

CLASS II AMALGAM RESTORATIONS

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- ***Occlusal outline form (occlusal step)***

The occlusal outline form of a Class II tooth preparation for amalgam is similar to that for the Class I tooth preparation.

- ***Proximal outline form (proximal box)***

As we prepare proximal box, we create 2 new walls:

- 1- Axial wall; parallel to the long axis of the tooth.
- 2- Gingival seat; should always be flat and perpendicular to the long axis of the tooth.

As a guide for the facial and lingual extension of the ditch, visualize the completed mesiofacial and mesiolingual margins as right-angle projections of the facial and lingual limits of the ditch these margins should clear the adjacent tooth by only 0.2 to 0.3 mm (Bring cavosurface margins to self cleaning areas). Clearance of the proximal margins (i.e., mesiofacial, mesiolingual, gingival) greater than 0.5 mm is excessive unless indicated to include caries, undermined enamel, or overextended to achieve 90-degree cavosurface margins.

Occasionally, it is permissible not to extend the outline of the proximal box facially or lingually beyond the proximal contact to conserve tooth structure.

The proximal ditch cut may be diverged gingivally (convergent occlusally) to ensure that the faciolingual dimension at the gingival is greater than at the occlusal

In addition, remove the weakened enamel along the gingival wall by using the gingival marginal trimmer in a scraping motion. If the gingival cavosurface margin is in enamel, it will usually require a slight bevel toward gingival direction to achieve 90 degree CSM and remove undermined enamel.

Resistance form

- 1- The pulpal and gingival walls being relatively flat and perpendicular to forces directed with the long axis of the tooth

- 2- Restricting extension of the walls to allow strong cusps and ridge areas to remain with sufficient dentin support.
- 3- Restricting the occlusal outline form (where possible) to areas receiving minimal occlusal contact.
- 4- The reverse curve (Reverse S Curve) at buccal wall of box optimizing the strength of both the amalgam and tooth structure. Viewed from the occlusal, a reverse curve in the occlusal outline of a Class II preparation, which often results when developing the mesiofacial wall perpendicular to the enamel rod direction and conserving the facial cusp structure to permit 90-degree amalgam at the mesiofacial margin and yet "curve" around the mesial portion of the facial cusp). Lingually, the reverse curve usually is minimal (if necessary at all) because the embrasure form is larger.
- 5- Slightly rounding the internal line angles to reduce stress concentration in tooth structure (automatically created by bur design).
- 6- Bevel or round the axiopulpal line angle, thereby increasing the bulk and decreasing the stress concentration within the restorative material.
- 7- Convex axial wall parallel to proximal tooth contour and must be 0.5-0.6 mm beyond DEJ in order not to undermined proximal wall enamel after preparation of retention grooves at axiobuccal and axiolingual line angles.
- 8- Providing enough thickness of restorative material to prevent its fracture under mastication.
- 9- Proximal retention locks (Resistance/Retention grooves) in the axiofacial and axiolingual line angles significantly strengthen the isthmus of a Class II restoration, and that these locks are significantly superior to axiogingival grooves in increasing the restoration's fracture strength.
- 10- All resistance form of occlusal class I cavity should be implicated at the occlusal portion of class II cavity.

Retention form

Primary retention form is provided by the occlusal convergence of facial and lingual walls and by the dovetail design of the occlusal step, if present.

The proximal ditch cut should be sufficiently deep into dentin (i.e., 0.5 to 0.6 mm) that retention locks, if deemed necessary, can be prepared into the axiolingual and axiofacial line angles without undermining the proximal enamel.

Finishing external walls

Use the mesial gingival marginal trimmer to establish a slight cavosurface bevel at the gingival margin of 20 degrees with gingival declination if it is in enamel. The bevel is angled no more than necessary to ensure full-length enamel rods forming the gingival margin, and it is no wider than the enamel. When the gingival margin is positioned gingival to the cemento-enamel junction (CEJ) on the tooth root, the bevel is not indicated.

CHANGING CONCEPTS IN CLASS II CAVITY PREPARATION

From the time G V Black, father of Operative Dentistry outlined the principles of cavity preparation, and stressed on "extension for prevention", dentistry has taken long strides. It is high time we fully realized the importance of preserving healthy tooth structure. Cutting sound tooth tissue is akin to murder of a person. Here, we are hastening the downslide journey of the tooth to its pulpal death.

Factors necessitating change of approach to tooth preparation are availability of: -

- 1- improved amalgams.
- 2- instruments with very small working points.
- 3- amalgam bonding systems.
- 4- adhesive restorative materials.

When proximal lesions are to be restored with adhesive restorative materials, there is no need to create conventional box preparation. Instead, there are two approaches.

The "**box-only**", "**Approximal slot**", or "**groove**" preparation. This approaches the lesion directly from the marginal ridge, or seldom either from buccal or lingual direction.

The second type is the "**tunnel preparation**", which is also known as "internal oblique preparation" "internal fossa preparation", "internal occlusal diagonal or internal preparation".

Box-only preparation

When restoring a small, cavitated, proximal lesion in a tooth with neither occlusal fissures nor a previously inserted occlusal restoration, a proximal box preparation without an occlusal step has been recommended.

To maximize retention, preparations with facial and lingual walls that almost oppose each other are recommended. Therefore this type of preparation should be limited to a proximal surface with a narrow proximal contact (allowing minimal facial and lingual extensions). As in the typical preparation, the facial and lingual proximal walls converge occlusally. Retention locks are necessary in box-only preparations.

The proximal retention locks should have a 0.5-mm depth at the gingival point angle, tapering to a depth of 0.3 mm at the occlusal surface.

Tunnel preparation

In recent years the trend in restorative dentistry has been towards conservative cavity designs. In this preparation approximal carious lesions were accessed and prepared by approaching the lesion from the occlusal aspect, instrumenting beneath the marginal ridge, but leaving it intact. The teeth were restored with a fluoride-leachable silicate cement and it was suggested that this might prevent caries developing in the mesial surface of the first permanent molar. But if didn't done perfectly, undermined marginal ridge or pulp exposure may resulted or leaving some inaccessible caries or harming adjacent tooth proximal surface.

Tunnel Preparations

1. Have shown to leave tooth significantly stronger.
2. Also shown that conservative tunnel preps at least 2mm from marginal ridge does not significantly weaken otherwise intact tooth.
3. Less tooth structure removed in preparation.

Traditional Black's Class II Preparations

1. Requires access from occlusal surface which obliterates the marginal ridge.
2. Loss of marginal ridge shown to substantially weaken remaining tooth structure.
3. More tooth removal needed for access, retention form, and caries removal.