Operative Dentistry

Class IV and Class V cavity preparations

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Class IV cavity preparation

Class IV tooth cavity preparation is indicated for restoring proximal areas that also include the incisal surface of an anterior tooth. The Class IV composite restoration has provided the profession with a conservative treatment to restore fractured, defective, or cariously involved anterior teeth when, previously, a porcelain crown may have been the treatment of choice.

The preoperative assessment of the occlusion is even more important for Class IV restorations because it may influence the tooth preparation extension (placing margins in non-contact areas).

Conventional Class IV Tooth preparation.

The conventional tooth preparation design (preparation design with 90-degree cavosurface margins) has minimal clinical Class IV application except in those areas that have margins located on root surfaces.

Beveled Conventional Class IV Tooth Preparation.

The beveled conventional Class IV tooth preparation is indicated for restoring large Class IV areas.

The outline form

Using an appropriate size round carbide bur or diamond instrument at high speed with air-water coolant. Remove all weakened enamel and establish the

initial axial wall depth at 0.5mm into dentin (because groove retention form will likely be utilized).

Prepare the walls as much as possible parallel and perpendicular to the long axis of the tooth. Excavate any remaining infected dentin as the first step of final tooth preparation. If necessary, apply a calcium hydroxide liner. Bevel the cavosurface margin of all accessible enamel margins of the preparation. The bevel is prepared at a 45-degree angle to the external tooth surface with a flame-shaped or round diamond instrument.

The width of the bevel should be 0.25 to 2 mm, depending on the amount of tooth structure missing and the retention perceived necessary.

Retention and resistance form: -

(Heavy occlusion and large Class IV require increased retention and resistance form). Thus, may dictate a **more conventional tooth preparation** form, with **more resistance form feature:** to provide appropriate resistance form, the preparation walls may need to be prepared in such a way as to resist occlusal forces. This often requires proximal facial and lingual preparation walls that form 90-degree cavosurface angles, which are subsequently beveled, and a gingival floor prepared perpendicular to the long axis of the tooth. This boxlike form may provide greater resistance to fracture of the restoration and tooth from masticatory forces.

Retention form features:

1. Etched beveled enamel margin and dentine surface. The bevel could be even wider than enamel margin bevel in class III.

2. Groove or other shaped undercuts placed in the dentin along line angles and into point angles wherever possible, without undermining the enamel. A gingival retention groove prepared using a No. 1/4 round bur. It is prepared 0.2

mm inside the DEJ at a depth of 0.25mm (half the diameter of the No. 1/4 bur) and at an angle bisecting the junction of the axial wall and gingival wall.

3. A dovetail extension onto the lingual surface of the tooth may enhance both the restorations strength and retention, but it is less conservative and therefore not used often. Although pin retention is sometimes necessary.

4. Pin placement prepared at 0.2-0.5 mm inside the DEJ.

Modified Class IV Tooth Preparation.

The modified Class IV preparation for composite is indicated for small or moderate Class IV lesions or traumatic defects.

The objective of the tooth preparation is to remove as little tooth structure as possible, while removing the fault and providing for appropriate retention and resistance forms.

Usually little or no initial tooth preparation is indicated for fractured incisal corners, other than roughening the fractured tooth structure. The cavosurface margins are prepared with a beveled configuration; the axial depth is dependent on the extent of the lesion, previous restoration, or fracture, but initially no deeper than 0.2 mm inside the DEJ.

The **retention** is obtained primarily from the bonding strength of the composite to the enamel and dentin.

The treatment of teeth with minor traumatic fractures requires less preparation than the beveled conventional.

Example. If the fracture is confined to enamel, adequate retention usually can be attained by simply beveling sharp cavosurface margins in the fractured area with a flame-shaped diamond instrument followed by bonding.

CLASS V COMPOSITE RESTORATIONS

Class V tooth preparations, by definition, are in the gingival one third of the facial and lingual tooth surfaces.

Because of esthetic considerations, composite materials most frequently are used for the restoration of Class V lesions in anterior teeth.

Conventional Class V tooth preparation:

A lesion entirely on root surface.

The outline form extension of the mesial, distal, occlusal (incisal), and gingival walls is dictated by the extent of the caries, defect, or old restorative material indicated for replacement.

All the external preparation walls of a Class V conventional tooth preparation are visible when viewed from a facial position (outwardly divergent walls).

A tapered fissure carbide bur (No. 700, 701, or 271) or similarly shaped diamond is used at high speed with air-water spray. If access interproximally or gingivally is limited, a No. 1 or No. 2 round bur or diamond may be used to prepare the tooth.

Initial tooth preparation with 90-degree cavosurface margins and axial wall depth of 0.75 mm. Remaining infected dentin excavated and incisal and gingival retention form prepared.

If retention grooves are necessary, they are prepared with a No. 1/4 bur along the full length of the gingivoaxial and incisoaxial (occlusoaxial) line angles.

Beveled Conventional Class V Tooth reparation.

The beveled conventional Class V tooth preparation has beveled enamel margins and is indicated either for:

(1) The replacement of defective Class V restoration or

(2) For a large, new carious lesion.

Entry with No. 701 bur or tapered diamond held at 45-degree angle to tooth surface.

As cutting proceeds distally (0.2 mm into dentin), bur shank is held perpendicular to enamel su [5] hen the mesial extension by keeping bur shank perpendicular to surface and maintaining initial depth.

Class V preparation initially will exhibit 90-degree cavosurface margins (that subsequently will be beveled) and an axial wall that is uniform in depth initial axial wall depth only 0.2 mm into dentin then:

(1) Remove any remaining infected dentin.

(2) Apply a calcium hydroxide liner, but only if necessary.

(3) Usually prepare a gingival retention groove if either the gingival margin is located on the root surface or the preparation is large enough to warrant groove retention form.

(4) Bevel the enamel margins.

The last two points for **retention form**.

Modified Class V Tooth Preparation.

The modified Class V tooth preparation is indicated for the restoration of small and moderate Class V lesions or defects.

The lesion or defect is "scooped" out, with a round or elliptical diamond instrument, resulting in a preparation form that may have a divergent wall configuration and an axial surface that usually is not uniform in depth.

Class V modified tooth preparations also are used to restore abraded or eroded cervical areas.