Class I, II, and VI Amalgam Restorations

Pertinent Material Qualities and Properties

Pertinent material qualities and properties for Class I, II, and VI amalgam restorations include the following:

-Strength

-Longevity n Ease of use

-Clinically proven success

-only restorative material with an interfacial seal that improves over time

Indications:

Amalgam is indicated for the restoration of a Class I, II, and VI defect when the defect

(1) is not in an area of the mouth where esthetics is highly important,

(2) is moderate to large,

(3) is in an area that will have heavy occlusal contacts,

(4) cannot be well isolated,

(5) extends onto the root surface,

(6) will become a foundation for a full coverage restoration, and

(7) is in a tooth that serves as an abutment for a removable partial denture.

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Contraindications :

Although amalgam has no specific contraindications for use in Class I, II, and VI restorations, relative contraindications for use include

(1) esthetically prominent areas of posterior teeth,

(2) small to moderate Class I and II defects that can be well isolated, and

(3) small Class VI defects.

Advantages :

Primary advantages are the ease of use and the simplicity of the procedure .

Disadvantages:

The primary disadvantages of using amalgam for Class I, II, and VI defects are

(1) amalgam use requires more complex and larger tooth preparations than composite resin, and

(2) amalgams may be considered to have a non-esthetic appearance by some patients.

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Clinical Technique for Class I Amalgam Restorations
Initial Clinical Procedures
-Anesthesia,
-Isolation with the rubber dam or with cotton rolls and high-volume evacuation. –A pre-operative assessment of the occlusal relationship

Initial Tooth Preparation:
The ideal outline form for a conservative amalgam restoration incorporates the following resistance form.
• Extending around the cusps to conserve tooth structure and prevent the internal line angles from approaching the pulp horns too closely
•Keeping the facial and lingual margin extensions as minimal as possible between the central groove and the cusp tips
• Extending the outline to include fissures, placing the margins on relatively smooth, sound tooth structure
• Minimally extending into the marginal ridges (only enough to include the defect) without removing dentinal support

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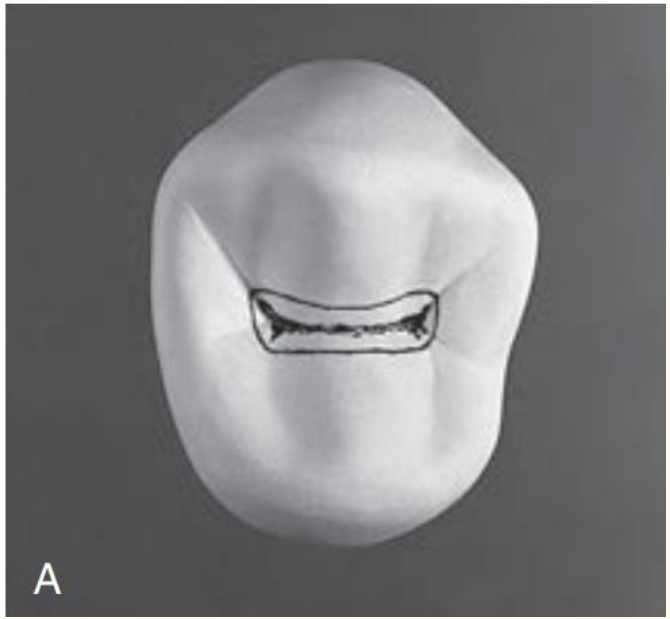
• Eliminating a weak wall of enamel by joining two outlines that come close together (i.e., <0.5 mm apart)
• Extending the outline form to include enamel undermined by caries
• Using enameloplasty on the terminal ends of shallow fissures to conserve tooth structure
• Establishing an optimal, conservative depth of the pulpal wall



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A No. 245 bur with a head length of 3 mm and a tip diameter of 0.8 mm or a smaller No. 330 bur is recommended to prepare the conservative Class I tooth preparation

The silhouette of the No. 245 bur reveals sides slightly convergent toward the shank,producing an occlusal convergence of the facial and lingual preparation walls and slightly rounded corners of the end of the No. 245 bur produce slightly rounded internal line angles that render the tooth more resistant to
fracture from occlusal force.

The No. 330 bur is a smaller version of the No. 245 bur and is indicated for the most conservative amalgam preparation.

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Class I occlusal tooth preparation is begun by entering the deepest or most carious pit with a punch cut using the No. 245 carbide bur at high speed with air-water spray.Hold the bur such that its long axis parallels the long axis of the tooth crown.The bur is inserted directly into the defective pit. When the pits are equally defective, the distal pit should be entered first this provides increased visibility for the mesial extension. The bur should be rotating when it is applied to the tooth and should not stop rotating until it is removed from the tooth.
As the bur enters the pit, an initial depth of 1.5 mm should be established i.e. one-half the length of the cutting portion of No. 245 bur.

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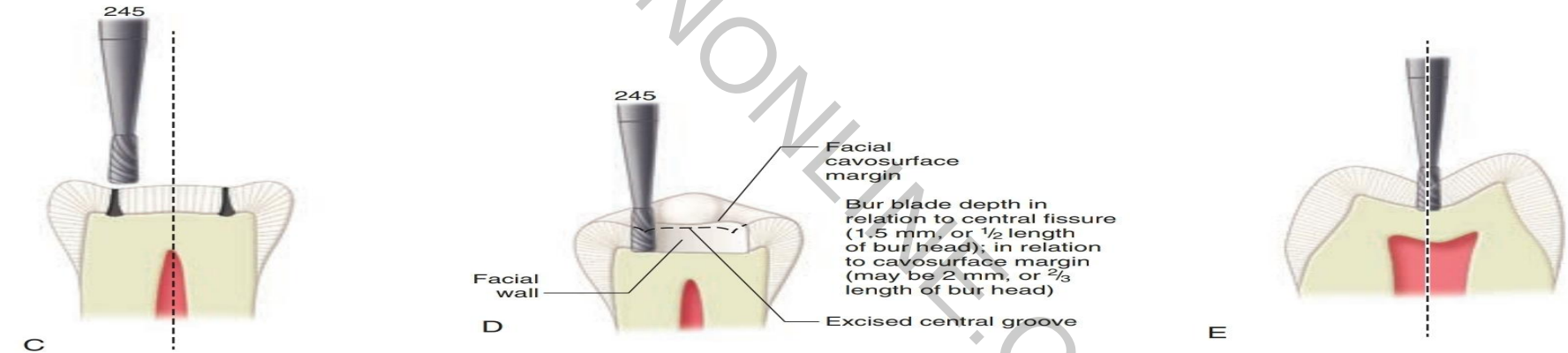
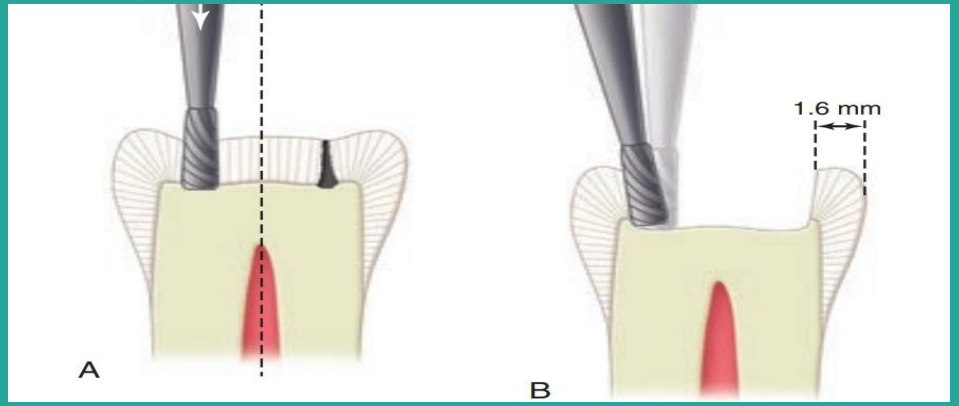


Fig. 14-3 **A,** No. 245 bur oriented parallel to long axis of tooth crown for entry as viewed from lingual aspect. **B,** The bur positioned for entry as viewed from the distal aspect. **C,** The bur is positioned over the most carious pit (distal) for entry. The distal aspect of the bur is positioned over the distal pit. **D,** Mesiodistal longitudinal section. Relationship of head of No. 245 bur to excised central fissure and cavosurface margin at ideal pulpal floor depth, which is just inside the dentinoenamel junction (DEJ). **E,** Faciolingual longitudinal section. Dotted line indicates the long axis of tooth crown and the direction of the bur.

For premolars, the distance from the margin to the proximal surface usually should not be less than 1.6 mm, or two diameters of the end of the No. 245 bur n For molars, this minimal distance is 2 mm.



Distal extension into the distal marginal ridge to include a fissure or caries occasionally requires a slight tilting of the bur distally (≤10 degrees). This creates a slight occlusal divergence to the distal wall to prevent undermining the marginal ridge of its dentin support . Because the facial and lingual prepared walls converge, this slight divergence does not present any retention form concerns.Same is applicable for mesial wall.

