# Surgically removal of maxillary impacted canine: labial and palatal approach

Pengeluaran secara bedah kaninus impkasi rahang atas: pendekatan labial dan palatal

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**ABSTRACT**

**Background**: The maxillary canines most frequently to be involved in eruption problem and become impacted following maxillary and mandibular third molars. When impacted maxillary canines have unfavorable position or they are not susceptible to orthodontic traction or reimplantation, surgical extraction is the most appropriate treatment. **Objective**: Report a surgical removal of impacted maxillary canine which accessed both labially and palatally. **Case**: A 19-years-old woman came to the oral and maxillofacial clinic complained her left upper anterior tooth missing and reported mild pain around the area since two years ago. There was a fluctuation on the labial mucosa. Panoramic radiograph confirmed the horizontal impaction of the maxillary left canine. **Conclusion**: The maxillary canine was removed by surgery under under local anesthesia.
**Key words**: surgical extraction, impacted canines, local anesthesia

**ABSTRAK**

**Latar belakang**: Gigi kaninus atas paling sering terlibat dalam masalah erupsi dan menjadi impaksi setelah gigi molar ketiga atas dan bawah. Jika kaninus atas memiliki posisi yang tidak menguntungkan atau tidak mungkin ditraksi ortodontik atau reimplantasi, ekstraksi bedah adalah perawatan yang paling tepat. **Tujuan**: Melaporkan kasus pencabutan kaninus atas yang terkena dampak yang diakses baik labial maupun palatal. **Kasus**: Seorang perempuan berusia 19 tahun datang ke klinik mulut dan maksilofasial yang mengeluh karena kehilangan gigi depan kiri atas. Ia melaporkan nyeri ringan di sekitar area tersebut sejak dua tahun lalu, dan fluktuasi pada mukosa labial. Radiografi panoramik mengkonfirmasi impaksi horisontal kaninus kiri atas. **Simpulan**: Gigi kaninus atas diangkat dengan operasi gigi disertai anestesi lokal.
**Kata kunci**: ekstraksi bedah, kaninus impaksi, anestesi lokal

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## INTRODUCTION

As we know that canines have a vital role in facial appearance, dental esthetic, arch development and functional occlusion. The permanent maxillary canines are developed deep within the jaws, complete their development, and erupt into dental arch after the adjacent teeth. Consequently, eruption disturbances in canine are more common than the other teeth, except third molars. According to Ericson and Kurol,[1] maxillary permanent canine should be palpable in the buccal sulcus at 10 years of age. If not, the dentist should initiate clinical and radiographic examination to determine the permanent canine position. Impaction is defined as the failure of tooth erupt at its position in the dental arch, within its normal period of growth. Impacted canines cause relatively few problems for patients, and some of these teeth remain unerupted and asymptomatic. When maxillary canine has been diagnosed as impacted, the patient is usually referred to the oral and maxillofacial surgeon. Studies have reported that the incidence of tooth impaction varies 5.6-18.8% of the population.[2-4] The incidence of maxillary impacted canine among general population is approximately 1,7% (ranges 1,0-2,5%), the other study reported prevalence of maxillary impacted canines ranges 0.9-2.5%, and it has been reported that females are two times more affected to the maxillary impacted canines than males. Caucasians are affected five times more than Asians. From the anatomic viewpoint impacted canines are located palatally in 85% of cases, while some literatures reported approximately one-third are located labially, and two-thirds are located palatally.[5-7] According to Daniela *et al*, maxillary permanent canines are the most commonly impacted teeth, second only to third molars. Following these, in decreasing frequency, are mandibular canines, premolars, and incisors. The incidence of canine impaction in the maxilla is more than twice that in the mandible.[6,8,9]

The management of impacted canines become a multidisciplinary issue, including orthodontists, oral surgeon, periodontists, and pediatric dentists. The available treatment options were surgical exposure and orthodontic repositioning or surgical removal of impacted canine, due to its problematic position or pathological reasons. Surgical removal of impacted canine was indicated if there was noticeable of pathology around the tooth; if there was interference with planned orthodontic treatment; and if there was misconduction on

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adjacent teeth. Surgical exposure and orthodontic repositioning was carried out if space analysis revealed that tooth can be brought into oral cavity and there is no severe alteration of tooth axis. When treatment of impacted canine teeth in position is indicated, the definitive treatment involves fenestration and orthodontic traction with eyelet and gold chain bonded to the crown of the impacted tooth, which facilitate the impacted tooth to be rearranged within the dental arch. However, if orthodontic traction and reimplantation are not anatomically achievable due to severe deviation of the canine tooth, or if the patient is resistant to orthodontic treatment, an alternative solution may be to remove the impacted tooth, this action is taken to prevent future problems and surgical procedure was planned according to position of impacted tooth. Abnormality in anteroposterior, buccopalatal, and vertical locations of the impaction tooth define treatment complexity.[2,9-11]

