

Tooth Impaction

4th Year Students Lecture 7 Dept. of Dentistry - Al-Noor University College Dr. Rayyan Al-Mallah

Definitions

- According to World Health Organization (WHO), an impacted tooth is the one that is unable to fully erupt in its normal functional occlusion/location by its expected age of eruption.
- <u>Unerupted teeth</u> tooth that have not yet erupted and they are in the process of eruption. i.e. still within the normal time of eruption and expected to erupt.
- <u>Ankylosed tooth</u> is when normal periodontal ligament between cementum and alveolar bone is absent and the tooth is fused to alveolar bone.



Etiology ot tooth impaction

• A. Systemic factors:

1- Genetic, syndromes like cliedo-cranial dysostosis , down's syndrome, etc...

- 2- Endocrinal deficiency like hypothyroidism and hypopituitarism
- 3- Febrile diseases (brucellosis , scarlet fever, ... etc.)

4- Other factors and diseases like rickets, anemia, tuberculosis, congenital syphilis, malnutrition.



Fig. 2. Anterior view of the patient with cleidocranial dysplasia. Observe the proeminance of the frontial and parietal bones, determining the increase of the cranial perimeter.



B. Local factors:

- 1. Early extraction of deciduous teeth.
- 2. Prolonged retention of deciduous teeth or ankyloses of deciduous teeth.
- 3. Malposition of the tooth germ.
- 4. Lack of sufficient space for a correct eruption (arch –tooth discrepancy)





- 5. Cleft lip and cleft palate
- 6. Abnormal root pattern (e.g. dilacerations)
- 7. Factors block the path of eruption like:
- Supernumerary tooth
- Adjacent teeth
- Scars resulting from the surgical correction of orofacial cleft
- Dense overlying bone or fibrous tissue
- Odontogenic tumors
- Any pathological mass









Frequency of tooth impaction:

The frequency of tooth impaction is as follow:

- 1- lower third molars
- 2- upper third molars
- 3- upper canines
- 4-lower premolars
- 5-lower canines
- 6- maxillary premolars
- 7-maxillary central and lateral incisors
- 8-mandibular second molars



(ما کلاسفکیشن یا شباب (Types)

Types of impaction:

- 1. Partial impaction (partial eruption)
- 2. Complete impaction

Types of impaction :

- 1. Soft tissue impaction
- 2. Bony impaction
- 3. Tooth impaction
- 4. Combination



Indications of Impacted Teeth Removal

1- Pericoronitis:

It is an inflammation of the soft tissues around the crown of partially erupted tooth (operculum) and is caused by bacterial infection either because of imbalance of normal flora\ defense mechanisms due to immune compromising condition, or secondary to minor trauma from an opposing teeth or food and debris entrapment under the operculum.

It represents the main cause of extraction for symptomatic third molars.



Acute pericoronitis

It is characterized by a <u>severe</u> throbbing pain which is exacerbated by chewing, interferes with sleep, with <u>limited mouth opening</u> (trismus). The patient may complain of extra-oral swelling and discomfort during swallowing, submandibular adenopathy can be palpated, and <u>foeter oris (bad oder)</u> may be noted.

In this state tooth extraction is absolutely contraindicated.

Sub-acute pericoronitis

• It is characterized by a continuous <u>dull</u> ache, some times <u>pus</u> tracks from the third molar region and present in the buccal sulcus alongside the first molar, a condition known as migratory abscess of the buccal sulcus.

Chronic pericoronitis

• This is characterized by <u>dull pain</u> or <u>mild</u> discomfort lasting for only a day and interspersed with remissions lasting many months . The patient usually complain of unpleasant taste ..

Treatment options:

- 1. In mild symptomatic cases conservative treatment is indicated : curettage and irrigation by hydrogen peroxide, normal saline or chlorhexidine and mouthwash prescription.
- 2. In slight more severe cases associated with large amount of soft tissue traumatized ,extraction of upper wisdom tooth is indicated.
- 3. For patients who have (in addition to local swelling and pain) mild facial swelling, mild trismus resulting from inflammation extending into the muscles of mastication, or a low-grade fever, the dentist should consider administering an antibiotic along with irrigation.