The remainder of any occlusal enamel defects is included in the outline, and the facial and lingual walls are extended to remove enamelundermined by caries

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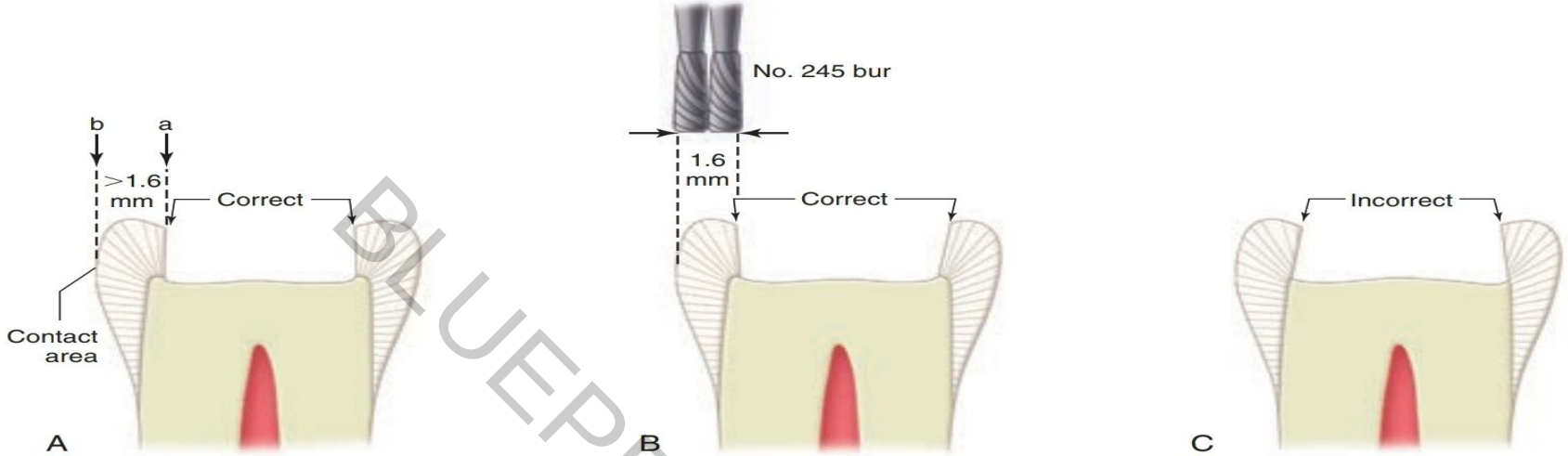

Fig. 14-5 The direction of the mesial and distal walls is influenced by the remaining thickness of the marginal ridge as measured from the mesial or distal margin (*a*) to the proximal surface (i.e., imaginary projection of proximal surface) (*b*). **A,** Mesial and distal walls should converge occlusally when the distance from *a* to *b* is greater than 1.6 mm. **B,** When the operator judges that the extension will leave only 1.6-mm thickness (two diameters of No. 245 bur) of marginal ridge (i.e., premolars) as illustrated here and in Figure 14-4, *B* and *C*, the mesial and distal walls must diverge occlusally to conserve ridge-supporting dentin. **C,** Extending the mesial or distal walls to a two-diameter limit without diverging the wall occlusally undermines the marginal ridge enamel.

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The conservative Class I tooth preparation should have an outline form with gently flowing curves and distinct cavosurface margins. A faciolingual width of no more than 1 to 1.5 mm and a depth of 1.5 to 2 mm are considered ideal, but it depends onthe extension of the caries. The pulpal floor is almost always in dentin. Although conservation of the tooth structure is important,convenience form requires that extent of the preparation provides adequate access and visibility.

The primary resistance form is provided by the following:
• Sufficient area of relatively flat pulpal floor in sound tooth structure to resist forces directed in the long axis of the tooth and to provide a strong, stable seat for the restoration
• Minimal extension of external walls, which reduces weakening of the tooth
• Strong, ideal enamel margins
• Sufficient depth (i.e., 1.5 mm) that results in adequate thickness of the restoration, providing resistance to fracture and wear

The parallelism or slight occlusal convergence of two or more opposing, external walls provides the primary retention form.

FINAL TOOTH PREPARATION
The final tooth preparation includes
(1) removal of remaining defective enamel and infected dentin on the pulpal floor; (2)pulp protection, where indicated; (3) procedures for finishing
the external walls; and (4) final procedures of cleaning and
inspecting the prepared tooth.

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An occlusal cavosurface bevel is contraindicated in the tooth preparation for an amalgam restoration. It is important to provide an approximate 90- to 100-degree cavosurface angle, which should result in 80- to 90-degree amalgam at the margins. This butt-joint margin of enamel and amalgam is the strongest for both. Amalgam is a brittle material with low edge strength and tends to chip under
occlusal stress if its angle at the margins is less than 80 degrees.

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OTHER CONSERVATIVE CLASS I AMALGAM PREPARATIONS

- Facial pit of the mandibular molar
- Lingual pit of the maxillary lateral incisor
- Occlusal pits of the mandibular first premolar
- Occlusal pits and fissures of the maxillary first molar
- Occlusal pits and fissures of the mandibular second premolar

Restorative Technique for Class I Amalgam Preparations

DESENSITIZER PLACEMENT

A dentin desensitizer is placed in the preparation before amalgam condensation . The dentin desensitizer is applied onto the prepared tooth surface according to manufacturer's recommendations; excess moisture is removed without desiccating the dentin; and then the amalgam is condensed into place.

MATRIX PLACEMENT

Generally, matrices are unnecessary for a conservative Class I amalgam restoration

INSERTION AND CARVING OF THE AMALGAM

Because of its superior clinical performance, high-copper amalgam is recommended.The triturated amalgam is emptied into an amalgam well.Correctly mixed amalgam should not be dry and crumbly. It has a minimal, yet sufficient, "wetness" to give a homogeneous and well-adapted restoration.

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The principal objectives during the insertion of amalgam are
-To condense the amalgam to adapt it to the preparation walls and produce a restoration free of voids.
-Thorough condensation helps to reduce marginal leakage.
-Optimal condensation also is necessary to minimize the mercury content in the restoration to decrease corrosion and to enhance strength and marginal integrity.
Condensation of amalgam that contains spherical particles requires larger condensers and smaller condensers for admixed amalgam.
An amalgam carrier is used to transfer amalgam to the tooth preparation. Increments extruded from the carrier should be smaller for a small preparation.
Each portion is thoroughly condensed prior to placement of the next increment.
Each condensed increment should fill only one-third to one-half the preparation depth. Each condensing stroke should overlap the previous condensing stroke to ensure that the entire mass is well condensed.
Cavosurface margins are completely covered with well-condensed amalgam. Final condensation over cavosurface margins should be done perpendicular
to the external enamel surface adjacent to the margins.

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To ensure that the marginal amalgam is well condensed before carving, the over-packed amalgam should be burnished immediately with a large burnisher, using heavy strokes mesiodistally and faciolingually, which is referred to as
pre-carve burnishing. To maximize its effectiveness, the burnisher head should be large enough that in the final strokes, it contacts the cusp slopes but not the margins . Pre-carve burnishing produces denser amalgam at the
margins of the occlusal preparations restored with high-copper amalgam alloys and initiates contouring of the restoration.

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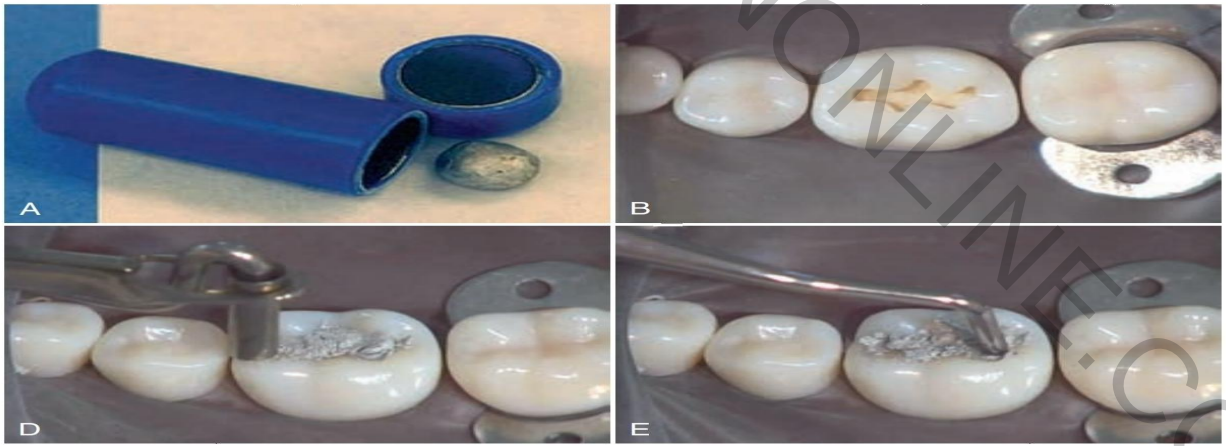

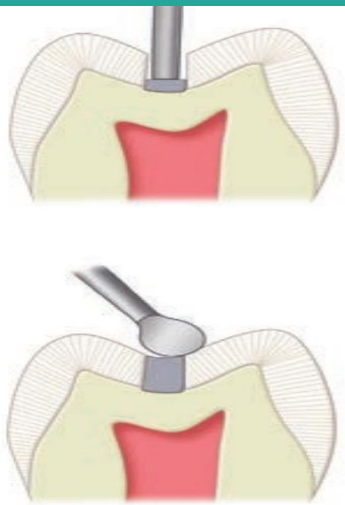

Deep occlusal grooves should not be carved into the restoration because these may thin the amalgam at the margins, invite chipping, and weaken the restoration .

