

213 RDS

# Class I Amalgam Cavity Preparation

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# Outline

- Introduction to amalgam restorations
- General considerations
- Sequence of preparation:
  - Conservative class I amalgam restorations
  - Extensive class I amalgam restorations
  - Class I occlusolingual amalgam restorations
  - Class I occlusofacial amalgam restorations

# Introduction

- Restoration of carious or fractured posterior teeth
- Replacement of failed restorations
- Provide many years of service

# Introduction

## Indications & Contraindications

Indications	Contraindications
Moderated -large restorations	Esthetic areas
Non-esthetic areas	Small-moderate Class I & II
Restorations -heavy occlusal contacts	Small Class VI restorations
Restorations -cannot be isolated	
Restorations extending to the root surface	
Foundations	
Abutment teeth-RPDs	
Temporary-carries control restorations	

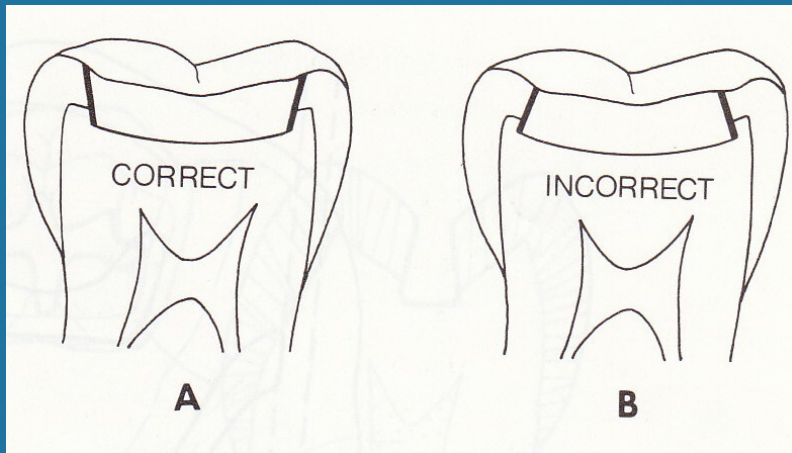


# Introduction

## Advantages & Disadvantages

Advantages	Disadvantages
Ease of use	Non-insulating
High tensile strength	Non-esthetic
Excellent wear resistance	Less conservative
Long-term clinical research results	Weakens tooth structure
Lower cost	Technique sensitive-bonded
Bonded amalgam-"bonding benefits"	More difficult tooth preparation
	Initial marginal leakage

# General Considerations



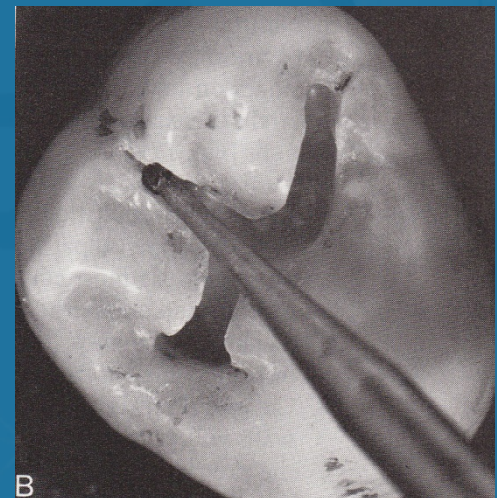
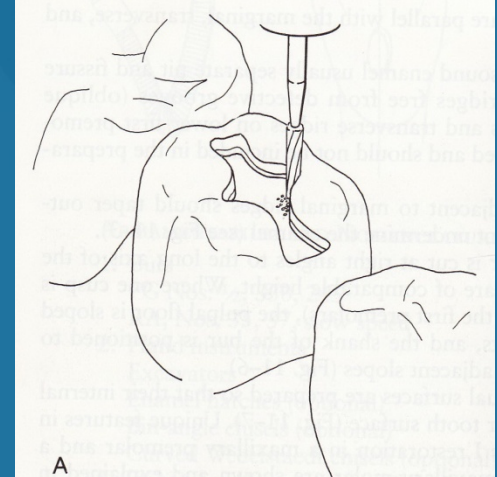
- Depth is kept uniform
- Shallow –thin enamel- Premolars
- Deeper-thick enamel-Molars
- Just below DEJ
- Mesial and distal walls, taper outwards, undercuts
- Weakening the outer tooth structure under functional load, fracture
- “Cervical Constriction”

# General Considerations

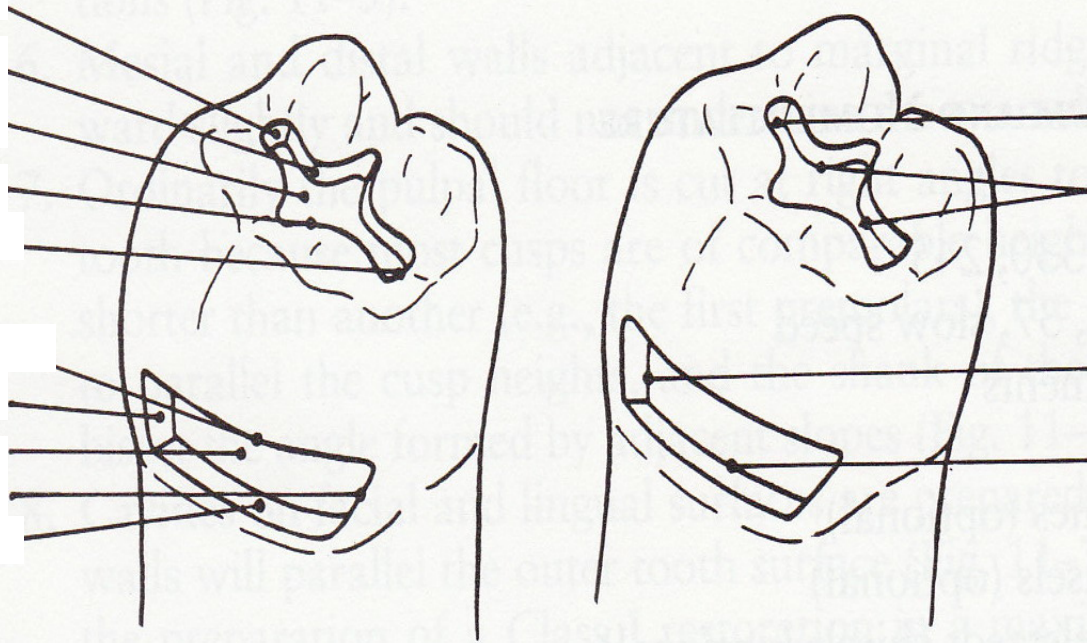
- Cavity width-sufficient to include defects
- Wide enough to permit instrumentation (placing & condensing amalgam)

# General Considerations

- Cavity outline- harmonious blend of definitive curves or straight line
- The degree of angularity of a corner matches the circumference of the bur used
- Leaving small sharp areas of the tooth structure:
  - Will lead to its fracture under load
  - Stresses amalgam, crack propagation, fracture



