
Good morning

ACCESS CAVITY PREPARATION

Dr Sindhu J

INTRODUCTION

- "All the treatment that follows hinges on the accuracy and correctness of the entry"

  Franklin S. Weine

- **'It is better to sacrifice coronal tooth structure that can be replaced with a restoration than to sacrifice the quality of root canal filling because of inadequate access cavity preparation'**

  Gerstein

DEFINITION

- Access cavity is defined as a round, tapered, evenly spaced preparation with minimal opening to the apical foramen.

SHIELDER

- A Coronal opening to the center(pulp chamber) of a tooth required for effective cleaning , shaping, and obturation of pulp canals and chamber during endodontic or root canal Therapy

MOSBEYSMEDICAL DICTIONERY

- Access is the first and most important phase of root canal treatment. A well designed access preparation is essential for a good endodontic result


Obtur.
Clean-shap
Tooth length
Access Cavity

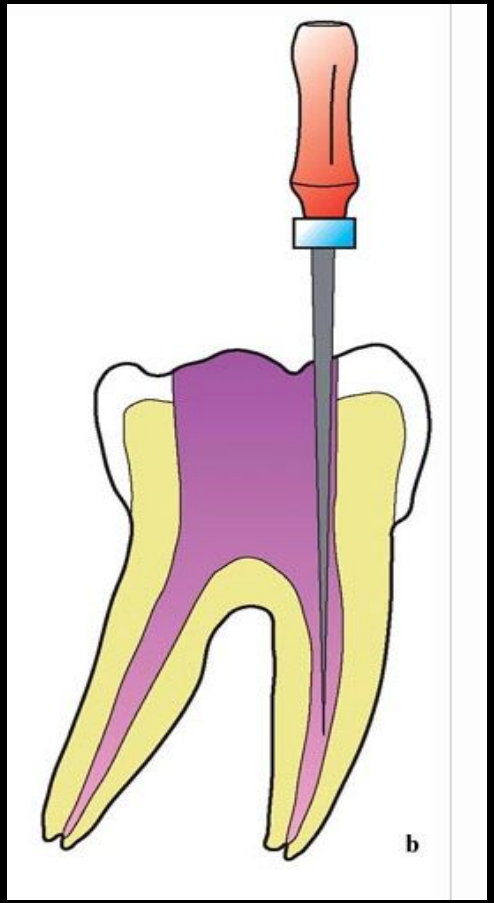
According to R.E. Walton, the 3 main objectives of access cavity preparation are :

1. **Straight line access :**

a. Improved instrument control.

b. Improved obturation.

c. Decreased procedural errors.



2.Conservation of tooth structure :

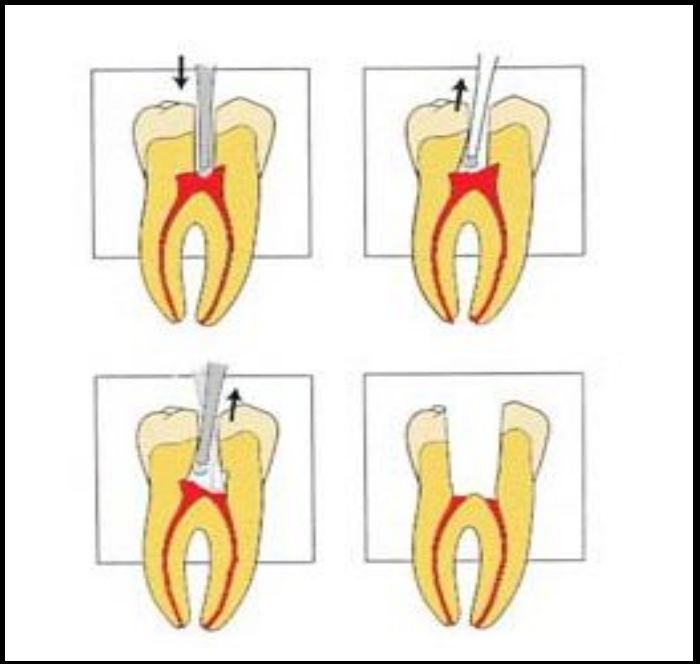
a. Minimal weakening of tooth.

b. Prevention of perforation.

3.Un roofing of chamber and exposure of pulp horns :

a. Maximum visibility.

b. Location of canals.



General pattern of internal anatomy

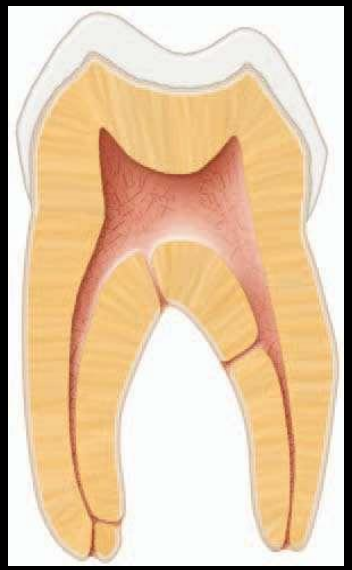
- The living pulp creates and shapes its own locale in the center of the tooth and represents, in shape, a miniaturization of the tooth.

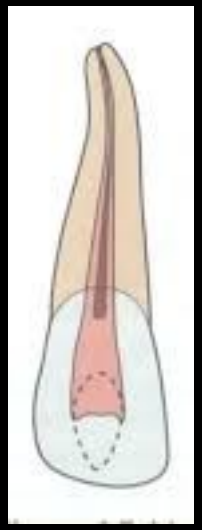
- The residence of the pulp is known as the pulp cavity. This pulp cavity lies entirely enclosed within dentin, except at the apical foramen wherein it has a cemental lining.

- **The pulp cavity may be divided into**

  -a coronal portion known as the pulp chamber

  -a radicular portion, the root canal





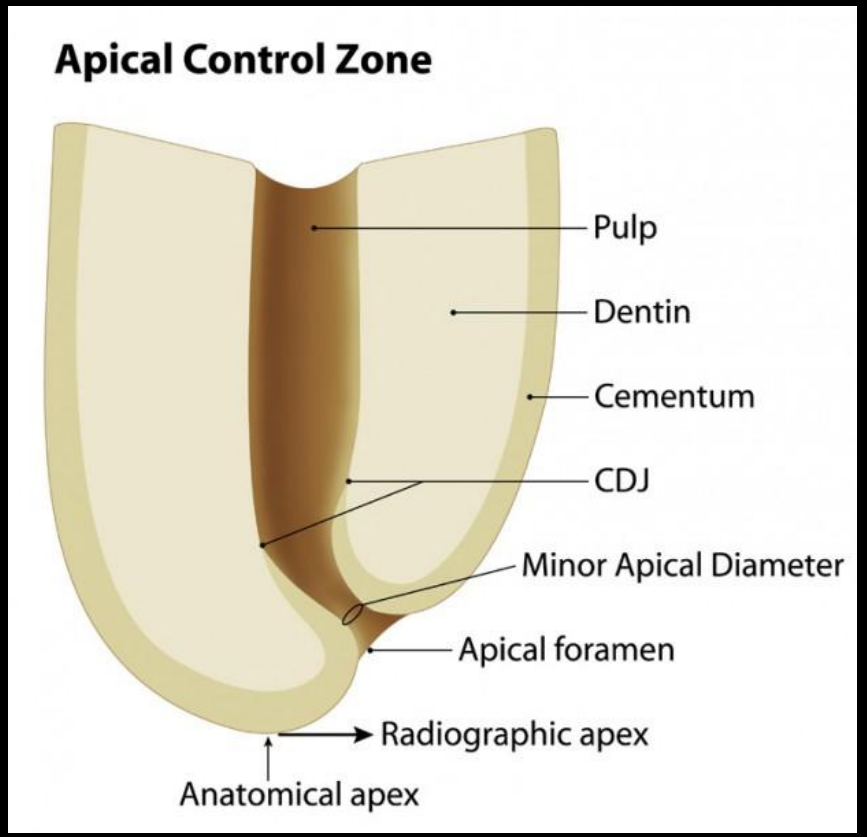
- In anterior teeth, the pulp chamber gradually merges into the root canal and the division becomes indistinct.

- In multi-rooted teeth, the pulp cavity consists of a single pulp chamber and a variable number of root canals which branch out into the roots.

ANATOMY OF THE APICAL ROOT

- The classic concept of apical root anatomy is based on three anatomic and histologic landmarks in the apical region of a root: the apical constriction (AC), the cementodentinal junction (CDJ), and the apical foramen (AF).

- Kuttler's description of the anatomy of the root apex has the root canal tapering from the canal orifice to the AC, which generally is 0.5 to 1.5 mm inside the AF.

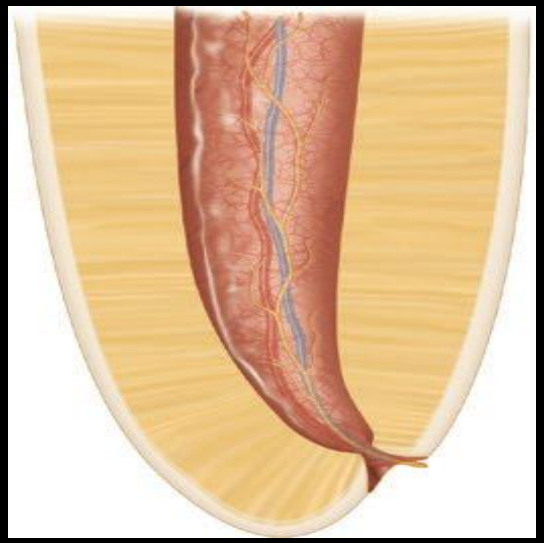


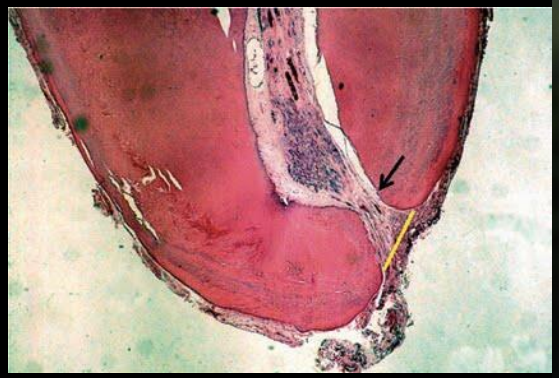
Apical Constriction (Minor Diameter)

- Apical part of root canal having the narrowest diameter short of the apical foramina or radiographic apex.

Apical Foramen (Major Diameter)

- Main apical opening on the surface of the root canal through which blood vessels enter the canal.
- Diameter is double the AC– Morning glory or hyperbolic

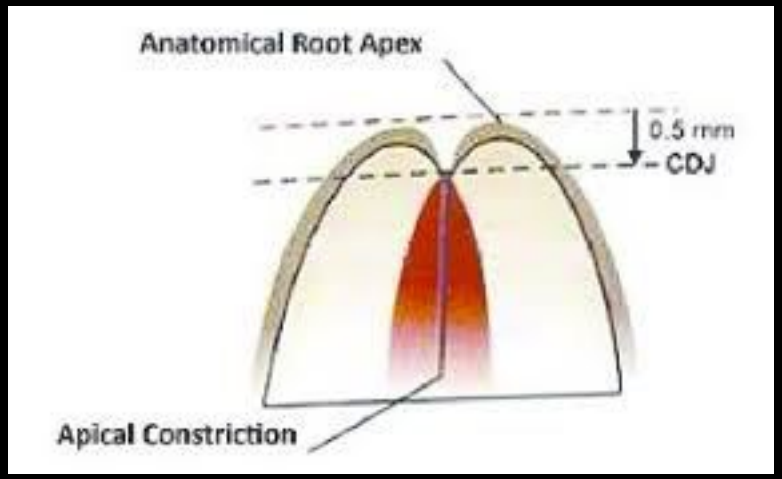




- In young, incompletely developed teeth the apical foramen is funnel shaped, with the wider portion extending outward.
- The mouth of the funnel is filled with periodontal tissue that is later replaced by dentin and cementum.
- As root develops, the apical foramen becomes narrower.
- Distance between minor and major diameter
  - Young – 0.5mm
  - Old -0.7mm

- The inner surface of the root apex becomes lined with cementum, which may even extend for a short distance (0.5mm) into the root canal.

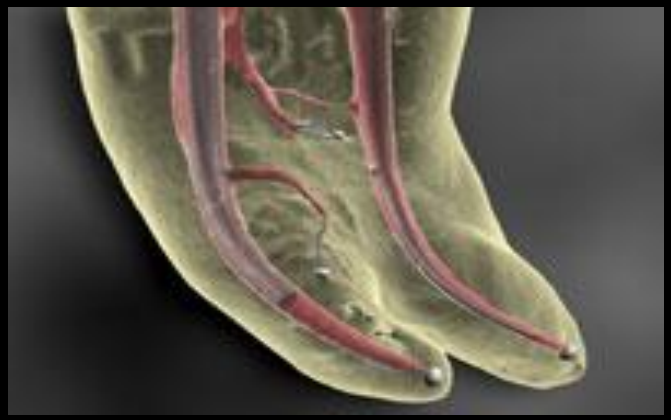
- The apical foramen is not always located in the center of the root apex. It may exit on the mesial, distal, labial, or lingual surface of the root, usually slightly eccentrically.



Lateral canals and Accessory foramina

- Lateral canals and accessory foramina are integral parts of a normal pulp cavity rather than exceptions.

- The periodontal vessels curve around the root apex of a developing tooth and often become entrapped in Hertwigs epithelial root sheath, with resulting formation of lateral canals and accessory foramina during calcification.



- This phenomenon frequently occurs in the apical third of the root explains the high incidence of lateral canals and accessory foramina in this region.

- When the pulp is removed, the blood vessels lying within the accessory or lateral canals are sealed or obliterated by cementum

APICAL DELTA

- **Apical** delta refers to the branching of small accessory canals and minor seen at the tip or apex of some tooth roots.

- The pattern is said to be reminiscent of a river delta when sectioned and viewed using a microscope.

- Because the anatomy of this area is very small and complex with several portals of entry to the root canal i.e. more than one apical foramen this may make successful endodontic treatment less likely.

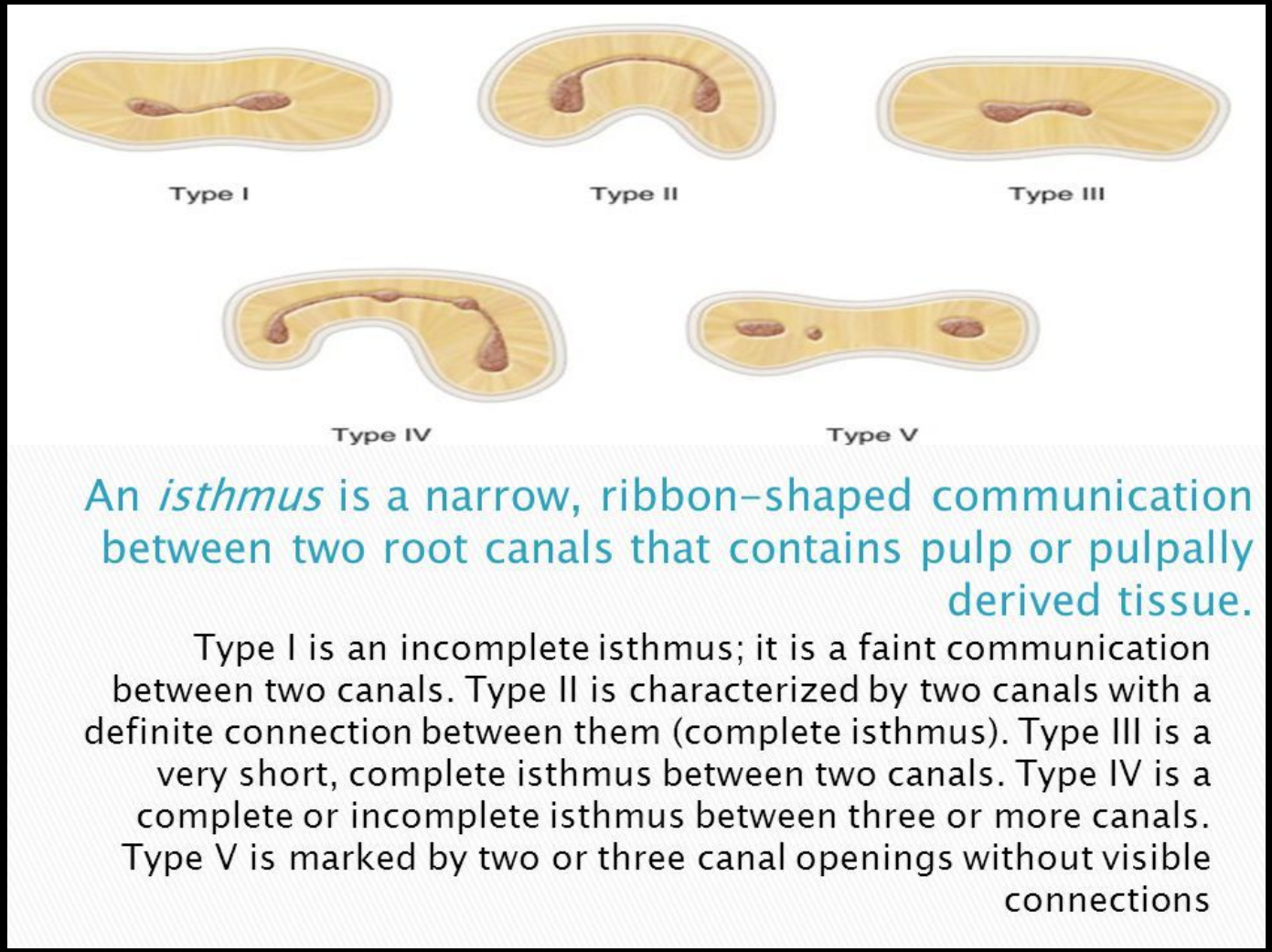
- Importance of Apical Third

- Presence of accessary and lateral canals
- Most curvatures are in apical third
- Obturation should end at AC
- Apical 3mm of root is resected

Isthmus

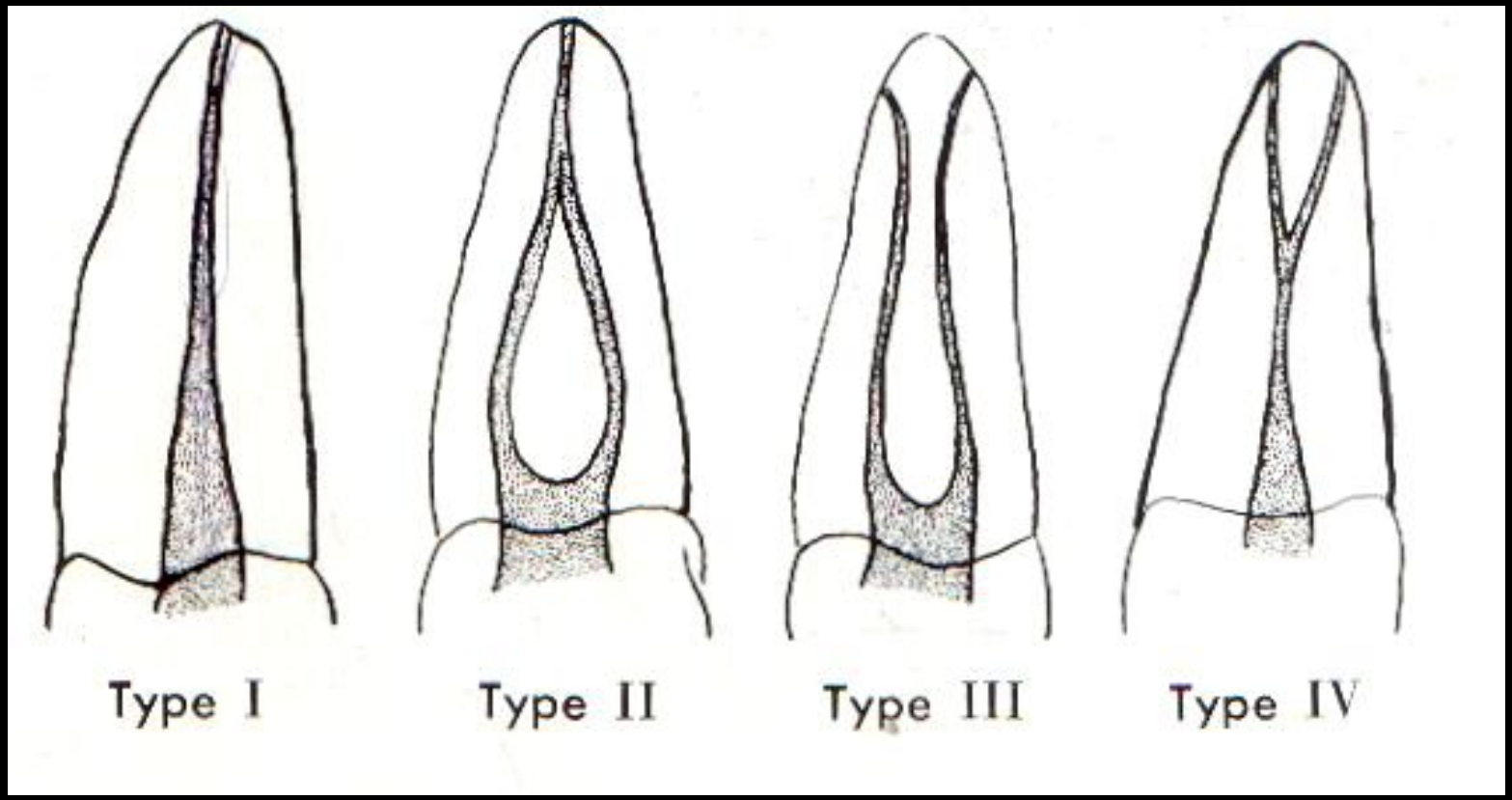
- Narrow , ribbon shaped communication between two root canals which can be completed or incomplete.
- Contains pulp and acts as store house for bacteria – well prepared and filled
- Part of root canal , not a separate entity so it should be cleaned, shaped and obturated.