Under-carving leaves thin portions of amalgam(subject to fracture) on the unprepared tooth surface. The thin portion of amalgam extending beyond the margin is referred to as flash. The mesial and distal fossae should be
carved slightly deeper than the proximal marginal ridges

After carving is completed, the outline of the amalgam margin should reflect the contour and location of the prepared cavosurface margin.

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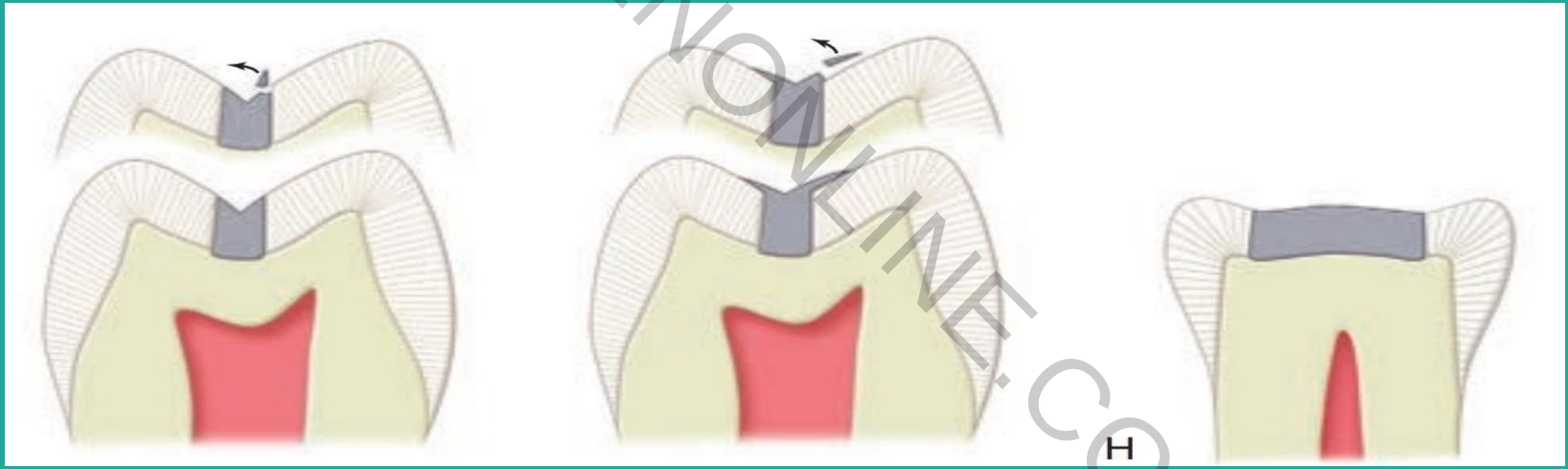

Post-carve burnishing is done by lightly rubbing the carved surface with a burnisher of suitable size and shape to improve smoothness and produce a satin (not shiny) appearance. The surface should not be rubbed hard enough to produce grooves in the amalgam. Post-carve burnishing may improve the marginal integrity of low- and high-copper amalgams and may improve
the smoothness of the restoration.
Post-carve burnishing
in conjunction with pre-carve burnishing may serve as a viable substitute for conventional polishing

Next, the occlusion of the restoration must be evaluated.
Most amalgams do not require further finishing and polishing. These procedures are occasionally necessary, however, to
(1) complete the carving;
(2) refine the anatomy, contours, and marginal integrity; and
(3) enhance the surface texture of the restoration.
Additional finishing and polishing procedures for amalgam restorations are not attempted within 24 hours of insertion because crystallization is incomplete

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Fig. 14-24 Polishing the amalgam. **A,** When necessary, fine-grit alumina or carborundum stone is used to develop continuity of surface from the tooth to the restoration. **B,** The restoration is surfaced with a round finishing bur. **C,** The stone's long axis or the bur's long axis is held at a right angle to the margin. **D,** Polishing is initiated with a coarse, rubber abrasive point at low speed. **E,** The point should produce a smooth, satiny appearance. **F,** A high polish is obtained with medium-grit and fine-grit abrasive points. **G,** Polished restoration. *(Courtesy of Aldridge D. Wilder, DDS.)*

Clinical Technique for Class II Amalgam Restorations :

Initial Clinical Procedures

Occlusal contacts should be marked with articulating paper before tooth preparation.

Opposing “plunging cusp” or other pointed cusp may need to be recontoured to reduce the risk of fracture of the new restoration or the cusp from occlusal forces. Placement of a rubber dam is generally recommended.

Insertion of an interproximal wedge or wedges depress and protect the rubber dam and underlying soft tissue, separate teeth slightly, and may serve as a guide to prevent gingival overextension of the proximal boxes.

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Tooth PreparationClass II Amalgam Restorations

Involving only one proximal surface:

INITIAL TOOTH PREPARATION

Occlusal Outline Form (Occlusal Step)

Using high speed with air-water spray, the operator enters the pit nearest the involved proximal surface with a punch cut using a No. 245 bur which is kept parallel to the long axis of tooth.

As the bur enters the pit, a depth of 0.1–0.2 mm into dentin should be established (i.e., one-half to two-thirds the length of the cutting portion of a No. 245 bur);

1.5 mm as measured at the central fissure. While maintaining the same depth and bur orientation, the bur is moved to extend the outline to include the central fissure and the opposite pit if necessary

For the very conservative preparation, the isthmus width should be as narrow as possible, preferably no wider than one-quarter the intercuspal distance.Ideally, it should be the width of the No. 245 bur. and approximately 2 mm on the pre-

pared external walls such that the DEJ is identified

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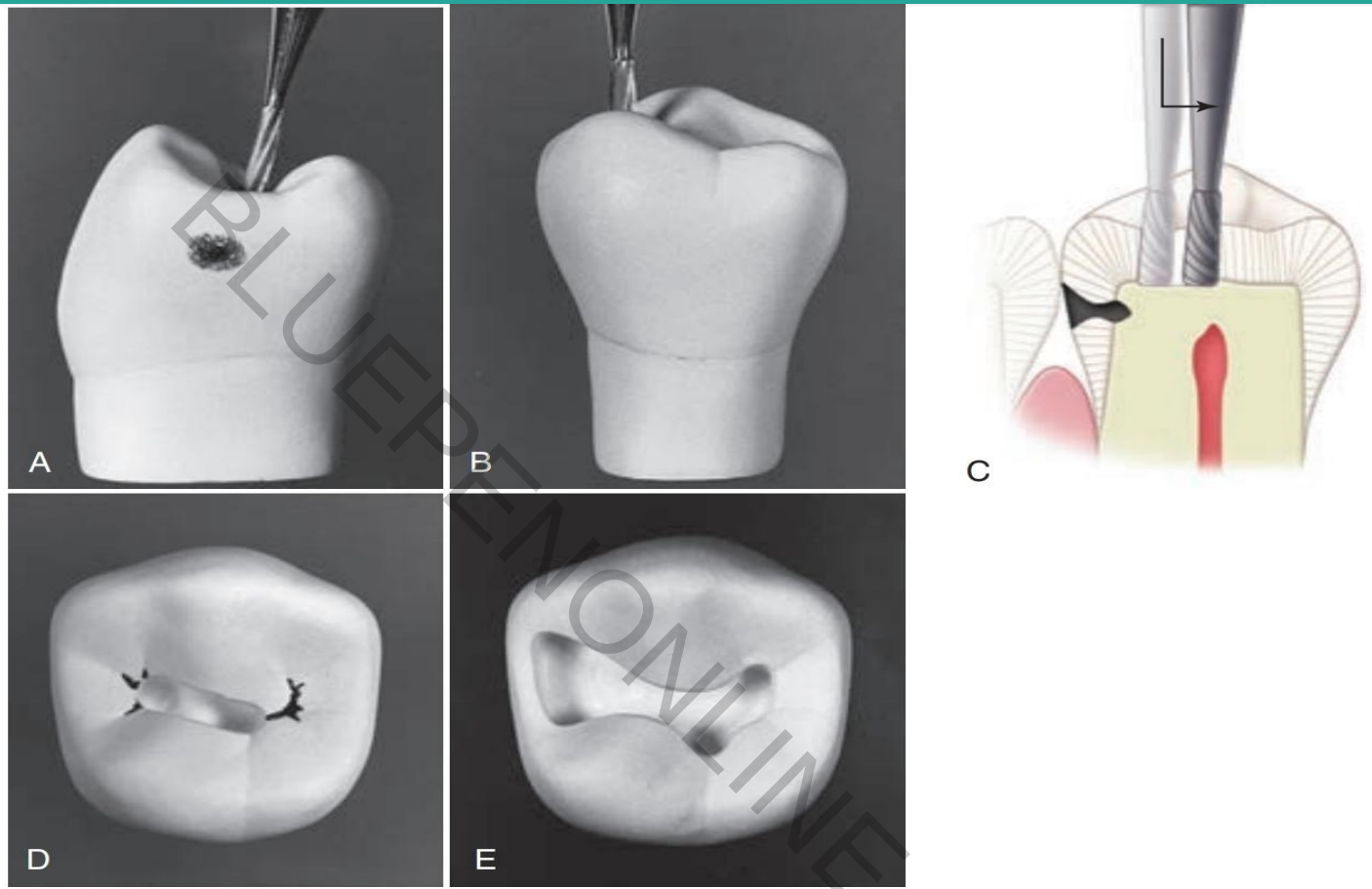

Fig. 14-39 Entry and occlusal step. **A,** Bur position for entry, as viewed proximally. Note the slight lingual tilt of the bur. **B,** Bur position as viewed lingually. **C,** The tooth is entered with a punch cut, and extension is done distally along central fissure at a uniform depth of 1.5 to 2 mm (1.5 mm at fissure; because of the inclination of the unprepared tooth surface, the corresponding measurement on the prepared wall is greater). **D,** Occlusal view of *C*. **E,** Completed occlusal step.