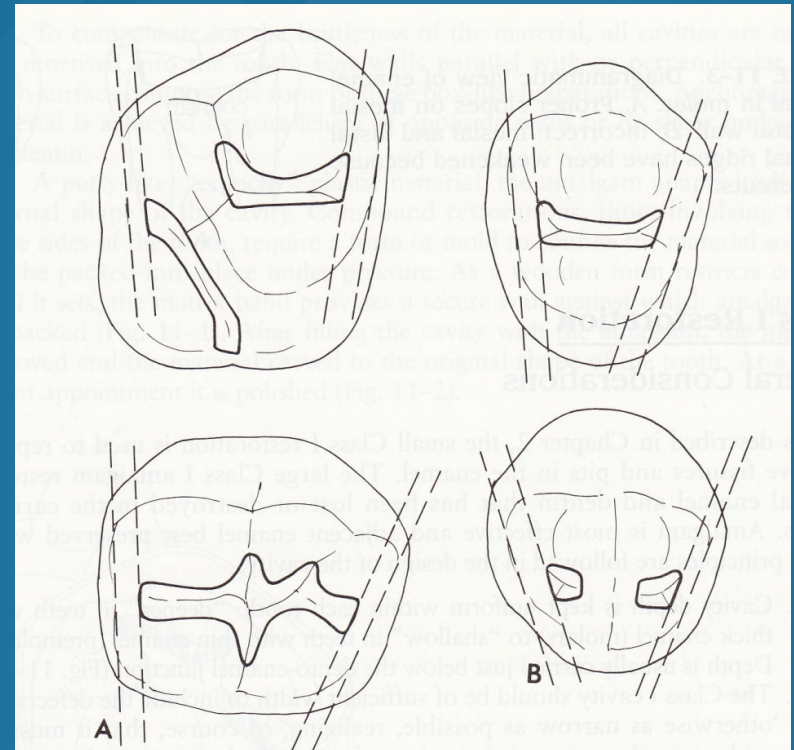
# General Considerations





# General Considerations

- Mesial & distal margins are parallel to the marginal, transverse & oblique ridges
- Preserve natural enamel ridges:
  - Under-extended, not enough bulk of amalgam, fracture
  - Over-extended, excessive loss of tooth structure, weakening remaining tooth structure, tooth fracture

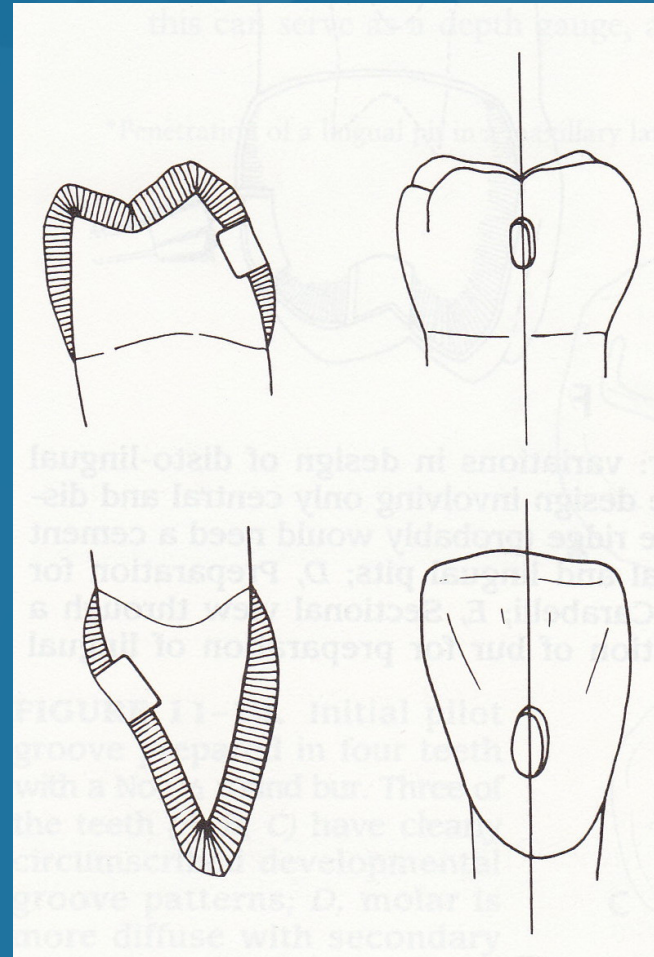


# General Considerations

- Pulpal floor cut at right angles to long axis of the tooth-most cusps are comparable in height
- Where one cusp is shorter than the other (1<sup>st</sup> premolars #44), it is sloped to parallel cusp heights

# General Considerations

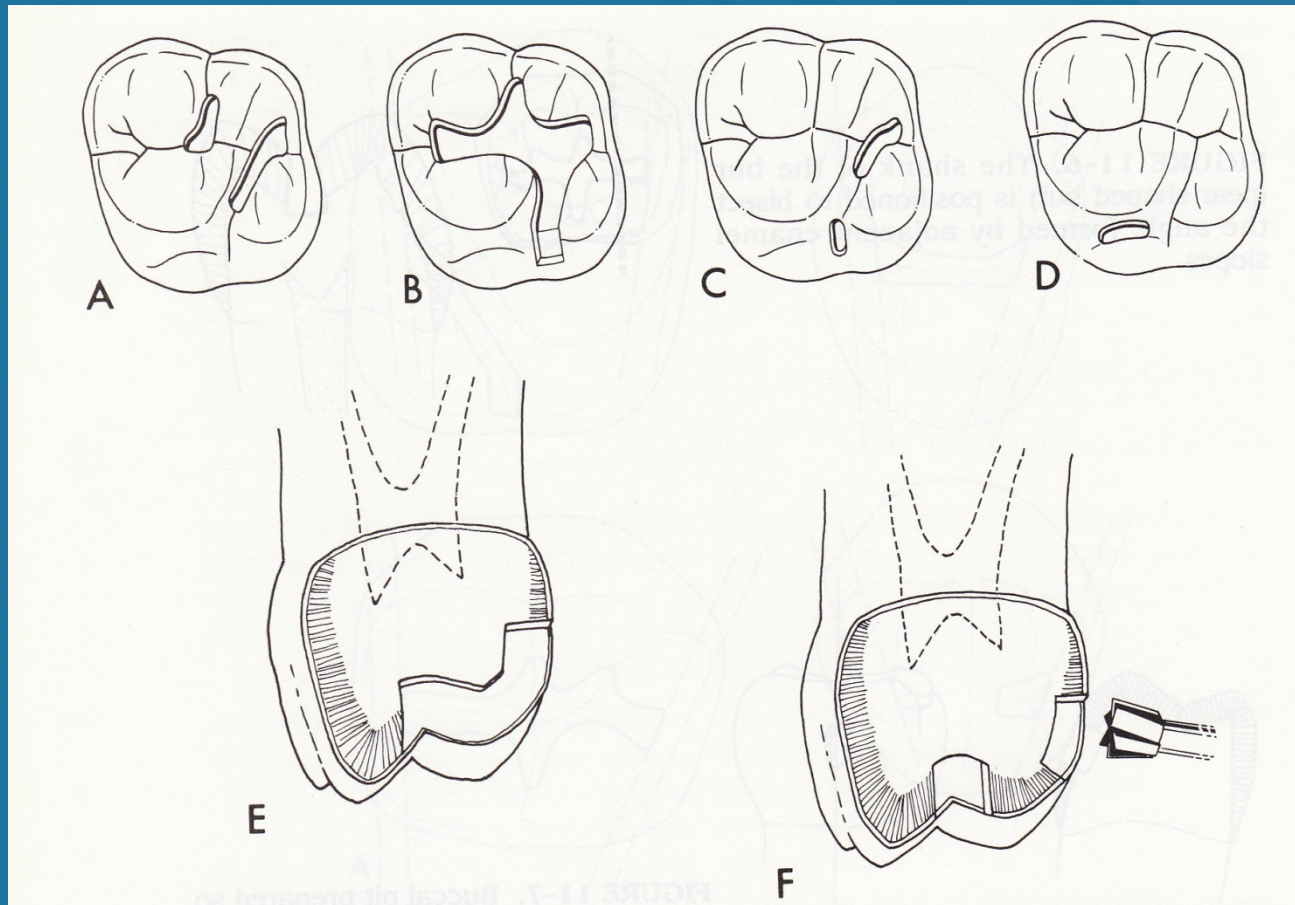
- In case of facial and lingual cavities the internal wall should be parallel to the outer tooth surface





