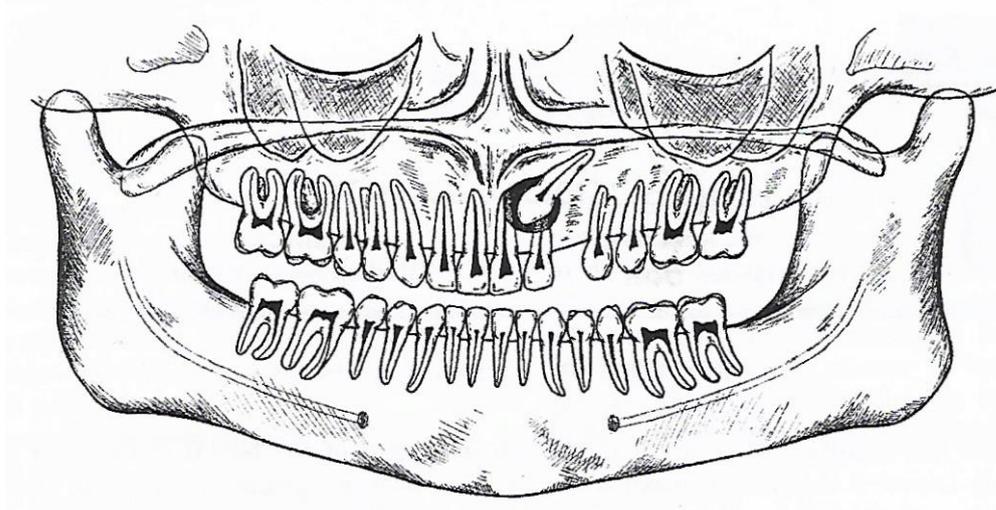


Impacted maxillary canine

- Maxillary canines are impacted in about 1%-3.5% of the population, the rate among female patients is twice as high as that in males.



The causes of maxillary canine impaction

Maxillary canines start their development at a higher level than the adjacent teeth and erupt after them. The long distance that this tooth needs to travel into its normal position there is an increased chance of deflection. The space for its eruption may be taken up by the first premolar.

Disturbance of the axis of the tooth germ, scar tissue in the path of eruption. Failure of resorption or ankylosis of the root of the deciduous predecessors, or their early loss. Missing lateral incisor which acts as a guide for the canine.

- If the maxillary canine fails to erupt by the age of 13 years, its position should be investigated, the orthodontist should be consulted to determine if the tooth can be brought to normal occlusion.

Classification of impacted maxillary canine

Classification helps much in the diagnosis and treatment planning.

The following classification suggested by Archer (1975):

- **Class I:** Impacted canines in the palate
 - 1: Horizontal
 - 2: Vertical
 - 3: Semi-vertical

- **Class II:** Impacted canines located on the labial surface
 - 1: Horizontal
 - 2: Vertical
 - 3: Semivertical

- **Class III:** Impacted canine located labially and palatally; crown on one side and the root on the other side

- **Class IV:** Impacted canine located within the alveolar process, usually vertically between the incisor and first premolar

- **Class V:** Impacted canine in edentulous maxilla

Clinical examination

- The position of the tooth may be obvious by the presence of a bulge either palatally or buccally. Palpation of the maxilla through the labiobuccal sulcus may reveal the presence of the bulge buccally. The lateral incisor may be proclined due to the presence of the canine labial to the root or may be retroclined the canine is palatal.

Radiographic examination and assessment

The radiographic views that can be used include; periapical, occlusal, OPG, lateral skull view cone beam CT (CBCT) can also be used. The periapical radiograph provides a detailed view of the tooth, surrounding bone, root formation, the presence of root resorption of the adjacent lateral incisor or the presence of any pathology. Localization of the canine is important especially when it could not be determined clinically.

- - Occlusal projection; which produces an axial view of the incisors, will demonstrate the buccopalatal localization of the canine.
- - OPG; can be used to localize impacted canine on the basis that palatally impacted canine appear magnified. It can also demonstrate the vertical angulation and its height.
 - Lateral skull view
 - CBCT.