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Maintaining the bur parallel to the long axis of the tooth crown creates facial, lingual, and distal walls with a slight occlusal convergence, which provides favorable amalgam angles at the margins.

A reverse curve in the occlusal outline of a Class II preparation often results when developing the mesiofacial wall perpendicular to the enamel rod direction while, at the same time, conserving as much of the facial cusp structure as possible. The extension into the mesiofacial cusp is limited to that amount required to permit a 90-degree mesiofacial margin which is indicated when using amalgam. Lingually, the reverse curve usually is minimal (i necessary at all) because the embrasure form is larger

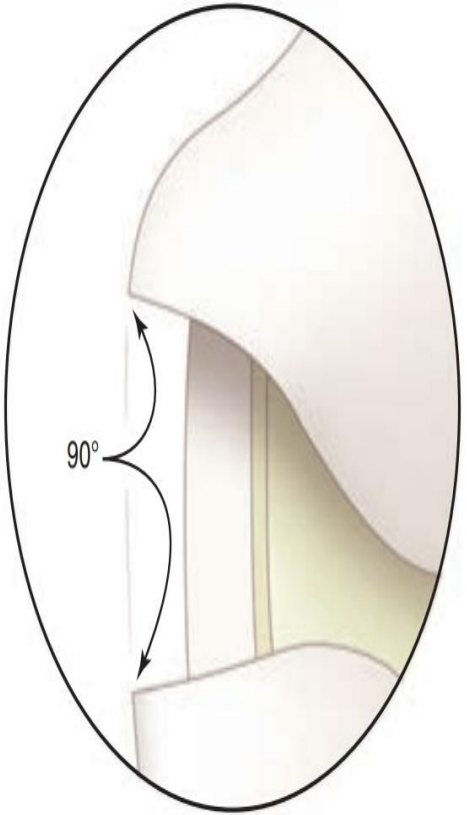

Fig. 14-41 The reverse curve in the occlusal outline usually is created when the mesiofacial enamel wall is parallel to the enamel rod direction. Lingually, the reverse curve is very slight, often unnecessary.

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While maintaining the established pulpal depth and with the bur parallel to the long axis of the tooth crown, the preparation is extended mesially, stopping approximately 0.8 mm short of cutting through the marginal ridge into the contact area. The occlusal step in this region is made slightly wider faciolingually than in the Class I preparation because additional width is necessary for the proximal box. The proper depth of the occlusal portion of the preparation increases the strength of the restoration, however, more than does faciolin-
gual width.

Proximal Outline Form (Proximal Box)

The objectives for the extension of the proximal margins are as follows:

1. Include all caries, defects, or existing restorative material
2. Create 90-degree cavosurface margins (i.e., butt-joint margins)
3. Establish (ideally) not more than 0.5 mm clearance with the adjacent proximal surface facially, lingually, and gingivally

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The initial procedure in preparing the outline form of the proximal box is the isolation of the proximal (i.e., mesial) enamel by the **proximal ditch cut**. While maintaining the same orientation of the bur, it is positioned over the DEJ in the pulpal floor next to the remaining mesial marginal ridge. The end of the bur is allowed to cut a ditch gingivally along the exposed DEJ, two-thirds at the expense of enamel and one-third at the expense of dentin. The ditch is extended gingivally just beyond the caries or the proximal contact, whichever is greater.

This gingival margin should clear the adjacent tooth by only 0.5 mm in a small tooth preparation . Clearance of the proximal margins greater than 0.5 mm is excessive, unless indicated to include any caries, undermined enamel, or existing restorative material. The location of the final proximal margins should be established with hand instruments (i.e., chisels, hatchets, trimmers) in conservative proximal box preparations. Otherwise, these margins may be overextended to achieve 90-degree cavosurface margins with the No. 245 bur

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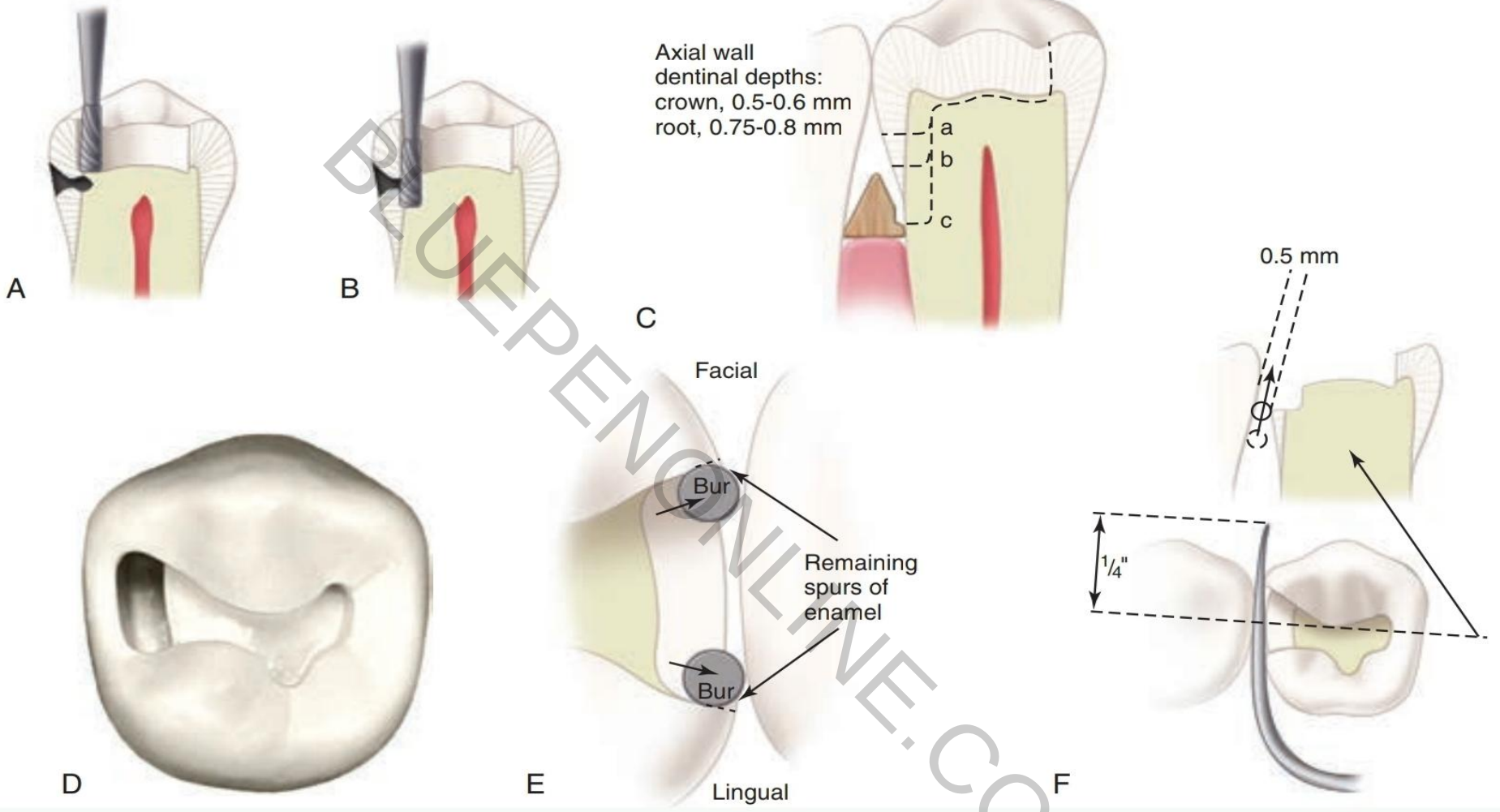

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Extending gingival margins into the gingival sulcus should be avoided, where possible, because subgingival margins are more difficult to restore and may be a contributing factor to periodontal disease.

The proximal ditch cut may diverge gingivally to ensure that the faciolingual dimension at the gingival aspect is greater than at the occlusal aspect .The shape of the No. 245 bur should provide this divergence. The gingival divergence contributes to the retention form and provides for the desirable extension of the facial and lingual proximal margins to include defective tooth structure or old restorative material at the gingival level, while conserving the marginal ridge and providing for 90-degree amalgam at the margins on this ridge.