- Identified using methylene blue dye
- Hsu and Kin (1997) classified isthmus

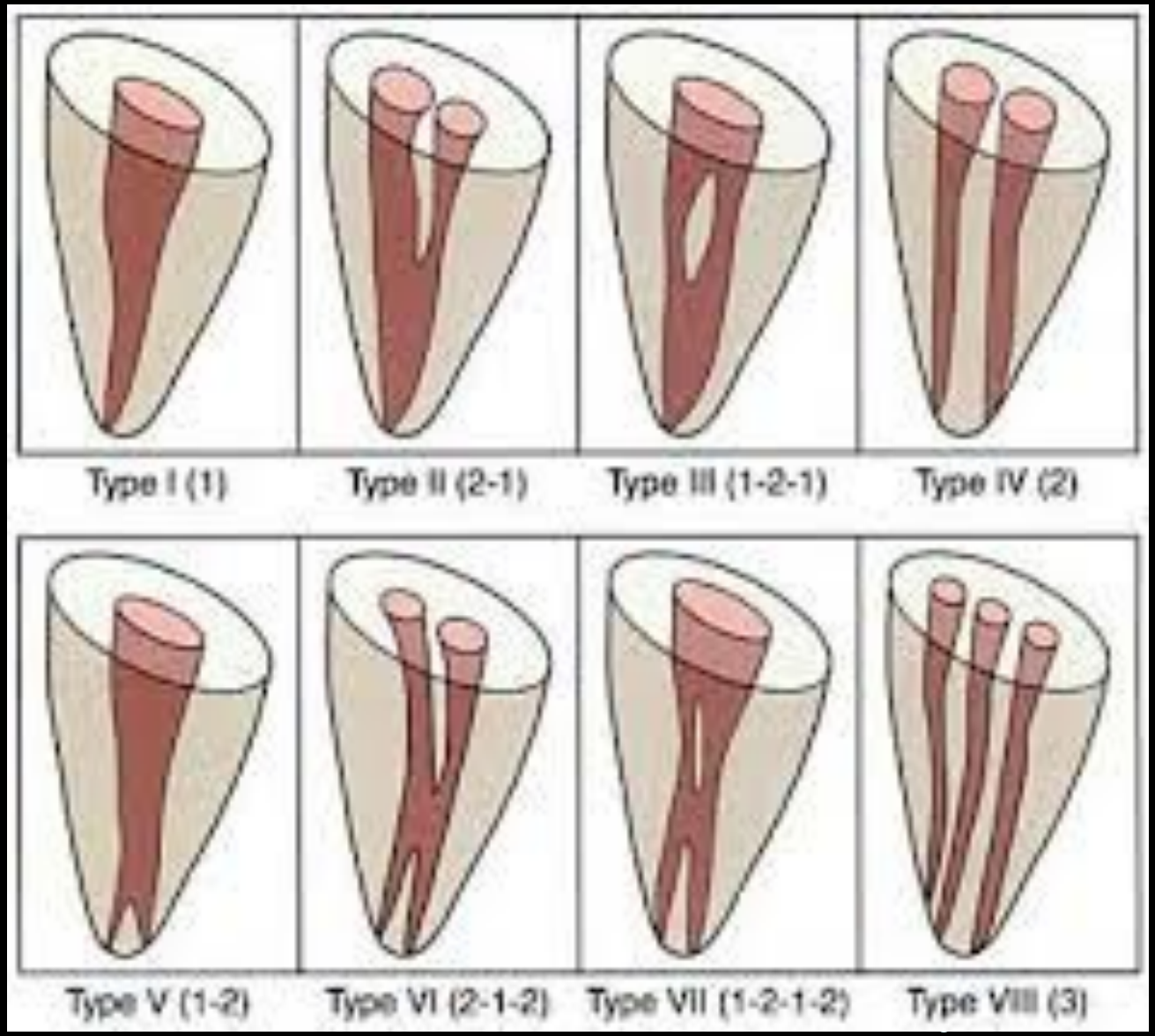


Internal Root Canal Anatomy Classifications

CANAL CONFIGURATIONS (WEINE)



VERTUCCI CANAL CONFIGURATIONS



OBJECTIVES AND GUIDELINES FOR ACCESS CAVITY PREPARATION

- ***Objectives***

- *To Remove all the caries*
- *To conserve sound tooth structure*
- *To completely un roof the pulp chamber*
- *To remove all coronal pulp tissue*
- *To locate all root canal orifices*

- To achieve straight or direct line access to the apical foramen or to the initial curvature of the canal

- To establish restorative margins to minimize marginal leakage of restored tooth.

GUIDELINES

Visualization of the Likely Internal Anatomy

- The first step in preparing an access cavity is visualization of the position of the pulp space in the tooth.

- Study preoperative periapical radiograph, helps in
  - Morphology of the tooth
  - Anatomy of root canal system
  - Number of canals
  - Curvature of the canal
  - Length of the canal
  - Position and size of the pulp chamber
  - Position of apical foramen
  - Calcification and resorption if any

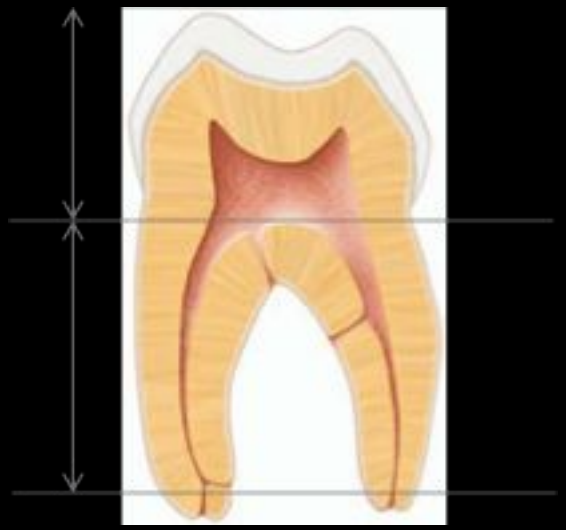
Evaluation of the Cementoenamel Junction and Occlusal Anatomies

- Traditionally, access cavities have been prepared in relation to the occlusal anatomy.

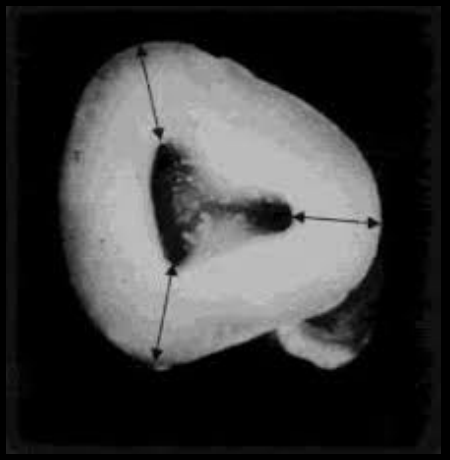
- In a study involving 500 pulp chambers, **Krasner and Rankow** found that the cementoenamel junction (CEJ) was the most important anatomic landmark for determining the location of pulp chambers and root canal orifices.

- These authors proposed nine guidelines, or laws, of pulp chamber anatomy to help clinicians determine the number and location of orifices on the chamber floor.

- Law Of Centrality : The floor of the pulp chamber is always located in the center of the tooth at the level of the CEJ .



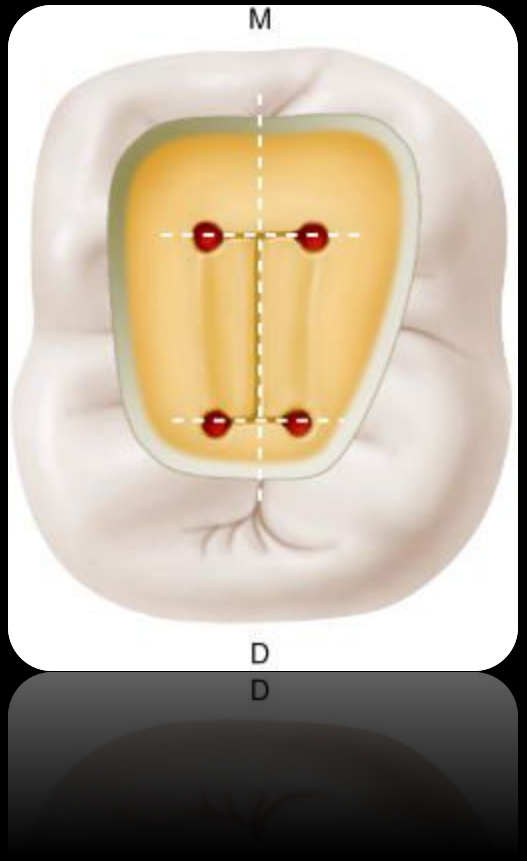
Law Of Concentricity: The walls of the pulp chamber are always concentric to the external surface of the tooth at the level of CEJ , that is the external root surface anatomy reflects the internal pulp chamber anatomy.



Law Of The CEJ : The distance from the external surface of the clinical crown to the wall of the pulp chamber is the same through out the circumference of the tooth at the level of the CEJ making the CEJ most consistent for locating pulp chamber.

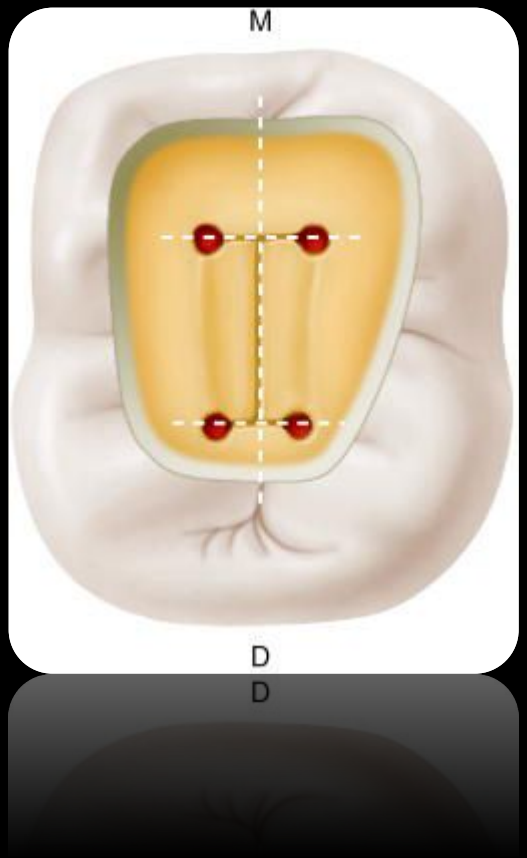
First law of symmetry:

Except for the maxillary molars, canal orifices are equidistant from a line drawn in a mesio distal direction through the pulp chamber floor.



Second law of symmetry:

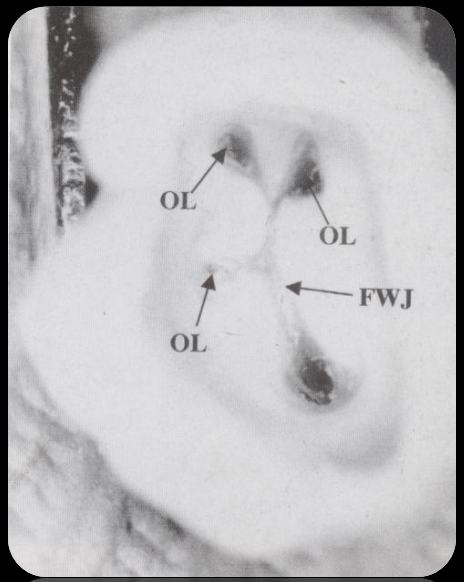
Except for the maxillary molars, canal orifices lie on a line perpendicular to a line drawn in a mesiodistal direction across the center of the pulp chamber floor.

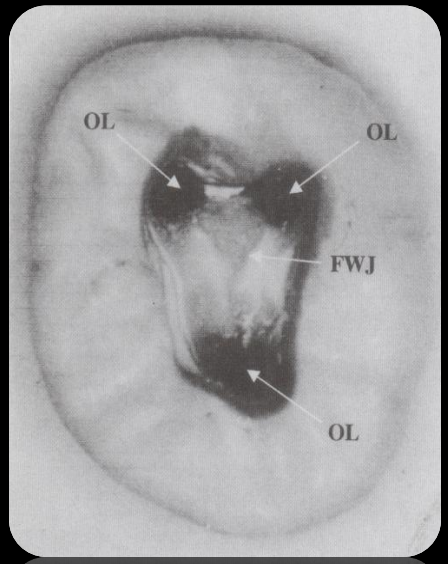


Law of color change: The pulp chamber floor is always darker in color than the walls.

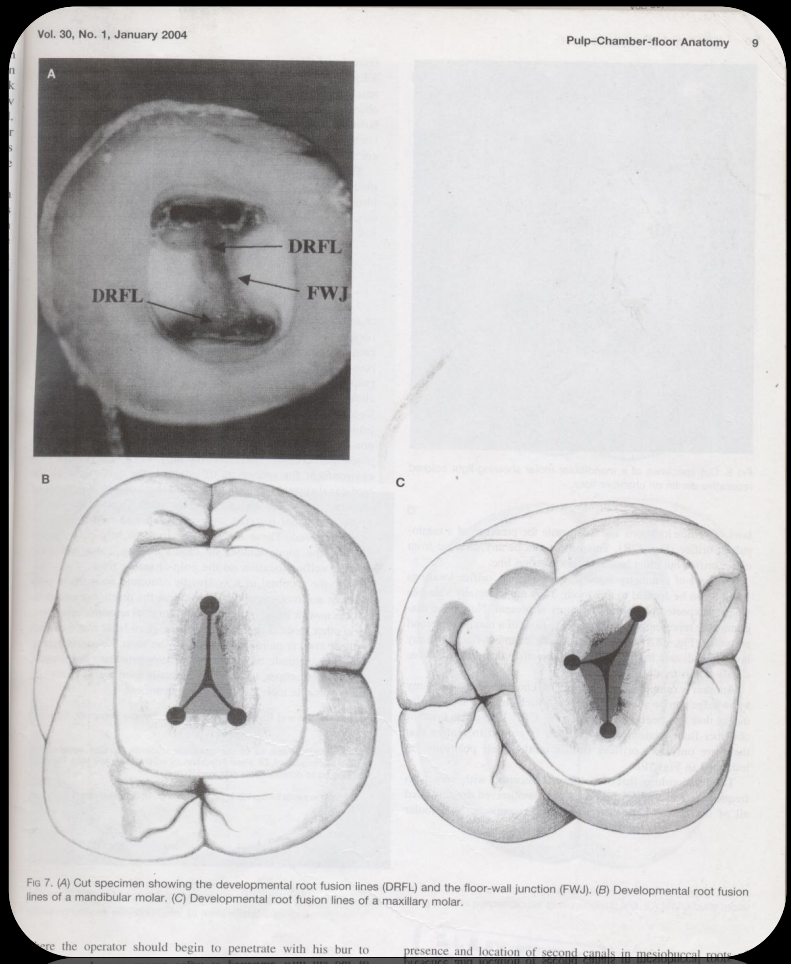
- ***First law of orifice location:*** The orifices of the root canals are always located at the junction of the wall and floor.

Second law of orifice location: The orifices of the root canals are always located at the angles in the floor-wall junction.



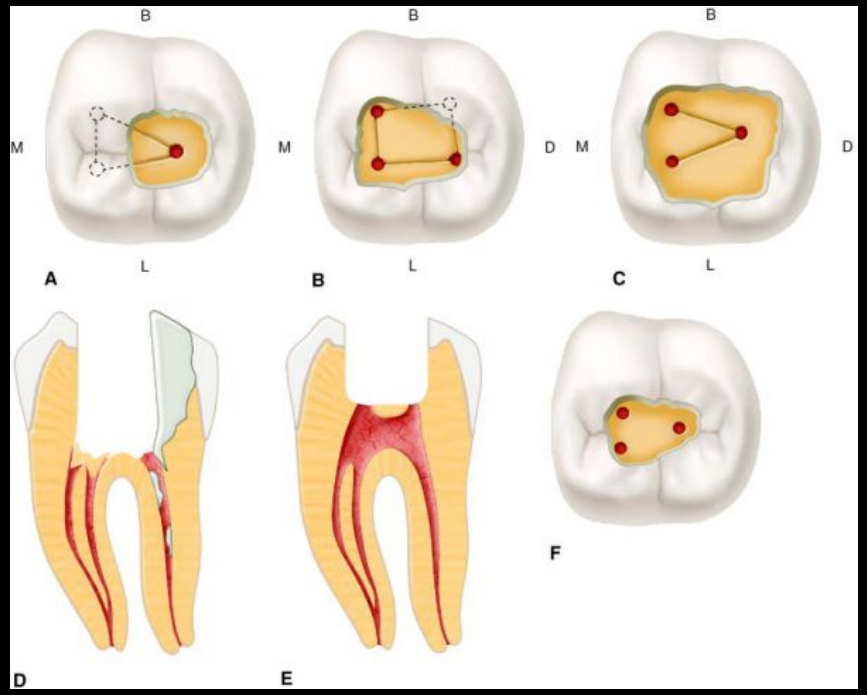


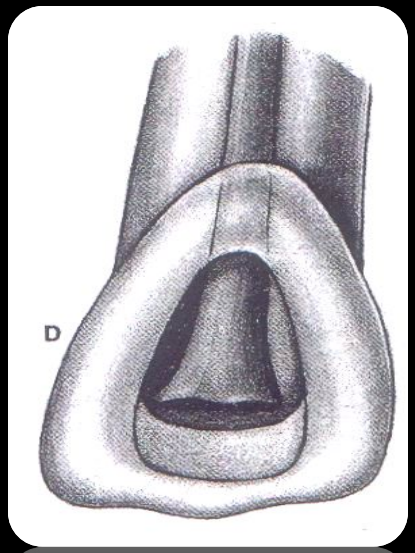
Third law of orifice location: The orifices of the root canals are always located at the terminus of the roots' developmental fusion lines.