- 4. In severe cases, that may lead to fascial space infection, severe trismus and high fever, hospitalization is indicated.
 - 5. Surgical removal of operculum (operculuectomy)
 - 6. Surgical removal of the impacted tooth
- Should not be removed until the signs and symptoms of pericoronitis have completely resolved.
- Pericoronitis shows a significant tendency to relapse, with increasing frequency and intensity, until the involved tooth is extracted.

Surgical Removal of Teeth, Complex Tooth Extraction



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Methods of Tooth Extraction:

1- Intra-alveolar extraction (closed extraction) is removing of the tooth or root using forceps , elevator or both without flap elevation.

2- Open extraction (Trans-alveolar Extraction or Surgical Extraction) involving:

- O Flap Elevation
- O Bone Removal(osteotomy)
- O Tooth Sectioning
- O Tooth Extraction
- O Socket Toilet
- O Flap Reposition and Suturing.



Indications for trans alveolar extraction:

- Failed attempted forceps extraction
- Retained roots which can not be grasped with forceps or delivered with an elevators



- History of complicated extraction
- Heavily restored teeth
- Root canal filled teeth





- Hypercementosed or ankylosed tooth
- Teeth with germination or fusion



• Dilacerated teeth or teeth severely curved roots



• Teeth near vital structures, and solitary teeth .



• Teeth with wide divergent roots



- When bone preservation is required (like in implant)
- If the patient has thick or extremely dense bone
- Short clinical crowns with evidence of severe attrition
- A tooth with radiographic findings that may complicate extraction procedure



 An open extraction technique may be more conservative, cause less operative morbidity, and be quicker to perform compared with a closed extraction. The bone loss may be less if a soft tissue flap is reflected and a proper amount of bone is removed; it may also be less if the tooth is sectioned (cut into smaller sections).



Radiographic evaluation

- Number of roots
- Shape of roots
- Relation to anatomical structures
- Periodontal condition
- The presence of root resorption



Blade no. 15

The No.**15 blade** has a small curved cutting edge and is the most popular **blade** shape ideal for making short and precise incisions. It is utilized in a variety of surgical procedures including most of minor oral surgical procedures.


Blade no. 11

The No.**11** is an elongated triangular **blade** sharpened along the hypotenuse edge with a strong pointed tip making it ideal for stab incisions needed when lancing an abscess or inserting a chest drain. It is held like a pencil and often upside down by the surgeon to prevent it inadvertently being inserted too deep.



Blade no. 10

The No.**10 blade** with its curved cutting edge is one of the more traditional **blade** shapes and is used generally for making varying sizes of incision in skin and muscle.



Blade no. 12

The number **12 blade** is a small, pointed crescentshaped blade sharpened along the inside edge of the curve. It sometimes **used as** a suture cutter. The number 15 **blade** has a small, curved cutting edge ideal for making short, precise incisions.



Scalpel handles sizes



mounting of blade in scalpel







Endodontic Surgery cont..

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Limitations and Contraindications

- A. Patient's Medical Status (uncontrolled medical condition)
- B. B. Patient's Mental/Psychological Health
- C. Nonrestorable Tooth
- D. Poor Periodontal Prognosis







E. INADEQUATE ACCESS TO SURGICAL AREA

- 1. Thick buccal cortical plate/external oblique ridge
- 2. Limited opening
- 3. Shallow palatal vault
- 4. Shallow vestibule



F. High risk of trauma to vital structures such as inferior alveolar nerve or mental nerve



G. If conventional root canal treatment or retreatment is possible

A- Success Of Nonsurgical Treatment And Retreatment

- If the quality of the non-surgical endodontic therapy can be improved by retreatment, this should be accomplished prior to periapical surgery as this will enhance the overall prognosis.
- Do not "seal in" necrotic debris and/or contaminated canal contents with a root-end filling.

