

Cavity preparation of Cl. 1 for amalgam restorations

Tooth cavity preparations for amalgam and composites have some differences. These differences varies from preparing good undercut to provide good retention for the amalgam filling to roughening the cavity walls to enhance composite filling's adhesion to the dentine. All of these differences are listed in the following table:

Tooth preparation—amalgam vs composites

Features	Amalgam	Composite
Outline form	<ul style="list-style-type: none"> • Include all pits and fissures (Figs 18.46A and B) and adjacent suspicious areas. • For class II tooth preparation, proximal contact has to be broken. 	<ul style="list-style-type: none"> • Include faults but need not to be extended to adjacent pits and fissures. • For class II tooth preparations, proximal contact need not be broken in all the cases.
Pulpal depth	<ul style="list-style-type: none"> • Should be maintained uniform (Figs 18.47A and B) • Depth–1.5 mm (Minimum) 	<ul style="list-style-type: none"> • Need not be uniform • Depth–1–2 mm (usually)
Axial depth	<ul style="list-style-type: none"> • Should be uniform • Depth–0.2-0.5 mm inside DEJ 	<ul style="list-style-type: none"> • Not necessarily uniform • Depth–to extent of the defect
Cavosurface margin	90° at margin	Equal to and greater than 90° at margin
Nature of prepared walls	Smooth	Rough
Primary retention form	Occlusal convergence	Etching, priming and bonding
Bevels	Not indicated in large preparations	Bevels indicated
Resistance form	Box shaped preparation (Figs 18.48A and B) Flat pulpal and gingival floor	Not indicated For small to moderate preparations
Secondary retention	Grooves, coves, slots, pins, locks and bonding	Indicated only for extensive preparations
Pulp protection and base	By use of varnish, liner	Varnish not indicated
	Base: GIC, calcium hydroxide liner	

Class I Tooth Preparations for amalgam restoration:

Principles of tooth preparation of Cl. 1 cavity preparation:

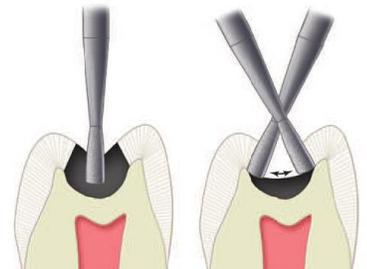
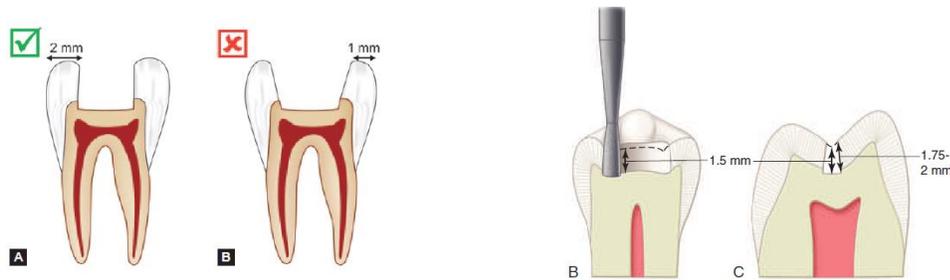
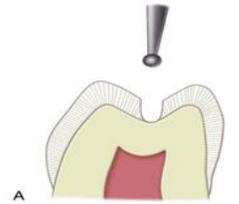
1. Outline Form:

Outline form means extending the preparation margins to the place they will occupy in the final preparation. General guidelines for outline form:

1. Remove all carious and defective pits and fissures to healthy tooth structure
2. Remove all unsupported enamel rods.
3. Avoid ending preparation margins in high stress areas like cusp tip and crest of the ridges.
4. Place margins on sound tooth structure.

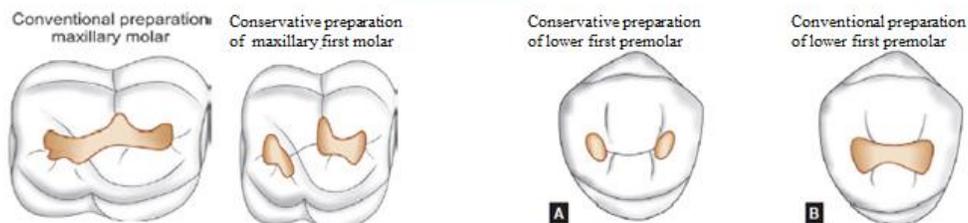
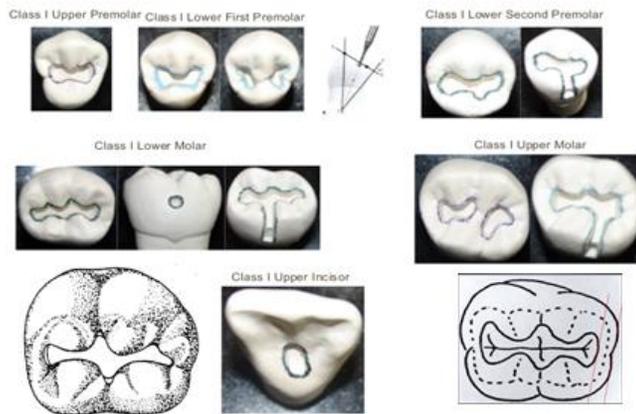
Steps:

1. Using pear or round burs to establish external outline form make a ditch (holes). Bur should be parallel to the long axis of tooth.
2. Maintain the initial depth of 1.5 mm. Depth should be at least 0.2 to 0.5 mm in dentin, move the bur (fissure bur) to extend the outline to include the central fissure.
3. Extend the margin mesially and distally but do not involve marginal ridges. These walls should have dovetail shape to provide retention to the restoration.
4. External outline form should have smooth curves and rounded angles.
5. All unsupported and demineralized enamel should be removed.

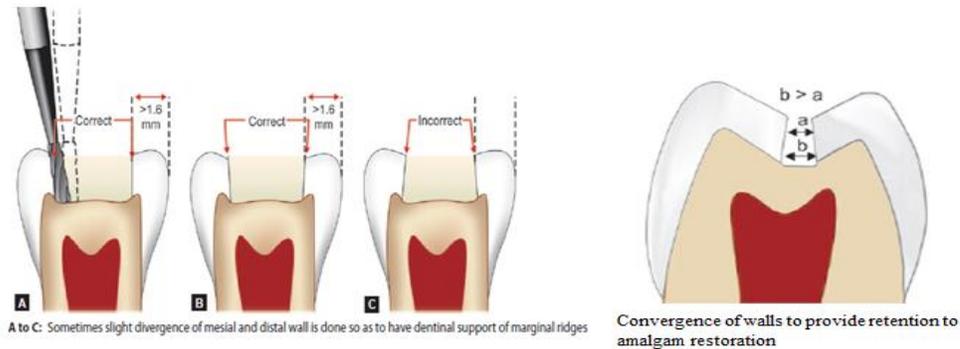


(A) Sufficient marginal ridge; (B) Overcutting of marginal ridge causes thinning.

Some cases need conventional preparations while others need conservative one. Conservative preparation can be done by preparing two separated cavities in maxillary first molar (due to it has an oblique ridge which rarely appear to have caries) and mandibular first premolar (due to it has a well-defined transverse ridge).



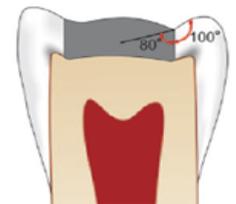
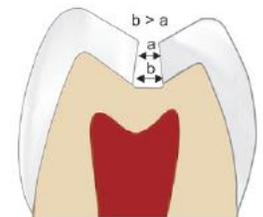
Mesial and distal walls in any cavity should be diverged to provide strength to the marginal ridge while buccal and lingual walls should be converge to provide retention to the restoration.



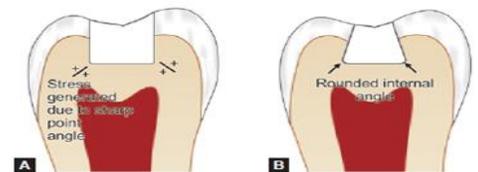
3. Resistance Form:

Resistance form can be achieved by the following:

1. Shape of the preparation should be like a box with flat floor. This helps the tooth to resist occlusal masticatory forces.
2. To provide adequate thickness of amalgam, keep the minimum occlusal depth of 1.5 mm.
3. Provide cavosurface angle of 90°.
4. Include all the weakened tooth structure.
5. Round off all the internal line and point angles.
6. Consider capping of cusp for preserving cuspal strength.



Cavosurface angle



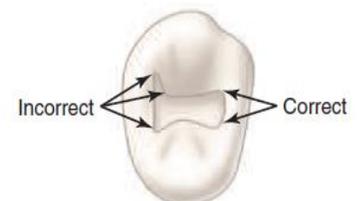
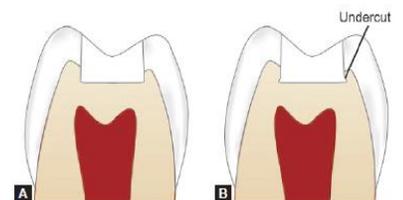
Internal angles of preparation should be round (A) Sharp angles lead to stress concentration; (B) Rounded internal angle.

4. Retention form:

Primary retention form prevents the restoration from being displaced.

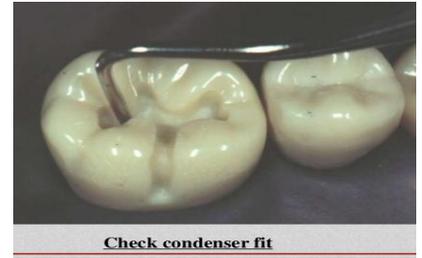
Retention can be increased by the following:

1. Occlusal convergence (about 2 to 5%) of buccal and lingual walls.
2. Giving slight undercut in dentin near the pulpal wall (using inverted bur).
3. Conserving the marginal ridges.
4. Occlusal dovetail.