Preparation of the Access Cavity through the Lingual and Occlusal Surfaces

- Access cavities on anterior teeth usually are prepared through the lingual tooth surface, and those on posterior teeth are prepared through the Occlusal surface.





- Removal of All Defective Restorations and Caries before Entry into the Pulp Chamber.
- Removal of Unsupported Tooth Structure.
- Creation of Access Cavity Walls That Do Not Restrict Straight- or Direct-Line Passage of Instruments to the Apical Foramen or Initial Canal Curvature.
- Delay of Dental Dam Placement until Difficult Canals Have Been Located and Confirmed.

- Location, Flaring, and Exploration of All Root Canal Orifices.
- Inspection of the Pulp Chamber Using Magnification and Adequate Illumination.
- Tapering of Cavity Walls and Evaluation of Space Adequacy for a Coronal Seal.

Tests for locating canals

- Vital cases – blood can be visualized as a small droplet above an orifice- Red Line
- A spot of blood on the side of a paper point that is placed within a shaped canal may suggest a Lateral canal
- Necrotic cases- White Line can be visualized
- Champagne bubble test

Access Cavity Preparation

Endodontic Coronal Cavity Preparation

I. Outline Form

II. Convenience Form

III. Removal of the remaining carious dentin (and defective restorations)

IV. Toilet of the cavity

Endodontic Radicular Cavity Preparation

I and II. Outline Form and Convenience Form (continued)

IV. Toilet of the cavity (continued)

V. Retention Form

VI. Resistance Form

Coronal cavity preparation

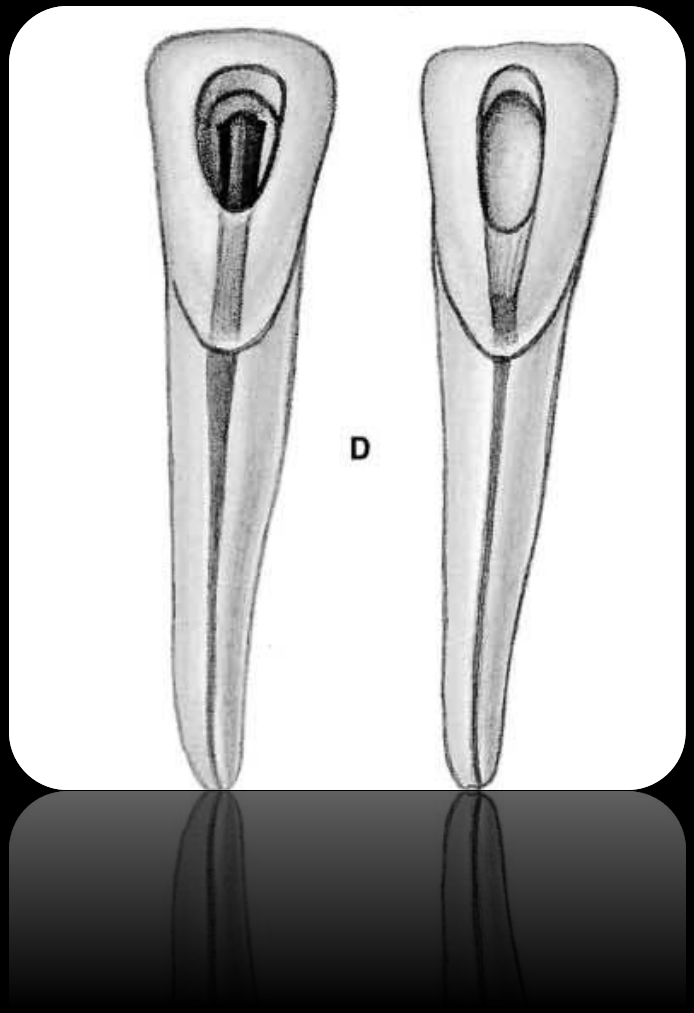
Principle I: Outline Form

To achieve optimal preparation, three factors of internal anatomy must be considered:

(1) The size of the pulp chamber.

(2) Shape of the pulp chamber

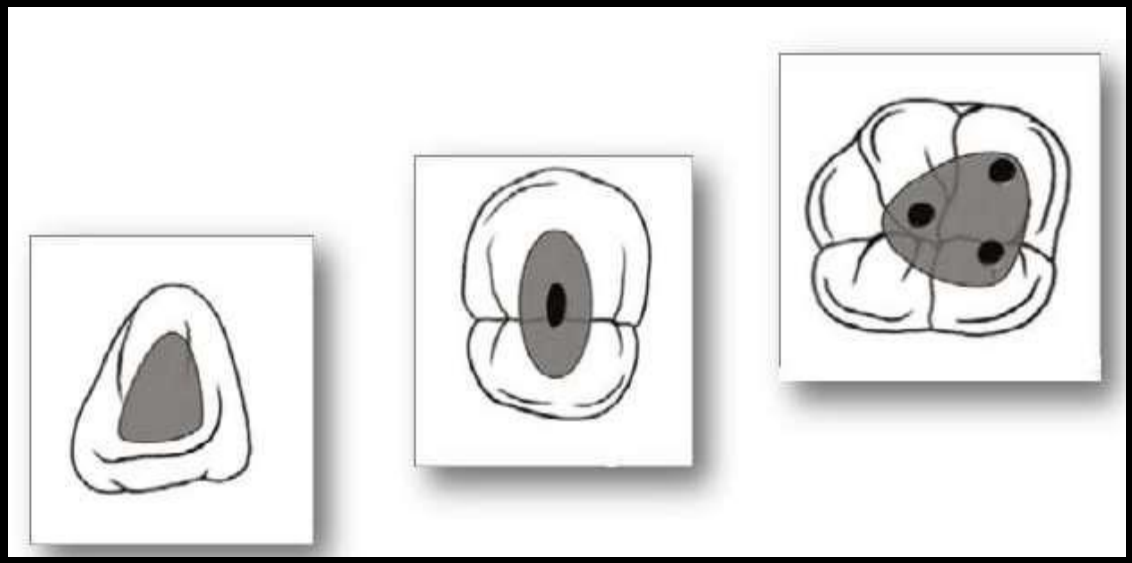
(3) Number, position and curvature of root canals



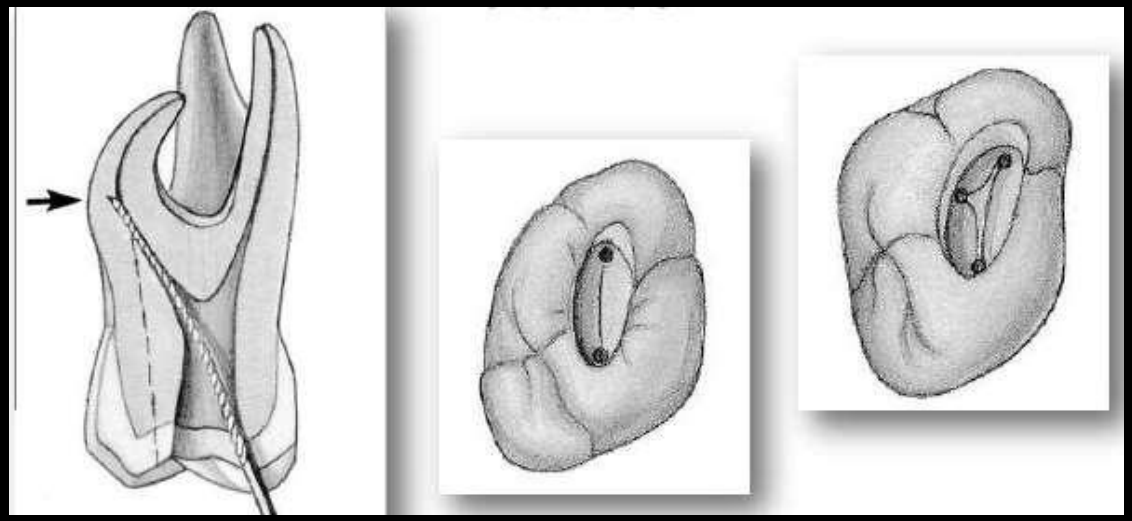
- Size of the pulp chamber
  - young patients- extensive
  - old patients- limited

- Shape of the pulp chamber

- Anteriors- Triangular
- Premolars- Oval or Ovoid
- Molars- Triangular



- Number, position and curvature of root canals



Principle II: Convenience Form

Four important benefits are gained through convenience form modifications:

(1) Unobstructed access to the canal orifice.

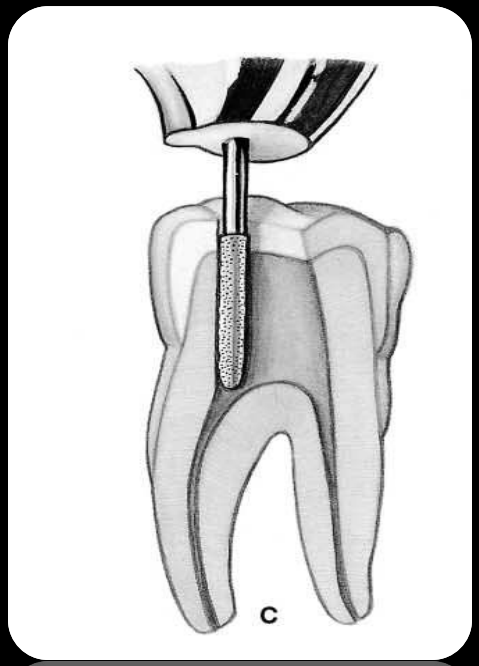
(2) Direct access to the apical foramen.

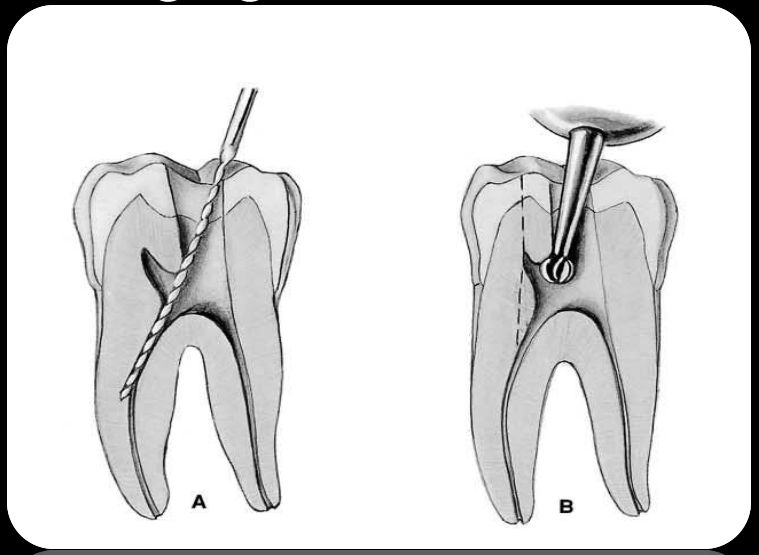
(3) Cavity expansion to accommodate filling techniques

(4) Complete authority over the enlarging instrument.

1. Unobstructed access to the canal orifice

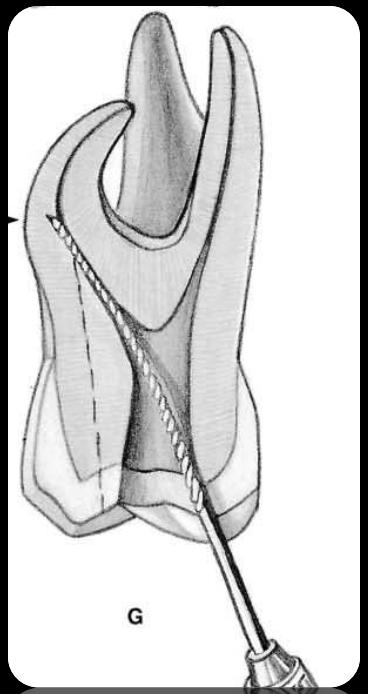
- In endodontic cavity preparations of all teeth, enough tooth structure must be removed to allow instruments to be placed easily into the orifice of each canal without interference from overhanging walls.

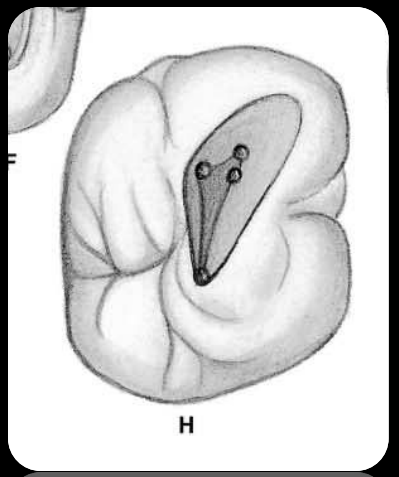




- **Luebke** has made the important point that an entire wall need not be extended in the event that instrument impingement occurs owing to a severely curved root or an extra canal.

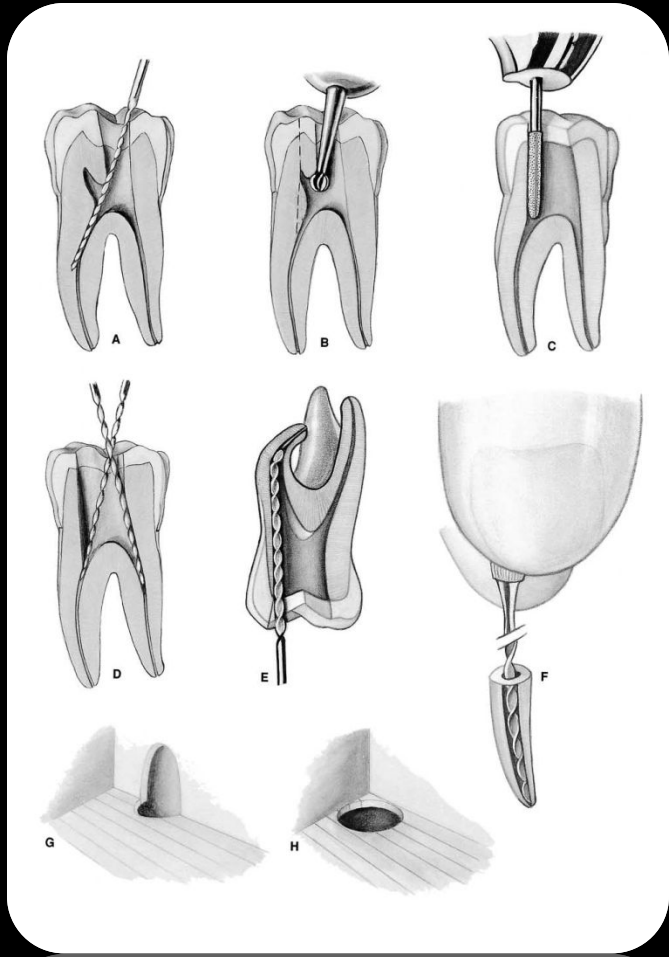
- In extending only that portion of the wall needed to free the instrument, cloverleaf appearance may evolve as the outline form. Hence, Luebke has termed this a **"shamrock preparation".**





2.Direct Access to the Apical Foramen

- This is especially true when the canal is severely curved or leaves the chamber at an obtuse angle.
- Infrequently, total decuspation is necessary.



3.Extension to Accommodate Filling Techniques

- If a softened gutta-percha technique is used for filling, wherein rather rigid pluggers are used in a vertical thrust, then the outline form may have to be widely extended to accommodate these heavier instruments.

4.Complete Authority over the Enlarging Instrument

- The tooth structure is removed around the orifice so that the instrument stands free in this area of the canal.

- The instrument will then be controlled by only two factors: the clinician's fingers on the handle of the instrument and the walls of the canal at the tip of the instrument.

Principle III: Removal of the Remaining Carious Dentin and Defective Restorations

- Caries and defective restorations remaining in an endodontic cavity preparation must be removed for three reasons:

(1) to eliminate mechanically as many bacteria as possible from the interior of the tooth.

(2) to eliminate the discolored tooth structure, that may ultimately lead to staining of the crown,

(3) to eliminate the possibility of any bacteria-laden saliva leaking into the prepared cavity.

Principle IV: Toilet of the Cavity

- All caries, debris & necrotic material must be removed from the chamber before the radicular preparations begins.

- Irrigation with sodium hypochlorite is an excellent measure for cleansing the chamber and canals of persistent debris.

Radicular cavity preparation:

Objectives

- Thorough debridement of the root canal system and the specific shaping of the root canal preparation to receive a specific type of filling.

- Ultimate objective, however, should be to create an environment in which the body's immune system can produce healing of the apical periodontal attachment apparatus.

Principles

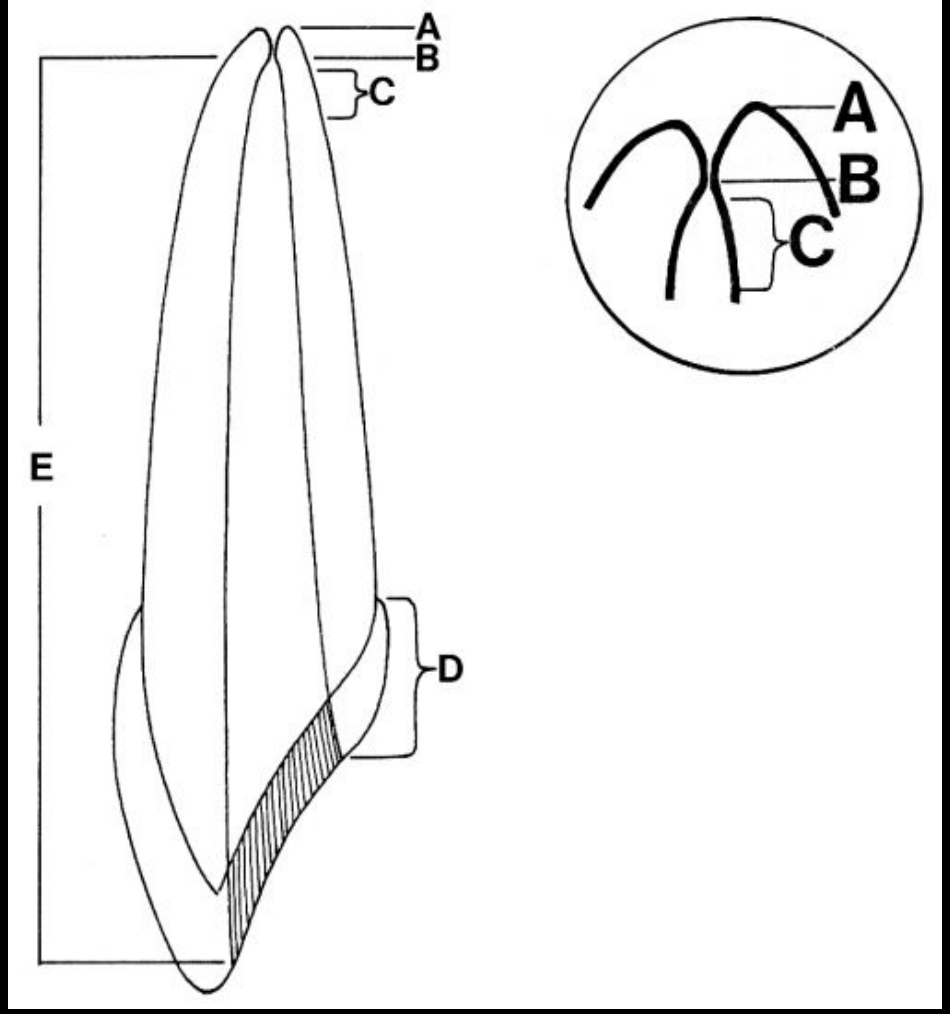
- **I) Outline form and convenience form:** must be continually evaluated by monitoring the tension of the endodontic instruments against the margins of the cavity.

