Morphology & Access cavity of premolar teeth

Restorative dentistry (Endodontics)

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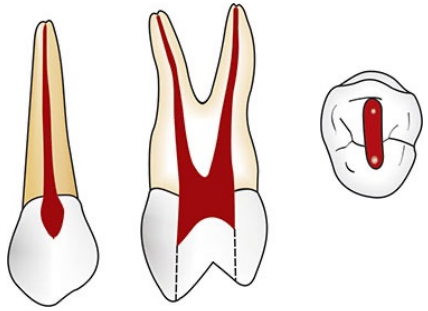
BDS,MDSc,PhD

Year 3 – semester 1

Fourth lecture

8TH week

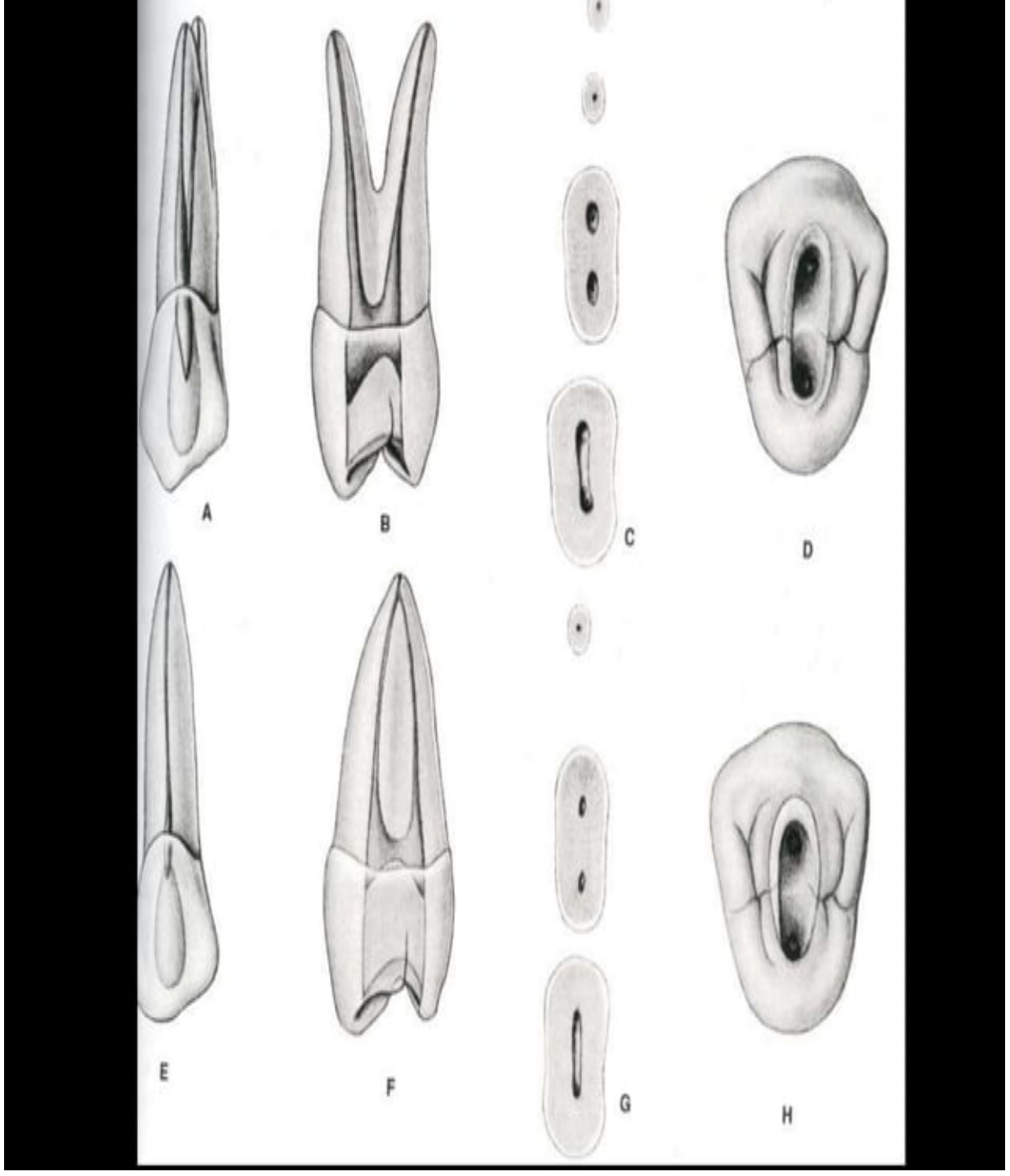
Maxillary first premolar



Pulp chamber

- Narrow mesiodistally
- Pulp horn under each cusp
- Buccal pulp horn more prominent than palatal

- The roof of the pulp chamber is corornal to the cervical line
- The floor of the pulp chamber is convex: usually with two orifices, one buccal and the other is palatal and it lies deep in the coronal third of the root below the cervical line.
- In cross section , the pulp chamber is oval in buccopalatal direction.



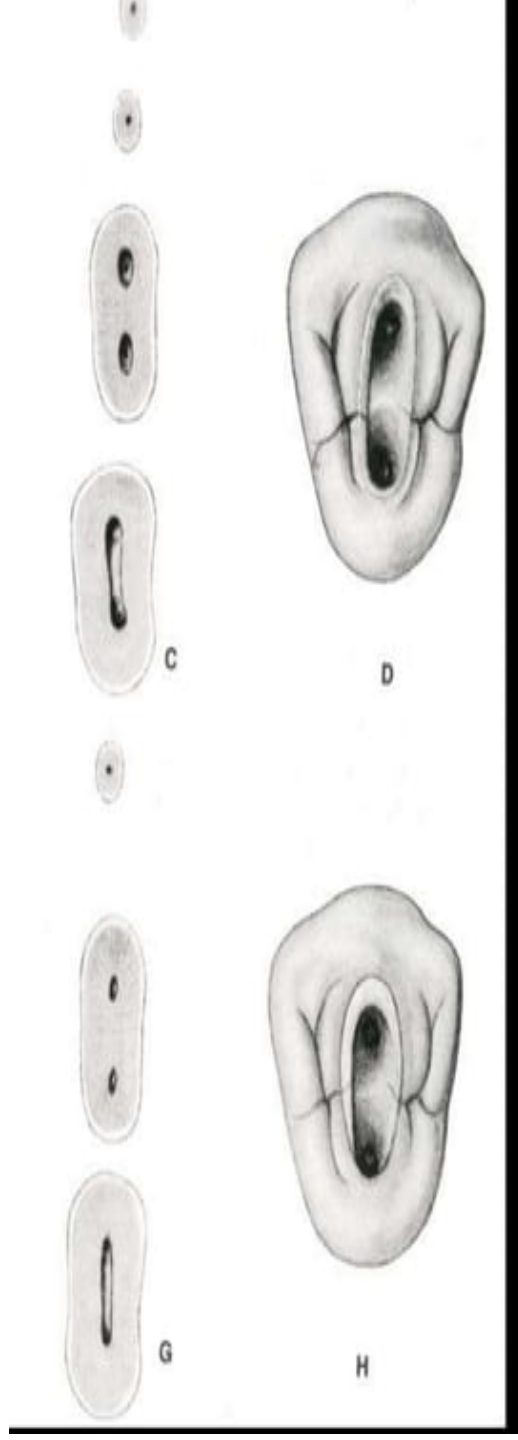
Roots

- Has two roots in 55% of cases:
- 22% of cases , roots are separated : 33% roots are partially fused
- 43% of cases have one root and 2% have three roots