Options of treatment

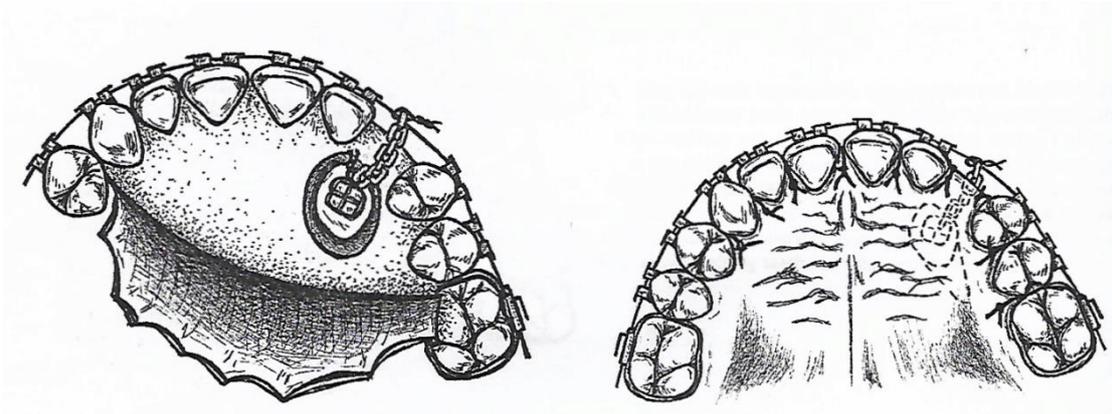
1-Retention or leave in situ indicated when:

- The canine is asymptomatic and its extraction may lead to damage to the adjacent teeth.
- There is absence of infection, abnormal widening of the follicle, absence resorption of the adjacent roots or any other associated pathology.
- Esthetically acceptable.

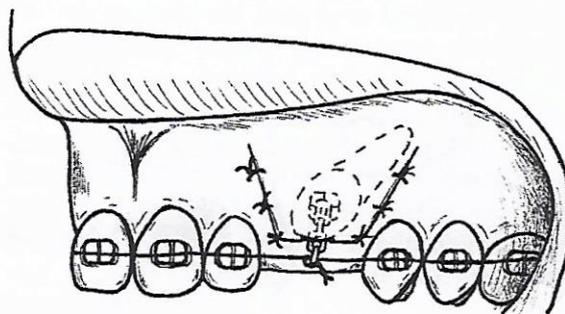
2- Only Surgical exposure .(without orthodontic traction).

3. Surgical exposure and orthodontic traction is the procedure that allows natural or orthodontically guided eruption of the impacted teeth

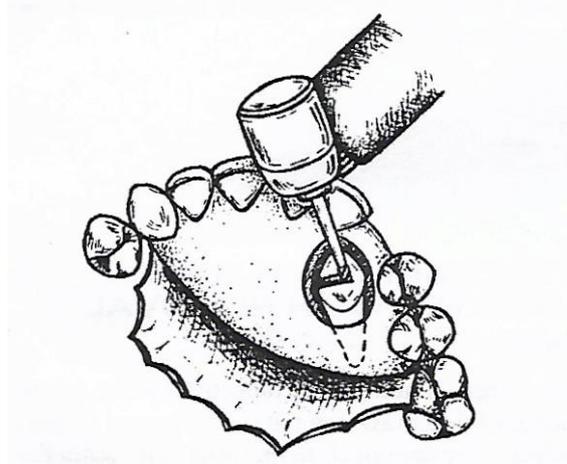
- -There should be adequate space in the arch to accommodate the tooth.
- -There should be an unobstructed path of eruption.
- -After eruption the tooth should be in near to normal position in all planes.
- -The timing of the procedure should be as close as possible to the normal eruption time.
- The approach is through a palatal envelope flap, extending from the first molar to the first molar on the other side in bilateral impaction cases, or from the first molar to the first premolar on the other side in unilateral impaction cases.



- Buccally impacted teeth are approached through a 3-sided buccal flap, depending on its location.

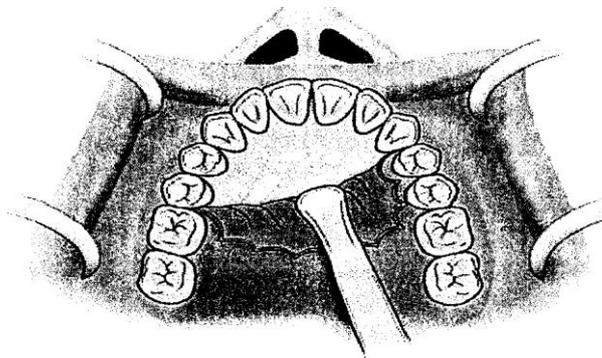


- After reflection of a full mucoperiosteal flap, the crown is exposed using bur and a low speed handpiece or a sharp curette in cases of thin overlying bone.