- **II)Toilet of the cavity:** thorough irrigation is important for total debridement, through certain "hooks and crannies" of the root canal system are virtually impossible to reach with any device or system.

III) Retention form : These nearly parallel walls ensure the firm seating of this principal point. Other techniques strive to achieve a continuously tapering funnel from the apical foramen to the cavosurface margin. Retention form in these cases is gained with custom fitted cones and warm compaction techniques.

IV) Resistance form: resistance to overfilling is the primary objective of resistance form.

Maintaining the integrity of the natural constriction of the apical foramen is a key to successful therapy.



Concept of total endodontic cavity preparation, coronal and radicular as a continuum, based on Black's principles. Beginning at apex: **A, Radiographic apex**. **B, Resistance Form,** development of the "apical stop" at the cementodentinal junction against which filling is to be compacted and a stop to resist extrusion of canal debris and filling material. **C, Retention Form** to retain primary filling point. **D, Convenience Form** subject to revision as needed to accommodate larger, less flexible instruments. External modifications change the Outline Form. **E, Outline Form, basic** preparation throughout its length dictated by canal anatomy.

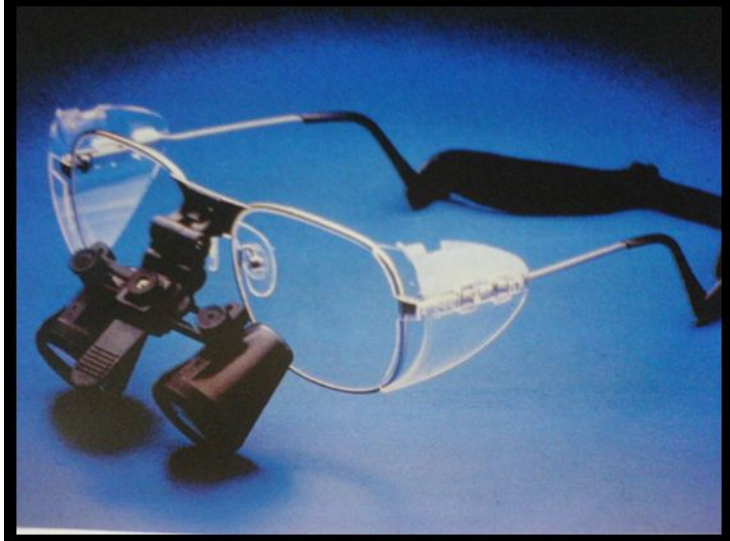
Mechanical Phases of Access cavity preperation

ARMAMENTERIA

The preparation of an access cavity requires the following equipment:

- Magnification and illumination
- Burs
- Endodontic explorer (DG-16, DE-17)
- Endodontic spoon
- #17 operative explorer
- Ultrasonic unit and tips

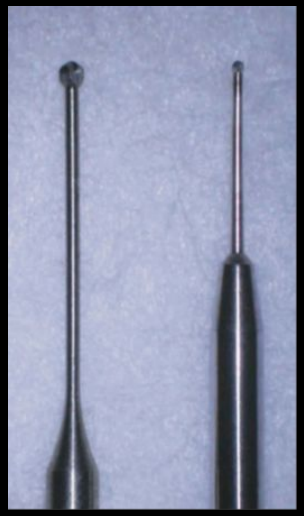
- Magnification and Illumination



SAFE ENDED
TAPERED DIAMOND
TAPERED CARBIDE

#57 FISSURE
CARBIDE

Access burs: #2 and #4
round diamond burs

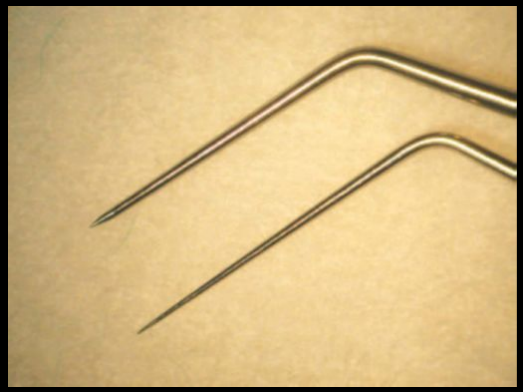


Access burs. A,
Mueller bur. B, LN bur.

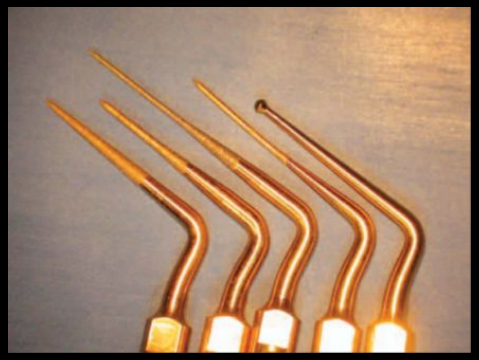
Access bur:
Transmetal bur

Access bur: #.12
taper
nickel–titanium
orifice opener

Access burs. A, Gates-Glidden burs, 1 to 6.
B, Gates-Glidden burs, short shank (left) and regular shank (right).



Endodontic explorer (DG-16, JW-17)



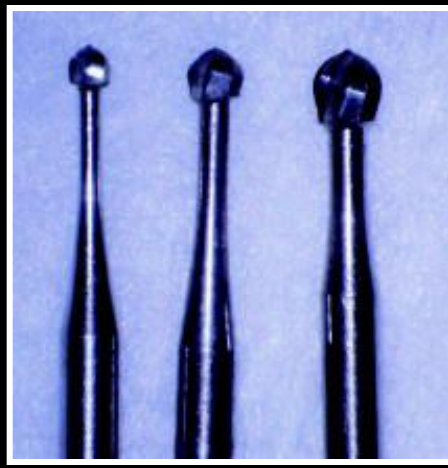
Endodontic ultrasonic tips

Endodontic spoon

Round bur

- No. 2
  - Mandibular anterior teeth
  - Maxillary premolar (narrow chambers & canals)
  - Incisal pulp horn area (Maxillary anterior teeth)

- No. 4
  - Maxillary anterior teeth
  - Mandibular premolar teeth
  - Maxillary premolar teeth
  - Maxillary and mandibular molars



- No. 6
  - Only in large pulp chamber of molars i.e., Taurodontism
- No. 1
  - Used in the floor of pulp chamber to seek additional canal orifice.
  - 702U: Access cavity through restoration, full crown and inlay.

ENDOACCESS BURS

- Combination of a round and cone shaped coarse diamond

- Allows access into the pulp chamber
- Prepares the chamber walls

•LN BUR

•The LN Bur is a unique 1/2-round bur

- Total length is 28mm.

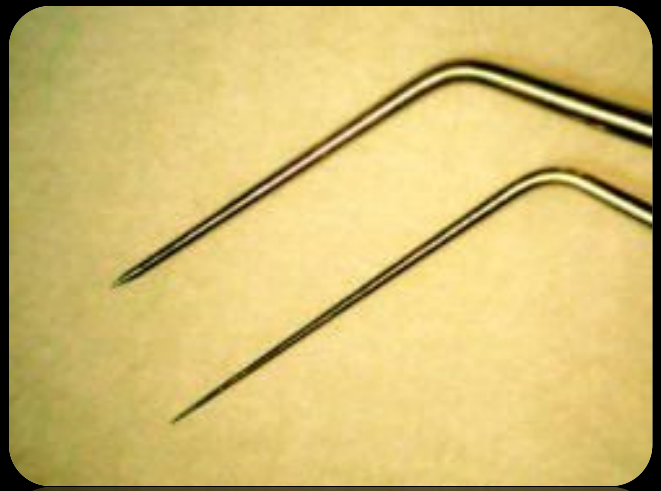
ENDO- Z BUR

- Long tapered configuration allows easy access to the canal orifices.
- Funnel shaping of the chamber walls.
- Prevents damage to the chamber floor.

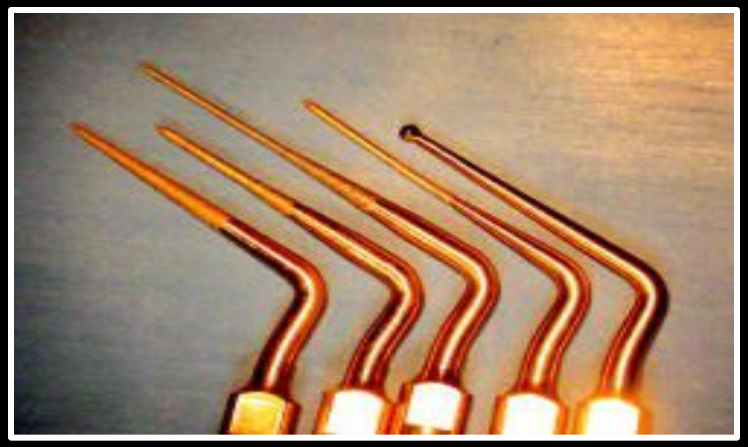
- The Mueller Bur (Brasseler, Savannah, Usa)

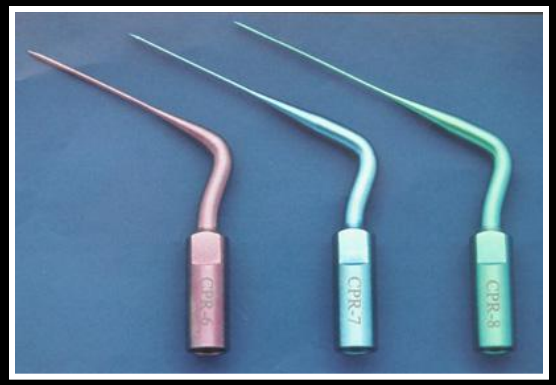
- Munce Discovery burs.

- **Endodontic explorers (DG-16, JW-17)**



Ultrasonic unit and tips

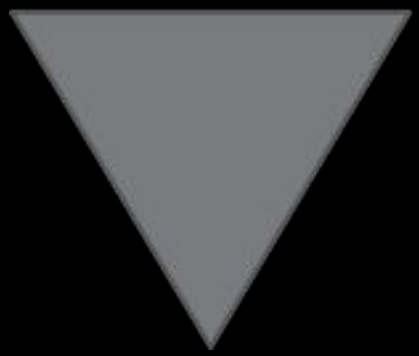




Access cavity preparation in Anterior teeth

- Outline form of central and lateral incisors are triangular with the base of the triangle towards the incisal edge and the apex towards the cingulum.

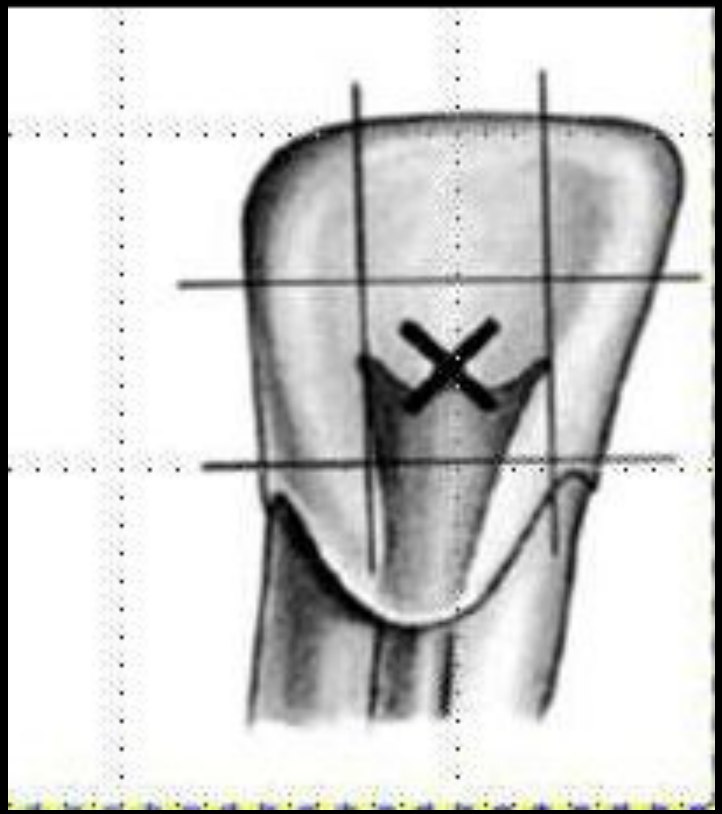
Incisal edge



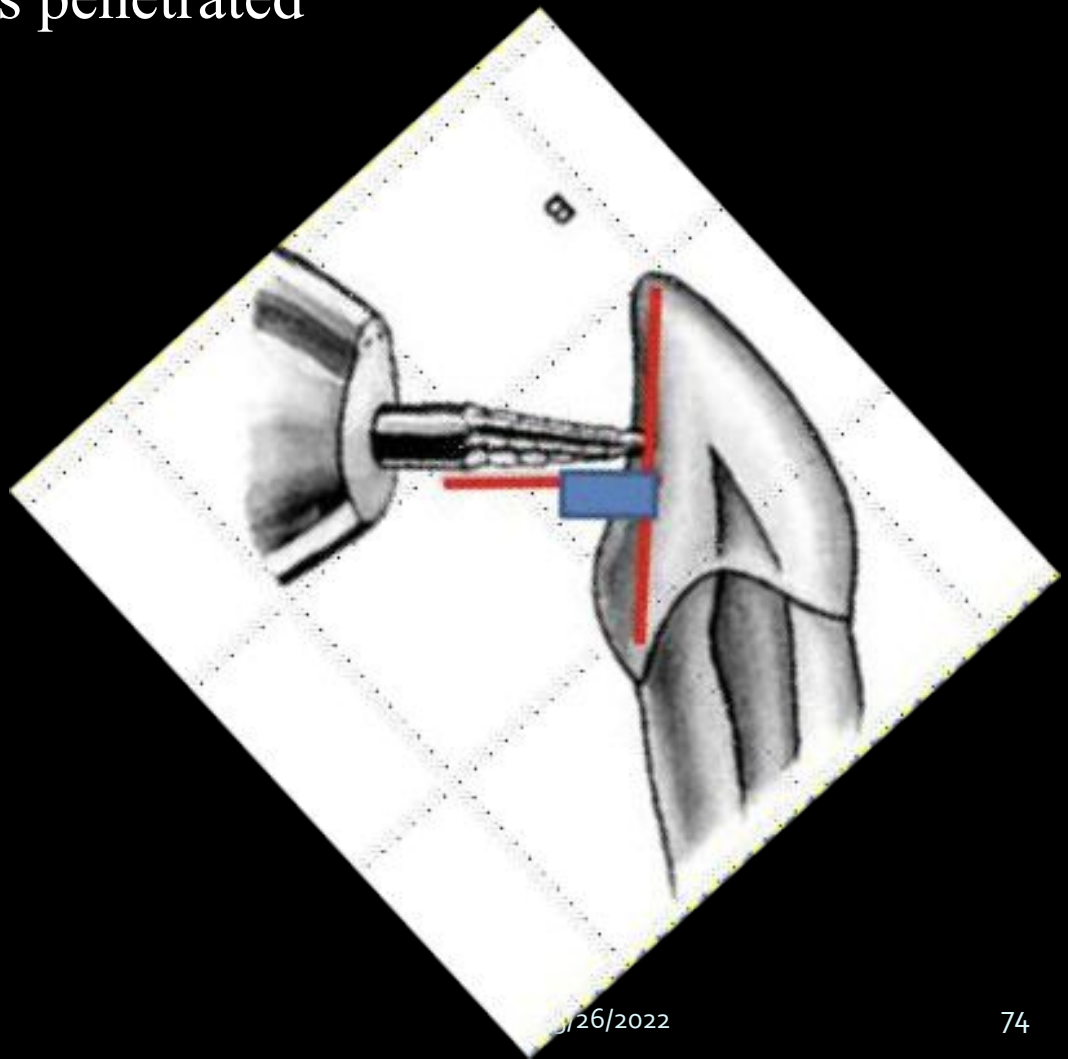
Cervical line

Steps

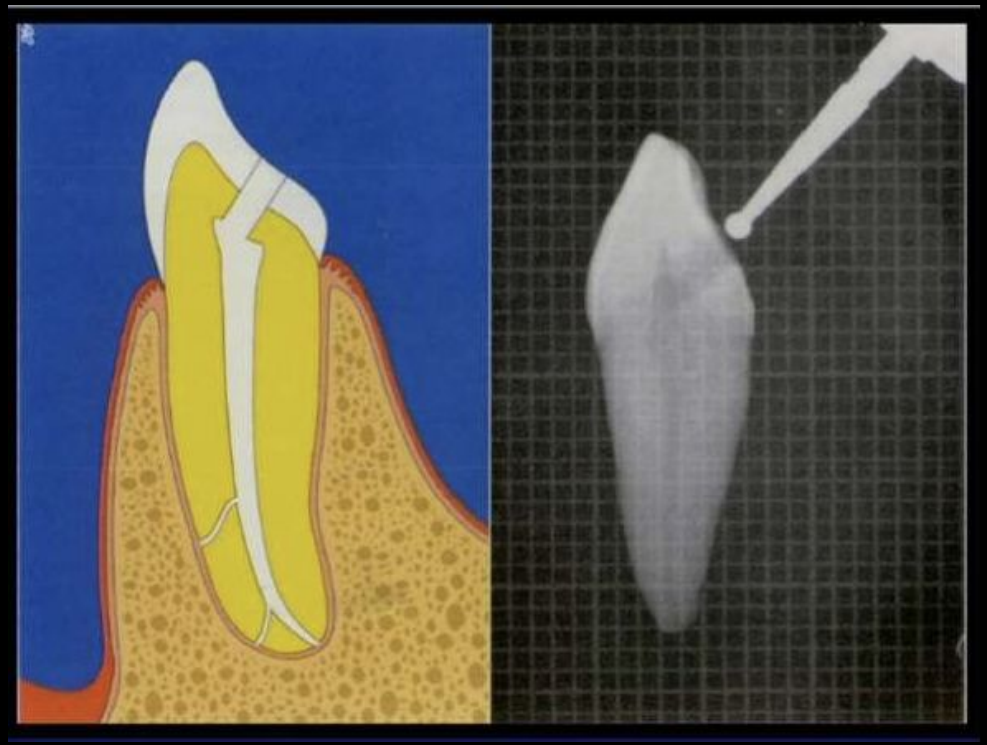
- Entrance is gained through the middle of the middle third of the palatal surface.