- When three roots are present ; one is palatal and two are buccal which closely resemble the configuration of a small maxillary second molar

Root canals

- **In a tooth with a single canal through the length of the root, the canal is ovoid in shape , wider buccopalatally than mesiodistally in the cervical and middle third and round in the apical third**



MAXILLARY FIRST PREMOLARS

Length of tooth (mm)		Canals (%)		Direction	Curvature of roots		
					Single root	Double roots	
						Buccal	Palatal
Average length	21.8	One canal One foramen	9	Straight	38	28	45
Maximum length	23.8	Two canals One foramen Type II Vertucci	13	Distal curve	37	14	14
Minimum length	18.8	Two canals Two foramina	72	Mesial curve	0	0	0
Range	5	Three canals Three foramina	6	Labial curve	15	14	28
				Lingual curve	3	36	9
				Bayonet curve	0	8	0

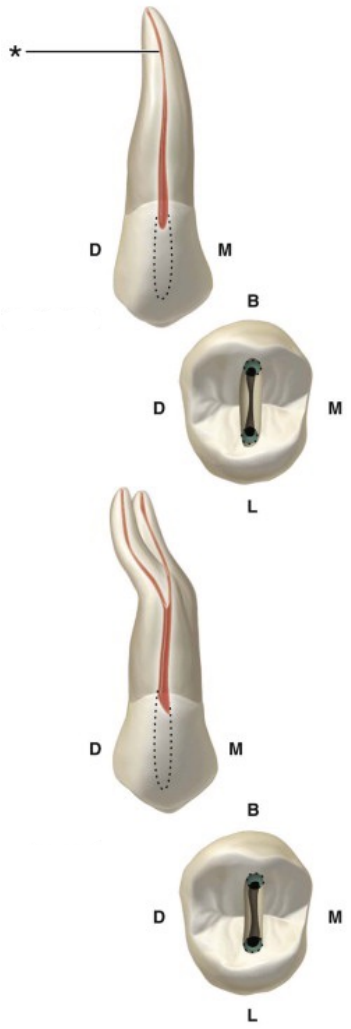
Maxillary second premolar

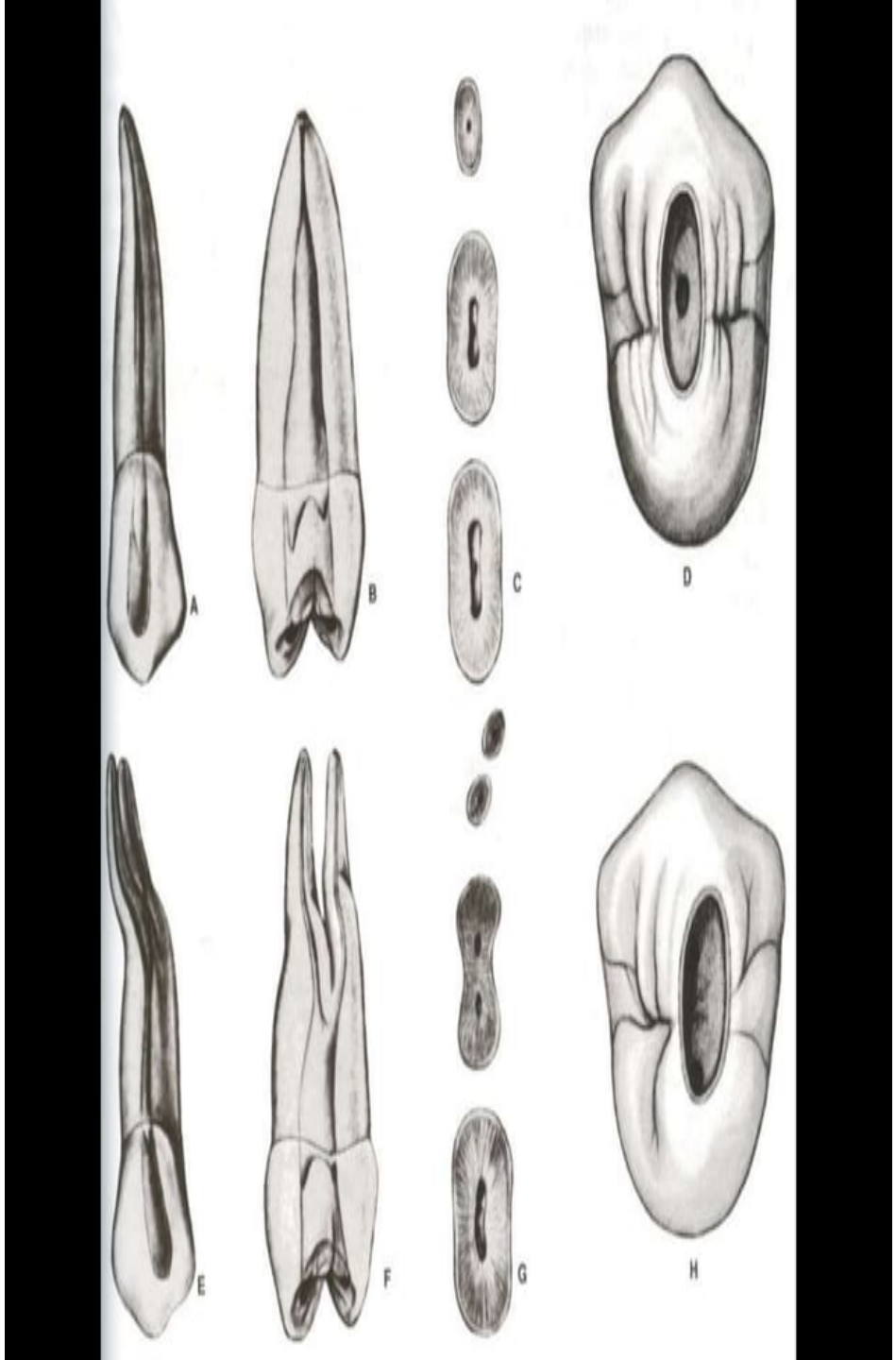
Pulp chamber

- Narrow mesiodistally
- Wider buccopalatally than maxillary first premolar
- Two pulp horns , buccal and palatal

- The roof of the pulp chamber is corornal to the cervical line
- The pulpal floor is deeper if two canals are present.

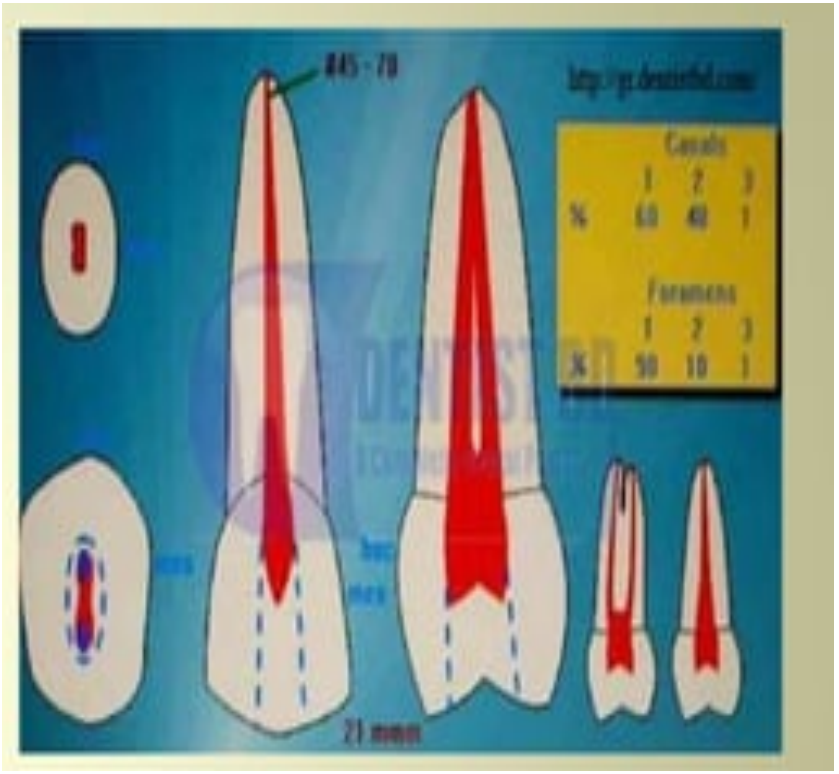
- In cross section , the pulp chamber has a narrow oval shape.