The proximal extensions are completed when two cuts, one starting at the facial limit of the proximal ditch and the other starting at the lingual limit, extending toward and perpendicular to the proximal surface (until the bur is nearly through enamel at the contact level), are made . The side of the bur may emerge slightly through the surface at the level of the gingival floor , this weakens the remaining enamel by which the isolated portion is held This prevents the bur from marring the proximal surface of the adjacent tooth.

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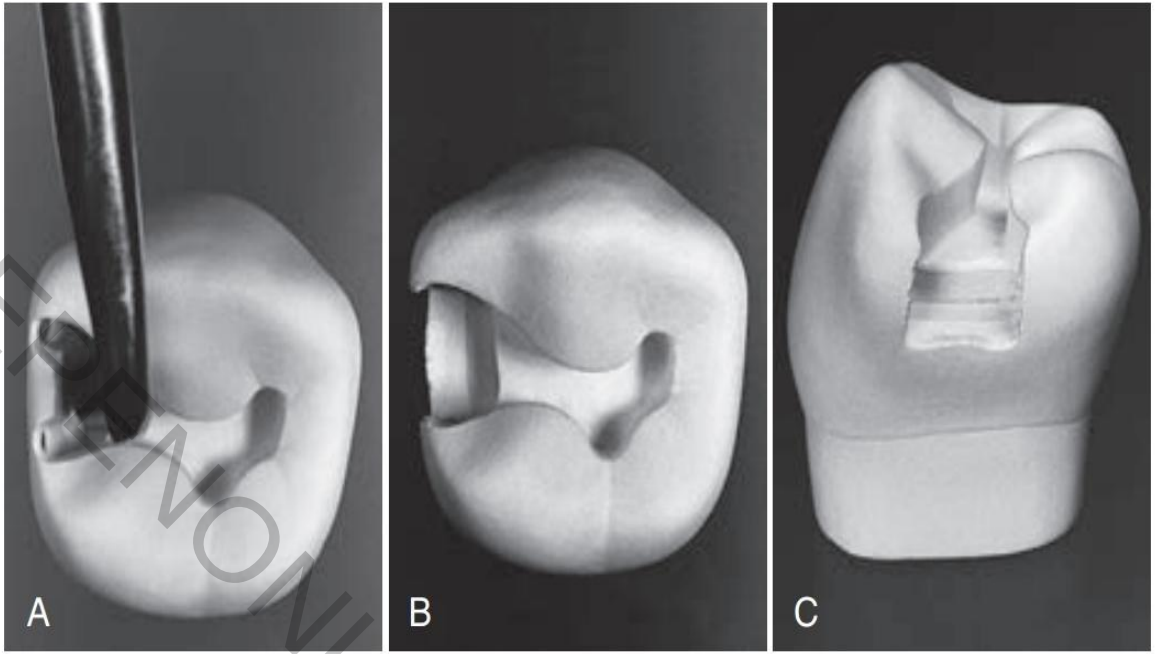

Fig. 14-43 Removing isolated enamel. **A,** Using a spoon excavator to fracture the weakened proximal enamel. **B,** Occlusal view with the proximal enamel removed. **C,** Proximal view with the proximal enamel removed.

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To protect the gingiva and the rubber dam when extending the gingival wall gingivally, a wooden wedge should already be in place in the gingival embrasure to depress soft tissue and the rubber dam.

A round toothpick wedge is preferred unless a deep gingival extension is anticipated.

A triangular (i.e., anatomic) wedge is more appropriate for deep gingival extensions because the greatest cross-sectional dimension of the wedge is at its base.

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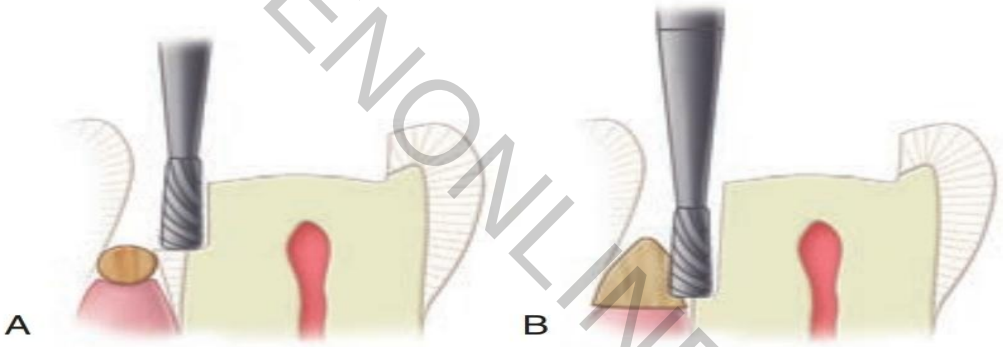

Fig. 14-44 Wedging. **A,** A round toothpick wedge placed in the gingival embrasure protects the gingiva and the rubber dam during preparation of the proximal box. **B,** A triangular wedge is indicated when a deep gingival extension of the proximal box is anticipated because the wedge's greatest cross-sectional dimension is at its base. Consequently, it more readily engages the remaining clinical tooth surface.

The primary resistance form is provided by
(1) the pulpal and gingival walls being relatively level and perpendicular to forces directed with the long axis of the tooth;
(2) restricting the extension of the walls to allow strong cusps and ridge areas to remain with sufficient dentin support, at the same time establishing the peripheral seat;
(3) restricting the occlusal outline form (where possible) to areas receiving minimal occlusal contact
(4) the reverse curve optimizing the strength of the amalgam and tooth structure at the junction of the occlusal step and proximal box;
(5) slightly rounding the internal line angles to reduce stress concentration in the tooth structure (automatically created by bur design except for the axiopulpal line angle); and
(6) providing enough thickness of the restorative material to prevent its fracture from the forces of mastication.

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The primary retention form is provided by the occlusal convergence of the facial and lingual walls

After completing the initial tooth preparation, the adjacent proximal surface should be evaluated. An adjacent proximal restoration may require recontouring and smoothing to develop proper contact, contour, and embrasure form for the

new restoration; this may be done with finishing burs, abrasive finishing strips, disks, or a combination of all of these. If inadvertent minimal damage occurs to the adjacent proximal surface during the initial tooth preparation, the proximal

surface should be recontoured or restored.

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FINAL TOOTH PREPARATION

Removal of Any Remaining Defective Enamel and Infected Carious Dentin

Removing enamel pit-and-fissure remnants and infected dentin on the pulpal wall in Class II preparations is removed with a slowly revolving round bur of appropriate size, a discoid-type spoon excavator, or both. The excavation should stop when a hard or firm feel with an explorer or small spoon excavator is achieved.

Removing enamel pit-and-fissure remnants and infected dentin should not affect the resistance form. To achieve an enhanced resistance form, the occlusal step should have pulpal seats at the initial preparation depth, perpendicular to the long axis of the tooth in sound tooth structure and peripheral to the excavated area .

Infected carious dentin in the axial wall is removed with appropriate round burs, spoon excavators, or both.

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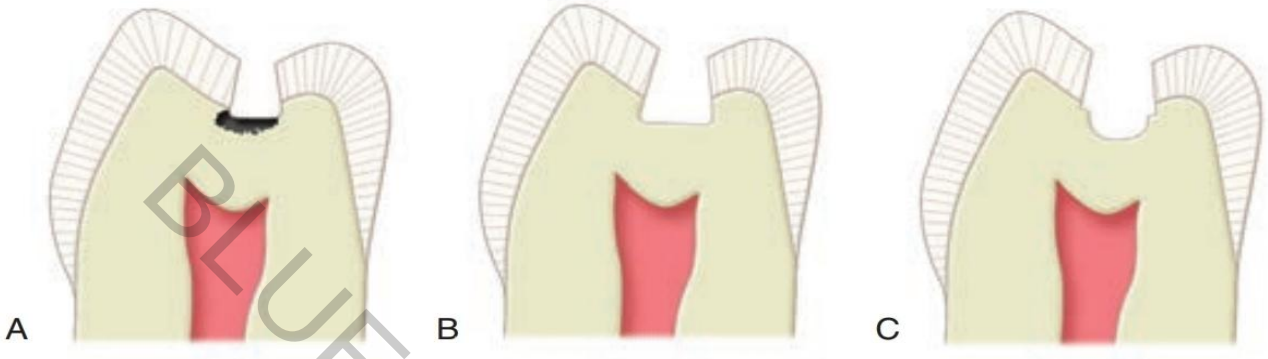

Fig. 14-47 Management of small- to moderate-sized carious lesion on the pulpal wall. **A,** Infected carious dentin extending beyond the ideal pulpal wall position. **B,** Incorrect lowering of the pulpal wall to include infected carious dentin. **C,** Correct extension facially and lingually beyond the infected carious dentin. Note the excavation below the ideal pulpal wall level and the facial and lingual seats at the ideal pulpal wall level.