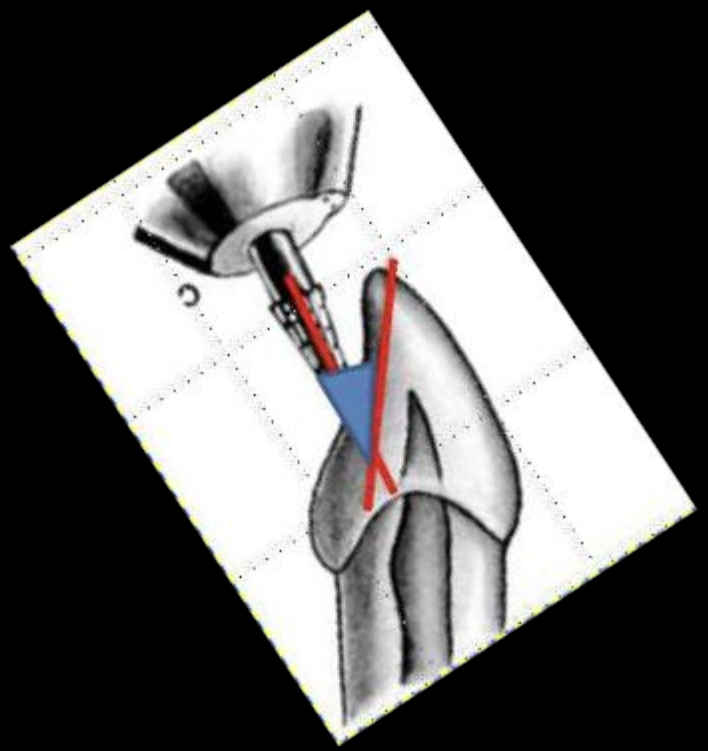


- Initial entrance Is prepared with a round bur at a high speed operated at a right angle to the long axis of the tooth. Only enamel is penetrated

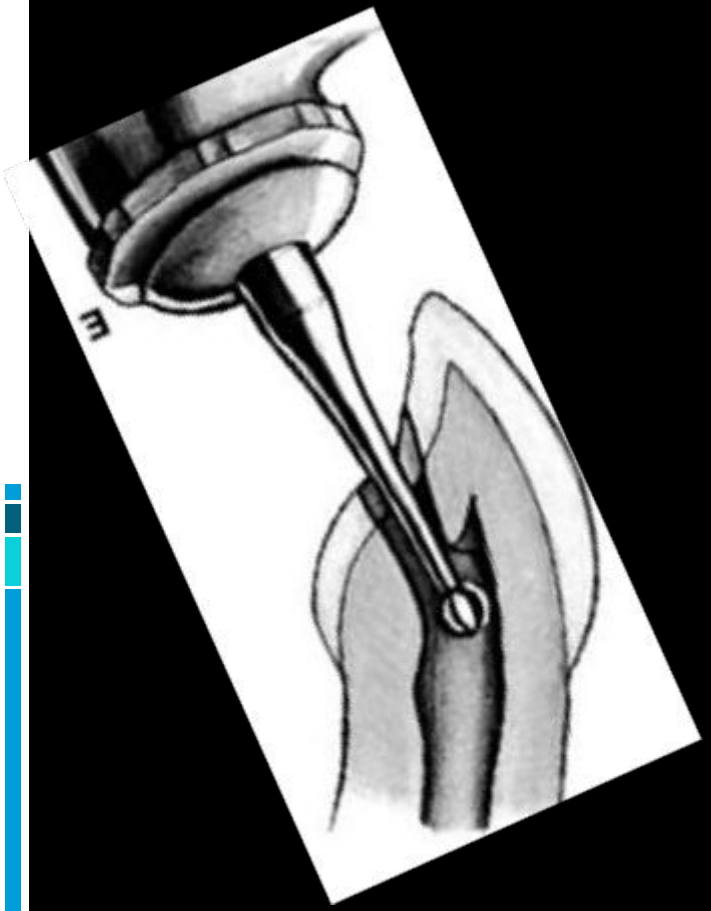


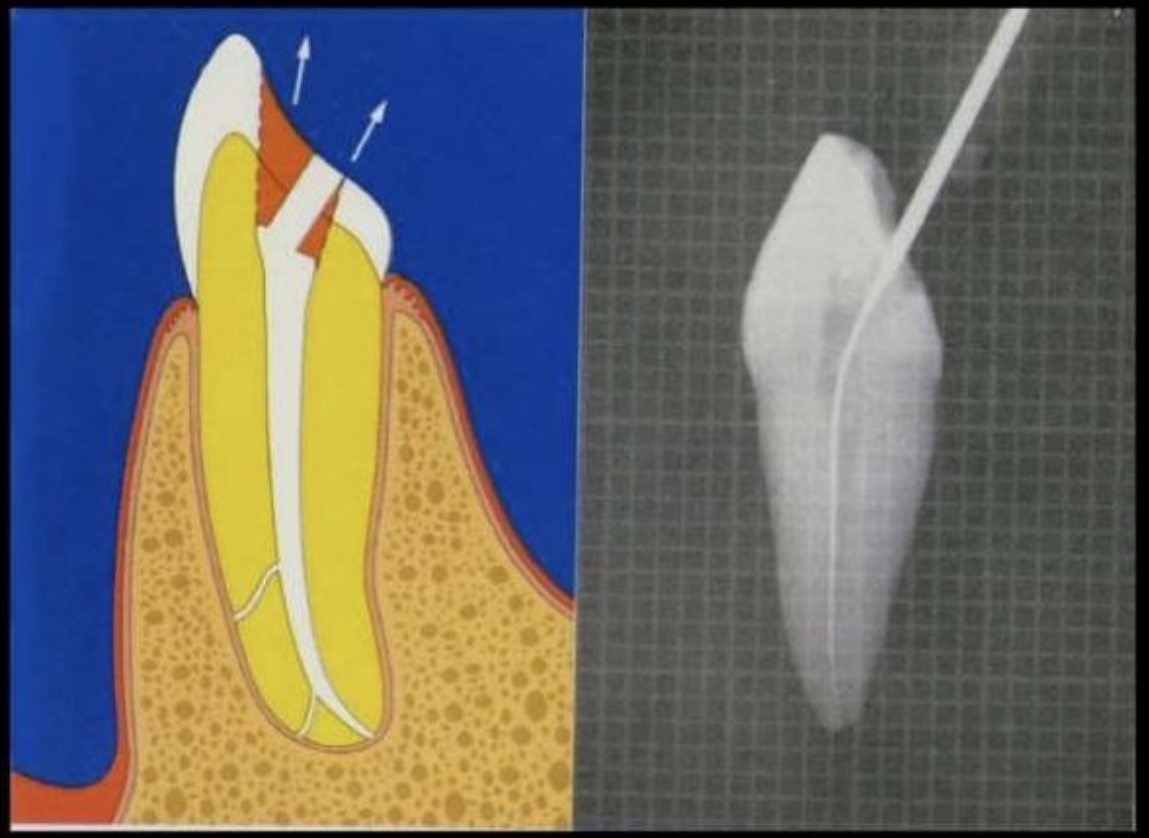
- The bur is positioned in a 45 degree to the long axis of the tooth then advanced to penetrate the pulp chamber.



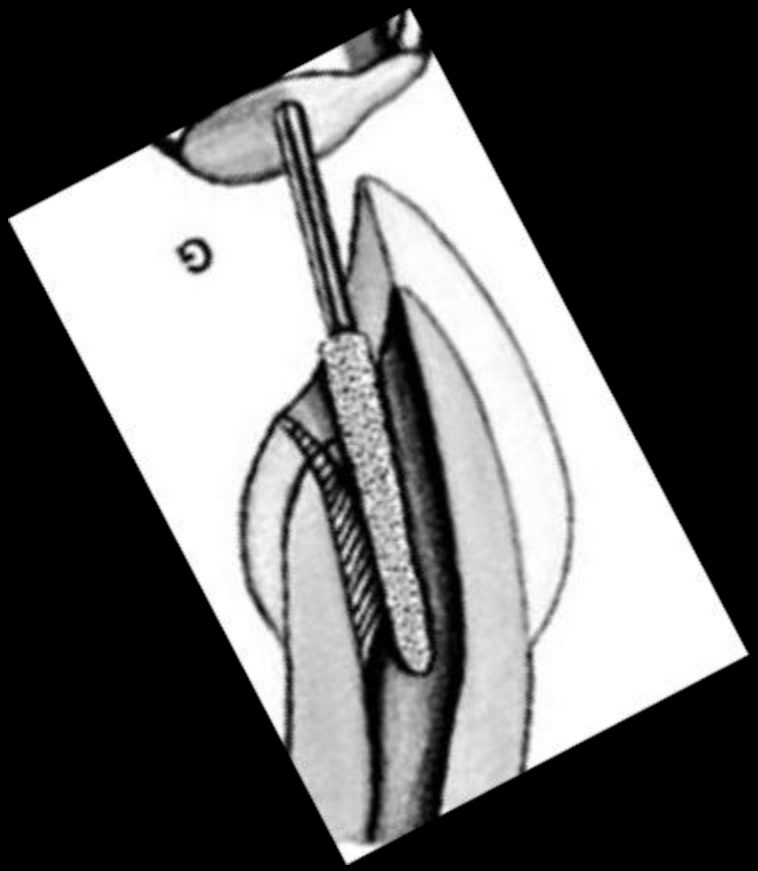


- Removal of the pulp chamber (deroofing)





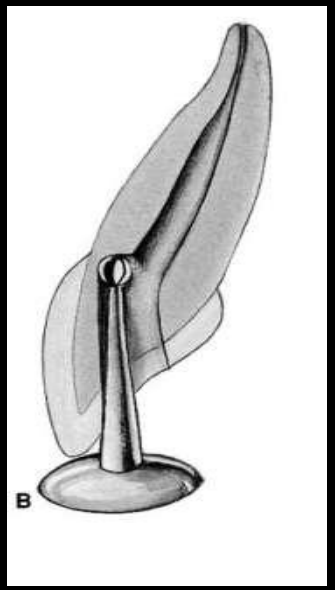
- Removal of lingual shoulder.



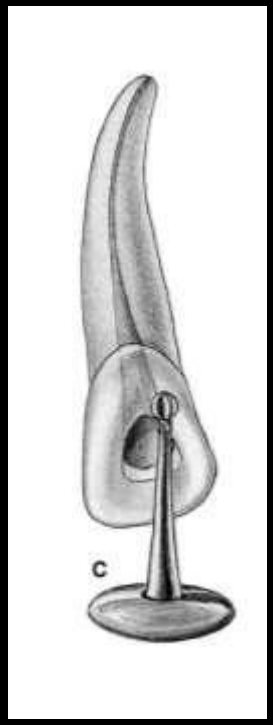
- In Canine the outline is oval

ERRORS

- 1- GOUGING of the labial wall caused by failure to recognize the 29-degree lingual-axial angulation of the tooth.

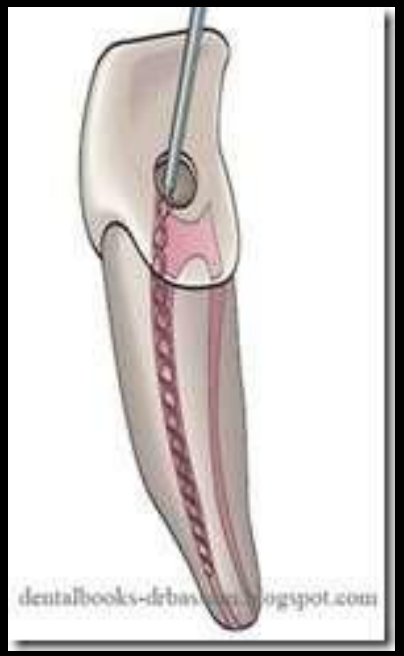


- 2- GOUGING of the distal wall caused by failure to recognize the 16-degree mesial-axial inclination of the tooth.

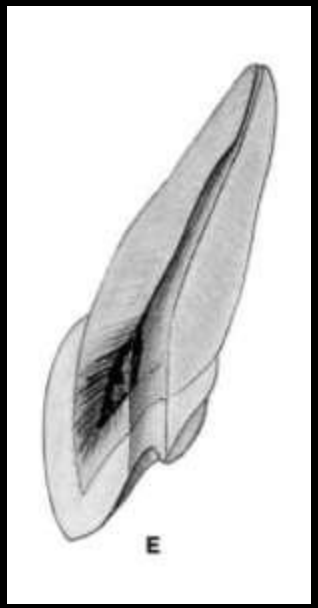


- 3- PERFORATION at the labiocervical caused by failure to complete convenience extension toward the incisal, prior to the entrance of the shaft of the bur.

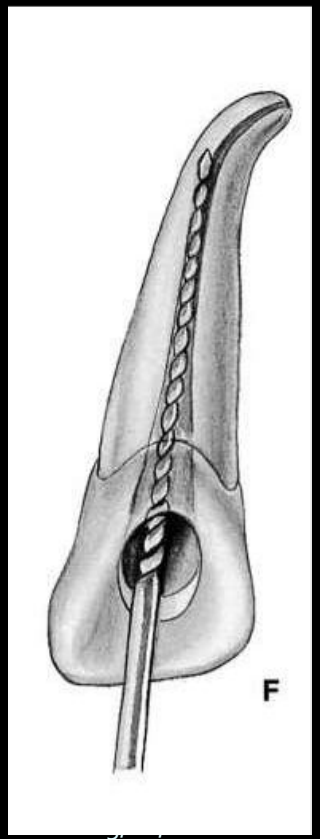
- 4- Missed canal due to insufficient convenience extension.



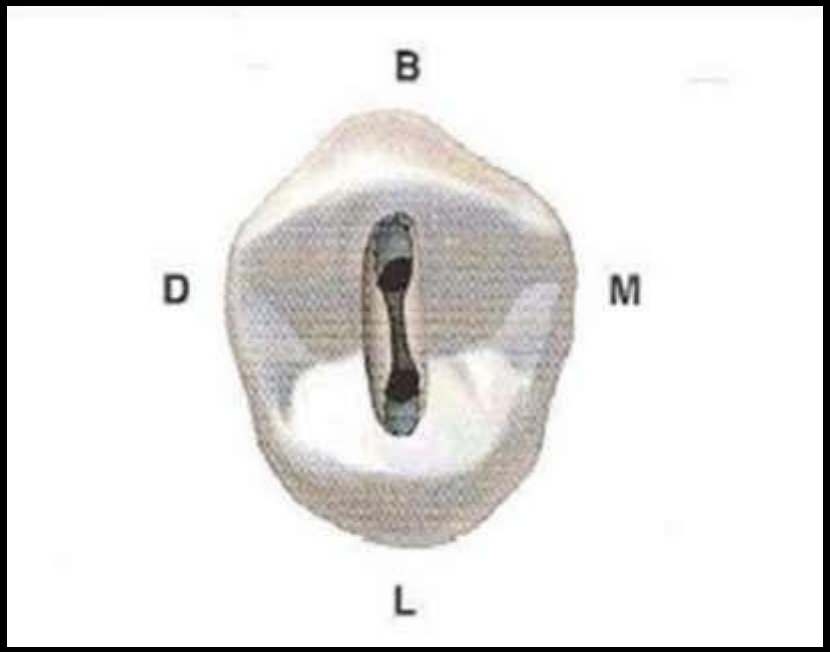
- 5- DISCOLORATION of the crown caused by failure to remove pulp debris. The access cavity is too far to the gingival with no incisal extension.

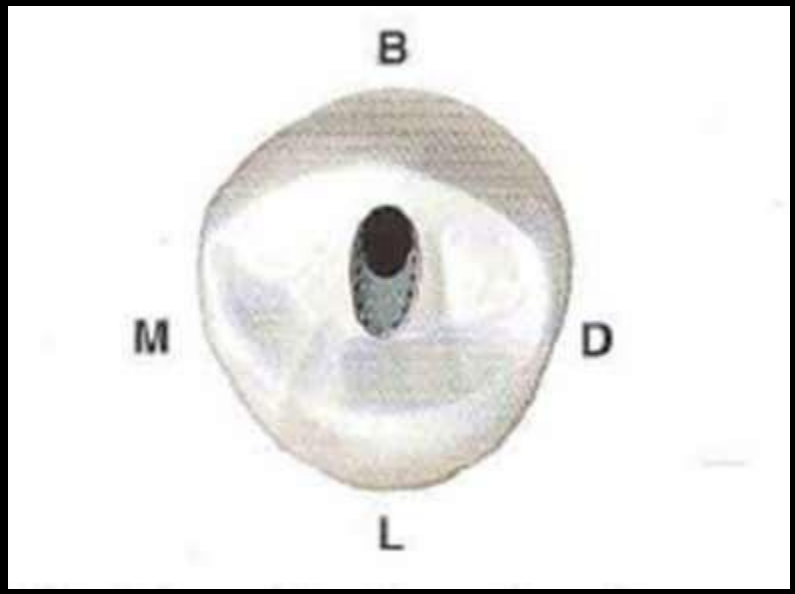


- 6- LEDGE formation at the apical-distal curve caused by using an uncurved instrument too large for the canal. The cavity is adequate.