Roots

- Maxillary second premolars have single root in 88% of patients.
- 10 % have 2 roots that are partially fused.
- 2 % have 2 well developed roots.
- 43% of cases have ~~one~~ 2 root root and 2% have three roots.



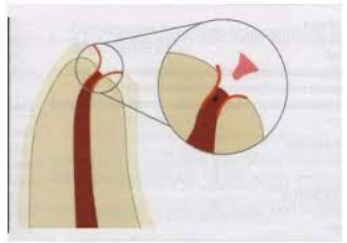
Root canals

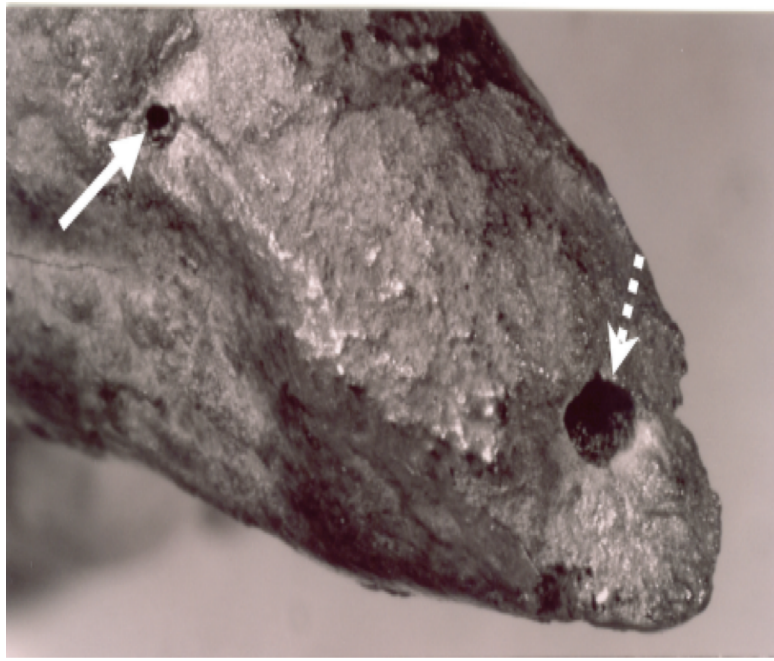
- If two canals are present, they may be separate Vertucci IV or converge at apex. → Vertucci II
- Majority of canals are curved.

In cross section :

Cervical third : canals are oval & narrow
Middle third : ovoid in shape
Apical third : round

- **The apical foramen is centrally located in 12% of cases.**
- **Gutmann reported that the apical foramen has been demonstrated to be on the lateral root surface 78% of time with a mean distance of 0.5 mm from the apex.**





MAXILLARY SECOND PREMOLARS

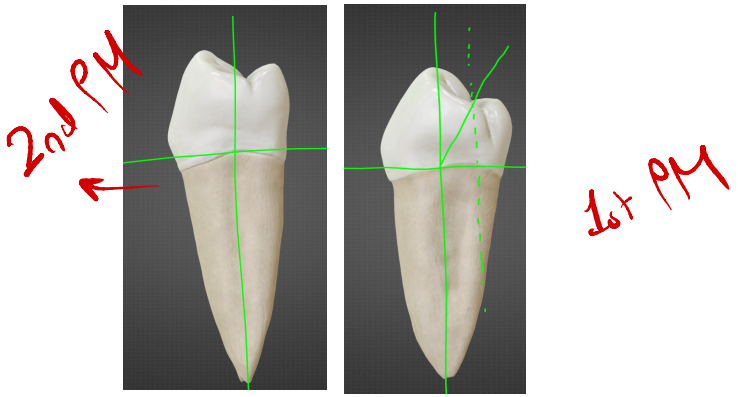
Length of tooth (mm)		Canals (%)		Root curvature (%)	
Average length	21	One canal One foramen	75	Straight	9.5
Maximum length	23	Two canals Two foramina	24	Distal curve	27
Minimum length	19	Three canals	1	Mesial curve	1.6
Range	4			Buccal curve	12.7
				Lingual curve	4.0
				Bayonet curve	20.6

