

Class III, IV and V cavity preparations for composite restorations.

Tooth Preparation:

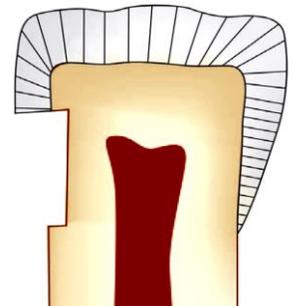
General concepts for tooth preparation for composite restorations:

1. Conservation of tooth structure: Tooth preparation is limited to extent of the defect. For composite restorations, rule extension for prevention and proximal contact clearance, is not necessary unless it is required to facilitate proximal matrix placement.
2. Variable depth of pulpal and axial wall depth: Pulpal and axial walls need not to be flat.
3. Preparation of operating site: To facilitate bonding, tooth surface is made rough by using diamond abrasives.
4. Enamel bevel: Enamel bevel is given in some cases to increase the surface area for etching and bonding.
5. Butt joint on root surface: Cavosurface present on root surfaces has to be butt joint.

Designs of Tooth Preparation for Composites:

1. Conventional.
2. Beveled conventional.
3. Modified (conservative).

1. Conventional: Conventional design is similar to the tooth preparation for amalgam restoration, except that there is less outline extension and in tooth preparation, walls are made rough.



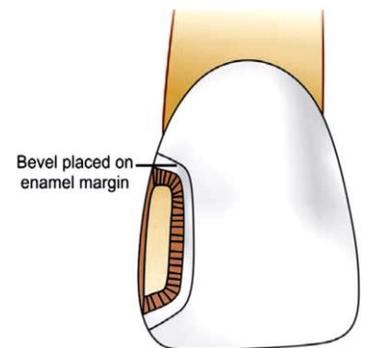
Indications for Conventional Tooth Preparation:

1. Preparations located on root surface.
2. Moderate to large class I or class II restorations.

Features:

1. Prepared enamel margins should be 90 degree or greater.
2. Butt joint cavosurface margin is made on root surfaces
3. The prepared tooth surface is roughened to increase the bonding.

2. Beveled conventional tooth preparation: This design is almost similar to conventional design but some beveled enamel margins are incorporated.



Indications:

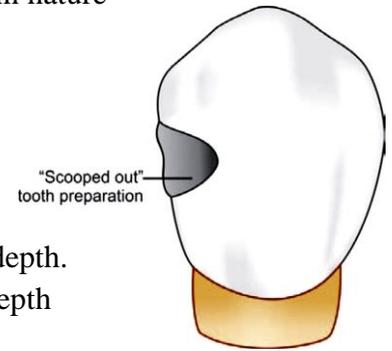
1. When restoration is being used to replace an existing restoration with a conventional design.
2. To restore a large preparation and especially indicated for classes III, IV, V and VI restorations.

3. Modified (conservative tooth preparation): It is more conservative in nature since retention is achieved by micromechanical bonding to the tooth.

Indications: For initial or small carious lesions.

Features:

1. Preparation has scooped out appearance.
2. It does not have specified wall configuration or pulpal and axial wall depth.
3. Extent and depth of the preparation depends upon the extent and the depth of carious lesion.
4. In combination preparations, that is part of the preparation is on crown and part is on root, **the root surface is prepared as conventional preparation and enamel surface portion is prepared as beveled conventional preparation where enamel margin is beveled.**



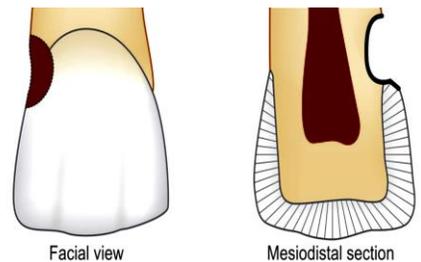
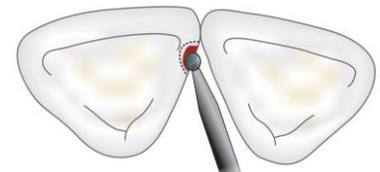
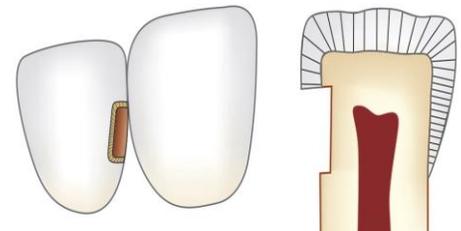
CLASS III TOOTH PREPARATION:

Tooth preparation on root is done in conventional method whereas on the crown, it is prepared in beveled conventional or modified type.

Conventional type:

Steps:

1. Extent of lesion determines the outline of tooth preparation.
2. For penetration into lesion, direction for entry of bur is preferred from lingual side because of the following reasons:
 - a. Preservation of esthetics
 - b. Color matching not critical
 - c. Facial enamel can be preserved for bonding with composite resin
 - d. Future discoloration of composite is less visible.