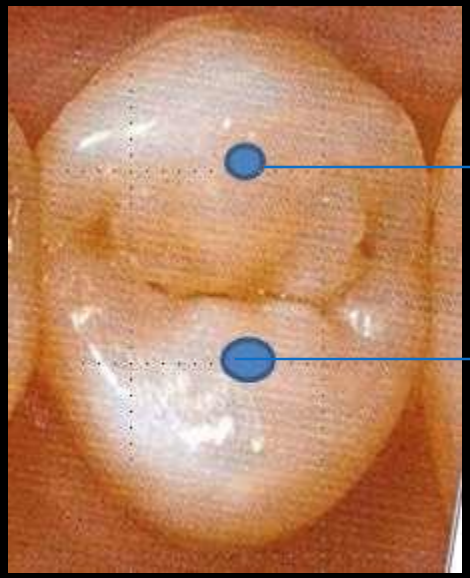


Premolars



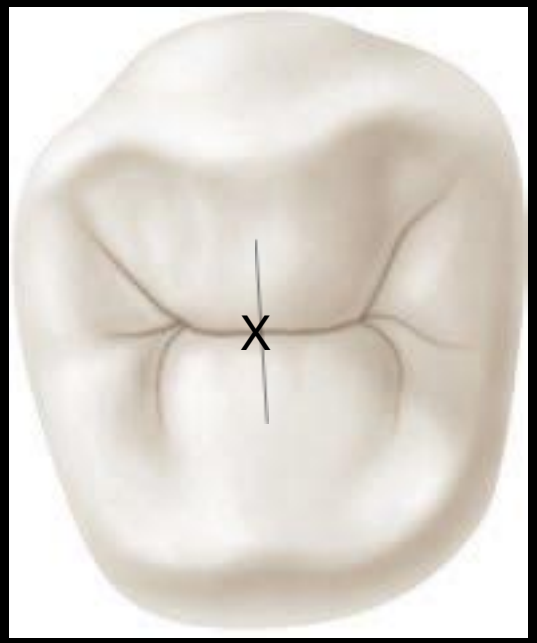


Maxillary premolars



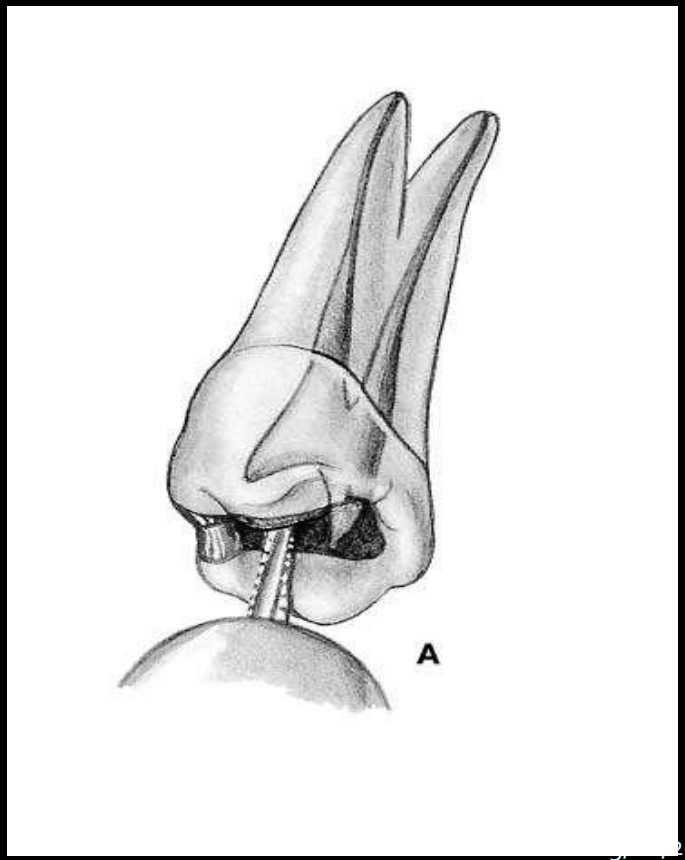
Buccal canal is located under the buccal cusp tip.

Palatal canal is located at the base of the palatal cusp.

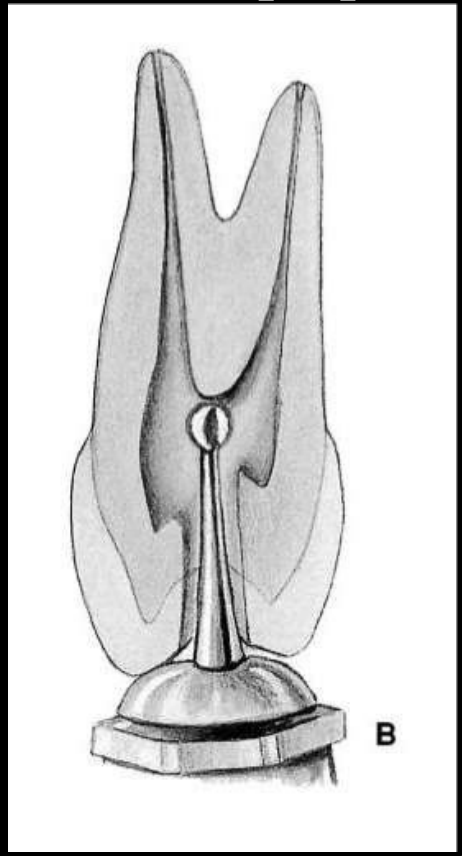


A, Starting location for access to the maxillary premolar *(X)*. B, Initial outline form *(dark area)* and projected final outline form *(dashed line).*

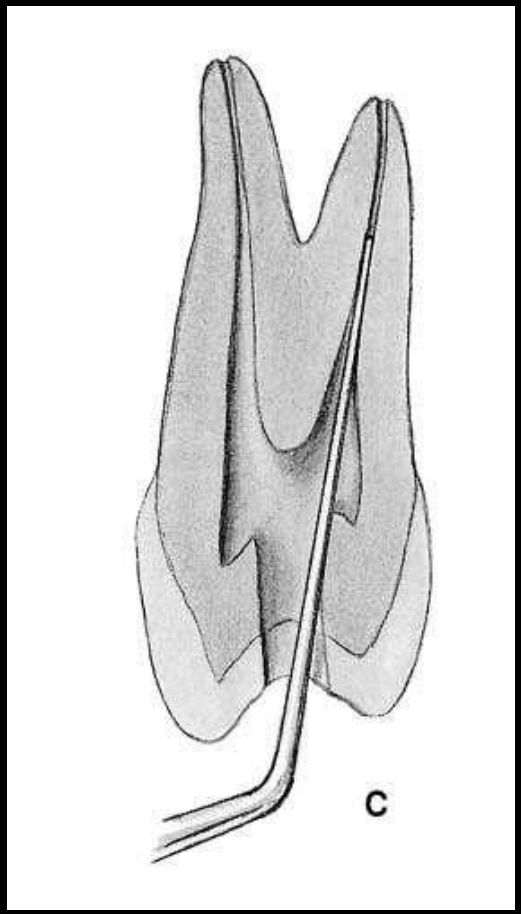
- Initial penetration is made parallel to the long axis of the tooth in the exact centre of the central groove



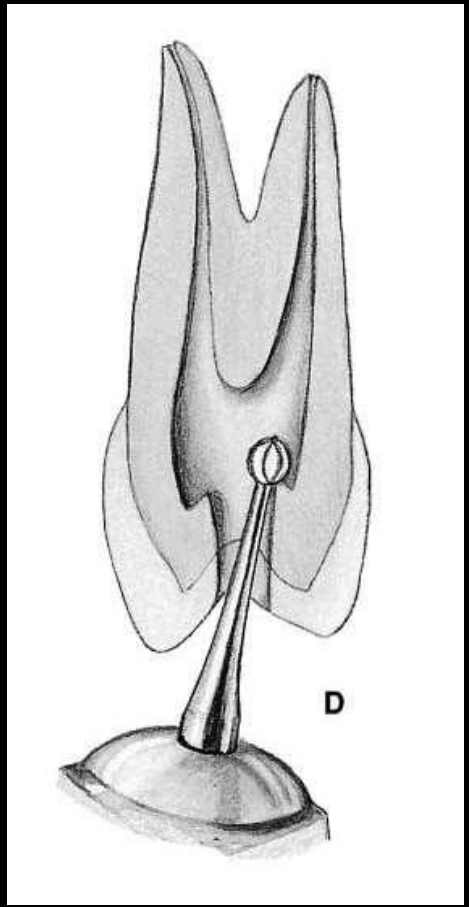
- A round bur is used to open into the pulp chamber. The bur will be felt to “drop” when the pulp chamber is reached



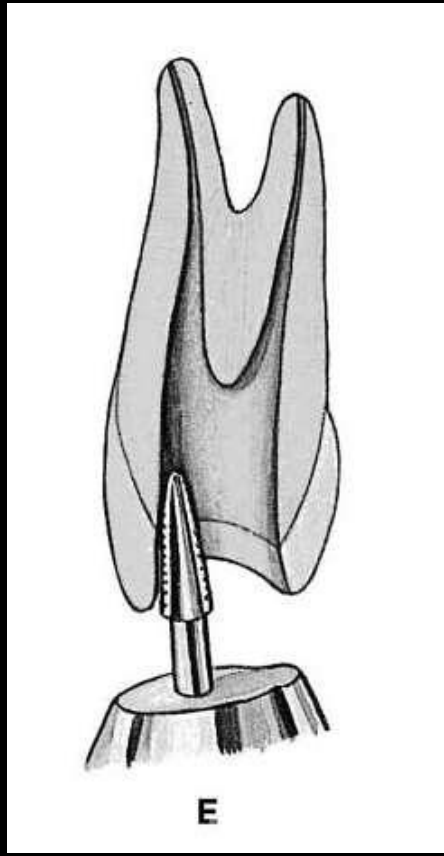
- An endodontic explorer is used to locate orifices.



- A round bur is used to deroof the pulp chamber.



- Finishing and flaring of the cavity walls.

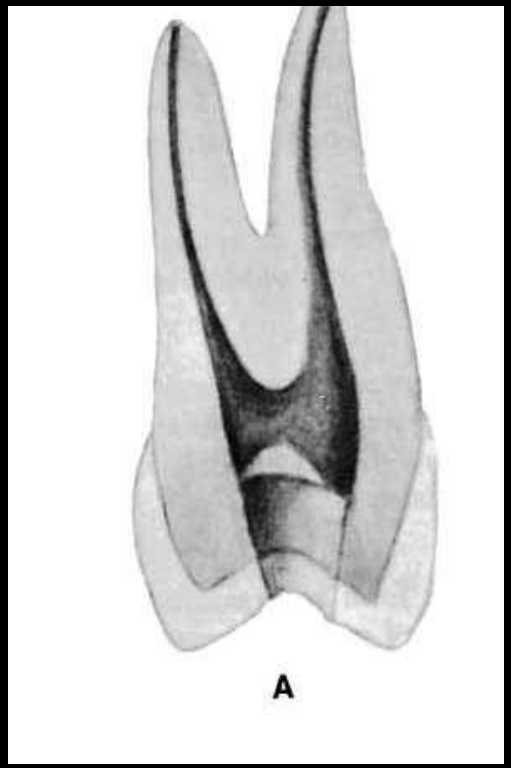


Upper

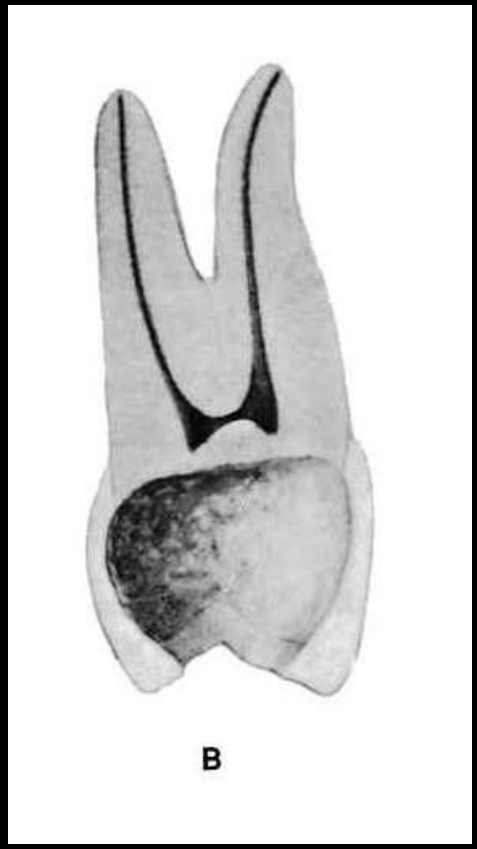
Lower

ERRORS

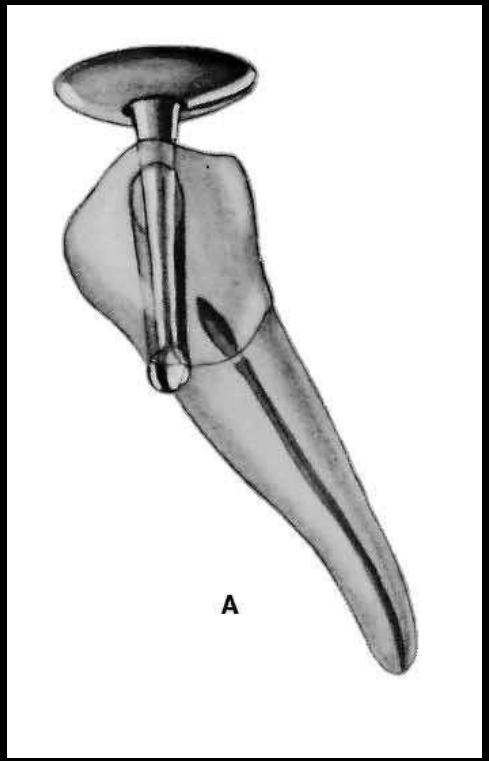
- Under extended access cavity



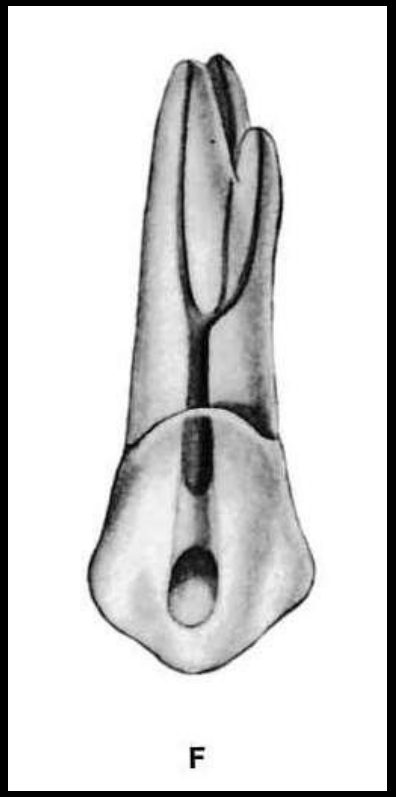
- Over extended access cavity



- PERFORATION at the cervical area caused by failure to recognize that the premolar has tilted to the distal.

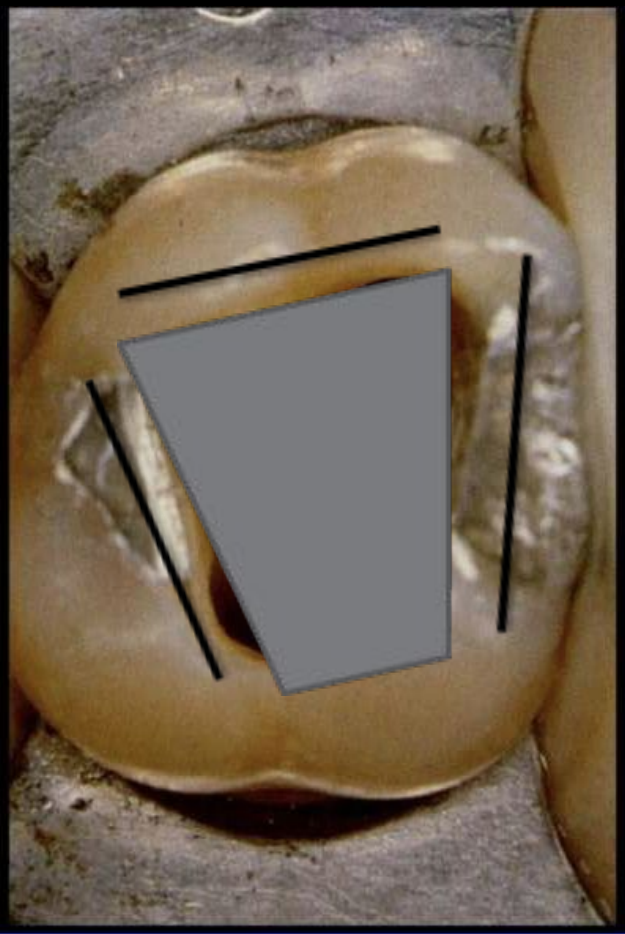


- FAILURE to locate the third canal of the maxillary first premolar (6% of the time).

