preservation following surgical removal of impacted teeth especially canine, with respect to ease of harvesting, advantage as a local donor site and successful graft uptake resulting in a satisfactory osseous healing.

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