

Principles of endodontic surgery

Note: the doctor said that this lecture mainly contain notes, so we should study it from the book for further information (chapter 18) principles of endodontic surgery.

Categories of endodontic surgery: -

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

(1) Abscess drainage

How to treat an abscess?

- ❖ Drainage
- ❖ Treat the cause

Why do we drain?

- ❖ To relieve pain
- ❖ To take culture + sensitivity test if needed
- ❖ To remove pus
- ❖ Improve circulation (so the antibiotic can reach the desire region)

When do we drain?

- ❖ When the spread of the infection is rapid
- ❖ Space involvement is evident
- ❖ If opening the tooth coronally does not yield obvious purulence

(2) periapical surgery (apicoectomy)

Includes a series of procedures performed to eliminate symptoms.

Example:

A patient came to you after 6 months of a good RCT with pain + chronic fistula + his periapical radiograph indicate periapical radiolucency. This patient needs a periapical surgery (on the other

hand a patient with a fistula because of a deep caries needs retrograde RCT)

- We need to expose the apex of the root + explore + shape + sometimes we need to seal + clean the granulation tissue + resect the apex + retrograde treatment. (Will be discuss in details later)

Why RCT is not 100% successful?

- ❖ Accessory canals that cant be seen
- ❖ The obturation is not that much sealed

Indications for periapical surgery:

- ❖ **Large periapical lesions that do not resolve with orthograde root canal treatment.**
- ❖ **Procedural errors during treatment** like: ***broken instrument** (if the file is sterilized and we can by pass it we don't need a retrograde surgery), ***perforation**, ***ledging** and ***gross overfill**. (gross filling is not itself an indication for removal of the material, surgical correction is beneficial if the teeth becomes symptomatic.
- ❖ **Horizontal root fracture with apical necrosis**
- ❖ **Irretrievable material preventing canal treatment or re-treatment** (post and core) (bridge)
- ❖ **Anatomic problems preventing complete obturation** (calcification) an nonobtured part of the canal may lead to a failure because of continued apical leakage so resecting the uninstrumented and unfilled portion of the root and placing a root end filling is necessary.
- ❖ **Restorative considerations that compromise treatment**

IMPORTANT: the conventional RCT is the main procedure but sometimes you need to put on to top of that periapical surgery. And in few cases periapical surgery is the only option alone.

Contraindication (or cautious):

- ❖ **Unidentified cause of root canal treatment failure** (for an unidentified RCT failure you need to re-treat or you refer him to a specialist to retreat)
- ❖ **When conventional cause of root canal treatment is possible**
- ❖ **Combined coronal treatment and apical surgery** (few situations occur in which simultaneous root canal therapy and apical surgery are indicated Usually, an approach that includes both of these as a single procedure has no advantages. It is preferable to perform only the conventional treatment without the adjunctive apical surgery, and it is likely that it will have a better outcome.
- ❖ **When re-treatment of a treatment failure is possible**
- ❖ **Anatomic structures (adjacent nerves and vessels) are at risk** (it is not necessary to remove the entire area of periapical granulation tissue or cyst when the apical surgery is a must and the anatomic structure is near the surgical area, because the treatment of the apical lesion and sealing of the root canal with the retrograde filling causes the apical lesion to heal).
- ❖ **Structures interfere with access and visibility** (nasal sinus)
- ❖ **Compromise of crown-root ratio.** (Teeth with very short roots have compromised bony support are poor candidates for surgery, root end resection in such cases may compromised stability. However, shorter roots may support a relatively long crown if the surrounding cervical periodontium is healthy).
- ❖ **Systematic complications** (bleeding disorders).

Dentists used to believe that whenever you see a periapical radiolucency you always need an apical surgery because it might be a small cyst, but researches proved that even small cyst can heal by a good RCT.

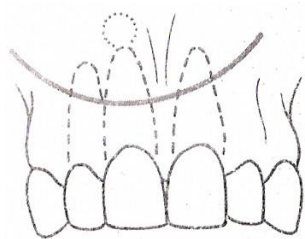
Surgical procedure: (surgical steps)

❖ **Antibiotics:** almost without exception periapical surgery is performed in an area with mixed acute and chronic infection. Because of the nature of the surgery and the potential for the spread of infection into adjacent spaces, preoperative prophylactic administration of antibiotics is indicated, 1 dose of penicillin v potassium (2g) or clindamycin (200mg) is given 1 hour before surgery.