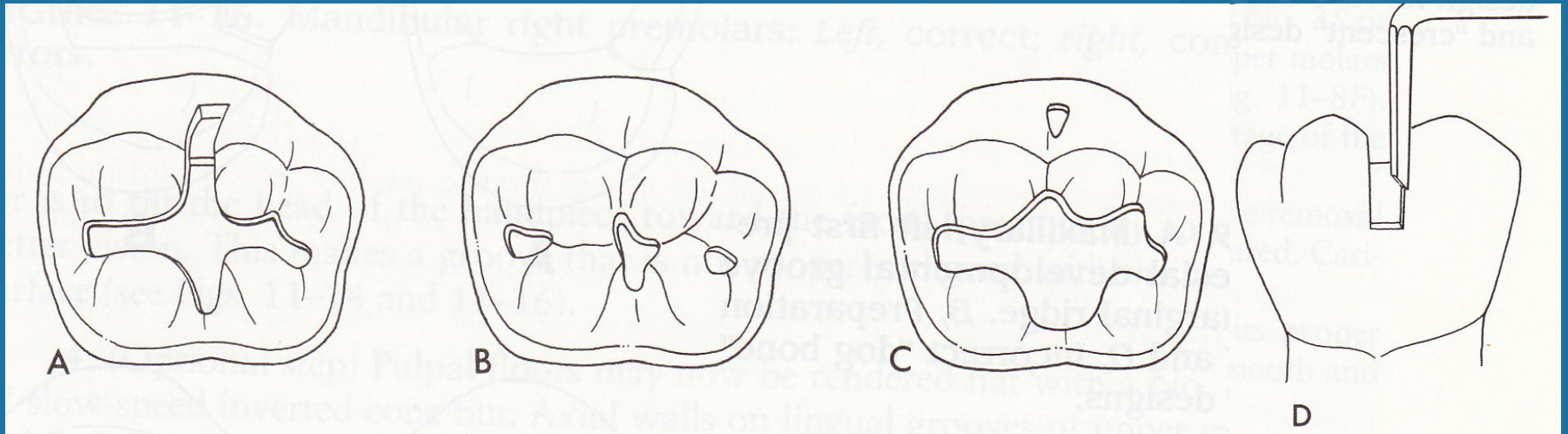
# General Considerations

## Variations in design for Class I maxillary first molar



# General Considerations

## Variations in design for Class I lower first molar



# Sequence of Preparation

## Conservative Class I Amalgam Restoration

- Armamentarium:
  1. Burs
    - Nos. ½, 330, 245
    - Nos. 35, 37, slow speed
  2. Hand instruments
    - Excavators
    - Enamel hatches
    - Bin-angle chisels
    - Curved Wedelstaedt chisels

# Sequence of Preparation

## Conservative Class I Amalgam Restoration

- Rubber dam isolation
- Cotton rolls
- **Initial Tooth Preparation:** “establishing the outline form by extension of the external walls to sound tooth structure, while maintaining a specified, limited depth and providing **resistance and retention forms.**”

# Sequence of Preparation

## Conservative Class I Amalgam Restoration

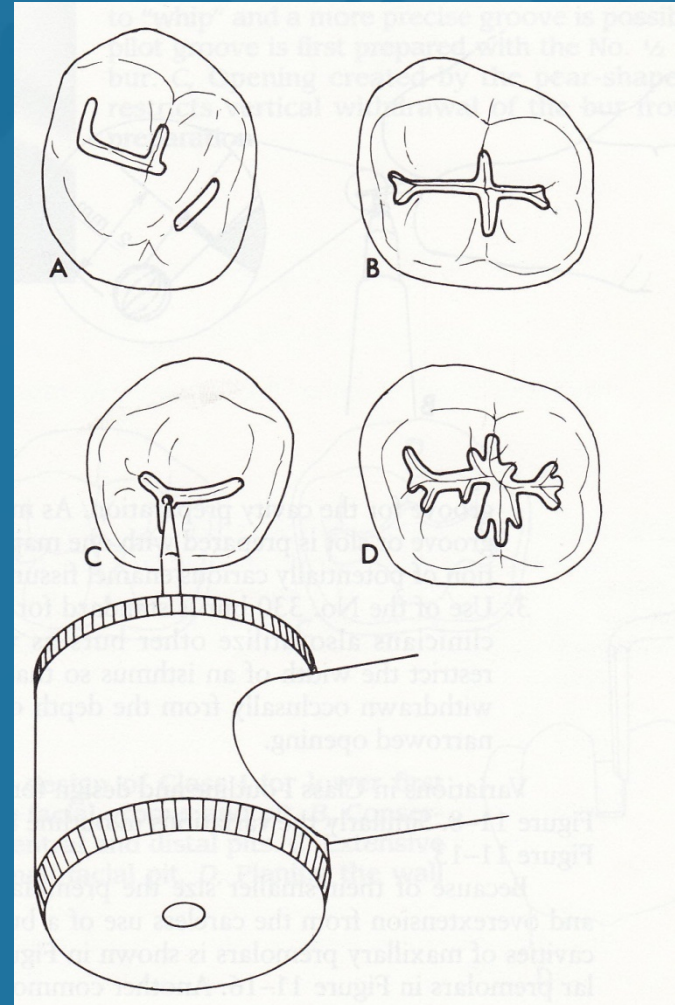
- **Resistance Form:**
  - Features that help the restoration and tooth resist fracturing as a result of occlusal forces.
- **Retention Form:**
  - Features that help lock or retain the restorative material in the tooth.
- **Convenience Form:**
  - Features that make the procedure easier or the area more accessible.