Indications for labial approach

1. Involvement of labial enamel
2. In cases of rotated teeth where lingual approach is difficult
3. In cases of malaligned teeth.
4. When damage is present only on root surface, conventional preparation is made only on root with 90 degrees cavosurface margins. In coronal part, retention is achieved by bonding to enamel and dentin.
5. If carious lesion is not deep, depth of preparation is kept 0.75 mm.

Retention in conventional tooth preparation is attained by:

1. Roughening of the preparation surface.
2. Parallelism or divergence of opposing external walls.
3. Giving retention grooves and coves.

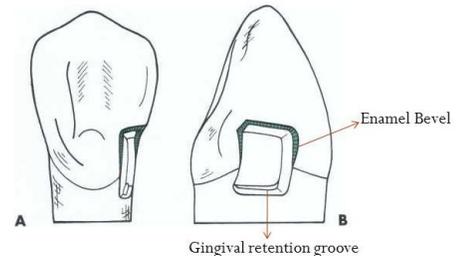
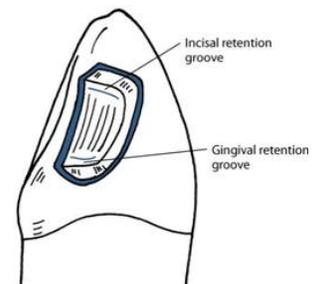
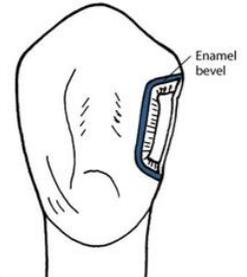
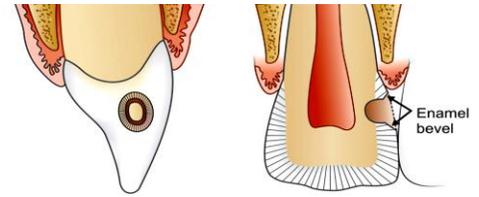
Beveled Conventional Class III Tooth Preparation:

Indications:

1. For replacing an existing defective restoration on crown portion of an anterior tooth.
2. For restoration of large preparations.

Steps

1. Approach carious area lingually with a no. ½, 1 or 2 round bur and move the bur in incisogingival direction.
2. Shape of the tooth preparation should be identical to the shape of existing carious lesion.
3. Initial depth of axial wall should be 0.75 mm deep gingivally and 1.25 mm deep incisally.
4. Axial wall should follow the contour of tooth, i.e. shape of axial wall should be convex outwardly.
5. In final tooth preparation, remove all remaining infected dentin or defective restoration using spoon excavator or slow speed round bur.
6. For pulp protection, place a calcium hydroxide liner.
7. Keep enamel margins beveled. Prepare bevels using flat end fissure bur at cavosurface margins. Bevel should be 0.2 to 0.5 mm wide at an angle of 45 degree to external tooth surface.
8. Bevels are not given in areas bearing heavy occlusal forces or on Cemental cavosurface margins.
9. If required, prepare retentive grooves and coves along gingivoaxial line angle and incisoaxial line angle, respectively, with the help of no. 1/4 or 1/2 round burs. Depth of these grooves should be 0.2 mm into the dentin.



Modified (Conservative) Class III Tooth Preparation

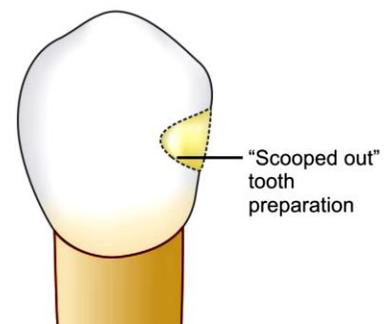
It is the most conservative type of tooth preparation used for composites.

Indication:

1. Small to moderate class III lesion.
2. Only infected carious area is removed as conservatively as possible by “scooping” out. This results in ‘scooped-out’ or ‘concave’ cavity shape.

Steps:

1. Make initial entry through palatal surface with a small round bur.
2. Design and extent of preparation is determined by extent of carious lesion.
3. Modified preparation does not have definite axial wall depth and walls diverge externally from axial depth in a scoop shape.



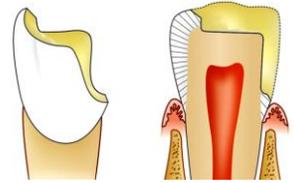
CLASS IV TOOTH PREPARATION:

Conventional Tooth Preparation:

Conventional type of class IV design is primarily indicated in those areas that have margins on root surface and where restoration is to be placed in high stress bearing area.

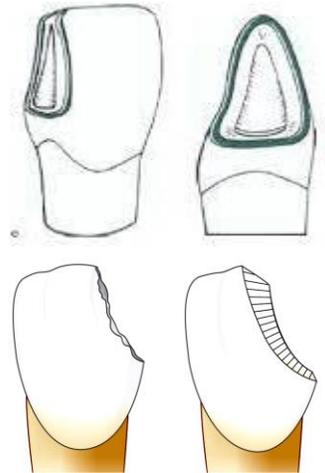
Features of Conventional Class IV Preparation for Composites:

1. Box-like preparation with facial and lingual walls parallel to long axis of tooth.
2. Retention obtained by means of dovetail or grooves placed gingivally and incisally in the axial wall using number ¼ round bur.