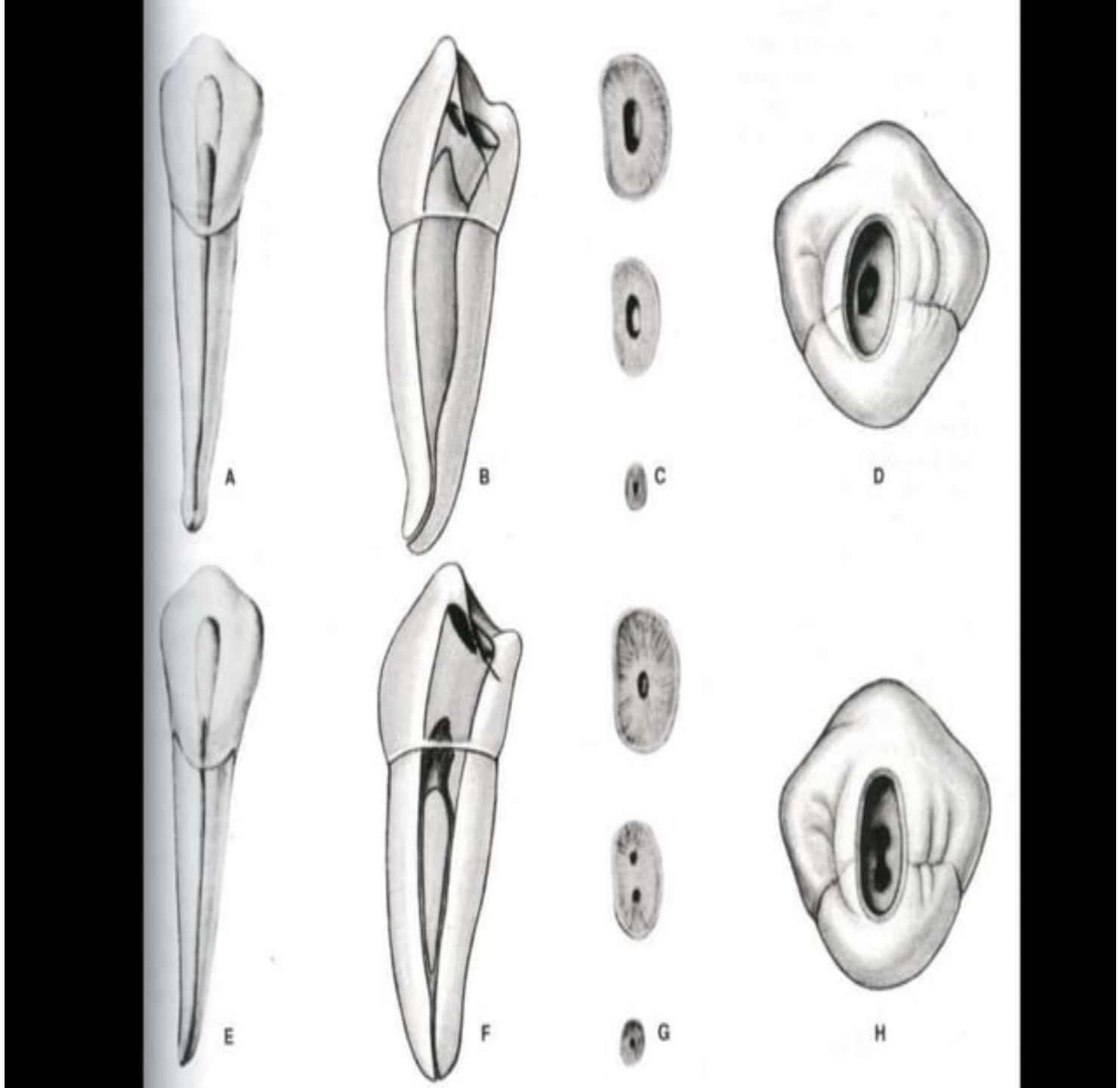
Mandibular first premolar

Pulp chamber

- **Transitional tooth between anterior and posterior teeth**
- **The crown of mandibular first premolar has 30 ^{0} lingual tilt.**
- **The mesiodistal width of the pulp chamber is narrow, buccolingually, the pulp chamber is wide, prominent buccal pulp horn.**
- **Small lingual pulp horn may disappear by time and may give the pulp chamber an appearance similar to that of a mandibular cuspid.**
- **In cross section**

Cervical third : canals are ovoid
Middle third : ovoid in shape
Apical third : round




A
B
C
D
E
F
G
H

Roots

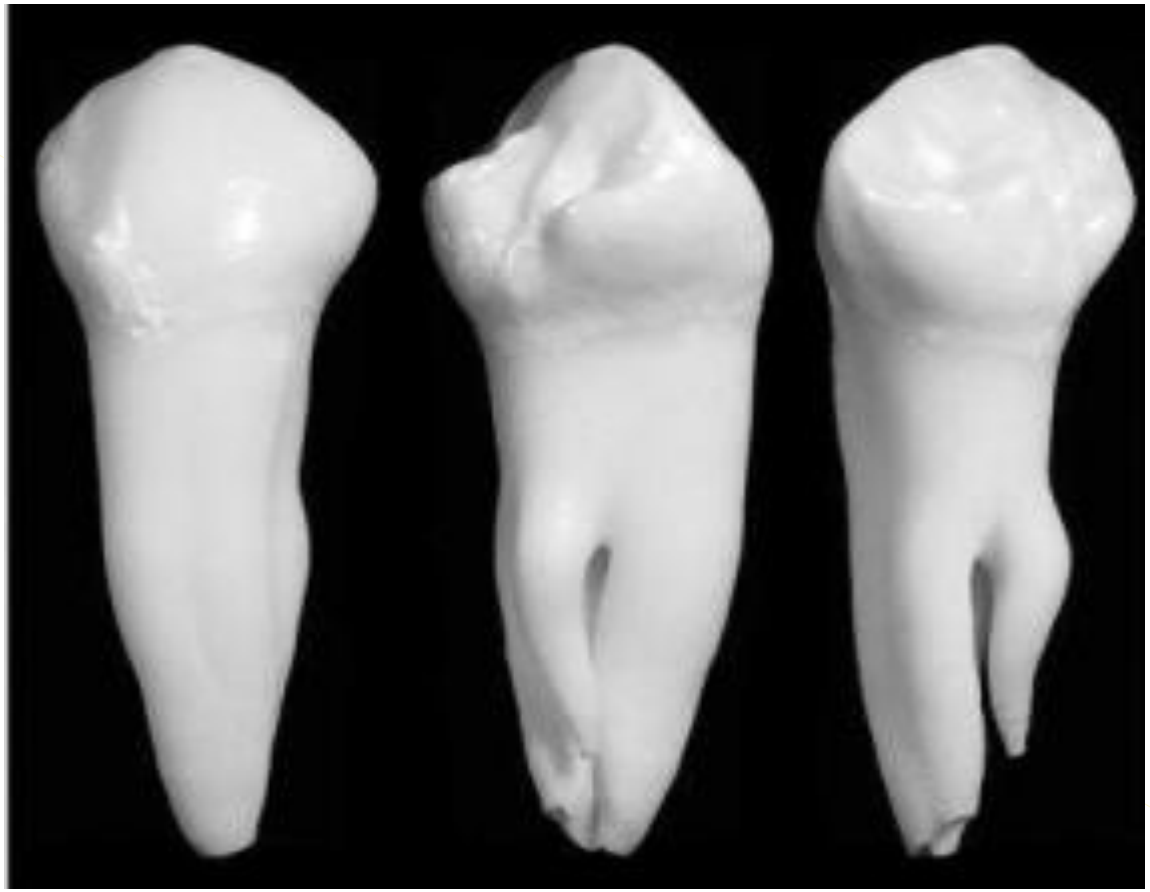
- Mandibular first premolar usually has a short conical root. Bifurcation and trifurcation of the roots are most common anomalies in mandibular first premolar.
- Bifurcation of roots among lower premolar , usually occurs buccolingually, but rarely bifurcation may occur mesiodistally also.

Root canals

- If one canal is present, it will be cone shaped and simple in outline. Mesiodistally, such a root canal is narrow; buccolingually, it is broad and tapers toward the apical third.

Cross section

- Cervical and middle thirds are ovoid.
- Apical third is round.



MANDIBULAR FIRST PREMOLAR

Length of tooth (mm)		Canals (%)		Root curvature (%)	
Average length	22.1	One canal One foramen	73.5	Straight	48
Maximum length	24.1	Two canals One foramen	6.5	Distal curve	35
Minimum length	20.1	Two canals two foramina	19.5	Mesial curve	0
Range	4.0	Three canals	0.5	Buccal curve	2
				Lingual curve	7
				Bayonet curve	7