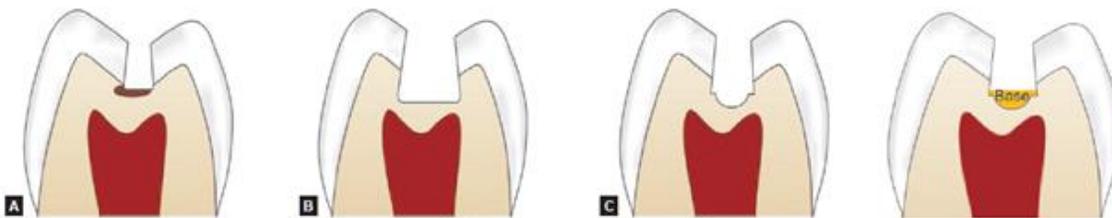
4. Convenience Form:

Convenience form of the preparation facilitates and provides sufficient visibility, accessibility and ease of operation in preparation and restoration of the tooth. It is provided by sufficient width of the preparation.



Finishing of the Enamel Walls and Margins

At this stage all unsupported enamel is removed. Cavo-surface angle should be made 90° butt joint type. This provides bulk to restoration, which in turn, provides maximum strength.



(A) Caries present beyond tooth preparation; (B) Over-preparation of tooth in an attempt to involve caries; (C) Stepped pulpal floor to involve carious lesion.

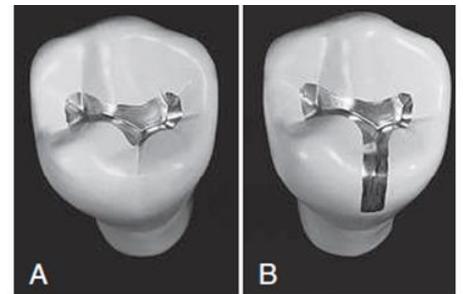
Final Cleaning and Inspection of the Preparation:

Final stage of tooth preparation is to clean the preparation thoroughly with water and air spray. Then dry it with moist air, cotton and inspect it for final approval.



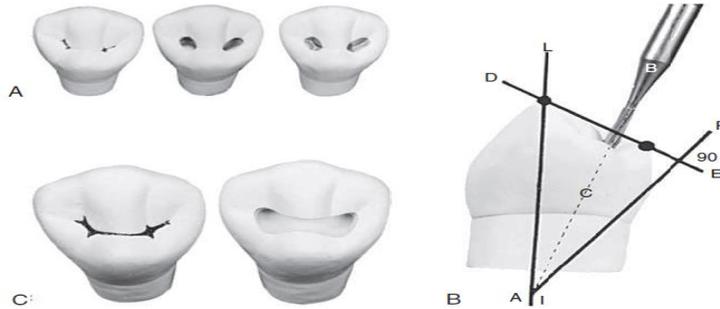
Tooth Preparation on Occlusal Surface with Buccal or Lingual Extension

- For removal of caries from buccal or lingual pits and fissures, slight modification in preparation is needed.
- In this, extend the pulpal floor in the same plane to include the caries.
- Make a box type preparation with mesial and distal walls parallel.
- Place retention grooves in the mesial and distal walls.
- Remove all the unsupported enamel by using slow speed bur.
- Finally, inspect the preparation to evaluate the need of additional cleaning and additional finishing.



(A) Conventional CL 1; (B) CL 1 with lingual extension.

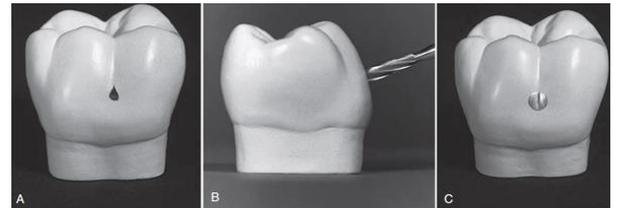
Cl. I cavity preparation in mandibular first premolar:



A, Preparation design and restoration of carious occlusal pits on the mandibular first premolar. B, Bur tilt for entry. The cutting instrument is held such that its long axis (broken line, CI) is parallel with the bisector (B) of the angle formed by the long axis of the tooth (LA) and the line (P) that is perpendicular to the plane (DE) drawn through the facial and lingual cusp points. This dotted line (CI) is the bur position for entry. C, Conventional outline, including occlusal pits and central fissure.

Other Class I Amalgam Preparations:

1. Facial pit of the mandibular molar.
2. Lingual pit of the maxillary lateral incisor.
3. Occlusal pits of the mandibular first premolar.
4. Occlusal pits and fissures of the maxillary first molar.
5. Occlusal pits and fissures of the mandibular second premolar.



Mandibular molar: A, Facial pit with a caries lesion. B, The bur positioned perpendicular to the tooth surface for entry. C, Outline of restoration.



Carious lingual pit and fissure and restoration on the maxillary lateral incisor.

References:

1. Textbook of operative dentistry. Nisha Garg and Amit Garg. (2015).
2. Sturdevant's Art and Science of Operative Dentistry. Seventh edition (2017).