

ORIGINAL ARTICLE

A Class III Cavity Preparation for Direct Gold: Modified Loma Linda Design

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This cavity, designed for maxillary teeth with strong marginal ridges, is inconspicuous, conserves tooth structure, preserves the marginal ridge, has adequate convenience form, excellent retention, and confined walls that assist the operator in beginning condensation.

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The illustrations are provided by George Robbins, School of Dentistry, UCLA.

The direct gold restoration has encountered a measure of disfavor in the profession and among instructors in the schools. This unfortunate status is attributed to a gradually diminishing interest in the ability to perform a rather challenging procedure with skill and efficiency. Where direct gold restorations can be placed to the satisfaction of clinician and patient alike, it is difficult to justify the use of inferior restorative materials. In examining reasons for the disfavor of direct gold restorations among our colleagues, we find that the preparation of the cavity and the manipulation of the gold, from placement to finish, are so exacting, complicated, or tedious that the average dentist is discouraged. Instead of developing the knowledge and skill that would ensure confidence in creating a satisfactory gold restoration with aptitude and efficiency, he prefers procedures that are less demanding. The modern clinician, however, with concern for preventive dentistry, can understand that teeth with small lesions can be restored securely and permanently with direct gold, whereas the temporary nature of "esthetic" materials provides only limited assurance that the tooth has been treated and restored. The harmonious color of esthetic restorations is short-lived, and replacements lead eventually to more heroic measures to retain appearance and function.

New Designs of Cavities

To encourage broader use of direct gold restorations, efforts to simplify the direct gold techniques are constantly being made. Among the new approaches is a cavity designed with an inconspicuous or invisible facial margin, yet a cavity that meets all the basic criteria for acceptability. The conservative facial outline ensures a minimal display of gold and also ensures acceptance by the patient, especially when the operation can be completed with ease and dispatch. The approach to the preparation of this cavity is from the lingual aspect and several designs have been developed (True, 1943; Jeffery, 1957; Ingraham & Koser, 1961).

True Cavity Preparation

True (1943) described a Class III preparation with a lingual approach that is instrumented from the linguoincisor direction. The preparation has a partial lingual wall that preserves a portion of the marginal ridge above the gingival wall. Convenience form is achieved by an exaggerated incisal turn on the lingual surface and a slight concavity to the axial wall. These two features permit adequate access for preparing the walls, the retention, and the remote line angles within the preparation; they also facilitate condensation of the gold.

Powdered Golds and the Loma Linda Cavity Preparation

The advent of the powdered golds, Goldent and Electraloy (Williams Gold Refining Company Inc., Buffalo, NY 14214, USA), has led to a modified design of Class III cavity (Lund & Baum, 1965). This preparation has a facial outline with minimal extension, complemented by a lingual approach that facilitates the preparation of the cavity and the condensation and finish of the restoration. Most of the instrumentation is carried out from the lingual direction.

Modified Loma Linda Cavity Preparation

Consistent with True we recognize the value of preserving a portion of the lingual surface if the maxillary anterior tooth is wide enough faciolingually where the gingival wall is to be located. The sacrifice of the valuable structure of the marginal ridge is usually unnecessary since convenience form may be achieved from the linguoincisor direction. Preserving the strong marginal ridge on the lingual surface adds to the retention of the restoration and expedites condensation of gold by confining the area of the cavity to which the gold is introduced and positioned for compaction (Fig. 1).

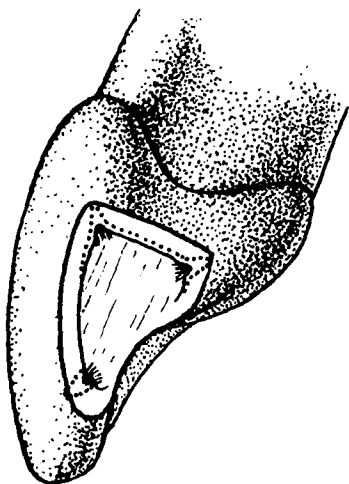


FIG. 1. Modified Loma Linda Class III cavity preparation with lingual access and preserved portion of the marginal ridge.

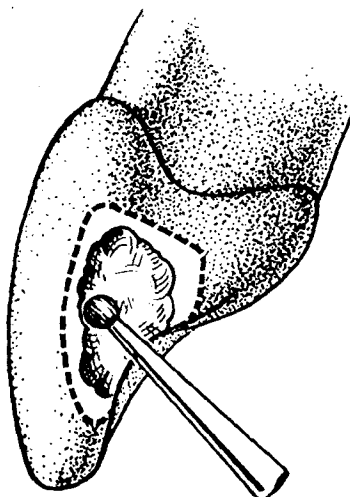


FIG. 2. Outline form is roughed out with a No. 2 round or No. 699 fissure bur.

