

AMALGAM RESTORATIONS

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Indications

There several clinical indications for amalgam restorations in Classes I, II, and VI and they are: -

1. Moderate-to-large restorations
2. Restorations that are not in highly esthetic areas of the mouth
3. Restorations that have heavy occlusal contacts.
4. Restorations that cannot be well isolated.
5. Restorations that extend onto the root surface .
6. Abutment teeth for a removable partial denture.
7. Temporary or caries control restorations .

Contraindications

Although amalgam has no specific contraindications for use in Classes I, II, and VI restorations, but it may be contraindicated in:

1. Esthetically prominent areas of posterior teeth.
2. Small-to-moderate Classes I and II restorations that can be well isolated.
3. Small Class VI restorations.

CL.I Occlusal Cavity Preparation

The restoration is restricted to the occlusal surface (pits and fissures) to the depth of the cavity beyond the dentine , e.g. 1.5-2 mm , and removing all non-coalesced pits and fissures .

Outline form :

Follow the curvature of the central fissure to obtain a multicurved occlusal outline , no sharp angles should be present. The occlusal surface exhibits too many grooves, buccal extension of these grooves extends to the buccal surface from between the mesiobuccal and the distobuccal cusps to end in the junction between the occlusal and the middle thirds in a non-coalesced pit termed the buccal pit.

Resistance form :

1. Relatively flat pulpal floor in sound tooth structure to resist forces directed in the long axis of the tooth and provide a strong, stable seat for the restoration.
2. Minimal extension of external walls, which reduces weakening the tooth. Isthmus area must be 1/4 intercuspal distance.
3. Strong, ideal enamel margins. cavosurface line angles should have 90-110°. This will necessarily result in slightly convergent or parallel buccal and lingual walls while slightly divergent or parallel mesial and distal walls (otherwise

unsupported enamel will result). as well as preserve 1.6mm of marginal ridge thickness for premolar and 2mm for molars is considered a mandatory requirements, otherwise unsupported marginal ridges will result.

4. Sufficient depth (i.e., 1.5 mm measured at central groove) to result in adequate thickness of the restoration, providing resistance to fracture and wear .
5. Internal line angles must be slightly rounded.
6. Flat and smooth pulpal floor parallel to occlusal plane and extended beyond DEJ about 0.2 mm.

Retention form :

Occlusal convergence and/or friction with cavity walls. Dovetail may help

CL.I Buccal Pit Cavity Preparation

The pit cavity should take a triangular shape due to the fact that this pit is somewhat triangular in shape before caries invasion , the apex of the triangle is directed towards the occlusal third of the tooth , it's base is towards the cervix of the tooth .

The margins of our cavity should be extended to a self-cleaning area to avoid the recurrence of dentinal caries in the future. The diameter is about (1.5 mm.); flat pulpal floor rule should also be achieved.

It must be noted that the occlusal third of the buccal surface of the lower molars is somewhat curved occlusogingivally, therefore cavity should follow this noticeable curvature.

The mesial and distal walls of the prepared cavity should converge to the outside (to avoid formation of unsupported enamel; this is, in fact, due to the way of the development of the 2 cusps), the gingival seat should be flat area at the junction of the middle and the occlusal thirds.

The resistance means should be the same as for those obtained for preparation of cl.I cavity preparation, all the unsupported enamel should be removed , slightly rounded internal line angles, the depth is least 1.5 mm. , cavosurface angle is 90°-110° .

If retention is compromised due to large extensive caries, secondary retention mean can be added in a form of retention groove at the axiokingival line angle with number 1/4 round bur in axiokingival direction without undermining the surface enamel.

CL.I Palatal (Lingual) Pit Cavity Preparation

The same steps for buccal pit should be followed for the preparation of the lingual/palatal pit.

Outline either circular or oval gingivoincisally. Caries may extend from the palatal pit along the grooves present between marginal ridges and palatal fossa. Retention groove also can be added following the same rule as in buccal pit.

As lingual is almost thinner than buccal enamel, care should be taken not to expose lingual pulp horn due to further cavity deepening (1.2 mm cavity depth may be advocated in some cases).

The Occlusal Pits of The Mandibular First Premolar

Many mandibular 1st premolars have no central occlusal fissure because of the very large facial cusp and its heavy transverse ridge of enamel, However occlusal pits (mesial, distal or both) may exist.

Generally these are easily restored by placing a small pit amalgam restoration with the bur properly tilted. The pit should be entered with a punch cut to depth of 1.5- 2mm. The bur should maintain perpendicular to the occlusal plane. The pulpal floor will decline lowered lingual aspect that will prevent exposure of prominent buccal pulp horn and provide dental support for the small lingual cusp.

The direction of the prepared facial wall will result in amalgam that approached 90 at the cavosurface margin. This preparation is usually done more at the expense of the facial cusp than of the lingual cusp.

Care should be taken not to undermined the enamel and the proximal marginal ridge and the small lingual cusp.

However when there are existing central occlusal fissure or the two occlusal Pits are in close proximately or both then a conventional occlusal outline for the preparation may be indicated.