- The exposure should be conservative taking care not to expose the cemento-enamel junction (CEJ) as this was shown to result in increased incidence of external root resorption. After exposure of the crown and hemostasis the orthodontist can attach a bracket to the crown at the same session.

- In palatally positioned canine, a window is excised in the soft tissue before replacing the flap, if the bracket is not attached at the same operation the window is packed with a suitable pack until it epithelializes for 2-3 weeks. In buccal approaches it is more appropriate to suture the flap above the crown (apically repositioned flap) and the area below covered with a pack to ensure that the tooth will erupt into an area of keratinized mucosa.



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Palatal envelope flap

4. Transplantation in this procedure the canine is carefully extracted and transferred to a surgically prepared socket in the dental arch with minimum delay. The transplanted tooth should be splinted in its new position for about a month with an orthodontic appliance.

It is essential to have sufficient space to accommodate the crown of the canine.

- Success rate is increased when the unerupted teeth still have open apex and when the handling of the root is kept to minimum to ensure the viability of the cementum and periodontal membrane. Endodontic treatment should be performed as soon as possible after surgery (about 6-8 weeks), periodic follow up is required to allow early detection of root resorption which is common.

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- 5. Removal surgical extraction may be performed when the other options are unavailable. The main indications include:

- - Before construction of a dental prosthesis.
- -To permit orthodontic alignment of other anterior teeth.
- -When there is resorption of the roots of adjacent teeth.
- -When a follicular cyst has developed.
- - Infection although uncommon .

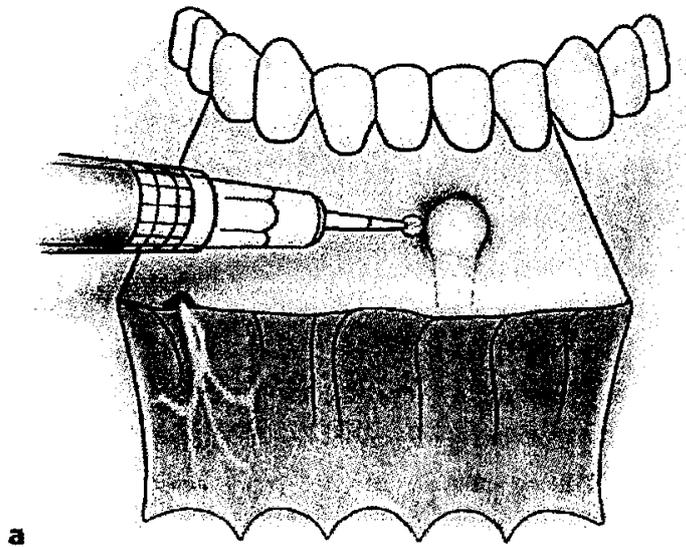
Possible complications include:

- 1- Palatal hematoma formation, this can be prevented by an acrylic splint to support the soft tissue.
- 2- Perforation into the floor of the nose, but it rarely causes a problem.

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Impacted mandibular canines

- These are less frequently impacted than maxillary canines (about 0.3% of population) and are mostly buccally located, partially erupted teeth can be removed easily using elevators or forceps.
- Localization of the unerupted teeth is by periapical film, OPG or occlusal view that is taken with the X-ray directed along the long axis of the teeth.
- Removal is by raising a 2-sided or 3-sided buccal mucoperiosteal flap with care to avoid damaging the mental nerve, bone removal and the tooth is extracted wholly or after sectioning.
- Surgical exposure and orthodontic traction is also indicated after consultation with the orthodontist, the exposure is either through a flap or sometimes through excision of the overlying soft tissue when the tooth is only covered by soft tissue.