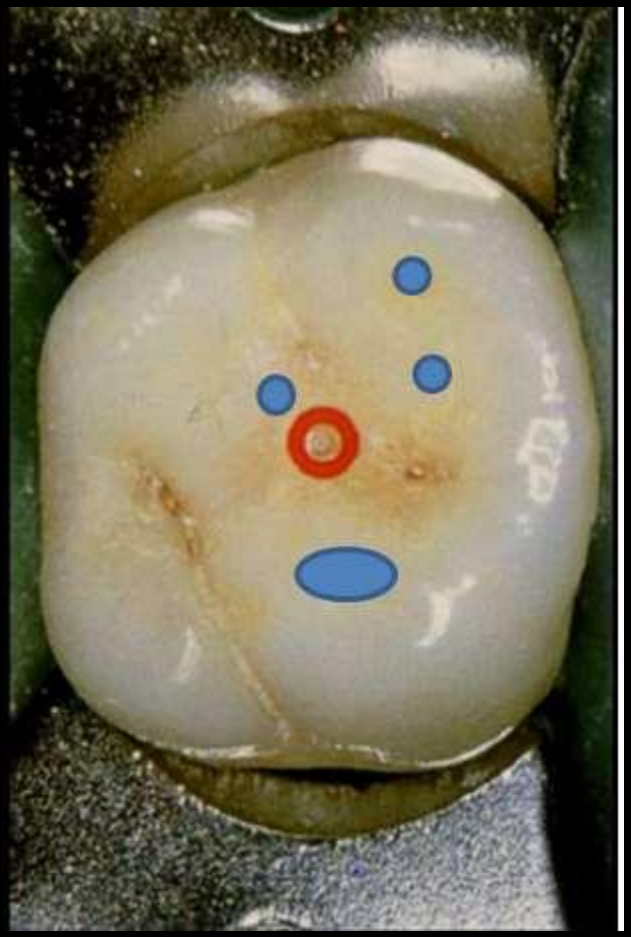


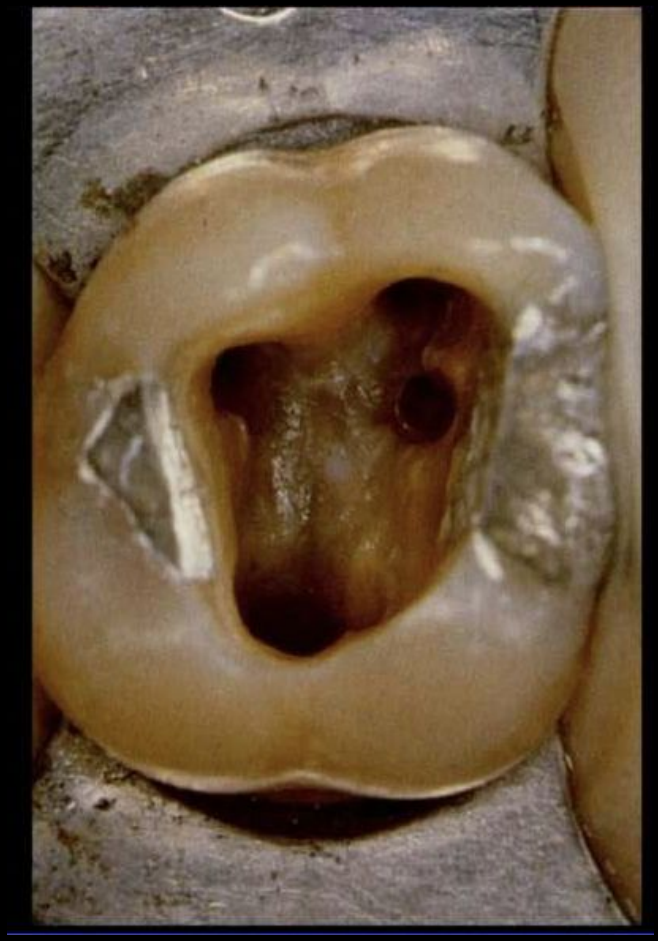
MOLARS

Upper

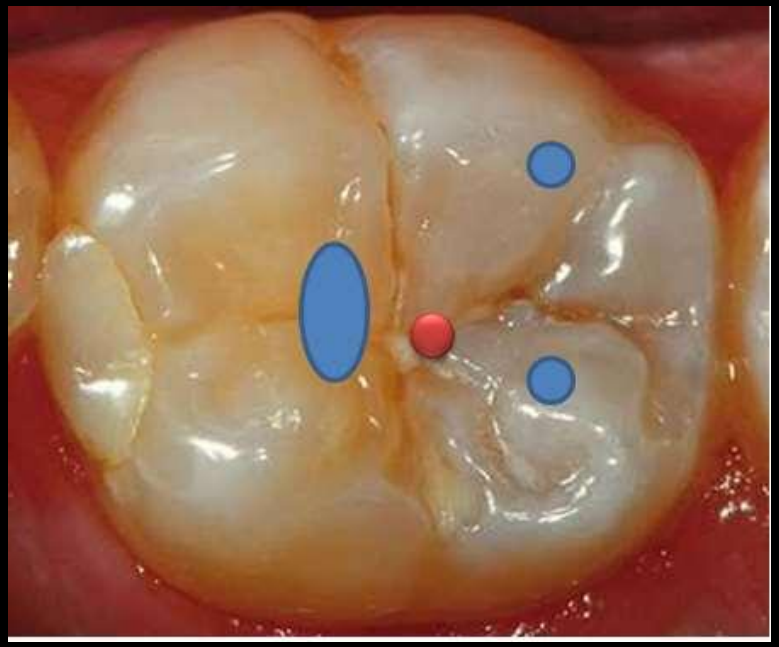


Lower

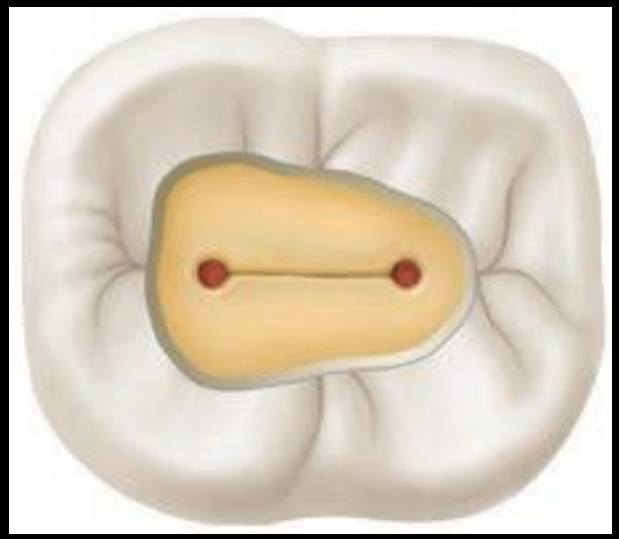


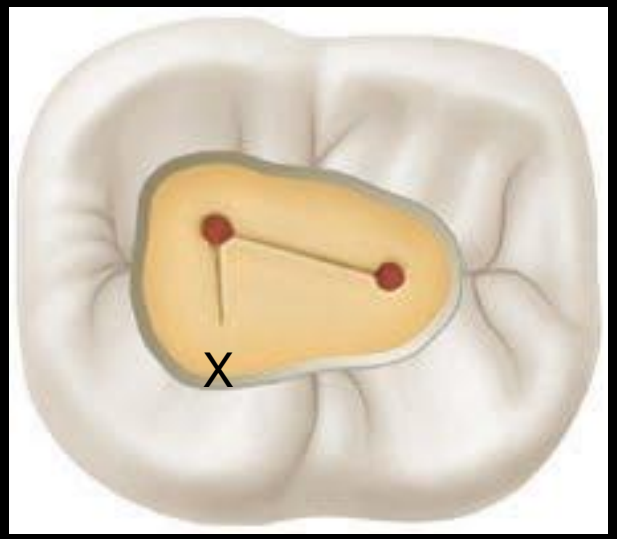


- MB1 is located under the buccal cusp tip.
- MB2 is located mesial and palatal to MB1.
- DB is located under the central fossa.
- Palatal is located at the junction of mesiopalatal cusp and oblique ridge.
- Point of entry is the center of the occlusal table.



- MB is located under the mesiobuccal cusp tip.
- ML is located at the same line lingual to the central fissure.
- Distal is located distal to the central fossa.
- Point of entry is the central fossa.

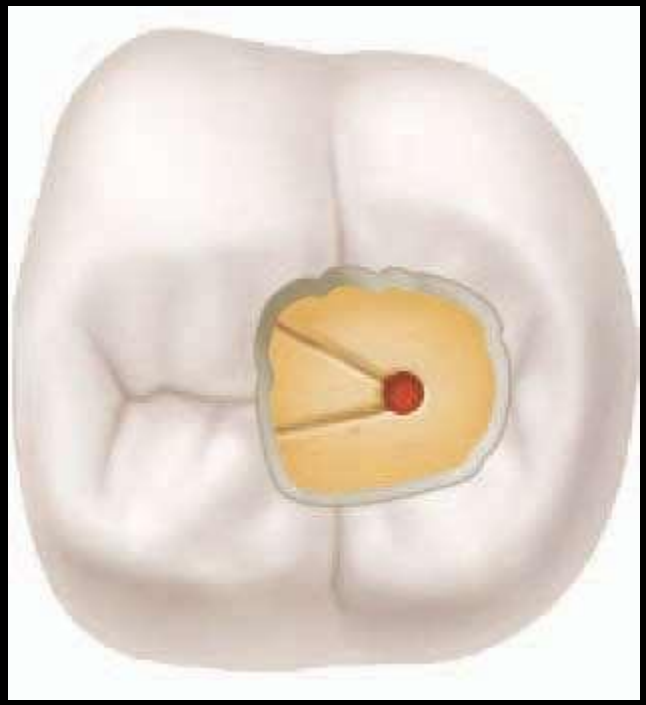




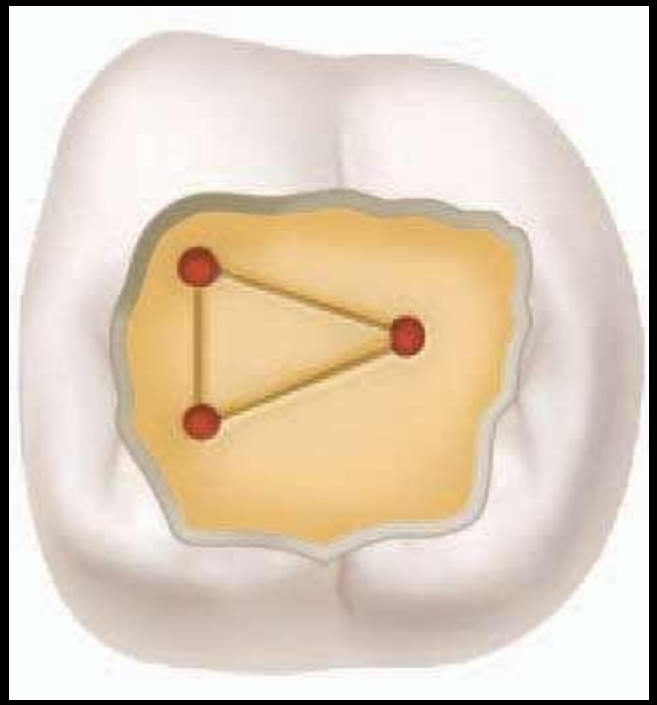
A, In a mandibular second molar with two canals, both orifices are in the mesiodistal midline. B, If two orifices are not directly in the mesio- distal midline, a search should be made for another canal on the opposite side in the area of “X.” *D,* Distal; *M,* mesial.

ERRORS

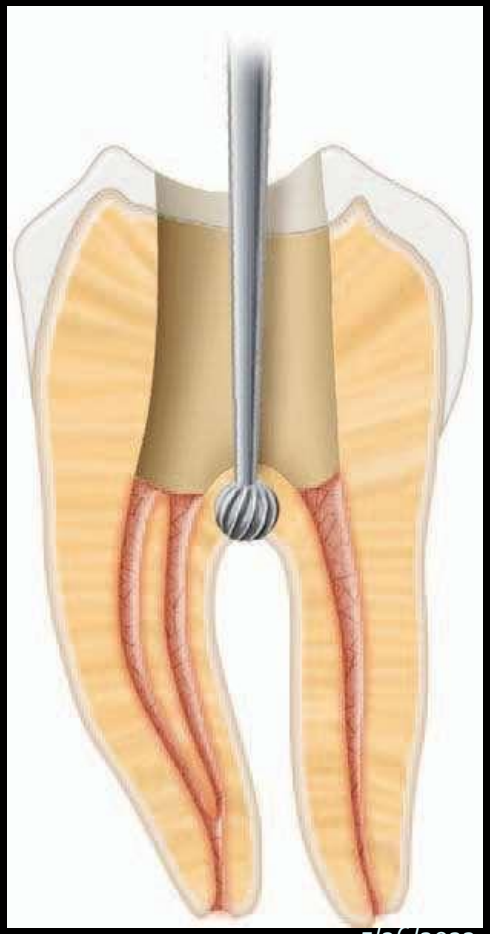
- Under extended access cavity



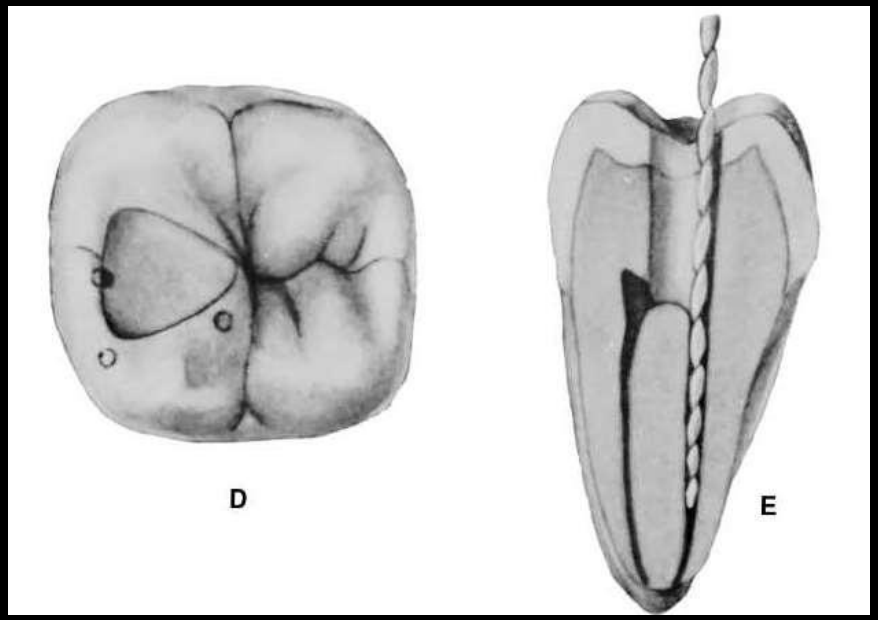
- Over extended access cavity



- Perforation in the furcation area

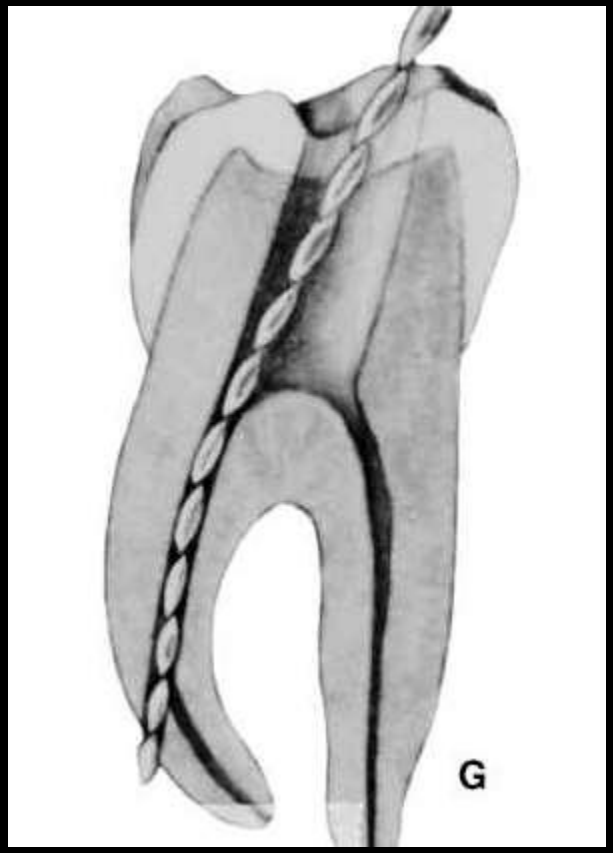


- Failure to locate all the canals



- Crown perforation

- Root perforation



CHALLENGING ACCESS PREPARATIONS

Access Through Full Veneer Crowns

- Properly made crowns are constructed with the occlusal relationship of the opposing tooth as a primary consideration.
- Preoperative radiograph.
- Achieving access through crowns should be done with coolants because of frictional heat.
- Once penetration of metal is accomplished can change to a sharp, round bur and move towards the central pulp chamber.
- Metal filings and debris from the access cavity should be removed.

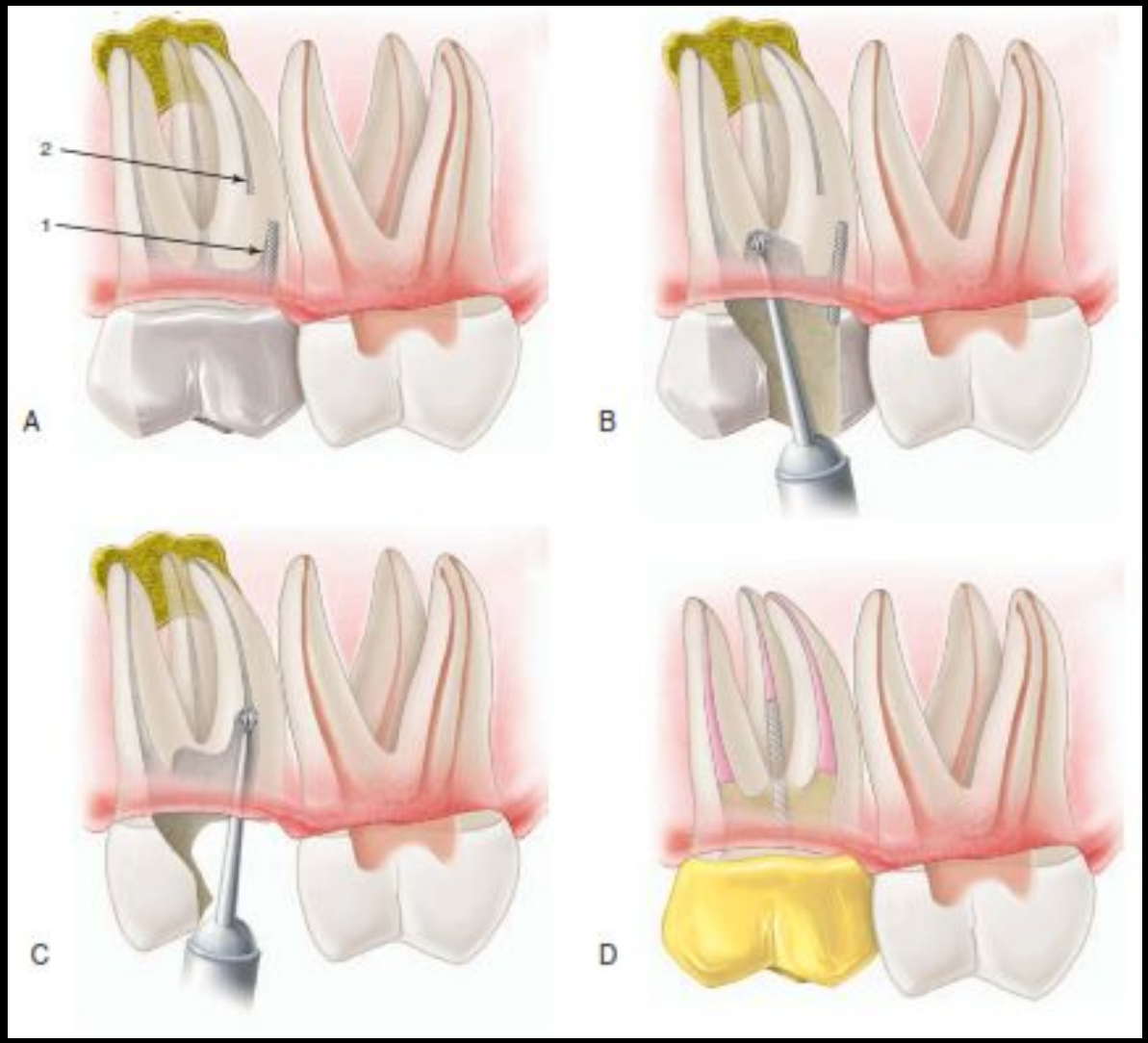
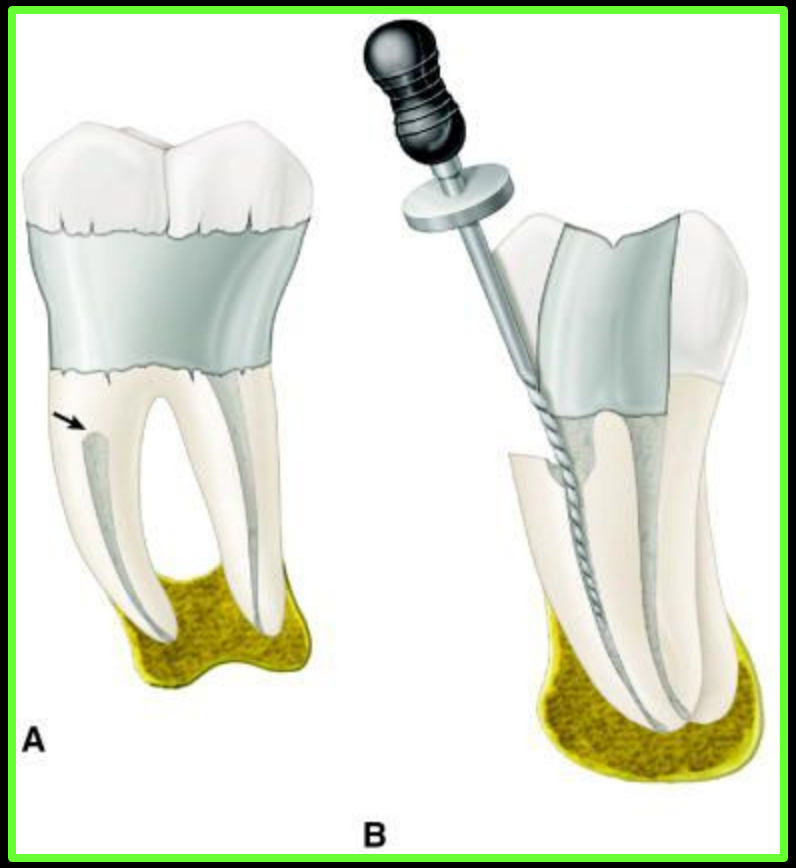


FIG. 7-61 A, In a heavily restored maxillary second molar that requires root canal therapy, the clinician may attempt access to the canals. Pretreatment radiographs demonstrate three important factors: (1) a reinforcing pin is in place *(arrow)*; (2) at least two thirds of the coronal portion is restorative material; and (3) the mesiobuccal canal appears calcified *(arrow)*. These factors suggest complete excavation. **B,** A patient may ask the clinician to attempt an unexcavated search for the canals; this may result in a furcal perforation, compromising the prognosis. In such cases the patient should be engaged in the decision to continue treatment, which unquestionably involves removal of the existing restoration. **C,** A safer, more conservative approach is to remove the amalgam, the pin, and any old cements. Careful excavation, using enhanced vision, results in access to the pulp chamber. **D,** The clinician now can perform sound root canal therapy, followed by internal reinforcement and full coverage.