The Occlusal Pits and Fissures of The Maxillary First Molar

Usually the occlusal surface of maxillary 1st molar is divided into mesial and distal halves by the oblique ridge if there is a caries at the mesial fossa, central fossa and distal fossa, then two separated conventional class I cavity preparation should be made.

The oblique ridge of enamel should not be crossed in cavity preparation, unless the ridge is undermined by caries or have a deep fissure or the remaining tooth structure separating the two cavities is less than 0.5 mm, because leaving the oblique ridge intact will preserve the strength of the tooth.

However, if its necessary to extend through the oblique ridge, the distal pit area should be included in the outline form and also the distal oblique and lingual fissure if there are caries.

Class I Occlusolingual (Distopalatal) Amalgam Restorations

Occlusolingual (Distopalatal) amalgam restorations may be used on maxillary molars when a lingual fissure connects with the distal oblique fissure and distal pit on the occlusal surface.

The tooth preparation should be no wider than necessary; ideally the mesiodistal width of the lingual extension should not exceed 1 mm, except for extension necessary to remove carious or undermined enamel or to include unusual fissuring.

When indicated, the tooth preparation should be cut more at the expense of the oblique ridge rather than centering over the fissure (to avoid weakening the small distolingual cusp).

Especially on smaller teeth, the preparation of occlusal portion may done with a slight distal tilt of the bur to conserve the dentin support of the distal marginal ridge.

The margins should extend as little as possible onto the oblique ridge, distolingual cusp, and distal marginal ridge. Using the mirror for indirect vision and the high speed Handpiece with air-water spray, enter the distal Pit with the end of the No. 245 bur, The Long axis of the bur usually should be parallel to the long axis of the tooth crown. Remember to conserve the dentinal support and strength of the distal marginal ridge and distolingual cusp, which may require directing the bur so that it cuts more of the tooth structure mesial to the pit rather than distal Penetrate to a depth of 1.5 to 2 mm as measured by the bur on the cut walls (1.5 mm at the fissure and up to 2 mm on the external walls) As with Class I occlusal preparations, a slight distal inclination of the bur will occasionally be indicated (e.g., smaller teeth) to conserve the dentinal support and strength of the marginal ridge and the distolingual cusp.

On large molars the bur position should remain parallel to the long axis of the tooth, particularly if the bur is offset slightly mesial to the center of the fissure. Keeping the bur parallel to the long axis of the tooth creates a distal wall with slight occlusal convergence Continue to move the bur lingually along the fissure, maintaining a uniform depth until the bur has extended the preparation onto the lingual surface. The pulpal floor should follow the contour of the occlusal surface and DEJ, which usually rises occlusally as the bur moves lingually.

The mesial and distal walls of the occlusal portion of the preparation should converge occlusally because of the shape of the bur. This convergence provides sufficient retention form to the occlusal portion of the preparation.

Extension of occlusal cavity lingually or palatally with same depth of pulpal floor to include the whole carious distolingual (distopalatal) groove will never include the palatal extension on the groove to its full length because the end of the palatal groove is at a higher level cervically. So, if cavity preparation continued from the occlusal surface to the lingual surface by deepening the occlusal preparation to include this extension , traumatic exposure of the pulp might takes place.

So that, preparation of the lingual portion may be accomplished by two techniques. In the first technique the lingual surface is prepared with the bur's long

axis parallel to the lingual surface to be prepared and the tip of the bur should be located at the gingival extent of the lingual fissure. Be careful to control the bur and not allow it to "roll out" onto the lingual surface, because this could "round over" or damage the cavosurface margin. While the second technique is by following the general rule "that is to say" the bur should be perpendicular on the surface we are working on", so we incline the bur at the lingual surface (Perpendicular to lingual surface) and continue our preparation.

However, both techniques will avoid the pulp trauma, and obtain a step-like cavity at the palatal cavity extension.

From the "resistance form" point of view, The mesial and distal walls of the lingual cavity should be diverged to the outside (to avoid unsupported enamel formation). The cavosurface line angle all are at right angle (90°). The gingival seat should be flat and perpendicular to the axial wall. The axial wall should be parallel with long axis of the tooth.

Axiopulpal line angle (where the axial wall and the pulpal floor meet, should be beveled to prevent stress concentration on the sharp line angle (same as Cl. II cavity preparation that will be discussed later).

Additional retention in the lingual extension may be required if the extension is wide mesiodistally without a lingual convergence. If additional retention is required, the No. 1/4 or 169 bur can be used to prepare locks into the mesioaxial and distoaxial line angles. If these angles are in enamel, the axial wall must be deepened to 0.5 mm axially of the DEJ (because the locks must be in dentin to not undermine enamel). The depth of the locks at the gingival floor is one half the diameter of the No. 1/4 bur.

Occasionally mandibular molars exhibit fissures that extend from the occlusal surface through the buccal cusp ridges and onto the facial surface or lingually. This may necessitate involving these extensions with occlusal class I, resulting in class I cavity with buccal and/or lingual extensions, and they usually follow the same general techniques for preparation as the distopalatal (occlusolingual) cavity.