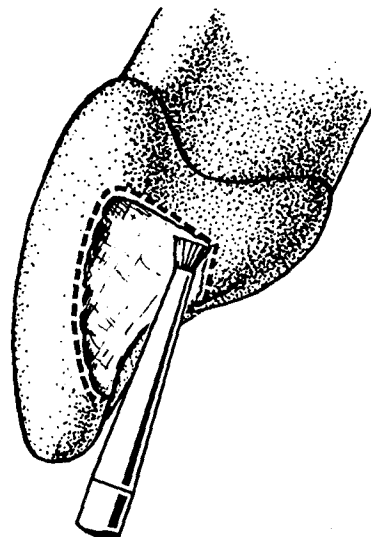


FIG. 3. Establishing the gingival wall with a No. 34 bur.

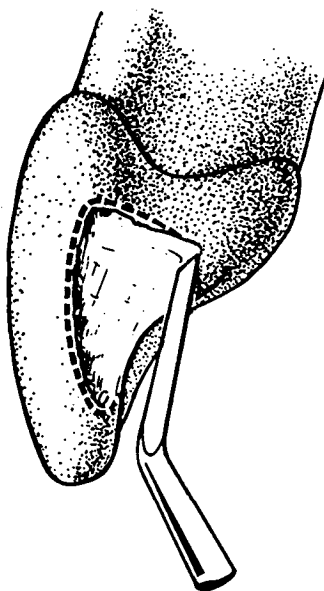


FIG. 4. Refining the gingival wall with a binangle chisel.

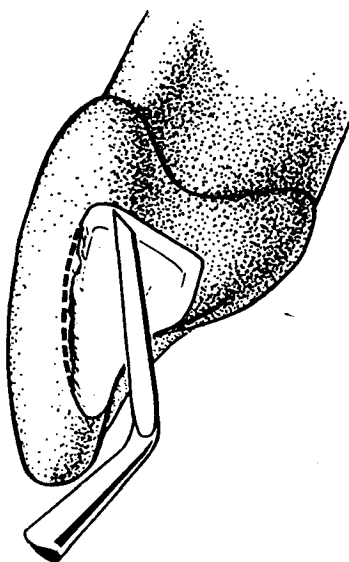


FIG. 5. Refining the lingual wall with a hoe or binangle chisel.

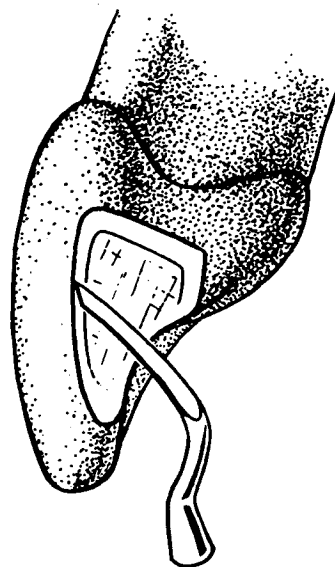


FIG. 6. Extending and refining the facial and incisal wall with Jeffery instruments.

Preparing the Cavity

Outline Form. Establish a rough outline form. Begin in the preparation with a 2 round bur or a 699 fissure bur (Fig. 2). Introduce the bur from the lingual surface toward the carious lesion. When this area is reached, extend the preparation with short "painting" strokes until a rough outline form with cavity walls has been achieved. The axial depth is limited because the removal of dentin is dictated only by the access needed to create the basic outline. Removal of caries is ignored at this stage of the preparation. The caries should influence only the extension of the gingival, facial, or lingual cavity walls to ensure adequate dentinal support. Caries on the axial wall is removed after the balance of the preparation has been completed.

Cavity Walls. Establish the gingival wall with a 34 inverted cone bur; make the wall perpendicular to the long axis of the tooth (Fig. 3). Be careful not to extend the gingival wall to the facial and lingual surfaces of the tooth. Establish the lingual wall within the gingival third of the lingual marginal ridge. Extend and refine the wall with a 6½-2½-9 hoe or a 10-8-8 binangle chisel (Fig. 4). Sharpen the junction of this wall with the gingival floor and join this wall to the lingual access opening with a sharp

but less abrupt angle. If necessary, flare the lingual wall slightly to ensure that no unsupported enamel prisms remain, and extend the cavosurface margin lingually to facilitate condensation and to aid in finishing the compacted gold. Prepare the facial portion of the gingival wall with the same hoe used for the lingual wall (Fig. 5).

The facial and incisal walls are considered as one wall. Extend it facially to break the contact and form a line in harmony with the facial contours of the crown. Continue the incisal extension of the facial wall to the lingual margin, then turn the wall abruptly and merge it with the margin of the access opening. Whenever possible, include the contact by the incisal extension of the wall. Establish definite line angles concomitantly with refining the facial wall by using the Jeffery 13, 14, and 15 hatchets (Fig. 6). Gingival margin trimmers also may be used for this procedure.