B. SYSTEMIC CONSIDERATIONS

- 1. Review of medical history
- 2. Consultations

C. PSYCHOLOGICAL EVALUATION

- 1. Patient motivation
- 2. Patient apprehension

D. ESTHETICS

- 1. Scarring
- 2. Exposure of crown margins

E. PROSTHETIC CONSIDERATIONS

- 1. Presence of crowns and bridges
- 2. Restorability



F. Clinical evaluation

- 1. Evaluation of radiographs Periapical films at different angles and panoramic films to evaluate root length, location of adjacent roots, and location of major anatomical structures such are nerves or maxillary sinus.
- Occlusal films may also be useful, especially for palatal lesions.
- Inform the patients about possible complications.

- 2. Limitations of opening
- 3. Pre-existing scar tissue
- 4. Extent of tori/exostoses
- 5. Vestibular depth
- 6. Quality of existing restoration (s)
- 7. Depth of palatal vault (is a stent necessary?)

G. Periodontal evaluation

- pocket depths
- status of gingival health
- Height and width of alveolus

PRESURGICAL PREPARATION

- a. Review medical history
- b. Verbal and written informed consent
- c. Vital signs (bp, pulse, respirations)
- d. Pre-operative therapeutics
 - 1. chlorhexidine mouth rinses
 - 2. pre-operative NSAID (preemptive analgesia)
 - 3. antibiotics
 - 4. sedation, if needed
 - 5. steroids, if needed

PRESURGICAL PREPARATION

E. ANESTHESIA

1. Regional blocks

2. Long acting anesthetic

3. Local infiltration using vasoconstrictors for increased hemostasis.

F. STERILE FIELD AND ASEPTIC TECHNIQUE

- 1. Surgical draping of patient.
- 2. Surgical scrubs for surgeon and assistant.
- 3. Betadine swab extraorally and intraorally.

Factors Associated With Success and Failure in Periapical Surgery

Success

- Radiographic evidence of bone fill following surgery
- Resolution of pain and symptoms
- Absence of sinus tract
- Decrease in tooth mobility

Failure

- Persistent pain and swelling
- Clinical or radiographic evidence of lesion is still
- Lack of bone repair following surgery (Scar tissue?)
- Sinus tract does not resolve or returns
- Deep probing defects

Complications of Endodontic Surgery

Intra-opertive:

- Systemic complications related to any dental or surgical procedure (eg: fainting, vasovagal shock, medical issues)
- Bleeding : controlled by?
- Trauma to adjacent anatomical structures(such as?) and teeth.
- Trauma to the nerve?

Complications of Endodontic Surgery

Post operative complications:

- Fenestration, sinus
- Abscess formation
- Increase mobility of the tooth
- Amalgam tattoo







Postoperative instructions

- 1. Written information regarding postoperative sequelae
- 2. Instructions inform the patient of what to expect (e.g., swelling, discomfort, possible discoloration, and some oozing of blood)
- 3. The surgical site should not be disturbed
- 4. Pressure should be maintained (cold packs over the surgical area till bedtime)
- 5. Oral hygiene procedures are indicated everywhere except the surgical site; careful brushing and flossing may begin after 24 hours.
- 6. Proper nutrition and fluid intake are important but should not traumatize the area.

- 7. A chlorhexidine rinse.
- 8. Analgesics are recommended
- 9. The patient is instructed to call if excessive swelling or pain is experienced, torn suture or any other complication.
- 10. Suture removal after 5-7 days

Follow up:

- 6- 12 months clinically and radiographically
- needs pre-operative radiographs

Bond Apatite transformation into the patient own bone



• Tissue removed:

Any tissue removed should by biopsied?

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• BOX 18.6 Rationale in Decision for Biopsy of Periapical Lesions

- Was there evidence of preendodontic pulpal necrosis?
- Is the characteristic of the radiolucency "classic"?
- Will the patient return for follow-up radiographs?

If all of these criteria are met, the surgeon may decide to not submit routinely collected periapical tissue.

Hemisection and root amputation

- These procedures may be indicated if an adequately root-filled molar has a periodontal furcation involvement, a vertical root fracture, extensive resorption, root fracture or gross caries.
- A full periodontal assessment is necessary before planning these procedures.
- The lesion is managed by removing the involved root (and the overlying crown), and then sealing and preserving the remaining root and crown.



NOOL HEINISECTION AND RESTORATION



Tooth with bony defect is endodontically treated.