A, Extensive Class V restoration necessitated by root caries and periodontal disease that led to canal calcification(arrow).
B, Access to the canal is occluded by calcification. Removal of the facial restoration may be required to obtain access from the buccal surface.

Teeth with Minimal or No Clinical Crown

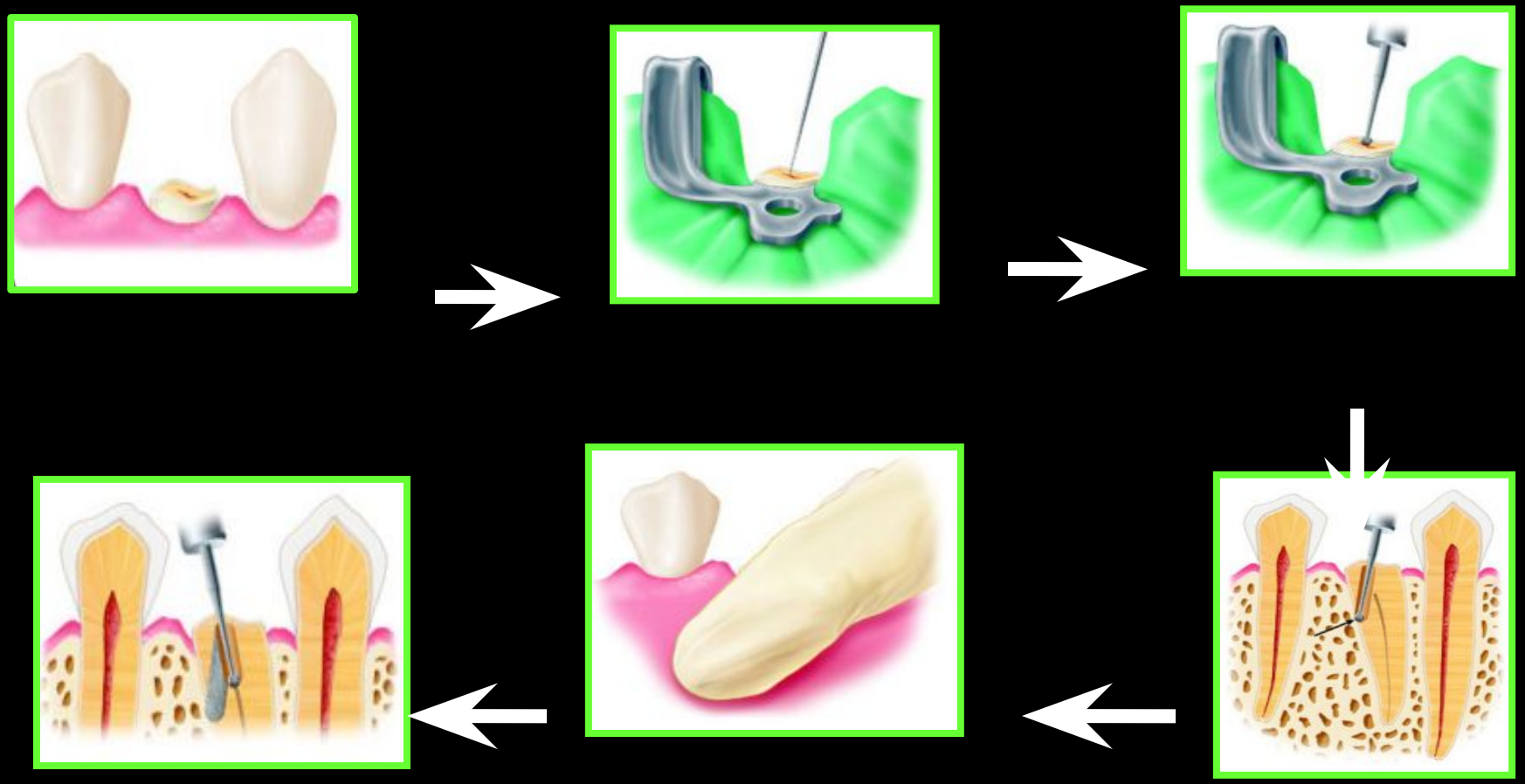
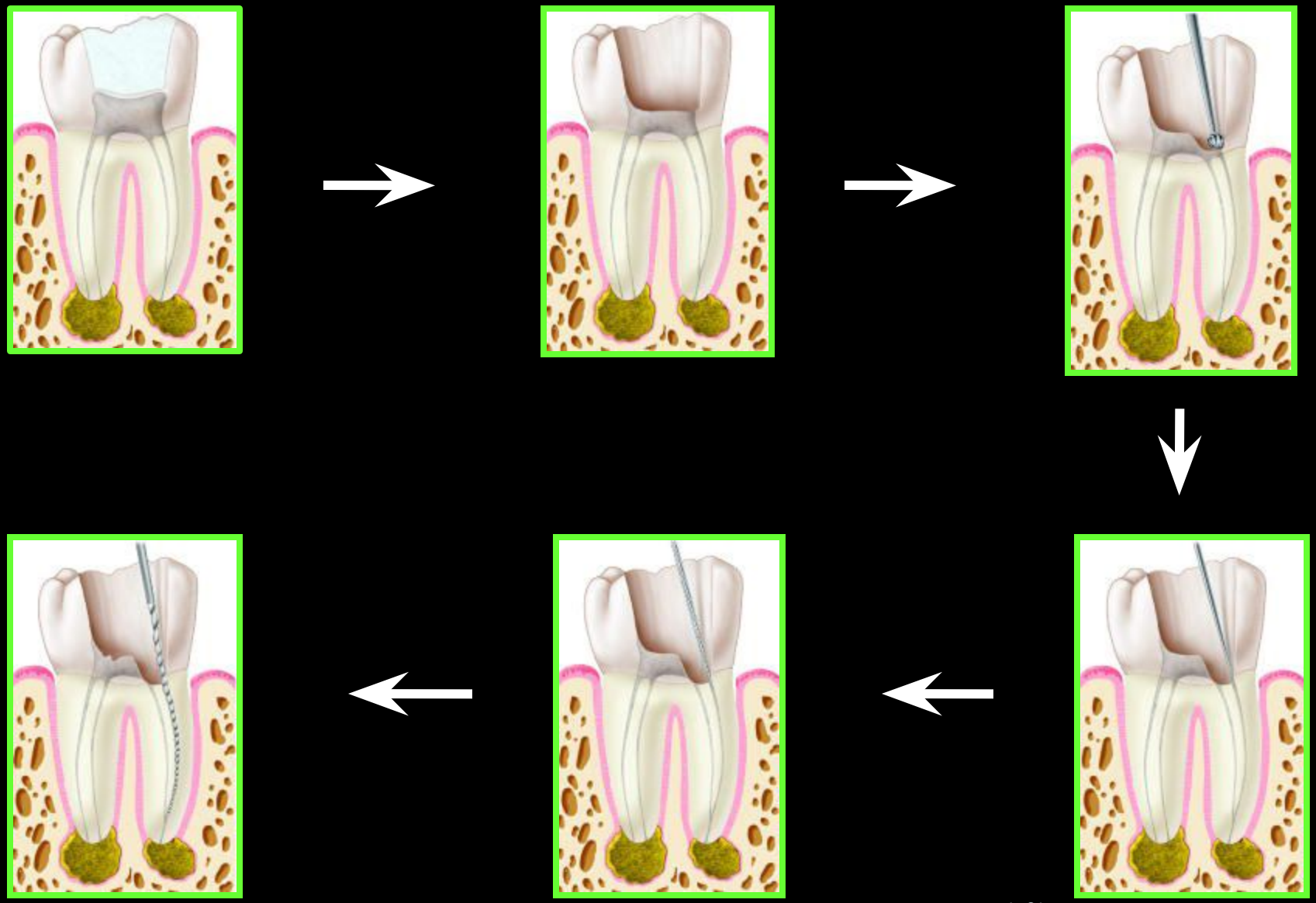


FIG. 7-59 Access cavity preparation when the anatomic crown is missing. A, A mandibular first premolar with the crown missing. B, An endodontic explorer fails to penetrate the calcified pulp chamber. C, A long-shank round bur is directed in the assumed long axis of the root. D, Perforation of the root wall (*arrow*), resulting from the clinician's failure to consider root angulation. E, Palpation of the buccal root anatomy without a dental dam in place to determine root angulation. F, Correct bur angulation after repair of the perforation with mineral trioxide aggregate (MTA; DENTSPLY Tulsa Dental Specialties, Tulsa, OK). The dental dam is placed as soon as the canal is identified.

Teeth with Calcified Canals



- EDTA 15% , Salvizol, Smear clear are chelating agents used for negotiation of calcified canals.
- C+ Files are available in three lengths, 18mm, 21mm and 25mm and three sizes 8, 10 and 15.
- An alternative option is to use instruments with reduced flute, such as a Canal Pathfinder or instruments with greater shaft strength such as the Pathfinder CS, which are more likely to penetrate even highly calcified canals.

Crowded Teeth and Rotated teeth

- The access preparation is performed through the buccal surface on tooth #32.

- Tooth #33 also has been accessed through the buccal surface; root canal therapy was performed, and the access cavity was permanently restored with composite.

RECENT ADVANCES FOR ROOT CANAL IDENTIFICATION

- CBCT
- OPTHALAMIC DYES
- INTRA ORAL CAMERAS

RECENT ADVANCES IN ACCESS CAVITY PREPARATION

- Conservative endodontic access cavity - David Clark and John Khademi have modified the traditional access cavities and these new designs are known as **CONSTRUCTED OR CONSERVATIVE ENDODONTIC ACCESS CAVITIES.**
- The designs are been advocated to minimize the tooth structure removal.

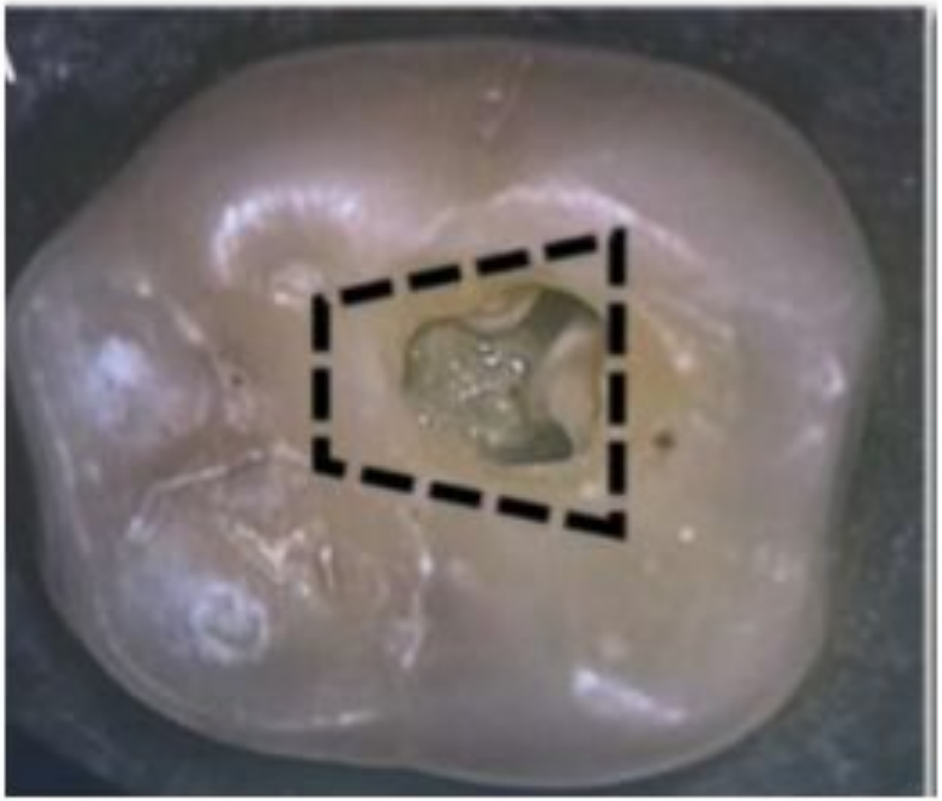


Figure 3 CEC in mandibular first molar. The occlusal view; for comparison purposes, the outline of TEC is demarcated with a dotted line.

- In conservative endodontic access cavity, the teeth are accessed at the central fossa and they are extended only as necessary to detect canal orifices.

- This helps in preserving the pericervical dentin and part of the chamber floor.

- The pericervical dentin is the dentin that is located 4 mm above and 4 mm below the crestal bone and they serve in distribution of functional stresses in teeth.

- Thus it is necessary that we preserve this pericervical dentin in order to maintain the biomechanical response of the radicular dentin.

- The preservation of this dentin roof above the pulp chamber is known as the ‘soffit’.

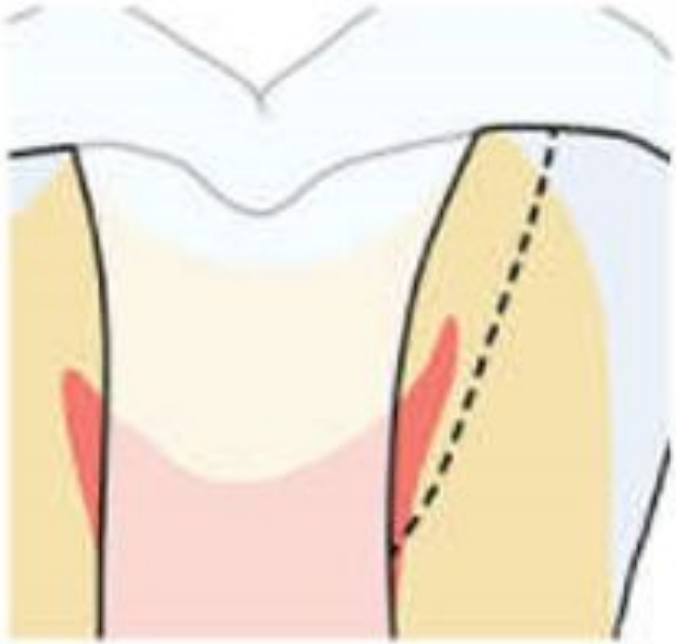


Figure 4 Dotted line shows the typical cut made to remove the entire pulp horn. Area between the lines should be maintained and is referred to as the soffit.

Ninja endodontic access cavity

- To obtain an access ‘ninja’ outline, the oblique projection is made towards the central fossa of the root orifices in an occlusal plane.
- As the endodontic access is parallel with the enamel cut of 90^0 or more to the occlusal plane, it is easier to locate the root canal orifices even from the different visual angulations.

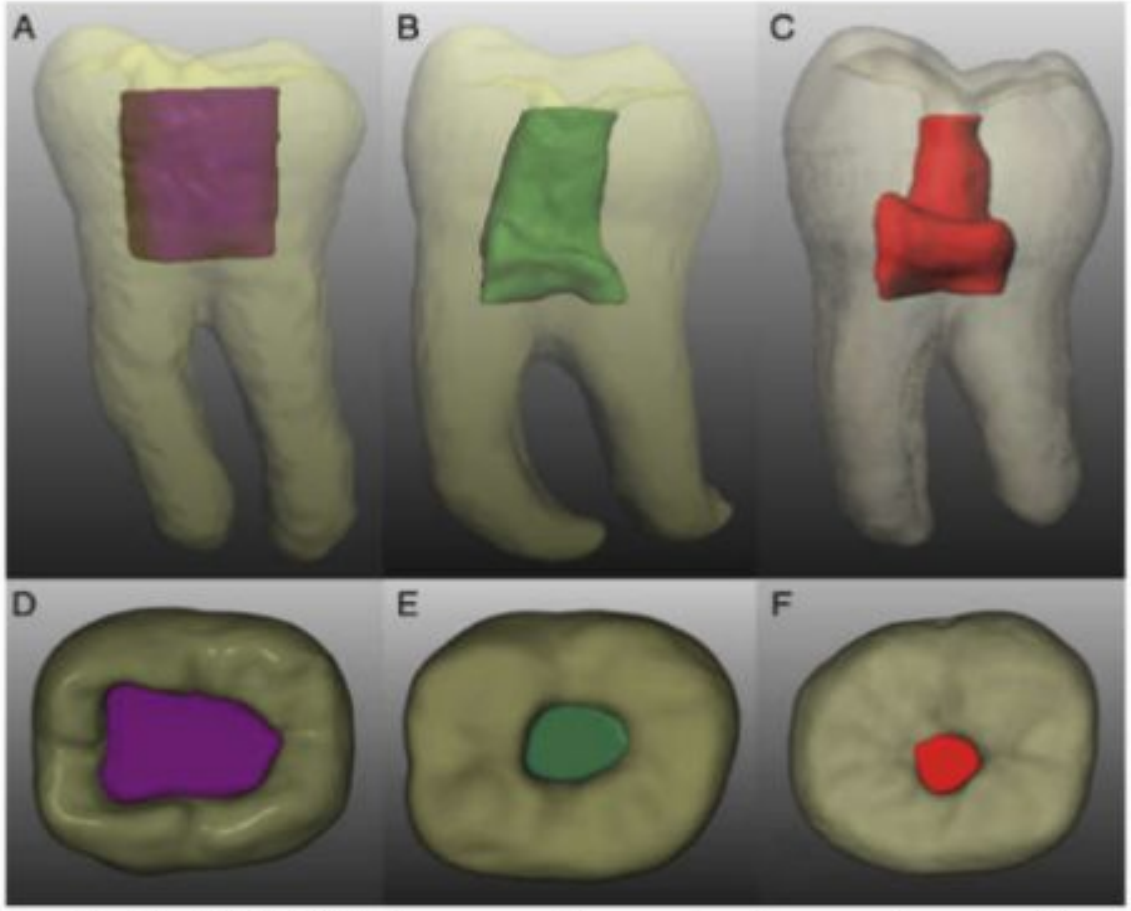


Figure2. (A–F) CBCT 3-dimensional reconstructions and segmentations of lower molars prepared with different access cavity designs in (A–C) the sagittal view and (D–F) the axial view at the occlusal surface. (A and D) A traditional access cavity (purple), (B and E) conservative access cavity (green), and (C and F) ultraconservative ''ninja'' access cavity (red) are segmented on CBCT reconstructions.

Orifice-directed dentin conservation access cavity

- The orifice-directed design is also known as the ‘truss’ access cavity.

- It is an approach to conservative access cavity where separate cavities are prepared to approach the canals.

- In mandibular molars, two separate cavities are prepared to approach the mesial and the distal canals.
- In maxillary molars, the mesio- and the distobuccal cavities are been approached in one cavity and another separate cavity for the palatal canal.
- The aim of preparing such conservative cavities is to preserve the dentin ie. Leaving a truss of dentin between the two cavities that has been prepared.

Figure 5 A schematic representation of the (A) TEC access (black dotted line) and (B) DDC access (red dotted line) cavity in a mandibular molar.

Conclusion

- Locating the number and position of orifices on pulp-chamber floors can be difficult especially true when the tooth being treated is heavily restored, malposed, or calcified.

- A thorough knowledge of the root canal anatomy and an understanding of its variations from the normal are mandatory for the successful root canal therapy.