The etiology of maxillary impacted canines was associated to various factors as absence of lateral incisors, anomalies in shape or size of lateral incisors, lack of guidance, ectopic position of the tooth germ, presence of obstacles to eruption, or genetic factors. The exact etiology of palatally displaced maxillary canines is still unknown.[9,12] Becker *et al* suggested that the distal aspect of the lateral incisor root guides the permanent canine to erupt into its relevant position, hence leading to the 'eruption guidance' theory. Because of the very high and palatal initial position, plus the extremely long path of eruption, local factors may interfere with the normal path of eruption, such as missing lateral incisors (congenital), supernumerary teeth, anomalies of lateral incisors, tooth transposition, any other mechanical factors that can all lead to canine ectopia. A multifactorial polygenic etiology for a palatally displaced canine has also been suggested by Peck *et al,* on the basis of five individual categories: Occurrence of other dental anomalies with palatally displaced canines, eg hypodontia and microdontia, bilateral occurrence of palatally displaced canines, sex difference in the occurrence of palatally displaced canines, familial occurrence of palatally displaced canines, population differences in the occurrence of palatally displaced canines.[11,13]

However, in some conditions when the position of maxillary impacted permanent canine is difficult or severe, extraction might be a reasonable option that satisfies the treatment goals for esthetics, function, and stability.[9] Radiographic assessment is vital methods in localize the maxillary impacted canine. Orthopantomogram, lateral cephalometry, CT, and CBCT are very useful for determining presence location of the maxillary impacted canines.[6]

Some classifications of impacted maxillary canine has been described before, included Archer, Ericson and Kurol. The most accepted classification is Archer's classification, it consist of five classes, I: impacted maxillary canine located in the palate (horizontal, vertical, and semi-vertical), II: impacted maxillary canine located in the labial surface of maxilla (horizontal, vertical, and semi-vertical), III: impacted maxillary canine located in both palatal as well as buccal alveolar bone, IV: impacted maxillary canines located vertically between incisors and premolars, V: impacted maxillary canines located in edentulous maxilla.[14]

This article report a surgical removal of impacted maxillary canine cases which accessed both labially and palatally.

## CASE

A 19-years-old female patient came to the oral and maxillofacial clinic complained her missing upper anterior tooth. She reported mild pain around the area since two years ago. Clinical evaluation of the patient was initiated by careful inspection of the intraoral mucosa. On palpation there was a canine bud on the labial vestibulum. Panoramic radiograph confirmed the semi horizontal impaction of the maxillary left canine. In the case described here, the clinical intraoral view of the patient, before starting the treatment, showed the maxillary left canine tooth missing (presumptively impacted). A panoramic radiograph confirmed the impaction of the maxillary left canine teeth (**Fig 1**). Thus, under local anesthesia; surgical palatal exposure was achieved through a crestal intrasulcular incision and full-thickness flap elevation, and flap opening to visualize the bone area (**Fig 2A,B**). The impacted canine tooth was exposed via an osteotomy from the palatal side, performed initially with a round drill followed by the use of a Lindemann bone cutter, on a handpiece turbine. Odontectomy was achieved using a steel dental bur on a handpiece turbine.


**Figure 1** Panoramic radiograph showing the left maxillary impacted canine (white arrow).

The surgical extraction of maxillary canines was planned. Surgery was performed under local anesthesia (Pehacain). A full-thickness palatal flap was designed,

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encompassing from mesial of the left upper central incisor to distal side of the left upper first premolar. The palatal flap was carefully raised to avoid damaging the neurovascular bundle corresponding with the anterior palatal nerve. A palatal approach osteotomy was performed using a rounded bur to expose the clinical crown of the left upper canine. The tooth was sectioned between the crown and root, because tooth positioning was very high, a vestibular aperture from labial was made, with a small window ostectomy between the roots of left upper central and lateral incisors, the dental crown was luxated and removed all tooth segments. The operation site was irrigated with saline solution and repositioned the flap. Triple-0 silk suturing was carried out (**Fig 3**), and cefadroxyl was prescribed (500 mg 2 times a day for 5 days), together with ibuprofen (400 mg 3 times a day for 5 days) and 0,12% chlorhexidine rinses. Patient was given postsurgical and oral hygiene instructions.