The diseased crown and root are sectioned off and removed.



A fixed bridge is placed to stabilize the treated tooth. As healing occurs, bone fills the defect.






Intentional Replantation

- The procedure involves extracting the tooth as a traumatically as possible.
- Performing conventional root resection and retro filling and then replanting the tooth.
- This procedure is indicated if the root apices are close to an important anatomical structure, such as a mandibular molar with roots close to the inferior alveolar canal.
- The last resort to save a tooth after other procedures have failed or would likely to fail

Corrective surgery

- Is the management of defects that have occurred along the root by a biological response (resorption) or iatrogenic(procedural)errors.
- Indications:
- 1.Procedural errors
- 2.Resorptive defects.
- Contraindications:
- 1.Anatomical impediments.
- 2.Inaccessible defects.
- **3.**Repair would create periodontal defect.

Considerations of Corrective surgery

- The position of the perforation is an important aspect in determining whether it is surgically accessible.
- 1.Surgical approach
- 2.Repair material
- 3.Prognosis

Considerations of Corrective surgery

• Surgical approach

• If the perforation is located on the mesial or distal aspect of the root, this will increase not only difficulties in visualization but also problems with access and hemostasis and material placements. However, such defects can sometimes be managed by conventional endodontics or by internal perforation repair, precluding the need for surgery.

• Repair Material

MTA and similar materials...show favorable biological properties..

• Prognosis

 Repair in cervical third or furcation have the poorest prognosis, while defects in middle or apical third with properly prepared and sealed has a very good long term prognosis

What is MTA?

• It is a versatile dental material based on calcium silicate in composition

Used in

- pulp capping
- pulpotomy
- apexogenesis and apexification
- perforation correction
- root end filling

- It is very biocompatible material, bioactive and cementoconductive
- It has antibacterial and antifungal properties
- But it also has weak physical properties and difficult manipulation and long setting time, so other materials emerged to overcome this problem, such as **Biodentin**.





APPROVED

Medical college of masit BY:OSAMA HADI√ Department of medicine



Thing to remember :-

- 1) Stand on the right side of the patient with good confidence .
- 2) Introduce yourself as a medical student not as a doctor. (you may face difficult question).
- 3) Talk the patient gently with clear comprehensible words .
- 4) Remember don't hurt the patient in your speak & touch .

LD :-Name :-Age :-Sex :-Occupation :-Address :-Religion :-Marital status :-Residency :-Date of admission :-

Blood group & RH :-

Chief compliant & duration :-

These compartment posses the main cause that made the patient get hospital & here you should avoid the medical terms. It should be a symptom not a sign .

* The symptom discovered by a patient & the sign observed by a doctor .

Example :-

- Diarrhea = frequent bowel motion
- Constipation = infrequent bowel motion
- Vomiting = explosion of gastric content or (same term)
- Fever = increase body temp.
- Dysphagia = difficulty in swallowing
- Dysponea = shortness of breath
- Fit = abnormal involuntary movement
- Headache = same term Pain = same term
- Edema = swelling of part of the body
- Jaundice = yellow discoloration of the skin & sclera
- Hematemesis = blood on vomitus

مختصر عملية الأبيسكتومي



flap incision



Flap reflection and elevation by?



Bone removal to access to the lesion



Curation (Curettage) of the lesion



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Root-end cutting



Root-end preparation



Root-end (retrograde) filling



Flap reposition and suturing



التعب يزول والإنجاز يبقى

Steps of Complex Tooth Extraction



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Open extraction (Trans-alveolar Extraction or Surgical Extraction)

<u>1-Flap Elevation (the same principles of flap design, followed by flap elevation and reflection by blunt dissection using mucoperosteal elevator(. مثل ما شرحنا سابقاً</u>

An envelope flap is made, and if needed a releasing incision is made.

- 2-Bone Removal(osteotomy)
- 3- Tooth Sectioning
- 4- Tooth Extraction
- 5- Socket Toilet
- 6- Flap Reposition And Suturing

Bone removal (osteotomy):

Bone should only be removed to expose the root or tooth to provide a point of application for an elevator or forceps.