Beveled Tooth Preparation

Beveled preparation is indicated for treatment of a large lesion. Initial axial wall depth should be kept 0.5 mm into dentin. Bevels are prepared at 45 degree angle to tooth surface with a width of 0.25 to 2 mm, depending on the amount of retention required. All internal angles should be rounded to avoid any stress concentration points. Various modes of gaining retention are placing grooves, coves, undercuts, flares, bevels and pins.



Modified (Conservative) Tooth Preparation

It is done in small class IV lesions or for treatment of small traumatic defects. Procedures used for this preparation are similar to class III preparation.

CLASS V TOOTH PREPARATION:

Composites are material of choice for restoration of class V lesions which are esthetically prominent. Among composites, microfill composites are material of choice because they provide better and more smooth surface and have sufficient flexibility to resist stresses caused by cervical flexure, when tooth flexes under heavy occlusal forces.

Conventional Tooth Preparation:

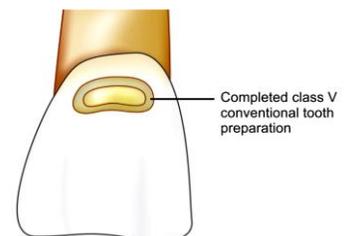
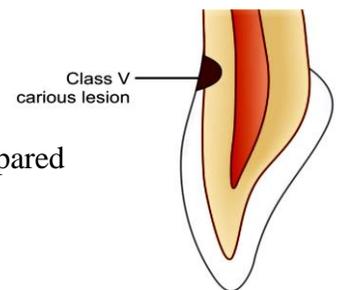
Indication:

1. If caries is present completely or mainly on root surface.
2. If lesion is partly on crown and partly on root, then crown portion is prepared using beveled conventional or modified preparation design and the root surface lesion is prepared by conventional method.

Steps of Tooth Preparation

Shape of the preparation is a “box” type.

1. Isolate the area and use tapered fissure bur to make entry at 45 degree angle to tooth surface initially.
2. After this, keep long axis of bur perpendicular to the external surface in order to get a cavosurface angle of 90 degree.



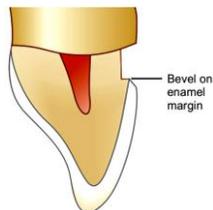
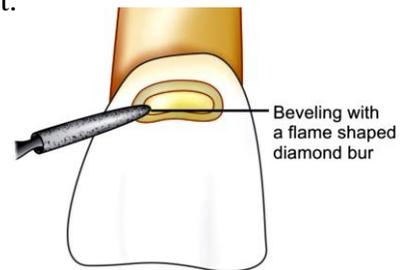
3. During initial tooth preparation, keep the axial depth of 0.75 mm into the dentin.
4. After achieving the desired distal extension, move the bur mesially, incisally (occlusally) and gingivally for placing the preparation margins onto the sound tooth surface while maintaining a cavosurface margin of 90 degree.
5. Axial wall should follow the contour of facial surface incisogingivally and mesiodistally.
6. During final tooth preparation, remove any remaining infected dentin, restoration material using spoon excavator or slow speed round bur.
7. For pulp protection, use calcium hydroxide liner, if necessary.
8. If additional retention is required, place retention grooves all along the whole length of incisioaxial and gingivoaxial line angles using a no. 1/4 or 1/2 round bur 0.25 mm deep into the dentin. At this stage, all the external walls appear outwardly divergent.
9. Finally, clean tooth preparation with water and air dry it.

Beveled Conventional Tooth Preparation

Indications

1. For replacing defective existing restoration
2. For restoring a large, carious lesion.

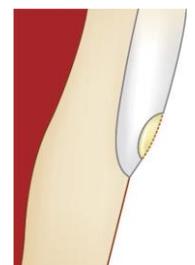
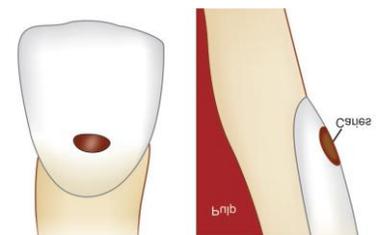
Initial axial wall depth should be limited to only 0.25 mm into the dentin, when retention grooves are not placed and 0.5 mm when retention groove is placed. After this, bevel the enamel margins 0.25 to 0.5 mm wide at 45 degree to external surface. When class V lesion extends onto the root surface, gingival preparation has conventional class V design with the initial axial depth of 0.75 mm. Beveling is done only on enamel cavosurface margins. Roughen the dentin with diamond bur to provide mechanical retention.



Modified (Conservative) Tooth Preparation:

Indications:

1. Restoration of small and moderate carious lesions and defects.
2. Small enamel defects like decalcified and hypoplastic areas present in cervical third of the teeth. Modified class V tooth is prepared as discussed in the previous modified preparation. Final tooth preparation should have 'scooped out' appearance with divergent walls and axial wall either in enamel or dentin.



Reference:

1. Textbook of operative dentistry. Nisha Garg and Amit Garg. (2015).