# Sequence of Preparation

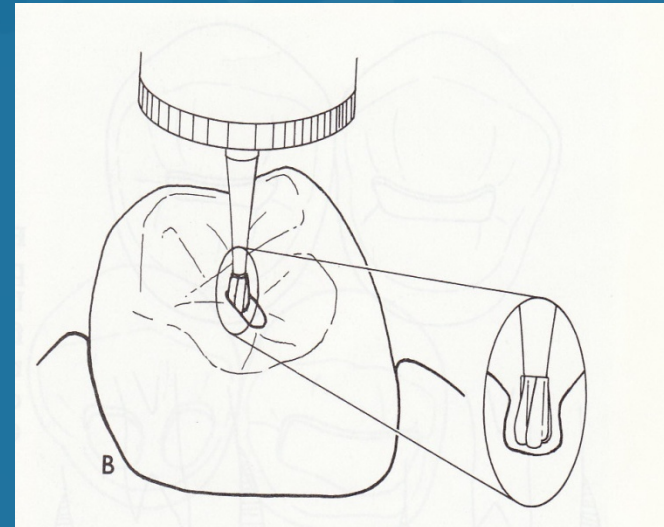
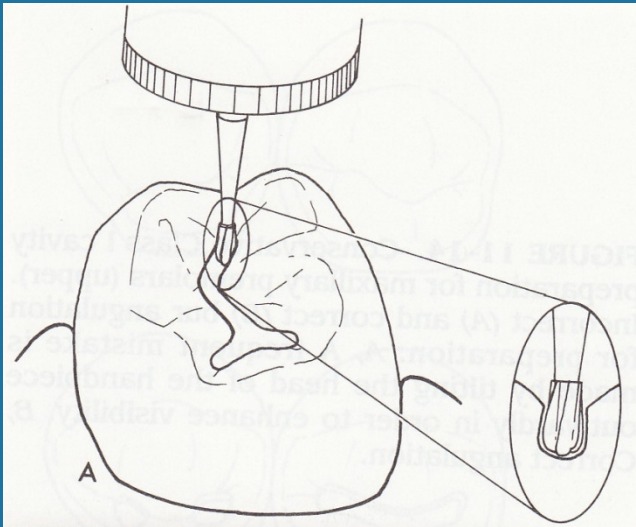
## Conservative Class I Amalgam Restoration

1. Enter pit with a No. 1/2 round bur, 2mm deep (1 1/2 mm- premolars and 3 mm-big molars)
2. Cavity is extended into all grooves, until evidence of defective fissures disappears



# Sequence of Preparation

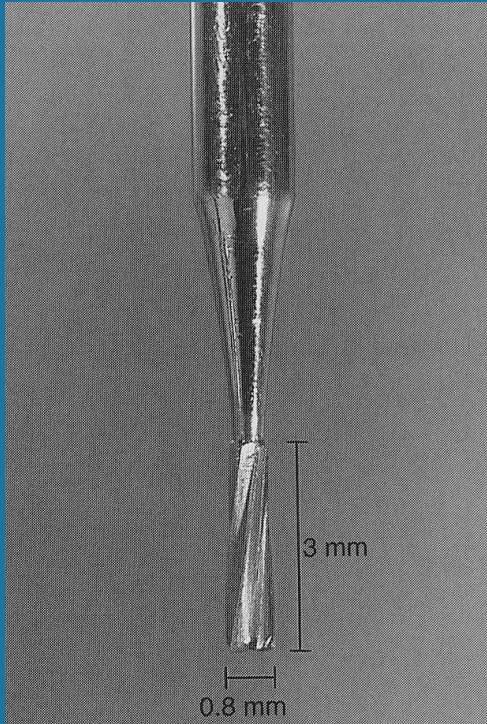
## Conservative Class I Amalgam Restoration



3. Use of 330 bur is standard for this preparation
- Pilot groove prepared using  $\frac{1}{2}$  round bur, “whip”

# Sequence of Preparation

## Conservative Class I Amalgam Restoration

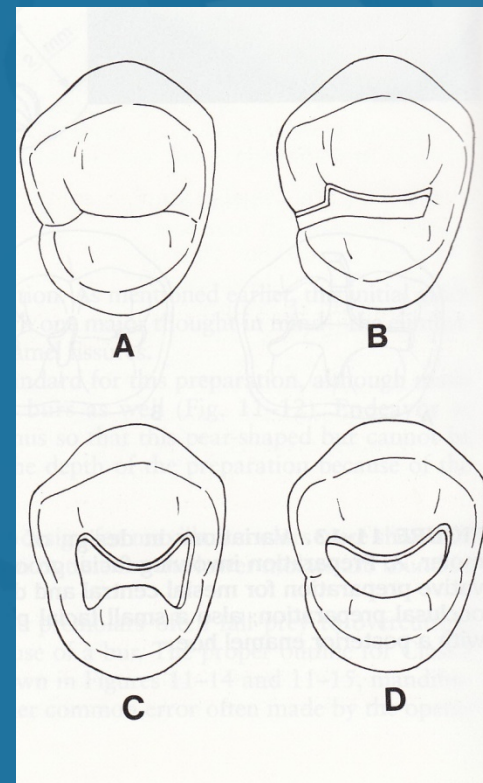
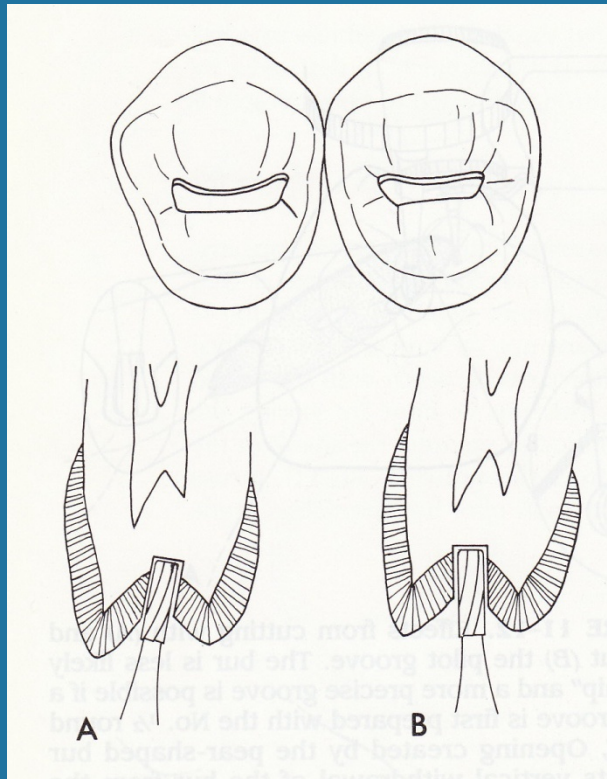


The bur should be rotating when it is applied to the tooth and as it is removed from the tooth