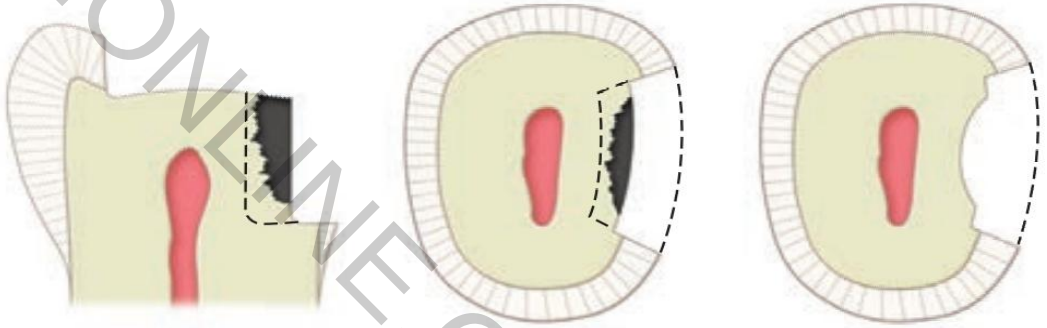

Fig. 14-48 Management of a moderate to extensive carious lesion. Infected dentin on the axial wall does not call for the preparation of the axial wall toward the pulp, as shown by dotted lines. Infected carious dentin extending pulpally from the ideal axial wall position is removed with a round bur.

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Extension of the entire gingival wall to include a large caries lesion may place the gingival margin so deep that proper matrix application and wedging become extremely difficult to do. It should extend gingivally in the central portion of the gingival wall to include caries that is deep gingivally, although leaving the facial and lingual gingival corners at a more occlusal position. This partial extension of the gin-gival wall permits wedging of the matrix band where otherwise it may be difficult and damaging to soft tissue

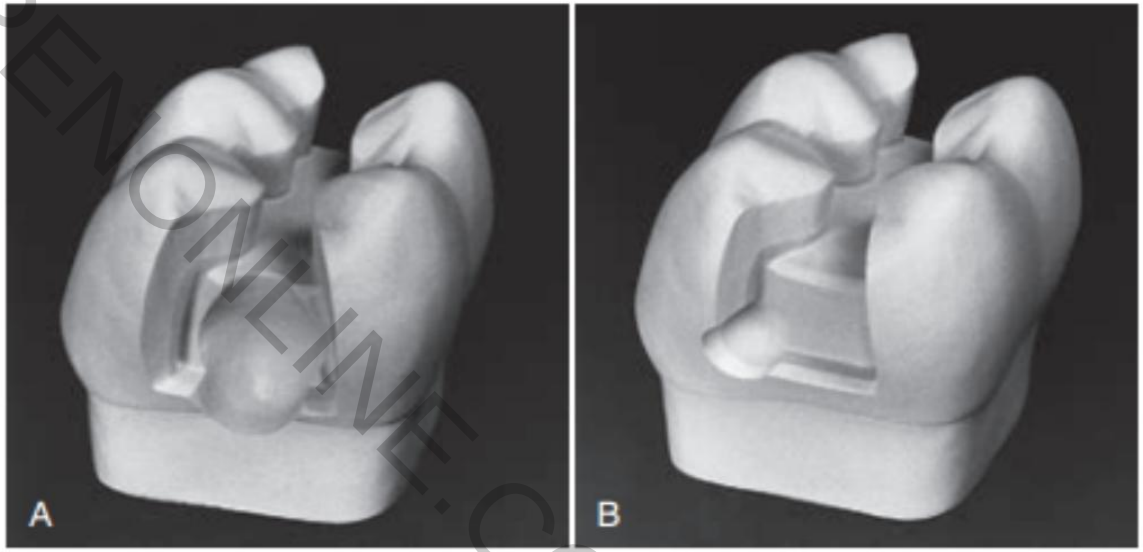

Fig. 14-50 **A,** Outline form that permits extension of the center portion of the gingival wall to facilitate proper matrix construction and wedging in situations where caries extends deep gingivally. **B,** Outline form that permits partial wall extension facially and gingivally to conserve the tooth structure.

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Pulp protection :
Achieved as stated earlier.
Secondary Resistance n Retention form:
Secondary resistance form in final tooth preparation involves resistance of the remaining tooth structure against fracture from oblique forces and resistance of restorative material against fracture. Restricting extensions of external walls pro-
vides the former; the latter is enhanced by using the gingival margin trimmer or a bur to round the axiopulpal line angle , increasing the bulk of and decreasing the stress concentration within the restorative material.
proximal retention grooves are often unnecessary in preparations that include dove-tails. The use of retention grooves is recommended, however, in tooth preparations with extensive proximal boxes.
Finishing the External Walls
Preparation walls and margins should not have unsupported enamel and irregularities. No occlusal cavosurface bevel is indicated . Ideally, a 90-degree cavosurface angle (maximum of 100 degrees) should be present at proximal margin. Mesial gingival margin trimmer is used to establish a slight cavosurface bevel at gingival margin (or 20 degreesdeclination gingivally) if it is in enamel.

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VARIATIONS OF PROXIMAL SURFACE TOOTH PREPARATIONS:

Mandibular First Premolar

When preparing the occlusal portion, the bur is tilted slightly lingually to establish the correct pulpal wall direction .In addition, the mandibular first premolar presents a variety of occlusal patterns, most of which exhibit a large transverse ridge of enamel. Often, such a ridge has no connecting fissure

between the mesial and distal pits, dictating a Class II preparation with an outline form that does not extend to, or across, the ridge. If the opposite pit or proximal surface is faulty, it is restored with a separate restoration.

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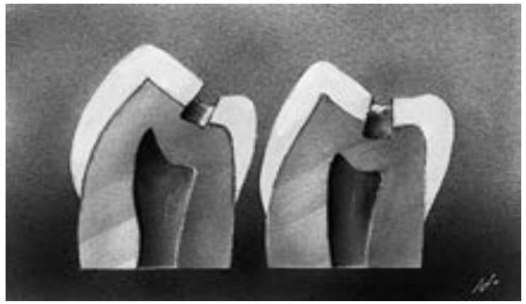

Fig. 14-55 The mandibular first and second premolars are compared. Note differences in the sizes of the pulp chambers, lingual cusps, and direction of pulpal walls.

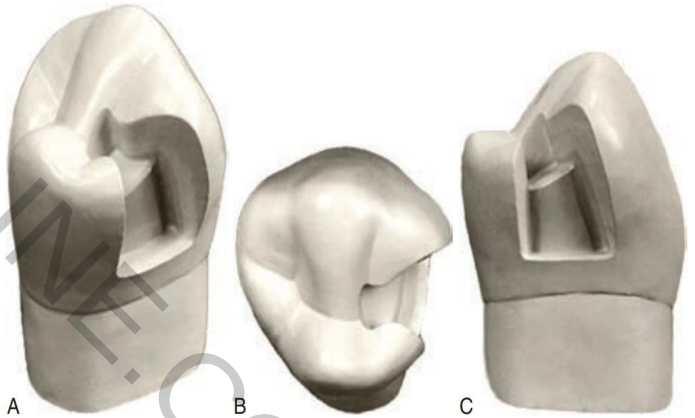

Fig. 14-56 The mandibular first premolar with a sound transverse ridge. **A,** A two-surface tooth preparation that does not include the opposite pit. **B,** Occlusal outline form. **C,** Proximal view of the completed preparation.

Maxillary First Molar

When maxillary first molar has an unaffected oblique ridge, separate two-surface tooth preparations are indicated (rather than a mesioocclusо-distal preparation) because the strength of the tooth crown is significantly greater when the oblique ridge is intact. Mesio-occlusal tooth preparation is generally uncomplicated . Occasionally, extension through the ridge and into the distal pit is necessary because of the extent of caries. The outline of this occlusolingual pit-and-fissure portion is similar to that of the Class I occlusolingual preparation.

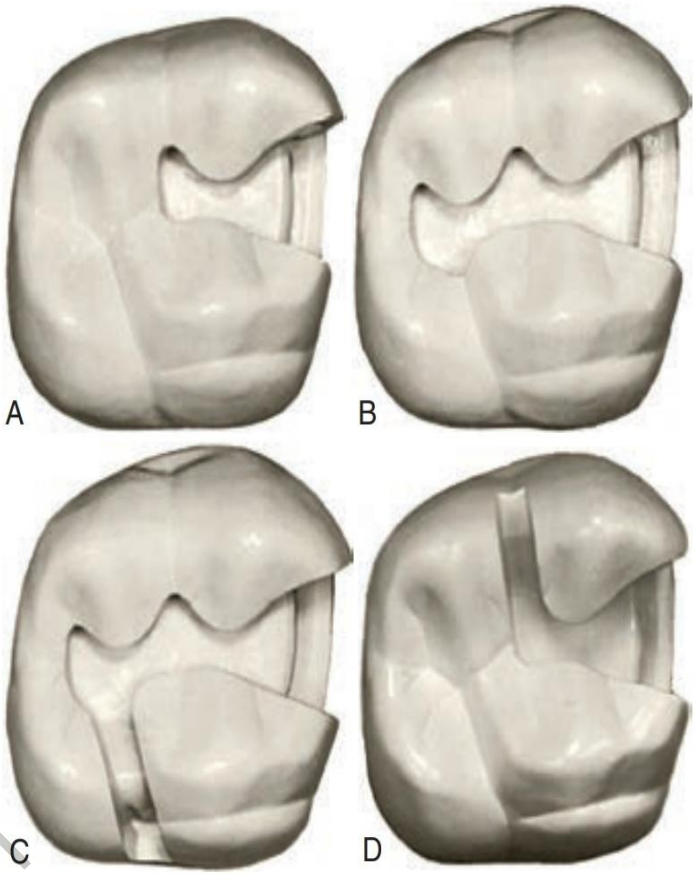

Fig. 14-57 Maxillary first molar. **A,** Conventional mesioocclusal preparation. **B,** Mesioocclusal preparation extended to include the distal pit. **C,** Mesioocclusо-lingual preparation, including the distal pit and the distal oblique and lingual fissures. **D,** Mesioocclusal preparation with facial fissure extension.