Bone removal is performed by:

- 1-Surgical bur either guttering or postage stamp method
- 2-Chisel and mallet pressure

3-Rongeur forceps is a valuable instrument for trimming bone edges after extraction of the tooth or root, it also removes bone quickly.

4-Bone file for reaming of the sharp bony margin











A constant stream of irrigation must accompany the drilling to :

1- Avoid overheating the bone that leads to trauma and necrosisi thus impairs healing .

2- Improve visibility by removing the cut bone and tooth debris and blood clot (flushing effect).

3-Has a lubricating effect .

4-The effect of irrigating solution (eg. disinfectant and antimicrobial).



Surgical extraction in single rooted teeth

- Only flap reflection gives us the privilege of grasping root with forceps.
- We may need to grasp a small portion of buccal bone to have better mechanical advantage.
- We may use straight elevator with caution and proper control, and with supporting our index finger on the adjacent tooth.
- Bone removal (guttering)
- Guttering with purchase point ?
- Bone removal to expose a sufficient amount of root strucure





e 8-36 Bone is removed with bone-cutting bur after reflection of andard envelope flap. Bone should be removed approximately one o two thirds the length of the tooth root.











Multi-rooted teeth surgical extraction by tooth division (sectioning)

If the roots have different path of removal in multi-rooted teeth or the root trunk can not be grasped with forceps , the root mass must be divided and the separated roots removed along their individual path of withdrawal.

Methods of tooth division:

Surgical bur and hand-piece .

Osteotome or chisel .

What is the difference between osteotome and chisel?



$T \ or \ Y_{\text{in three}}$

rooted upper molars

Single cut in lower molars

Extraction of small root fragments and tips

- Visualization (position, light, irrigation, dryness)
- Analysis of the case

Mobility? Possible size? Radiography?

Extraction of small root fragments and tips

- Vigorous irrigation and suction
- Using apexo-elevators and small elevators (avoid excessive force)





• Changing to open extraction

Extraction of small root fragments and tips

- Leave in situ... When?
- ✓ Small fragment (less than 4 mm)
- Proximity to vital structures, or possible traumatic removal (the risks outweigh the benefits)
- Deeply imbedded
- ✓ Absence of infection

(the patient should be informed about the case and asked to contact the dentist immediately if any problem develops).

Sequence of tooth extraction

- Maxillary teeth before mandibular, Why?
- Posterior teeth before anterior, Why?
- The most difficult first.
- The canine should be the last.

If teeth in the maxillary and mandibular left quadrants are to be extracted, the following order is recommended: (1) maxillary posterior teeth; (2) maxillary anterior teeth, leaving the canine; (3) maxillary canine; (4) mandibular posterior teeth; (5) mandibular anterior teeth, leaving the canine; (6) mandibular canine.








Flaps in Endodontic Surgery

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Flaps

• Flap is a section of soft tissue outlined by surgical incision, having its own blood supply and allowing a surgical access to the intended area, to be replaced to its original position and maintained by sutures and expected to heal.



Principals of flap design

 The base of the flap must be broader than the free gingival margin?



- The incision must be carried out with a firm, continuous stroke.
- Full thickness Mucoperiosteal flap



• Flap design and incision should be carried out in such a way that injury of anatomic structures is avoided

- The width of the flap must be adequate, so that the operative field is easily accessible, without creating tension and trauma during manipulation.
- The flap itself must be larger than the bone deficit so that the flap margins, when sutured, are resting on intact, healthy bone and not over missing or unhealthy bone, thus preventing collapse of the wound and flap dehiscence and tearing.

- The vertical incision at the gingival crest should end in a line angle and interdental papilla should be preserved (either involved or excluded)?
- Also it should not be on the facial surface of the tooth.