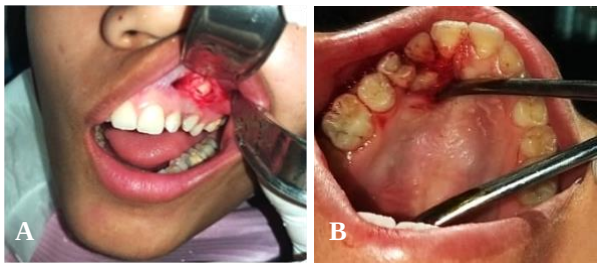


**Figure 2A** Exposing the impacted tooth from buccal aspect, creation of flap and removal of part of the buccal plate, **B** single-sided (envelope) flap created by a single horizontal incision on the palatal aspect along the cervical lines of the teeth (from mesial side of left maxillary central incisor to distal side of left maxillary first premolar)

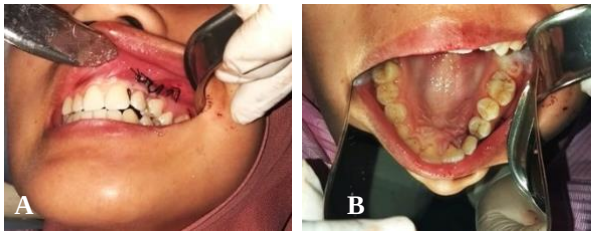


**Figure 3** After suturing; **A** buccal aspect, **B** palatal aspect.

**Figure 4** Impacted maxillary canine after removal

## DISCUSSION

The management of impacted teeth is probably the most common problem in oral surgery worldwide. The American Association of Oral and Maxillofacial Surgeons's definition of an impacted tooth is one which is not fully erupted into its appropriate site in the dental arch, within its normal period of growth, usually due to a lack of space, bad positioning or the presence of associated pathology. The impacted tooth can be pathologic and always requiring treatment. Impacted teeth can be managed in several ways. Impacted maxillary canines can be guided by surgical exposure to erupt spontaneously or by using orthodontic traction. The impacted tooth can also sometimes be used as donor tooth for auto transplantation. When impacted maxillary canines are not susceptible to those treatment, surgical extraction is the reasonable choice. Management of impacted teeth can be challenging. The most important part of this process is to develop an organized approach to establish a diagnosis, plan the treatment, identify risk, assess benefits, and recognize alternatives treatment.[7,15] The case of a 19 years-old woman with impaction of left upper canine is presented, the surgical exposure and orthodontic traction was not possible because of high and horizontal impaction. Therefore, surgical extraction was chosen. The tissue incision on the palatal and labial mucosa achieved by scalpel under local anesthesia, in addition, there is an option to treated patient with ultrasonic surgery. Although very time consuming, the ultrasonic cutting can reduce the bleeding risk during treatment.[16]

The radiographic evaluation is to determine the location of the impacted tooth, its relation to the anatomic structure, and identification of potential pathologic findings in that area. Therefor imaging modalities must provide useful diagnostic information about the impacted tooth and the enclosed structures. Plain radiograph (periapical, occlusal, panoramic radiograph), cone beam computed tomography (CBCT), and CT scans 3D are the modalities for radiographic evaluation of maxillary impacted canines. Several variables have been proposed to predict the duration of forced eruption: age, number of impacted canines, pretreatment radiographs, indices calculated from (CBCT). The problems 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 dental arch.[9,17] Indications, risks, benefits, and alternatives must be clearly determined by clinicians, even though on the initial presentation the indication may appear quite clear. The factors contributing to the problems eruption are the main factors that should be considered in defining the indications for treatment. Other factors to recognize include the patient's chief complaint, symptoms, age, and any findings that can identify the impacted tooth as a pathologic entity. These findings may include damage to the neighboring teeth in the form of dental caries, bone loss, infection, or pericoronitis.[7]

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It was concluded that impaction is defined as the failure of tooth eruption at its appropriate site in the dental arch, within its normal period of growth. Impacted canines cause relatively few problems for patients, and some of these teeth remain unerupted and asymptomatic. Maxillary canines are the most commonly impacted teeth, second only to third molars. The available treatment options were surgical removal of impacted canine (due to its difficult position and pathological reasons), or surgical exposure and orthodontic repositioning. It was reported the surgical removal of impacted maxillary canines from 19 years old female patient which accessed both labial and palatal.

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