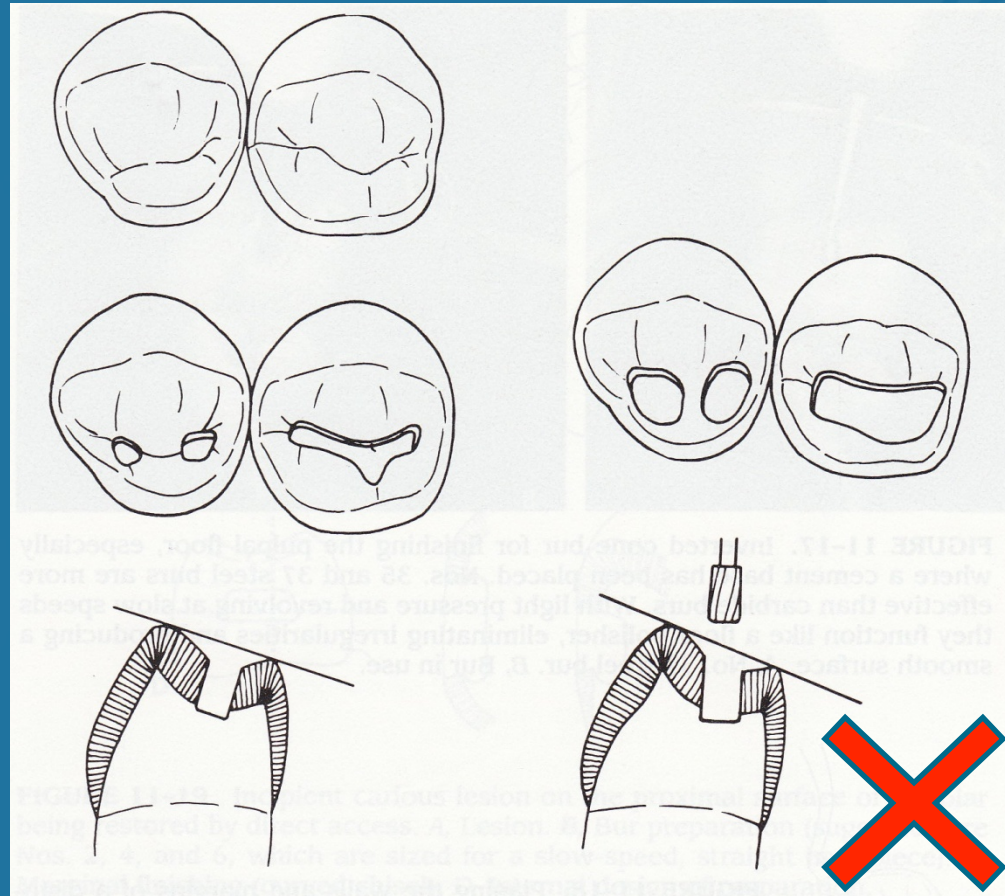
# Sequence of Preparation

## Conservative Class I Amalgam Restoration



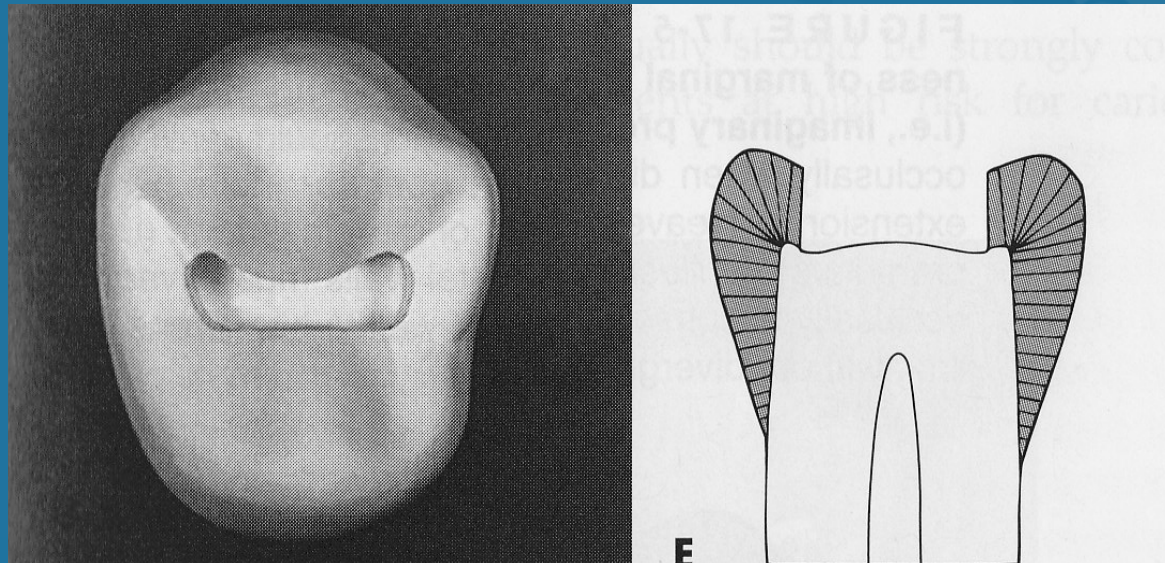
# Sequence of Preparation

## Conservative Class I Amalgam Restoration



# Sequence of Preparation

## Conservative Class I Amalgam Restoration



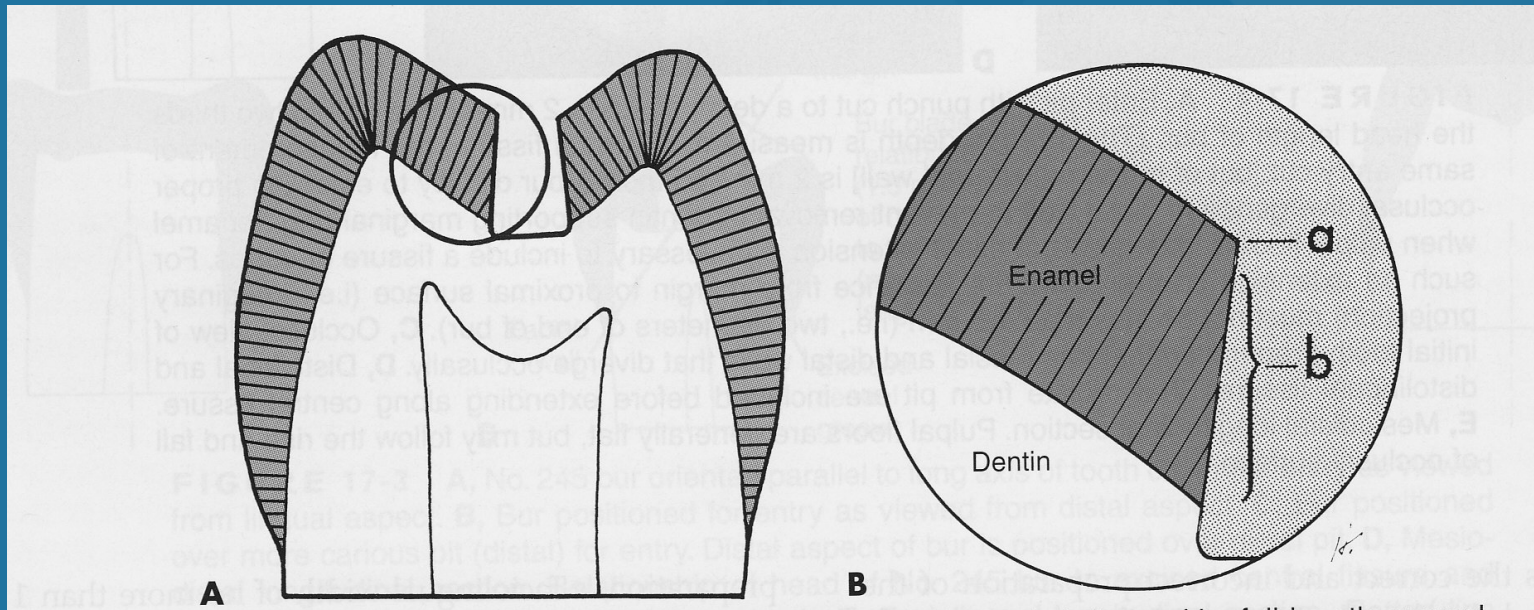
Do not undermine the marginal ridge



# Sequence of Preparation

## Conservative Class I Amalgam Restoration

Ideal enamel margin



# Sequence of Preparation

## Conservative Class I Amalgam Restoration

4. Pulpal floor flattened with No.35 or 37 slow speed inverted cone bur, likewise for axial walls on lingual grooves for upper molars and facial grooves on lower molars
  - In case of deep carious areas, the entire pulpal floor shouldn't be flattened to the same level
  - Deep carious areas should be excavated, prepared, treated (liner, base) to level it to the sound pulpal floor