- The incision should not be placed over boney prominence such as canine eminence to avoid dehiscence of the wound.
- The vertical releasing incision should not extended beyond muco-buccal fold.
- Retractor must rest on bone and not impinge on soft tissue

Vertical releasing incision is contraindicated in certain sites in the oral cavity:

- Transverse incisions in the palate: to avoid injury to the greater palatine artery. (note)
- Lingual surface of the mandible: to avoid injury to the lingual nerve
- Canine eminence: because it increases the tension on the suture line which lead to wound dehiscence.
- In the area of mental foramen, between mandibular first and second premolars: to avoid injury to the mental nerve

Types of Mucoperiosteal Flaps:

• Envelope (gingival) flap



Envelope Flap

- Intrasulcular horizontal incision without vertical releasing incisions.
- Generally not used for surgery in the apical area except occasionally for palatal roots of maxillary molars.
- Used for root resections, root amputations, hemisections, and repair of cervical perforations or resorptive defects.

Advantages :

- 1. Easy re-approximation to original position
- 2. Good blood supply
- 3. It can easily modified to two-sided or three sided flap by adding vertical releasing incisions to either ends of the flap when necessary.

Disadvantages :

- 1. Limited accessibility and visualization
- 2. Difficulty in reflection with greater tension that can result in tearing at the ends of the flap

Triangular Flap (Two-sided)



Triangular Flap (Two-sided)

Advantages

- 1. Excellent wound healing potential
- 2. Minimal disruption of vascular supply to flapped tissues
- 3. Excellent visibility
- 4. Can view the entire root and overlying cortical and crestal bone; good for viewing and treating periodontal defects and root fractures
- 5. Easy to extend, if needed
- 6. Good flap re-approximation
- 7. Easy to suture

Disadvantages

- 1. More difficult to incise and reflect
- 2. Surgical access slightly limited due to the single releasing incision
- 3. Possibility of slight gingival recession

Trapezoidal flap, or Rectangular (three sided flaps)



Rectangular or Trapezoidal or Three-sided

Used in: Multiple teeth Large Lesion Long roots



Disadvantages

- 1. More difficult to incise and reflect
- 2. Possibility of gingival recession
- 3. Flap re-approximation, wound closure, suturing, and post-surgical stabilization is more difficult than with the triangular flap



 Fig. 9.6 Vertical-releasing incisions at the other end of the envelope incision convert the envelope incision into a four-cornered flap (corners numbered). Semilunar flap



Semilunar Flap

Advantages

- 1. Fast, easy to reflect
- 2. Marginal and interdental gingiva are not involved
- 3. Unaltered soft tissue attachment level
- 4. Crestal bone is not exposed
- 5. May be used for an extremely long root in certain situations (long maxillary canine)



Semilunar Flap

Disadvantages:-

- 1. Excessive scarring
- 2. Disruption of blood supply to unflapped tissues
- 3. Flap shrinkage
- 4. Difficult flap re-approximation and wound closure
- 5. Delayed, secondary intention healing with more postsurgical sequelae
- 6. Limited apical orientation (cannot visualize root eminences and other landmarks)
- 7. Limited use in mandibular surgery
- 8. May cross bony cavity
- 9. Cannot extend flap
- 10. Least amount of access and convenience

Submarginal Flap



Submarginal (Ochsenbein-Luebke)

- Formed by scalloped horizontal incision in attached gingiva and two vertical releasing incisions.
- Scalloped incision corresponds to the contour of the marginal gingiva.
- There must be an adequate band of attached gingiva present (4-5mm).
- This requires a very careful analysis of attachment level along the entire length of the horizontal incision.

Submarginal (Ochsenbein-Luebke)

Advantages

- 1. Does not involve marginal or interdental gingiva.
- 2. Does not expose crestal bone
- 3. Minimizes gingival recession where crowns are in place and esthetics is a concern.
- 4. Minimizes crestal bone loss.
- 5. Easy to reapproximate flap.



Disadvantages

- 1) -Unable to extend flap, if needed
- Disruption of blood supply to marginal gingival tissues, must rely on collateral circulation (which may not exist resulting in sloughing of marginal gingiva)
- 3) Limited use in mandibular surgery
- 4) Possible delayed healing- Possible scarring-Possible flap shrinkage
- 5) Full root and crestal bone are not exposed, so periodontal defects and root fractures are difficult to visualize and treat

Other flaps for reasons other than endodontic surgery:

Wisdom teeth impaction flaps palatal torus canine impaction flaps palatal lesion\cyst. pedicle flap buccal advancement flap buccal fat pad flaps



Pedicle Flaps







• Blades (scalpels)



• Scalpel handle (size 3)



Notes

- The scalpel blade is mounted on the scalpel-handle with the help of a needle holder, or hemostat, with which it slides into the slotted receiver with the beveled end parallel to that of the handle.
- The scalpel is grasped in a pen grasp for maximum control and tactile sensitivity.
- The incision should be made at right angle to the underlying bone to ensure good healing when the tissues are re-apposed.