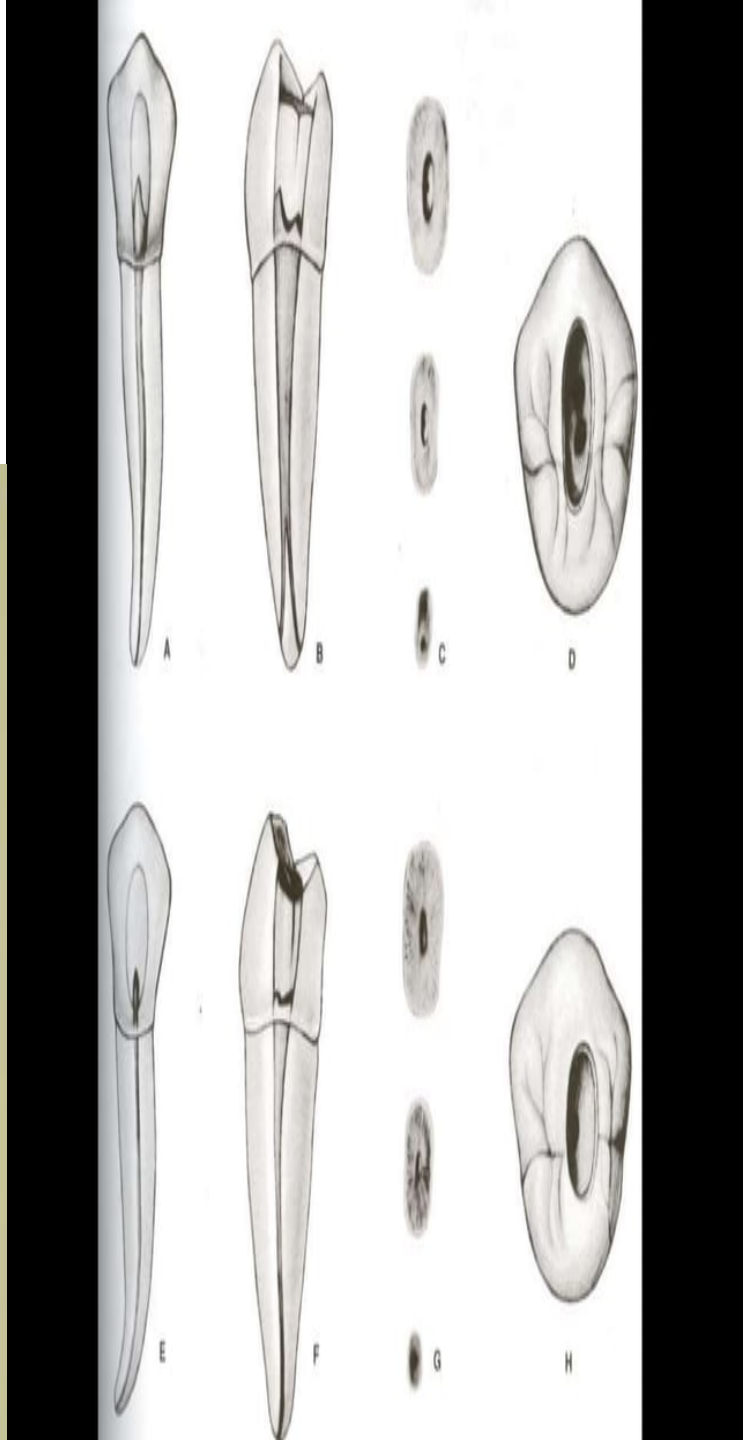
Mandibular second premolar

Pulp chamber

- **The pulp chamber of mandibular second premolar is similar to that of mandibular first premolar , except the lingual horn is more prominent under a well developed lingual cusp.**

Roots

- **The mandibular second premolar usually has a single root, but on rare occasions 2 to 3 roots are present.**



MANDIBULAR SECOND PREMOLARS

Length of tooth (mm)		Canals (%)		Root curvature (%)	
Average length	21.4	One canal One foramen	85.5	Straight	39
Maximum length	23.7	Two canals One foramen	1.5	Distal curve	40
Minimum length	19.1	Two canals two foramina	11.5	Mesial curve	0
Range	4.6	Three canals	0.5	Buccal curve	10
				Lingual curve	3
				Bayonet curve	7
				Trifurcation curve	1

Principles of Access cavity preparation

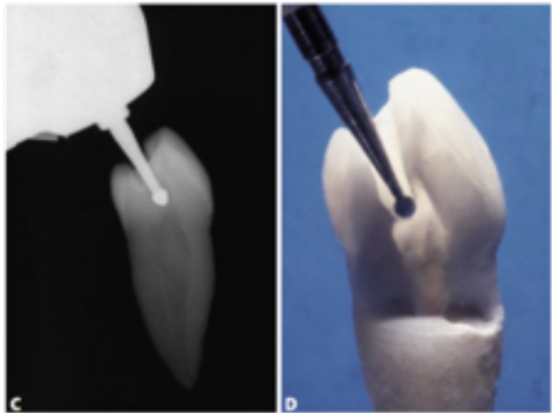
Principles of coronal cavity preparation:-

- Outline form (Access cavity)
- Convenience form
- Removal of carious dentine and defective restorations
- Toilet of the cavity (Irrigation)

Premolar

Access Cavity Preparation for Premolar Teeth

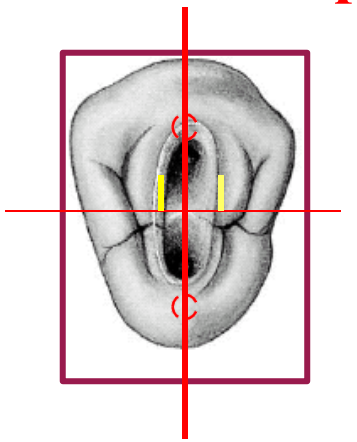
(Step by Step)