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If caries on facial cusp ridge cannot be eliminated without extending the margin to the height of the cusp ridge or undermining the enamel margin, preparation should be **extended facially through the ridge.**Pulpal wall of this facial extension has a depth of 1.5 to 2 mm,that is necessary to provide sufficient bulk of material for adequate strength. For the best esthetic results, minimal extension of the proximal mesiofacial margin is indicated.

The disto-occlusal tooth preparation has several outlines, depending on the occlusal anatomy n is determined by the pit-and-fissure pattern and by amount and extension of caries. An extension onto the lingual surface to include a lingual fissure should be prepared only after the distolingual proximal margin is established. This allows conservation of more tooth structure between the distolingual wall and the lingual fissure extension, resulting in more strength of the distolingual cusp.Distolingual cusp on many maxillary molars (particularly the maxillary second molars) may be weakened during a disto-occluso-lingual tooth preparation because of the small cuspal portion remaining between the lingual fissure preparation and the distolingual proximal wall. In addition, caries excavation may weaken the cusp. **Capping of the distolingual cusp is often necessary to provide the proper resistance form.**

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Maxillary First Premolar

A Class II amalgam tooth preparation involving the mesial surface of a maxillary first premolar requires special attention because the mesiofacial embrasure is esthetically prominent. The occlusogingival preparation of the facial wall of the mesial box should be parallel to the long axis of the tooth instead of

converging occlusally and facial extension of the mesiofacial proximal wall should be minimal so that the mesiofacial proximal margin of the preparation only minimally clears the contact .

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 in the typical preparation, the facial and lingual proximal walls converge occlusally. Retention grooves are necessary in box-only preparations.The proximal retention grooves should have a 0.5-mm depth at the gingival point angle, tapering to a depth of 0.3 mm at the occlusal surface .

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Class II Amalgam Restorations Involving Both Proximal Surfaces:

The principles of tooth preparation are as follows:

- A cavosurface marginal design that results in an approximate 90-degree amalgam margin
- Appropriate removal of tooth structure to provide for adequate strength of the amalgam
- Appropriate retention features

Occlusal Extensions

Often, a larger Class II defect requires greater extension of the occlusal surface outline form. This may require extending the grooves that are fissured, capping the cusps that are under-mined, or extending the outline form up the cuspal inclines.

Proximal Extensions

Larger Class II restorations often require larger proximal box preparations. These may include not only increased faciolin-gual or gingival extensions but also extension around a facial or lingual line angle and also need secondary retention features (i.e., retention grooves, pins, slots) for an adequate retention

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Restorative Technique for Class II Amalgam Preparations:

Matrix Placement

The primary function of the matrix is to restore anatomic contours and contact areas.
The qualities of a good matrix include
(1) rigidity,
(2) establishment of proper anatomic contour,
(3) restoration of correct proximal contact relation,
(4) prevention of gingival excess,
(5) convenient application, and
(6) ease of removal.

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UNIVERSAL MATRIX

The universal matrix system (designed by B.R. Tofflemire) is ideally indicated when three surfaces (i.e., mesial, occlusal, distal) of a posterior tooth have been prepared . It also is commonly used for the two-surface Class II restoration. Advantage of the Tofflemire matrix retainer is that it may be positioned on the facial or lingual aspect of the tooth. The retainer and the band are generally

stable when in place. The retainer is separated easily from the band . Matrix bands of various occlusogingival widths are available.A small Tofflemire retainer is available for use with the primary dentition.

Fig. 14-72 Lingual positioning requires a contra-angled Universal retainer.

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After the matrix contour and extension are evaluated, a wedge is placed in the gingival embrasure using the following technique:
(1) Break off approximately 0.5 inch (1.2 cm) of a round toothpick.
(2) Grasp the broken end of the wedge with the No. 110 pliers.
(3) Insert the pointed tip from the lingual or facial embrasure (whichever is larger), slightly gingival to the gingival margin.
(4) Wedge the band tightly against the tooth and margin
The wedge should not be so far apical to the gingival margin that the band will not be held tightly against the gingival margin. This improper wedge placement results in gingival excess (i.e., "overhang").To be effective, a wedge should be positioned as close to the gingival margin as possible without being occlusal to it.

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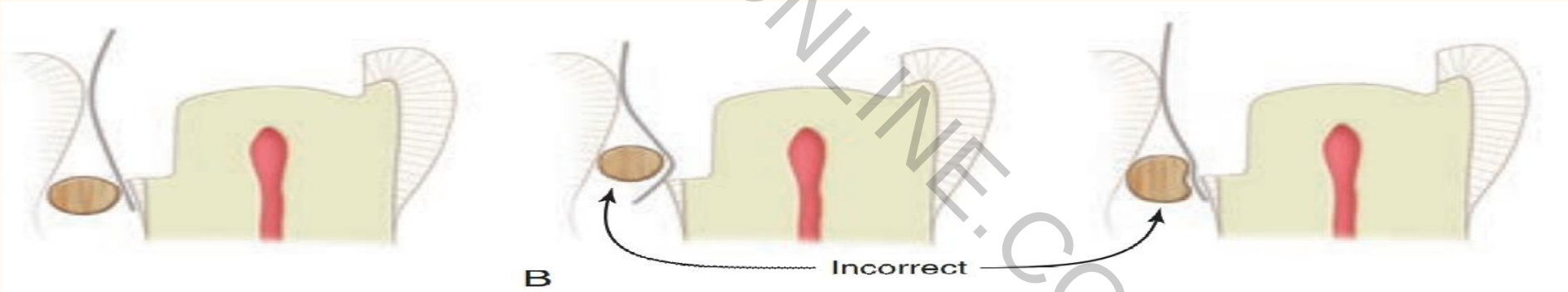

Fig. 14-79 **A,** Correct wedge position. **B,** Incorrect wedge positions.

Variations

●If the wedge is significantly apical of the gingival margin, a second (usually smaller) wedge may be placed on top of the first to wedge adequately the matrix against the margin . This type of wedging is particularly useful for patients whose interproximal tissue level has receded.

●Double wedging refers to using two wedges: one from the lingual embrasure and one from the facial embrasure . Two wedges help ensure that the gingival corners of a wide proximal box can be properly condensed; they also help minimize gingival excess. Indicated when the proximal box is wide faciolingually.

●Wedge wedging -Occasionally, a concavity may be present on gingival margin of the proximal surface of a fluted root, such as the mesial surface of the maxillary first premolar . A gingival margin located in this area may be concave . To wedge a matrix band tightly against such a margin, a second pointed wedge can be inserted between the first wedge and the band.

●The round toothpick wedge is usually the wedge of choice with conservative proximal boxes. The triangular (i.e., anatomic) wedge is recommended for a preparation with a deep gingival margin.