The lingual cavosurface margin forms the lingual border of the axial wall in the region of the access opening. Straighten and refine this margin with a hoe or the small Wedelstaedt chisel (Fig. 7).

Retention Form. Begin retention with a ¼ round bur. Place the gingival retentions in dentin at the facial and lingual extremities of the gingival floor. Direct these retentions as

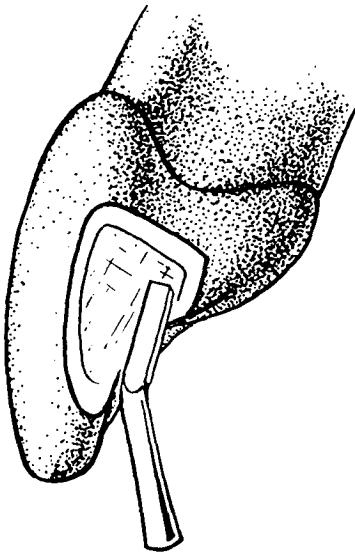


FIG. 7. Straightening and refining the lingual cavosurface margin with the Wedelstaedt or binangle chisel.

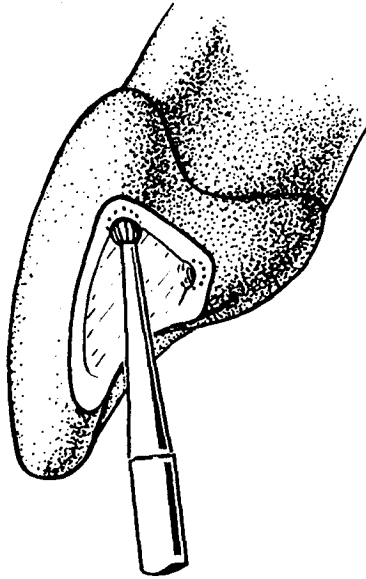


FIG. 8. Positioning the gingival retentions with a No. 1/4 round bur.

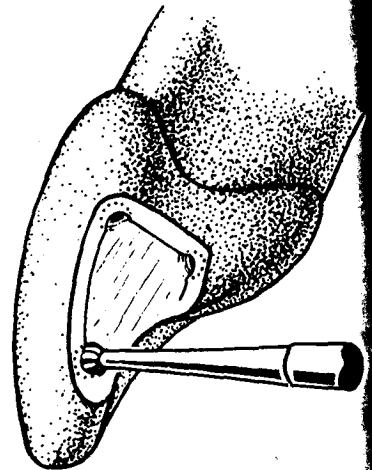
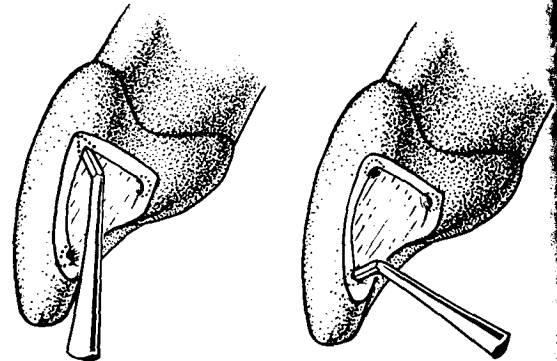


FIG. 9. Positioning the incisal retention.

much toward the long axis of the tooth as access or convenience form allows (Fig. 8). Begin the incisal retention on the axial wall and extend it under the incisal wall in a labioinciso-axial direction. This direction carries the retention into an area under the lobe of the labial surface (Fig. 9). Then use angle formers (Fig. 10) and incisal hatchets (Fig. 11) to transform the "pot holes" created by the bur into retentions that have a more sharply defined base (Fig. 12). This gives greater strength to the gold in the retentive pits.

Caries Removal. Now remove caries and clean the cavity.

The cavity is now ready for the insertion of the gold.



FIGS. 10 and 11. Opening the linguogingival retention with a bayonet or regular angle former (at left); extending and defining the incisal retention with an incisal hatchet (at right).

"TEARDROPS"

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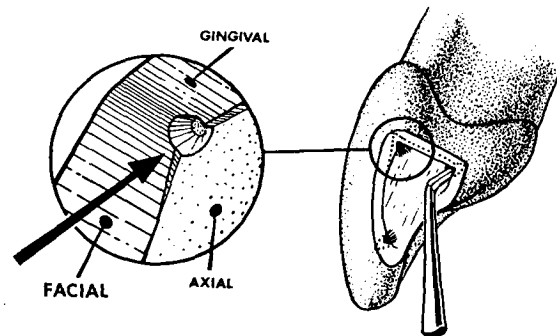


FIG. 12. The instrumentation of the gingival retentions gives them a more defined base as seen in the enlargement. Note also the accentuated axiokingival line angle.