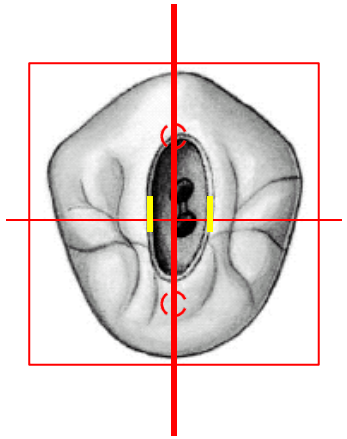


Practical steps

- **Shape:**

Distal





Mesial

- **Site (Location):** **Center**

- **Size (Extent):** ***Ridges*** Leave 1.5 – 2 mm of marginal ridge

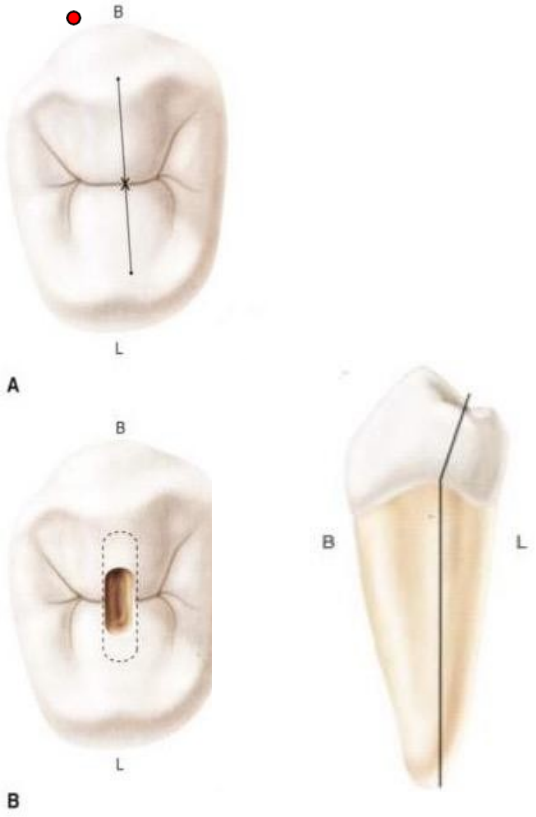
1

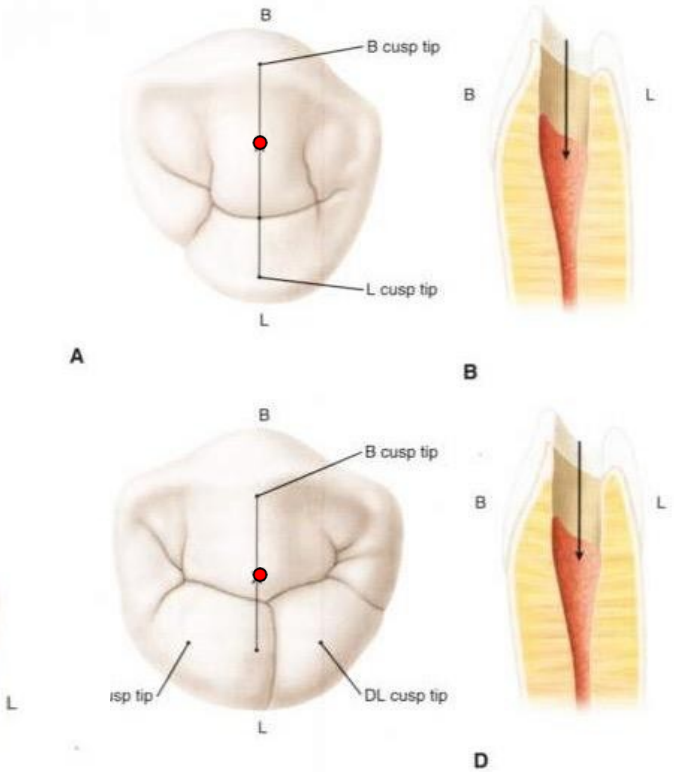
Gain Access

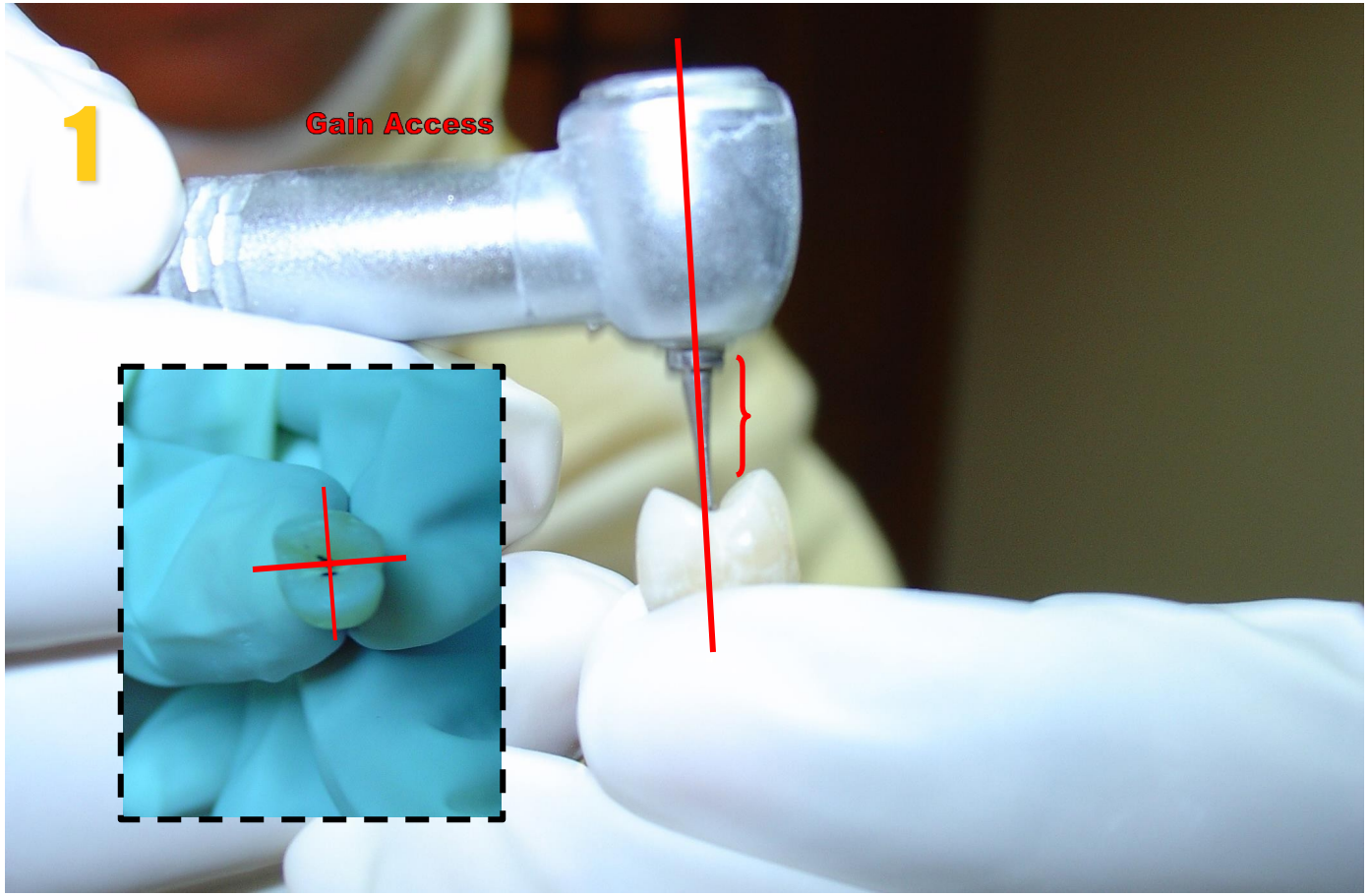
* Max 1st and 2nd PM
in the center of occlusal surface

* Man 1st PM
in the center of buccal cusp ridge

* Man 2nd PM
few mm above the central groove.