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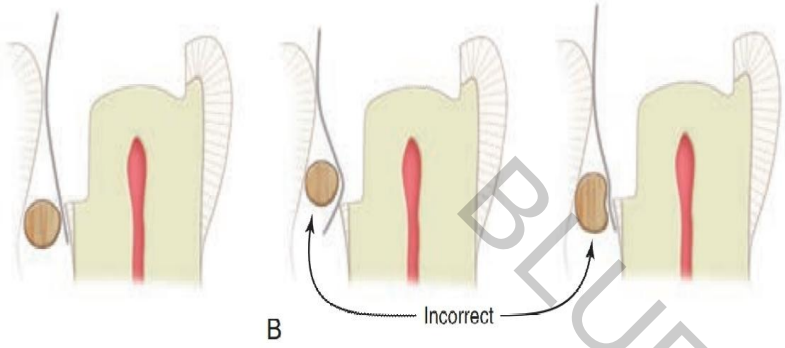
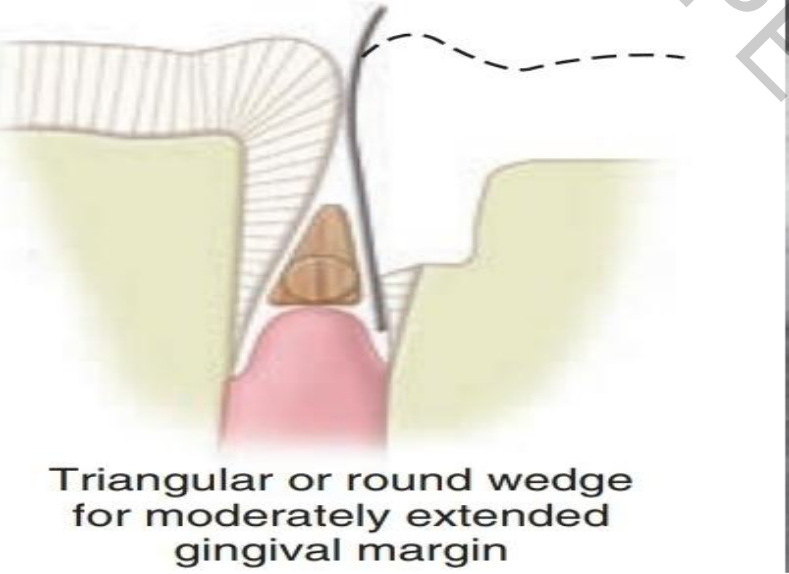
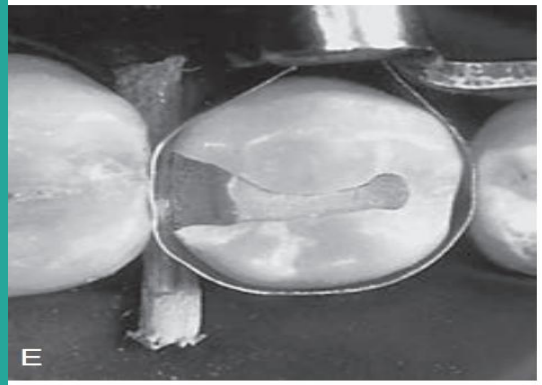
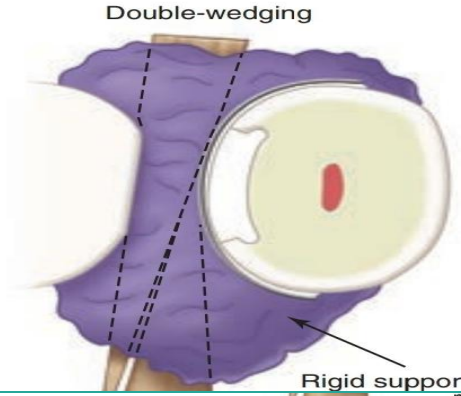
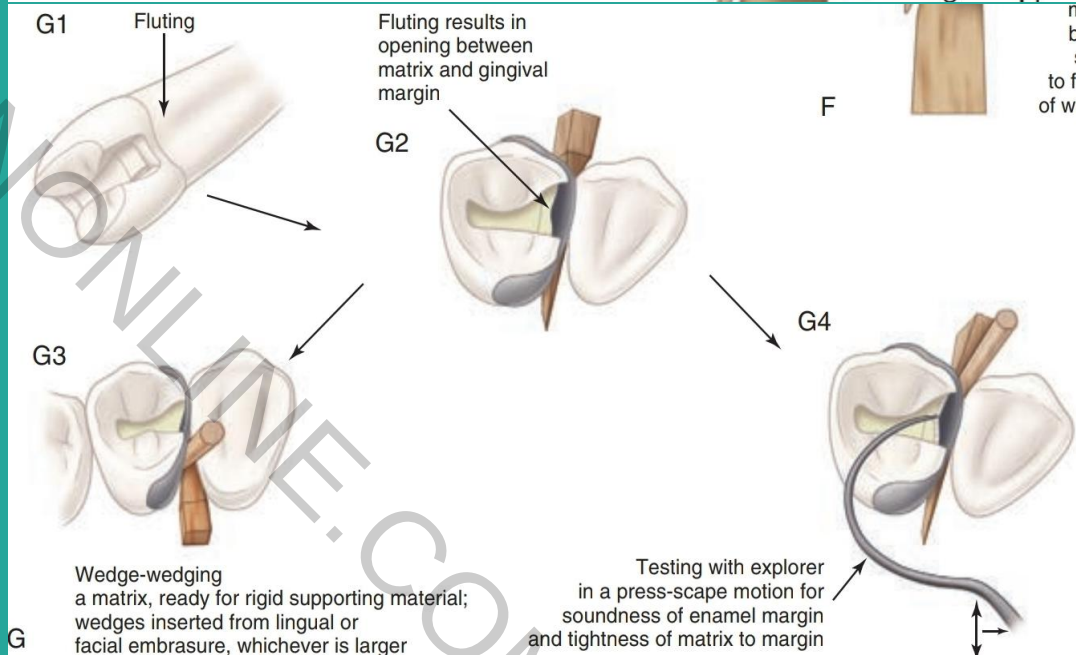


Fig. 14-79 **A,** Correct wedge position. **B,** Incorrect wedge positions.









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INSERTION AND CARVING OF THE AMALGAM

The principal objectives during the insertion of amalgam are as follows:

• Condensation to adapt the amalgam to the preparation walls and the matrix and to produce a restoration free of voids

• Keeping the mercury content in the restoration as low as possible to improve strength and decrease corrosion

Further Procedure is same as described earlier

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Class VI Amalgam Restorations:

Composite is generally used to restore Class VI preparations. Amalgam may be selected for posterior class VI preparations because of its wear resistance and longevity. Moisture control for Class VI restorations is usually achieved with
cotton roll isolation. Class VI amalgam preparations may be accomplished with a small tapered fissure bur and involves extension to place the cavosurface
margin on enamel that has sound dentin support. The preparation walls may need to diverge occlusally to ensure a 90-degree cavosurface margin. A depth of 1.5 mm is sufficient to provide bulk of material for strength. Retention
of the restoration is ensured by the creation of small undercuts along the internal line angles. Do not remove dentin that is immediately supporting enamel. Conservative tooth preparation is particularly important with Class VI preparations because it is easy to undermine the enamel on incisal edges
and cusp tips. Inserting, carving, and polishing are similar to Class I tooth preparations for amalgam.

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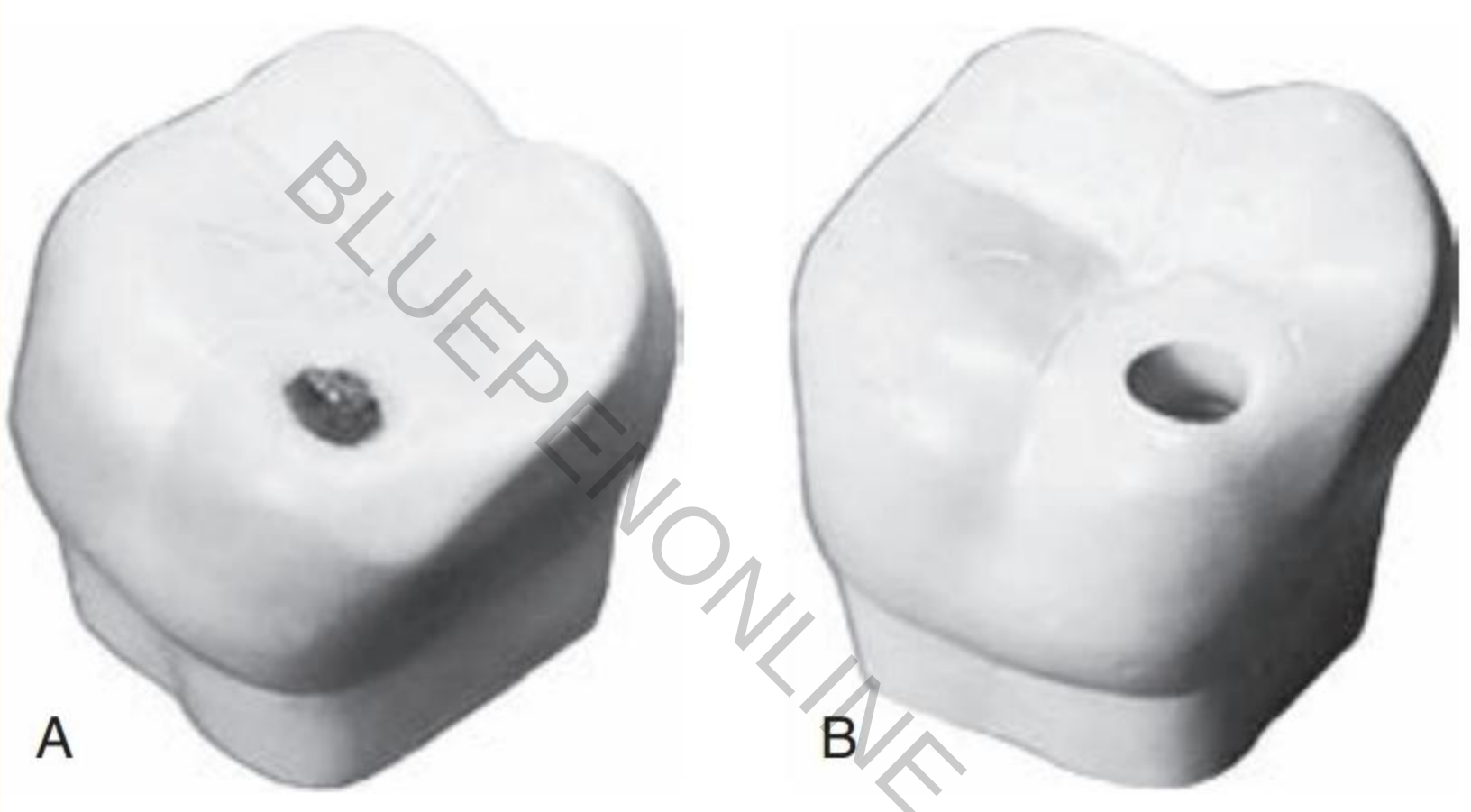

-Dr.Swapnali

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