# Sequence of Preparation

## Conservative Class I Amalgam Restoration

- The resistance form is provided by:
  - Flat pulpal floor, resist forces directed in the long axis of the tooth, strong & stable seat for the restoration
  - Minimal extension of external walls
  - Strong ideal enamel margins
  - Sufficient dept (1.5 mm), adequate thickness of the restoration (fracture & wear)

# **Sequence of Preparation**

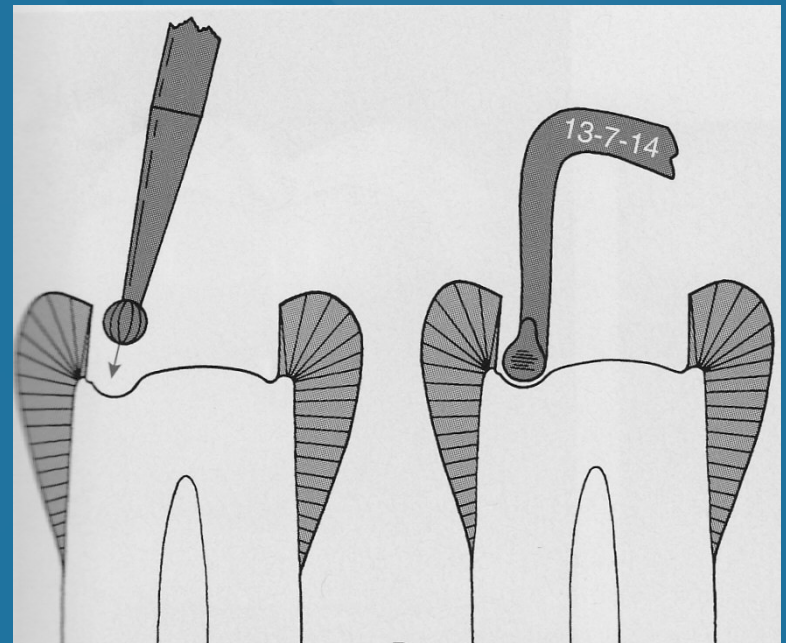
## **Conservative Class I Amalgam Restoration**

- The retention form is provided by:
  - Parallelism or slight convergence of two or more opposing, external walls

# Sequence of Preparation

## Conservative Class I Amalgam Restoration

5. Carious dentin removed with excavator or round bur. Use largest instruments that fits the carious area, safest. Remove from the peripheral DEJ

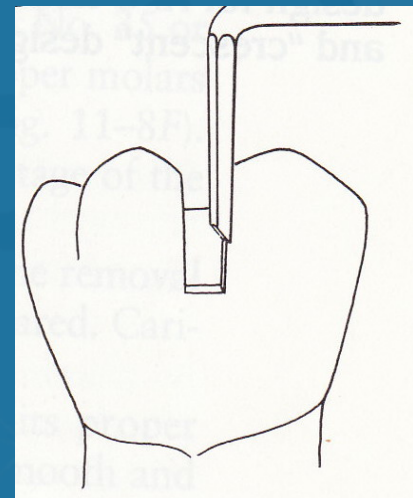
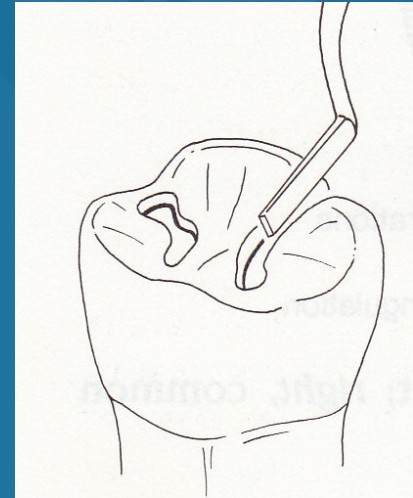




# Sequence of Preparation

## Conservative Class I Amalgam Restoration

6. Cement base placed on the deepest portion of the cavity & finished with No. 35 or 37, smooth and flush with adjacent dentin
7. Enamel margins finished with hand instruments and with high speed burs (330-245) under light pressure

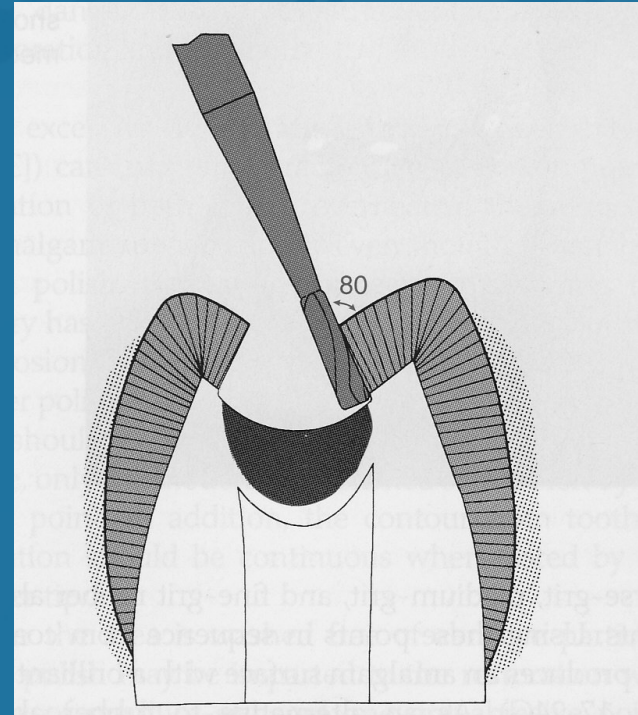


# **Extensive Class I Amalgam Restorations**

- Caries is considered extensive if the distance between infected dentin and the pulp is less than 1mm or when the faciolingual extent of the defect is up to the cuspal inclines.

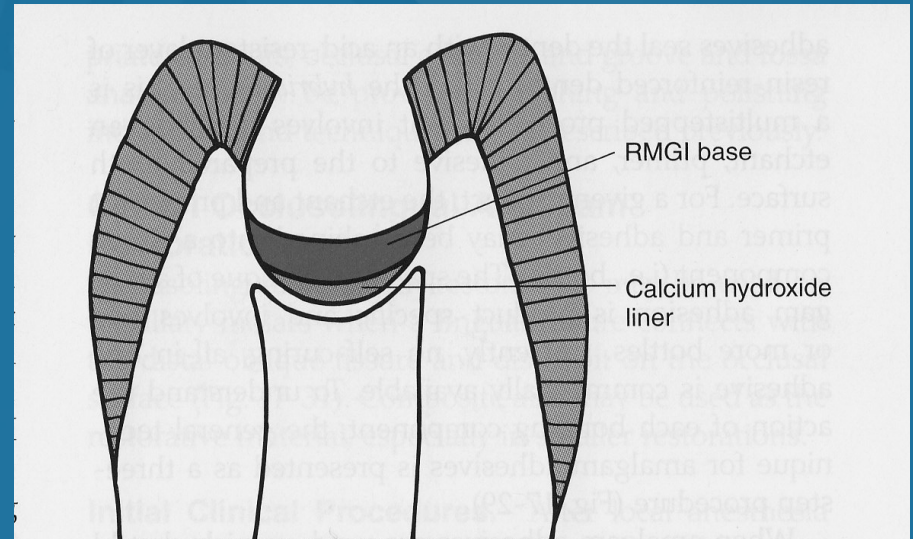
# Extensive Class I Amalgam Restorations

- Prepare a 90-100 degree cavosurface angle while maintaining the initial depth.