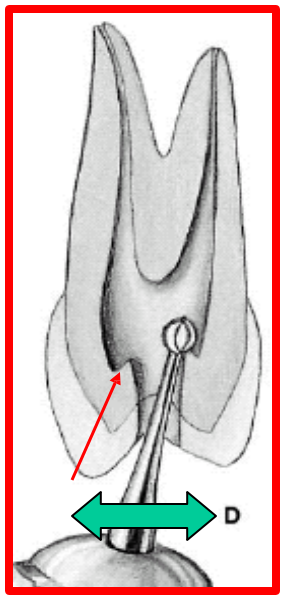


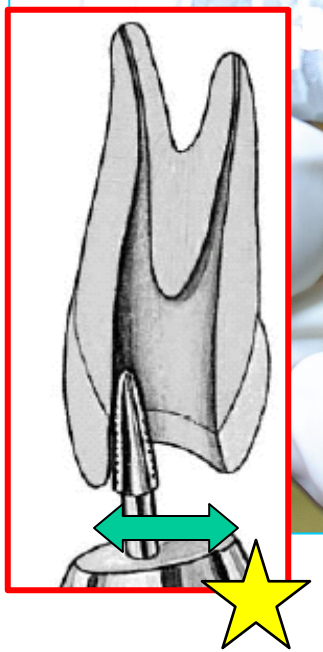


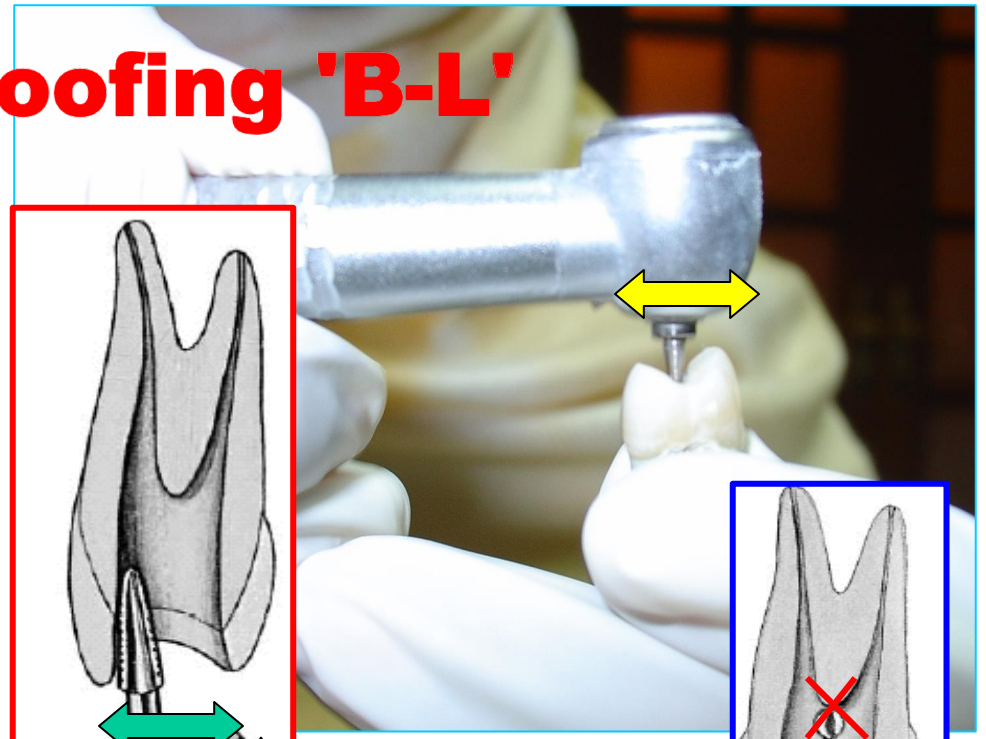
- Parallel with the long access in all teeth except in lower 1st PM you should start by 45° because of lingual convergence of the crown.

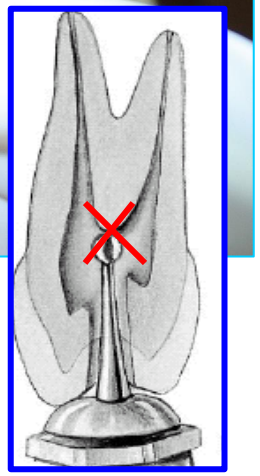
2

Deroofing 'B-L'





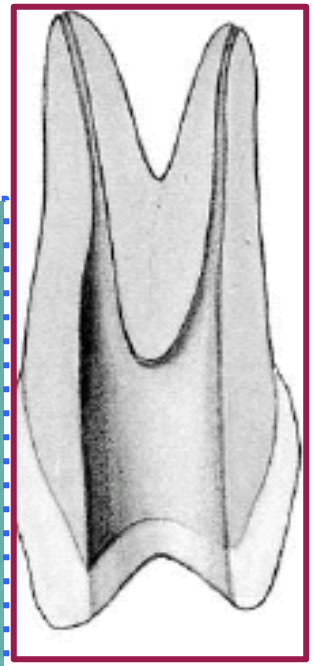


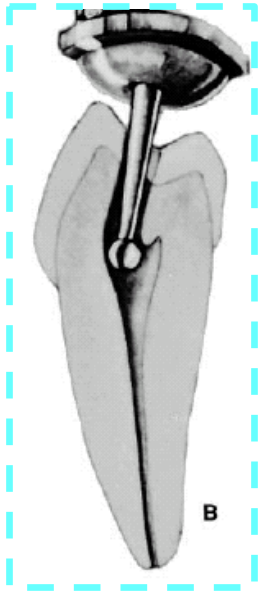


- Don't deroof widly in mesiodistal direction bcz pulp chamber in PMs are narrow mesiodistaly.

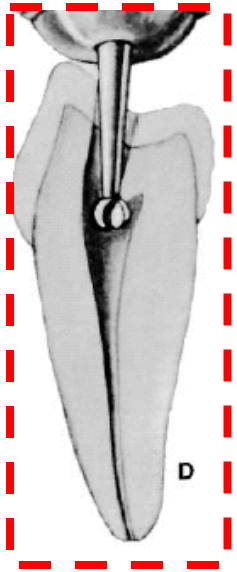
3

Flaring

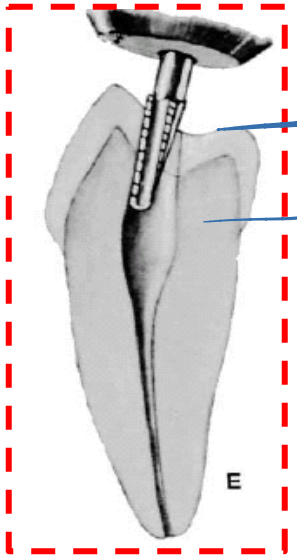




Gain Access



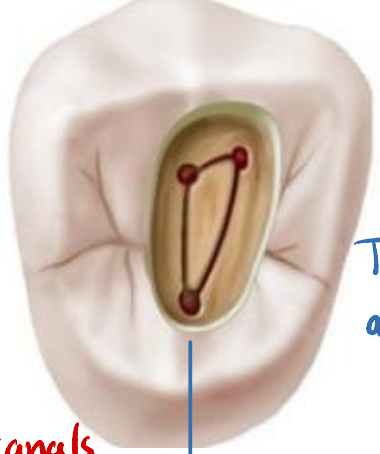
Deroofing 'B-L'



Flaring

→ smoothing the walls

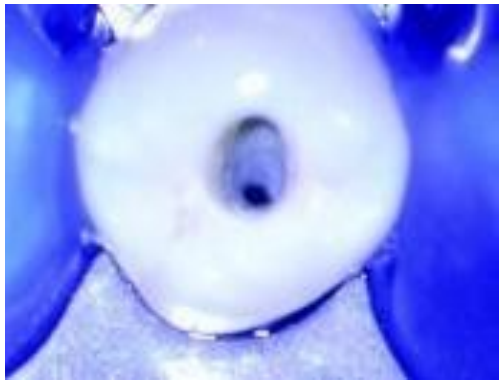
→ using non-cutting tip bur.

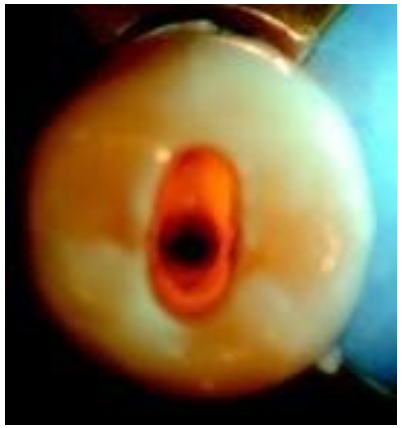


3 canals

Triangular access.

5-6% in maxillary 1st PM.





- Access cavity is ovoid in shape if there was one canal.
- Keep about 2mm from marginal ridge.