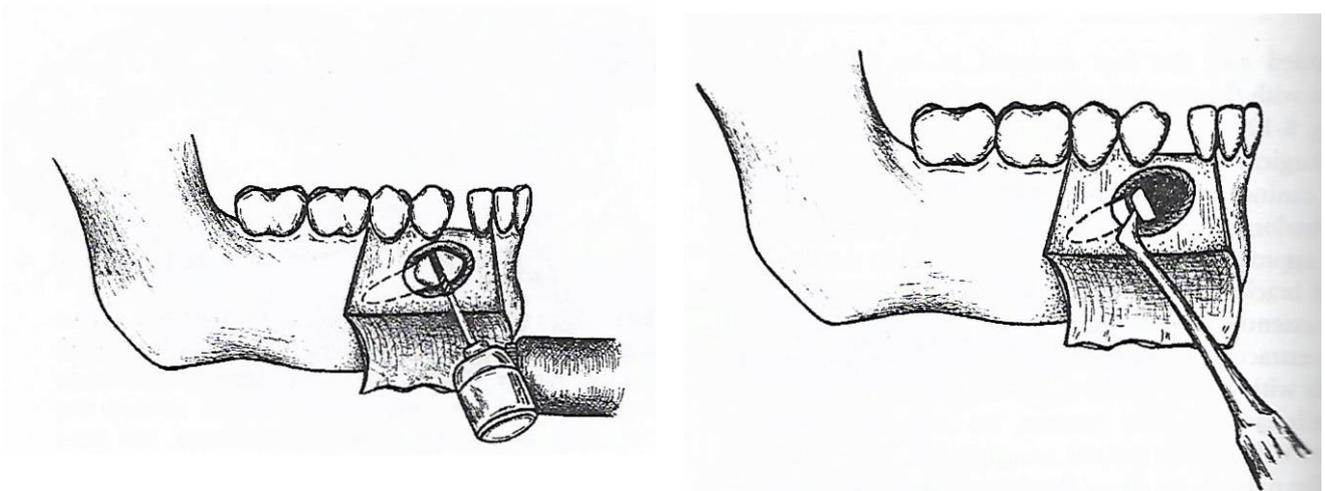


Approach to impacted mandibular canine

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Impacted lower premolars

- It occurs mostly due to loss of space by drifting forward of the first permanent molar after early extraction of the second deciduous molar, other causes are gross malformation and retention of the deciduous predecessor.
- Localization is by peri-apical film or OPG with occlusal view to demonstrate the bucco-lingual position.
- Removal is by raising a 2-sided or 3-sided buccal flap, with preservation of the mental nerve, bone removal, sectioning of the tooth if needed and extraction of the tooth.
- In young patients, it is essential to consult an orthodontist before extraction.

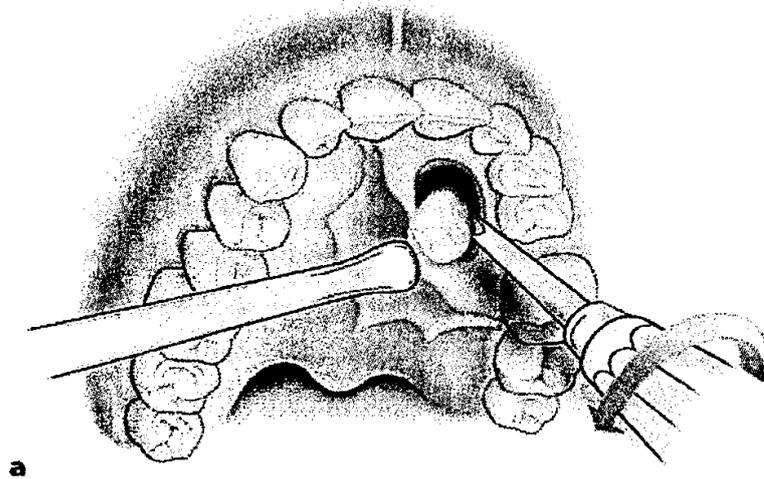


Impacted maxillary premolars

- It is usually impacted with its crown palatally, or it may be within the arch between adjacent roots. It can be partially erupted, completely buried or the crown may be wholly exposed, in the latter case extraction is easy with an elevator or forceps.
- Completely impacted teeth require a palatal envelope flap extending from the second molar to the lateral incisor on the same side, bone removal and extraction of the tooth.

— Buccal approach is needed in cases where the tooth is within the arch between the standing teeth, sectioning of the tooth is needed when the root is curved. Care is taken not to damage the adjacent teeth.

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Removal of palatal impacted premolar