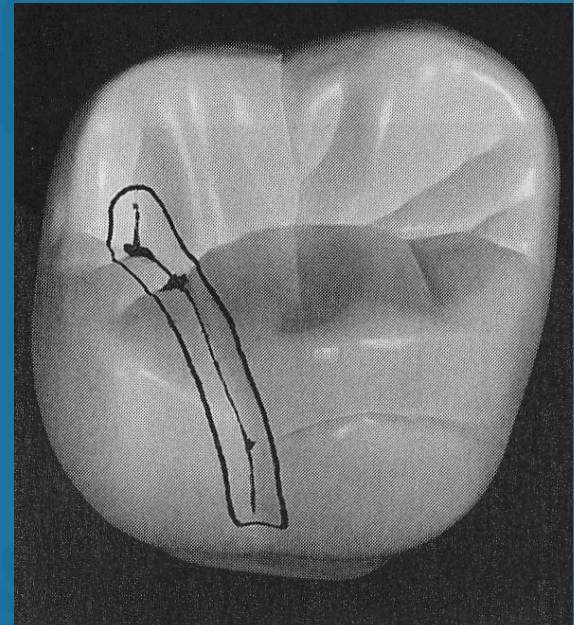
# Extensive Class I Amalgam Restorations

- When remaining dentin thickness is less than 0.5 mm:
  - Calcium hydroxide
  - Resin Modified Glass Ionomer (RMGI)



# Class I Occlusolingual Amalgam Restorations

- When a lingual fissure connects with the distal oblique fissure and distal pit on the occlusal surface



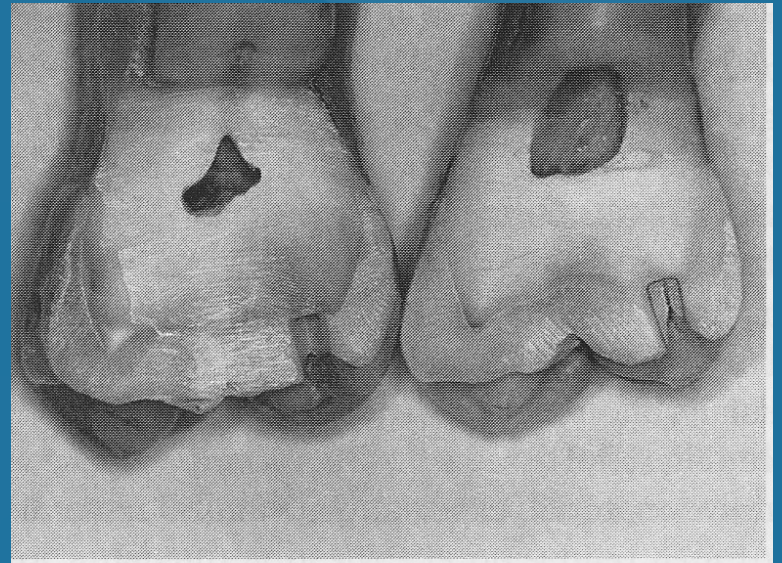
# **Class I Occlusolingual Amalgam Restorations**

- Mesiodistal width of the lingual extension should not exceed 1 mm.
- The preparation should be cut more at the expense of the oblique ridge rather than weakening the small distolingual cusp



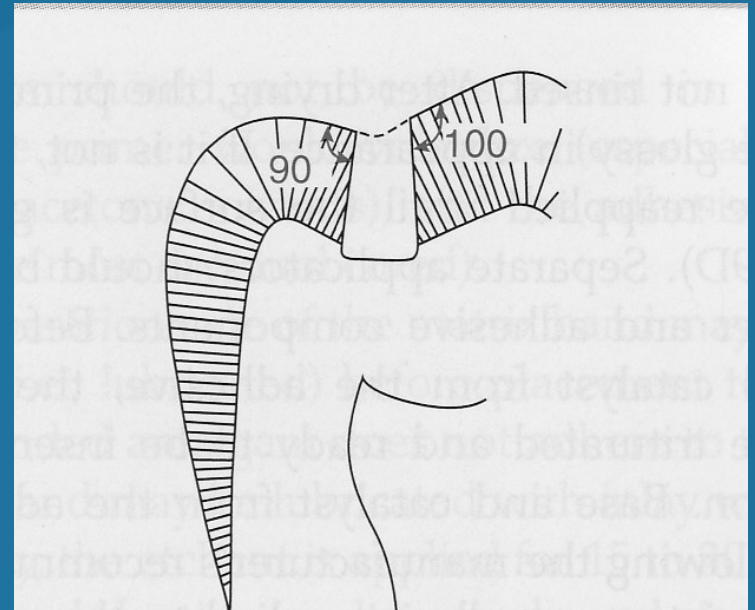
# Class I Occlusolingual Amalgam Restorations

- The occlusal portion may have a slight distal tilt to conserve the dentin support of the distal marginal ridge.
- The margins should extend as little as possible onto the oblique ridge, distolingual cusp & distal marginal ridge



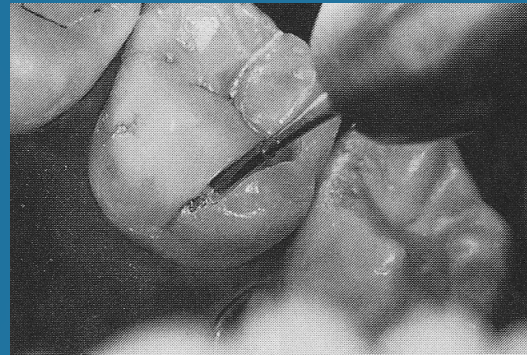
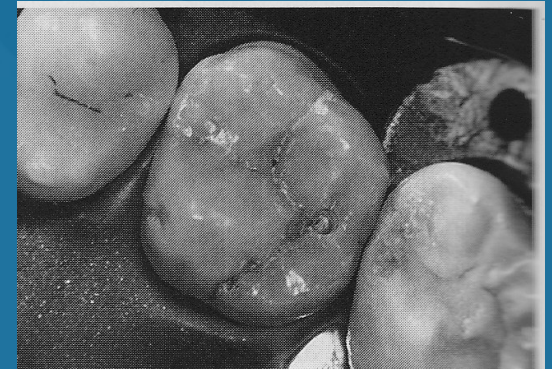
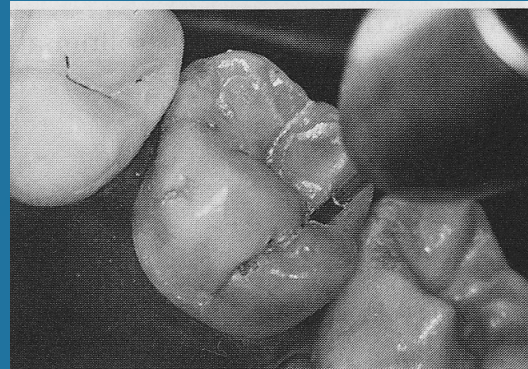
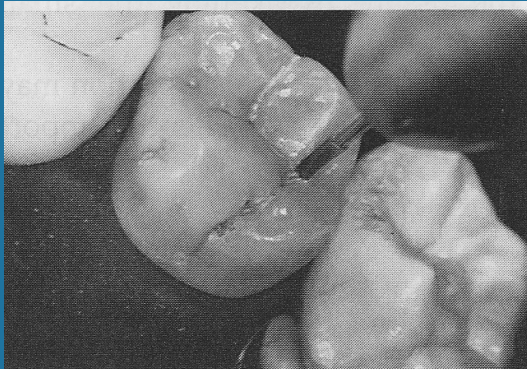
# Class I Occlusolingual Amalgam Restorations

