ABSTRACT: Background. Treatment of impacted maxillary canines in adults includes an orthodontic procedure to bring the unerupted tooth to the dental arch or prosthetic replacement of the missing tooth. The authors describe an alternative treatment that involves immediate placement of implant into extraction socket of the tooth.

Case Description. A patient with palatally impacted upper canine chose to have the unerupted tooth removed and replaced with implant and crown. A cylindrical implant was inserted through the alveolar ridge into the extraction site. The unfilled areas in the extraction site, around the dental implant, were packed with autogenous bone graft.

Clinical Implications. This treatment modality avoids the need for conventional preparation of teeth as part of prosthetic reconstruction or prolonged orthodontic treatment aimed at bringing the impacted canine to the dental arch. Combining the implantation with bone augmentation preserved the alveolar bone and shortened the treatment period.

INTRODUCTION:
Epidemiologic data shows that with the exception of third molars, the most frequently impacted teeth in adults are maxillary canines. The impaction rate ranges from 1% to 3% for the maxillary canines. Disturbances in the eruption of permanent maxillary canines are common because they develop deep within the maxilla and have the longest path to travel compared with any other tooth in the oral cavity. Canines play a vital role in facial appearance, dental esthetics, arch development and functional occlusion. Sequelea of abnormal eruption paths within the dentoalveolar process can include impactions and have serious clinical ramifications. For example, labially or palatally impacted teeth cause migration of the neighboring teeth and loss of arch length. In addition, unerupted canines may increase the patient's risk of developing a cystic lesion and infection and cause root resorption of the nearby lateral incisors and jeopardize the longevity of lateral incisors. When impacted maxillary canines are not amenable to orthodontic traction or reimplantation, extraction is the only option available, followed by implant placement or prosthetic replacement of missing tooth. If apical and ridge crest bone remains after the extraction of the maxillary canines, an immediate implant can be placed. The implant is anchored bicortically with good primary fixation.

This article presents a new surgical technique that allows an immediate implant placement after the extraction of the maxillary canine. The full circumference of the implant is left without bone coverage, except for the apical and coronal area. The implant screw threads and the bone defect around the dental implant are covered with the bone shavings collected during ostectomy. The case of a 28-year-old man with impaction of upper right canine is presented. Right canine orthodontic traction was not possible because of high and horizontal impaction, and the patient was unwilling to receive orthodontic treatment. Furthermore, moving the canine to the dental arch takes considerably longer time in an adult than in a child. Therefore, the patient must be part of the decision-making process and be fully informed of the potential problems related to treatment. Therefore, extraction with the simultaneous placement of dental implant was chosen. Several authors have reported success rates of more than 90 percent for implants placed into fresh extraction sites. During ostectomy, bone shavings were collected. The bone defects remaining around the implant were filled with the collected bone shavings. When possible, impacted maxillary canines are subjected to fenestration and orthodontic traction. If neither traction nor reimplantation is feasible, or the patient is unwilling to accept orthodontic treatment, extraction followed by dental implant placement is a management option. If apical and ridge crest bone remain after the extraction of the maxillary canines, an immediate implant can be placed. This case report presents a patient with impaction of maxillary right upper canine. The high and horizontal disposition of the tooth precluded orthodontic treatment. As a result, the canine was removed, with collection of the ostectomy bone shavings and immediate dental implant placement.

CASE REPORT:
A 28-year-old man presented with missing upper right canine (Fig.1). Impacted canines usually are asymptomatic. Therefore, a patient usually is unaware of the impacted canines existence. X-ray showed impacted canine to be located in a high position (Fig.2). The patient requested implant treatment and rejected orthodontic treatment. The mesiodistal dimension between the upper lateral incisor and premolar was sufficient for placing implant. Extraction of the maxillary canine was planned, with the immediate placement of implant in the socket of the upper canine. Surgery was performed under local anesthesia (2% lignocaine and 1:200,000 adrenaline). A full-thickness palatal flap was designed, encompassing from distal of the right upper second premolar to mesial of the right upper central incisor.
The palatal flap was carefully raised to avoid damaging the neurovascular bundle corresponding with the anterior palatal nerve. A palatal approach ostectomy was performed using a rounded carbide bur to expose the clinical crown of the right upper canine (Fig.4). Following luxation of the tooth, the latter was sectioned, with removal of three segments (Fig.5). Implant osteotomy was performed via the alveolar crest to the extraction site for the placement of implant for the upper canine, using rotary instrumentation and irrigating with abundant sterile saline solution. Lifecare implant measuring 3.5 mm in diameter and 13 mm in length was inserted between the floor of the maxillary sinus and the nasal fossae and dental socket. The nasal mucosa was not violated. The implant was anchored with good primary fixation, and with the full circumference of the implant without bone coverage except for apical and coronal area. The implants spirals and the bone defects were then covered with the bone shavings collected during ostectomy to remove the canine (Fig.6). Implant was left submerged. Triple-0 silk suturing was carried out (Fig.7,8) and amoxicillin was prescribed (500 mg 3 times a day for 7 days), together with ibuprofen (400 mg 3 times a day for 4 days) and 0.2% chlorhexidine rinses. The postoperative course was normal. Final prosthesis was placed after a period of 4 months (Fig.9,10).

**DISCUSSION:**

When patients are unwilling to accept orthodontic treatment and/or the impacted canines are in a high position precluding orthodontic traction, the treatment of choice is extraction. There are significant risks to the extraction and replantation of the tooth. More recently there has been an increase in the number of extractions of impacted teeth and the use of dental implants. With the techniques and implant systems available today, this becomes a more predictable manner to restore the integrity of the arch and solve a complex problem where the likelihood of orthodontic success is decreased. In this patient, the decision was made to extract tooth with immediate positioning of dental implant and bone graft, in accordance with the approach adopted by other authors such as Mazoret al in similar situations. Extraction proved uncomplicated, the advantage of performing extraction and dental implant placement in the same procedure is that the number of operations and waiting time are minimized. A disadvantage is the possibility of graft (and therefore implant) failure. The implants presented primary stability when anchored bicortically between the floor of the maxillary sinus and the nasal fossae, in the implant apical area, and with the dental socket in the coronal area. If these 2 corticals are not maintained, the implant cannot be stable. The remainder of the implant spirals are kept uncovered. The bone defects can be filled with different bone substitutes. In this case, dental extraction left a space between the ample socket and the implant, which was filled with autogenous bone collected during ostectomy. The implants were
left submerged to ensure healing by first intention and a better esthetic outcome.

**CLINICAL IMPLICATIONS:**

This treatment modality avoids the need for conventional preparation of teeth as part of prosthetic reconstruction or prolonged orthodontic treatment aimed at bringing the impacted canine to the dental arch. Combining the implantation with bone augmentation preserved the alveolar bone and shortened the treatment period.

**CONCLUSION:**

We have presented a case report that illustrates a unique treatment modality for impacted canine in an adult. The simultaneous placement of an implant into the extraction site of a palatally impacted canine in conjunction with bone grafting minimizes the number of surgical interventions and the waiting time. We need to emphasize, however, that a prerequisite for immediate placement of an implant into an extraction site is an adequate mesiodistal arch space for subsequent placement of a crown and increased surgical skill is needed to place the implants.

**REFERENCES:**