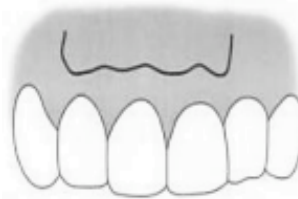
❖ Flaps:

A common misconception is that flaps should be designed that are trapezoidal, having a broader base than edge. A trapezoidal flap design creates a longer component in the nonkeratinized tissue that heals more slowly and with more discomfort. As the vertical release tends to broaden out apically, the incision crosses more bony prominences over the roots of the teeth and cross the muscle frenum, further delaying the healing process. The dental papilla just adjacent to the released flap actually ends up having a compromised blood supply and the potential for recession. In contrast, by making the vertical release more perpendicular to the sulcus, a shorter length in the nonkeratinized tissue may permit the same amount of flap release. The vertical incision should parallel the long axis of teeth and should be made between two teeth where the tissue is the thickest and has the best blood supply. The direct vertical incision makes sense because the blood supply to the gingiva follows the long axis and is oriented longitudinally.

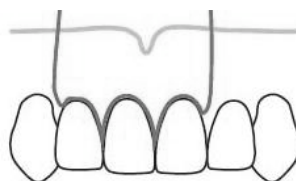
Type	Design	Advantages	Disadvantages	Extra notes
Semi-lunar	Half moon in the alveolar mucosa	It spares the marginal gingiva, easy, and quickly done	Small access, scarring, hemorrhage, and delayed healing	It used to be the best flap
Sub marginal	Scalloped in the horizontal line, then you do one or two releasing vertical incisions	Provides less risk of incising over a bony defect and provides better access and visibility, esthetic	Include hemorrhage and healing by scarring compared with the full muco. The incision also provides limited access should a fracture be noted or other situation in which extraction or root resection is indicated.	This flap needs a thick attached gingiva
Full mucoperiosteal	Made into the gingival sulcus, extending to the gingival crest	Maximum access, visibility, not incising over the lesion or bony defect, lower risk of hemorrhage, reduced likelihood of healing with scar formation	Difficult to replace and suture, gingival recession can develop if the flap is not reapproximated well	Preferred over the other two techniques



Semi-lunar flap



Sub marginal flap



Mucoperiosteal flap

❖ **Anesthesia:** lidocaine, bupivacaine.

❖ **Incision and reflection**

❖ **Periapical exposure:** removing of bone is done ideally by electrically driven hand pieces. You need to expose about half the root. (round bur, low speed, electrical driven, with normal saline irrigation you remove bone, and by a sharp curettage you remove the granulation tissue.

❖ **Root and resection:** it is done by a tapered fissure bur. And then by an ultrasonic instrument you prepare a cavity in the apex.
Why do we need to resect the apex?

To provide a larger surface and to expose additional canals.

We usually remove 2 to 3 mm. we remove less when the root is short and more when the root is long. Depending on the location, a bevel of varying degrees is made in a faciolingual direction for a better visibility.

❖ **Root end preparation and restoration:** it is a seal, the depth of the preparation must be at least 1 mm deeper than the length of the bevel to seal the apex adequately. The preparation depends on the type of the restoration.

Ultrasonic instruments offer the advantages of control and ease of use- they give us a cleaner, better-shaped preparation, and a perfect bevel.

❖ **Root end-filling materials:**

The ideal restoration properties:

1-seal well 2-tissue tolerant 3-easily inserted 4-minimally affected by moisture 5-visible radiographically 6-stable 7-nonresorbable (last 2 are the most important)

Types:

- **MTA (mineral trioxide aggregate)** is the best because tissue fluids don't affect it.
- **Amalgam:** you need dry field and adequate access.

- **Composite:** you need completely dried field, it works in molars because the apex is so narrow.

❖ Irrigation

- ❖ **Radiographic verification:** before suturing a radiograph is obtained to verify that the surgical objectives are satisfactory. If corrections are needed, these are made before suturing.

Before you suture you should clean everything and remove the granulation tissue.

- ❖ **Flap replacement and suturing:** the absorbed suturing materials are the best.
- ❖ **Postoperative instruction:** if you gave a patient preoperative prophylactic antibiotic he doesn't need a postoperative dose, but if there was a lot of pus you should give.

3) Corrective surgery:

Indication:

- ❖ **Procedural errors (perforation)** *when the perforation is cervically located the prognosis is usually poor why?*
It is near the surface, so communication through a pocket might happen, and bacteria will re-inter
- ❖ **Resorptive defects**

No need for a apicoectomy in corrective surgery

Contraindication:

- ❖ **Anatomic impediments**
- ❖ **Inaccessible defect**
- ❖ **Repair would create periodontal defect**

Whishing you all the best