Practical steps in Endodontic Surgery - Apicoectomy and Root End Preparation

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Endodontic surgery has now evolved into endodontic microsurgery. By using state-of-the-art equipment, instruments and materials that match biological concepts with clinical practice, microsurgical approaches produce predictable outcomes inthe healing of lesions of endodontic origin.

Curettage

OBJECTIVE

- To remove all pathologic tissue, foreign bodies, and root and bone particles from the periradicular area

TECHNIQUE

- Strip the tissue from its bone attachment, with the concave surface facing bone
- Remove the tissue when it's free, with the convex surface facing bone

KEY CONCEPTS

When there is resistance to lesion tissue removal

- Granulation tissue is firmly attached to the lingual aspect of the root surface: widening the osseous window
- The lesion tissue has perforated the lingual plate of bone: Allison forceps or Kramer-Nevins, scalpel blade
- the area to be re anesthetized in such cases must be extended beyond what would be considered the normal range.

Granulation tissue is removed to the extent where the root apex is clearly identified.

Biopsy

OBJECTIVE

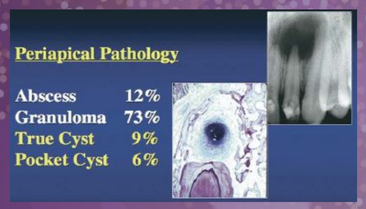
- To establish a definitive diagnosis for a histologic evaluation by oral pathologist

TECHNIQUE

- 10% neutral buffered formalin or alcohol

KEY CONCEPTS

- A too-small, torn, or mutilated specimen: remove the lesion in its entirety
- Characteristics seem suspicious: expedite the diagnosis
- Biopsy indicates a malignancy: refer patient to oral surgeon or oncologist



According to Nair, 15% of all periapical radiolucencies are some type of cyst.

Apicoectomy

OBJECTIVE

- To expose the foramen/canal for inspection by sectioning the apical segment of the root and/or beveling it to the line of sight.

ARMAMENTARIUM

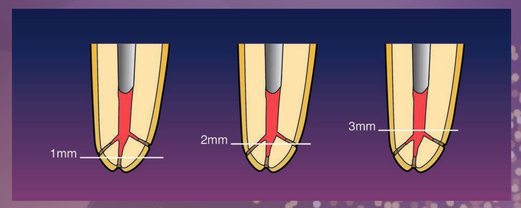
- 45 degree surgical handpiece
- Lindemann burs
- Microexcavators
- Methylene blue dye

KEY CONCEPTS

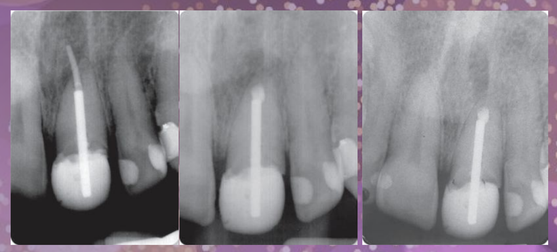
- A root resection of 3 mm from the apex is indicated and should be made perpendicular to the long axis of the root.
- Root resection should be done at a midrange magnification (e.g., ×10).
- The bevel angle of root resection should be shallow,from 0 to 10 degrees.

Root End Resection

How Much Should be Resected?

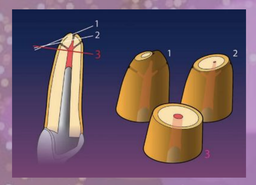


Removal or the apical 3 mm end of the root eliminates 98% of the apical ramifications and 93% of the lateral canals.

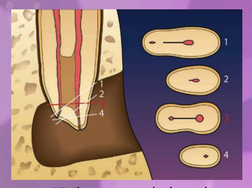


Central incisior with extruded gutta percha. (a) Preoperative radiograph of tooth #9 with guttapercha overfilling. A 3mm root end resection would be at the level of the post. Therefore, 1.5mm of the root tip is resected. (b) Postoperative radiograph showing MTA root end filling. (c) Postoperative 6 months radiograph.

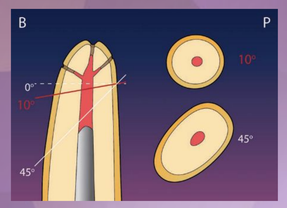
Steep Bevel versus Shallow Bevel



3 mm of the root end of tooth #6 is resected (magnification ×10).

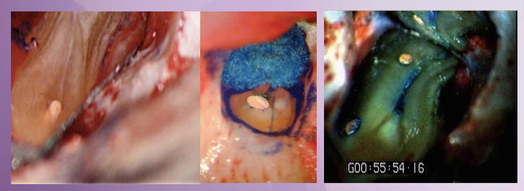


a 45 degree angle bevel. the lingual canal may be missed.



A 45 degree angle bevel is associated with more exposed dentinal tubules on the cut root surface

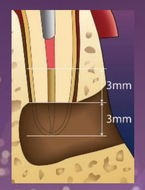
Inspection of the Resected Root Surface



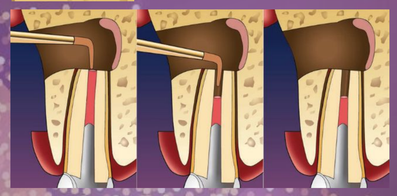
Inspection is done under a high magnification of the microscope (×16-26).

(a) Missed MM canal and unprepared isthmus;
(b) vertical root fracture;
(c) unfilled isthmus;

Ultrasonic Root-end Preparation



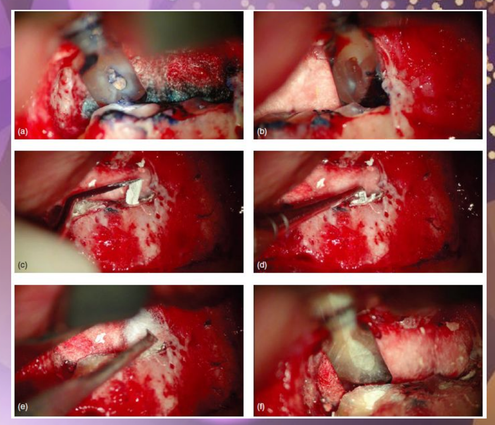
a Class I cavity at least 3 mm into root dentine after the apical root tip of 3 mm is resected, with walls parallel to and within the anatomic outline of the root canal space.



Schematic drawing showing ideal root end preparation

Root-End Filling Materials

- Advantages of MTA and newer Bioceramics are their excellent sealing ability and biocompatibility.
- There are potential bioactive actions such as biomineralization with MTA and Bioceramics.



Clinical presentation of the root end filling procedure using Bioceramic RRM.

References:

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