How to choose the proper flap design?

- 1. Number of teeth involved
- 2. Length and shape of roots involved
- 3. Presence or absence of periradicular pathosis
- 4. Extent of periradicular lesion
- 5. Sulcular depth
- 6. Location and size of frenum and muscle attachments
- 7. Approximating anatomic structures.
- 8. Access needed.
- 9. Types of restorations in surgical area.
- 10. Width of attached gingiva.



Endodontic Surgery

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Endodontic Surgery

- Definition:
- Surgical endodontics is defined as "removal of pathologic tissues, other than the contents of root canal to retain a tooth, with pulpal/ periapical involvement"
- Endodontic surgery is the management of periradicular disease by a surgical approach.

Categories of Endodontic Surgery

- Abscess drainage
- Periapical surgery
- Hemisection or root amputation
- Intentional replantation
- Corrective surgery

Drainage of an Abscess

- What is abscess?
- Drainage releases *transudates* or *exudates* from a focus of liquefaction necrosis.

- Goals of Draining an abscess : Relieves signs and symptoms, increases circulation, promote healing , decrease a potent irritant and for culture and sensitivity if needed.
- The abscess may be confined to bone or may have eroded through bone and the periosteum to invade soft tissue.
- Draining the infection does not eliminate the cause of the infection, so definitive treatment of the tooth is still needed.

Drainage can be through?

- Drainage through the tooth
- Periodontal Abscess Drainage
- Incision and Drainage (I & D) WHEN?
- Drainage may also be performed with trephination of the buccal bone when the root canal is inaccessible (cortical trephination).

Periapical Surgery

- Periapical Curettage
- Apicectomy (apicoectomy)
- Apicectomy with Retrograde Filling.

The Main Surgical Steps of Periapical Surgery

- 1. Appropriate exposure of the root and the apical region (flap)
- 2. Exploration of the root surface for fractures or other pathologic conditions
- 3. Curettage of the apical tissues
- 4. Resection of the root apex
- 5. Retrograde preparation with the ultrasonic tips
- 6. Placement of the retrograde filling material
- 7. Appropriate flap closure to permit healing and minimize gingival recession







• Apicoectomy is the surgical resection of the root tip of a tooth and its removal together with the pathological periapical tissues. Accessory root canals and additional apical foramina are also removed in this way, which may occur in the periapical area and which may be considered responsible for failure of an endodontic therapy.













Indications of Periapical Surgery

- 1. Anatomic problems preventing complete debridement or obturation
- 2. Restorative considerations like the presence of posts or cores in root canal when they are crowned or difficult to remove.
- 3. Horizontal root fracture with apical necrosis
- 4. Fractured file cannot be bypassed or removed to complete a satisfactory endodontic treatment
- 5. Irretrievable material pushed to periapical tissues
- 6. Other procedural errors during endodontic treatment like perforations that cannot be treated with conventional treatment.
- 7. Large periapical lesions that do not resolve with root canal treatment
- 8. Teeth with active periapical inflammation, despite the presence of a satisfactory endodontic therapy.

1. Anatomic problems preventing complete debridement or obturation







2. Restorative considerations like the presence of posts or cores in root canal when they are crowned or difficult to remove.







3. Horizontal root fracture with apical necrosis



Fractured file cannot be bypassed or removed to complete a satisfactory endodontic treatment





5. Irretrievable material pushed to periapical tissues



6- Other procedural errors during endodontic treatment like perforations that cannot be treated with conventional treatment or ledges cannot be managed.



7- Large periapical lesions that do not resolve with root canal treatment



8- Teeth with active periapical inflammation, despite the presence of a satisfactory endodontic therapy.