Errors of access cavity

Correctable

1 Underextended (Too constricted) cavity
2 Pulp horn remains
3 Cervical bulge remains
4 Mouse hole effect

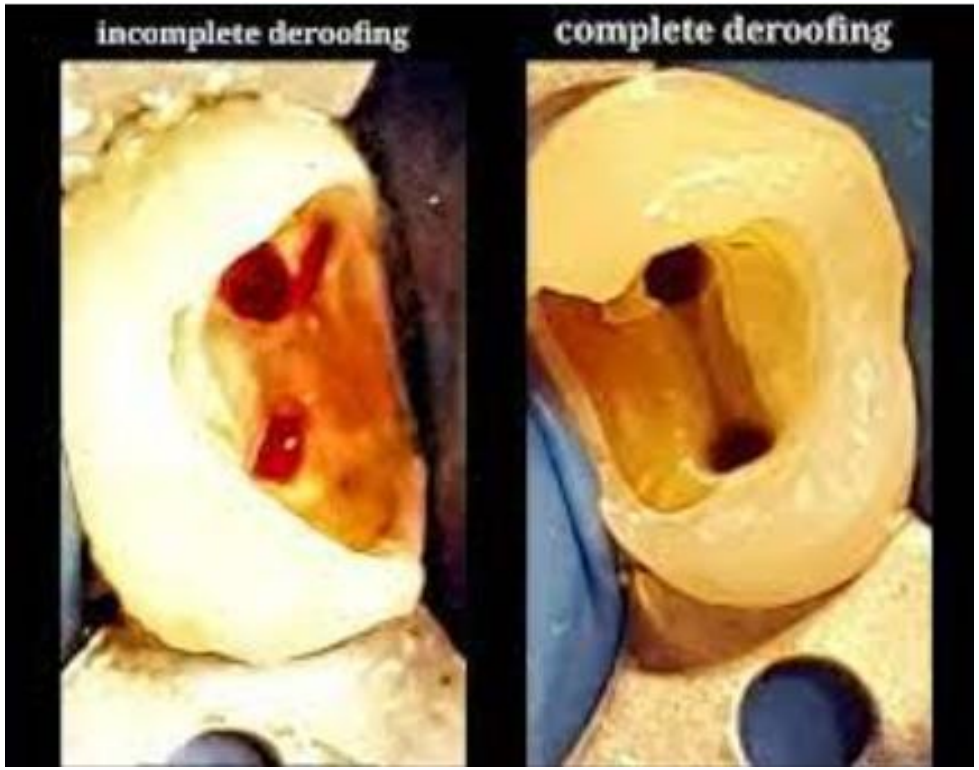
Non-correctable

1 Overextended cavity
2 Gouging
3 Perforation

- Unexposed orifice "canal"
- Remenants of infected pulp and dentin
- many microorganisms
- Failure of RCT

Correctable errors

Underextended acces cavity

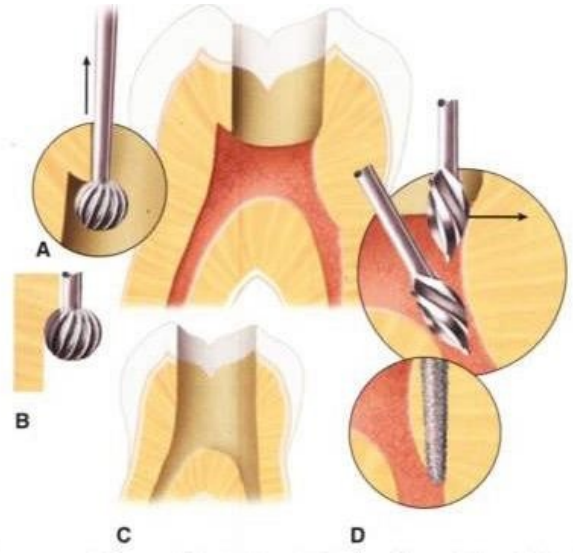


* Contain much microorganism. ←

Pulp horns remain

Cervical bulge remain

Lingual shoulder



cervical bulge

* Leaving remenants of Pulp chamber above the orifices, so orifice is Partialy visible

Mouse hole effect

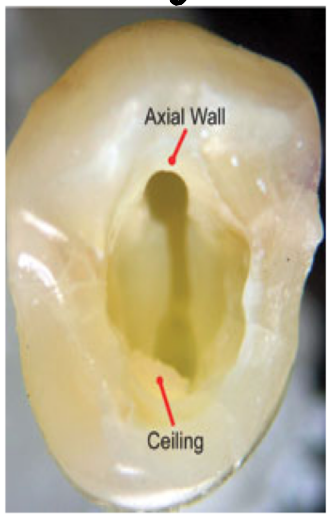
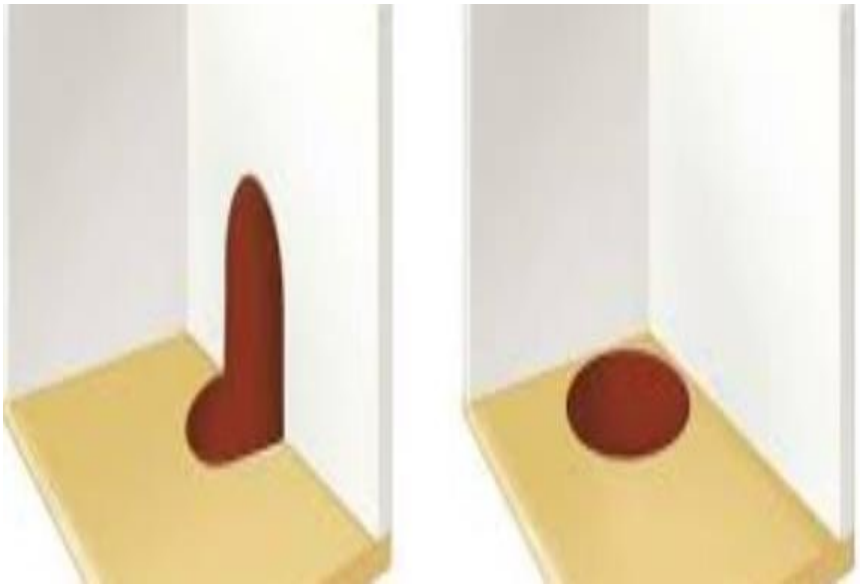


Figure 3. Access preparation demonstrates "mouse hole" effect on buccal, and ceiling overhang on palatal.



Non correctable errors

- Excessive cutting during access cavity
- more dentin removal weakens the tooth more and more

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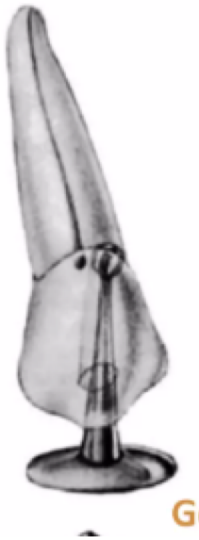
* finaly poor prognosis.

Gouging



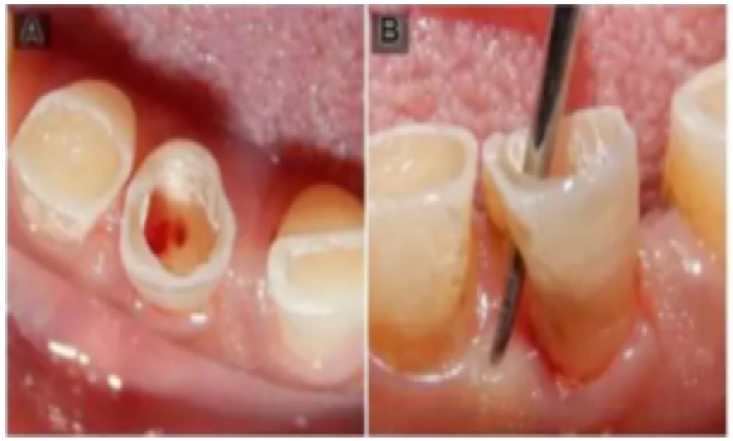
Gouging

- Cutting in non-interested area (sound dentin)

- End with perforation

Perforation

- weaks the tooth
- Leads to poor prognosis.



Thank you very much !