- Establish an enamel cavosurface margin as close as possible to 90 degrees
- To ensure sound enamel structure supported by dentin
- Acute weak amalgam margin, fracture





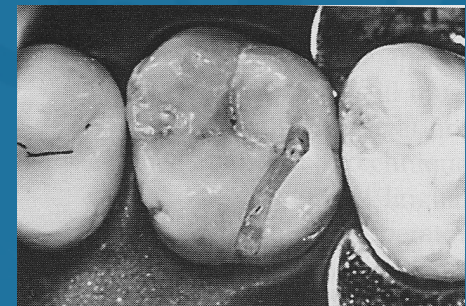
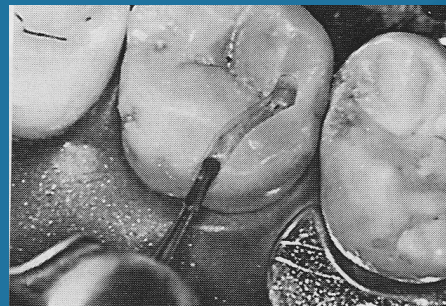
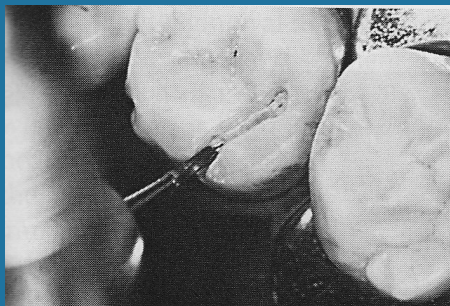
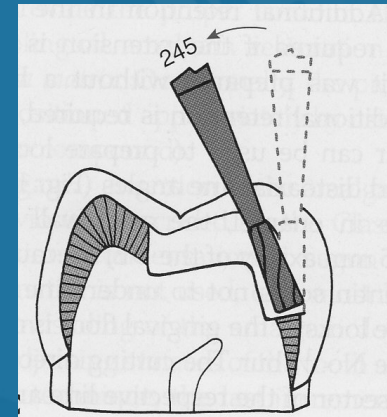
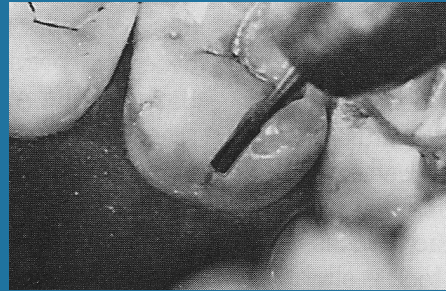
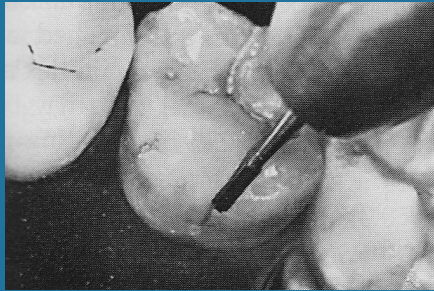
# Class I Occlusolingual Amalgam Restorations





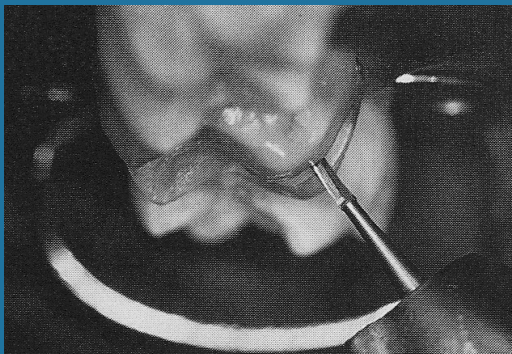
# Class I Occlusolingual Amalgam Restorations

- First technique, bur's long axis parallel to the lingual surface



# Class I Occlusolingual Amalgam Restorations

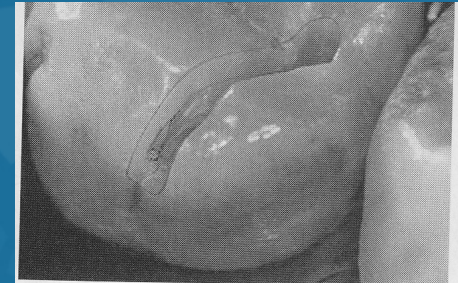
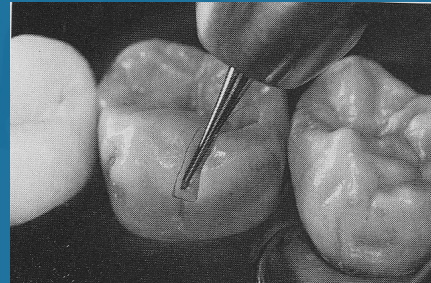
- Second technique, bur is held perpendicular to the cusp ridge and lingual surface as it extends the preparation from the occlusal surface gingivally.



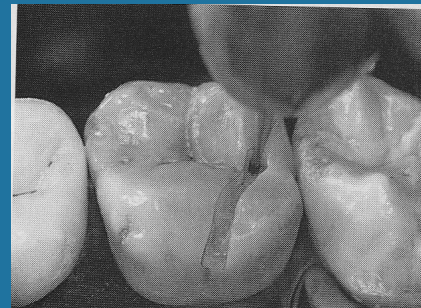


# Class I Occlusolingual Amalgam Restorations

- Primary retention form is provided from the occlusal and lingual convergences
- If the lingual extension is wide mesodistally secondary retention forms may be needed using  $\frac{1}{4}$  round bur or 169 fissure bur.



Lock in mesioaxial line angle



Cove in faciopulpal line angle

# **Class I Occlusofacial Amalgam Restorations**

- Extending from the occlusal surface through the facial cusp ridge and onto the facial surface.
- Same preparation technique as in class I occlusolingual amalgam restorations.



# References

- Textbook of Operative Dentistry, 3<sup>rd</sup> edition. Baum, Philips & Lund. Pages 295-304
- Sturdevant's Art and Science of Operative Dentistry, 5<sup>th</sup> edition 2006. Pages 711-720, 728-729, 731-734

# Thank you!

Any Questions?

