

Operative Dentistry: Removal of the Extensive Carious Lesions

Armamentarium

Explorer
Different sized spoon excavators
Cotton pliers
Round burs #1, 2, 4, 6, and 8
High speed handpiece with air and water spray
Low speed handpiece
Cotton pellets

Step 1: Identify Caries

There is opacity surrounding the pit and fissure indicating undermining or demineralization of the enamel. There is softened enamel that can be flaked away with the explorer; and there is softening of the base of the pit and fissure that can be detected with the explorer. Place the tip of the explorer in the shallowest point of the groove and pull it toward the deepest part of the groove. Move the explorer from the outer groove to the center of the tooth. Recognize where there is a catch and remember where the catches are noted. This recognition of the carious lesion is the first step in developing the external outline. We use a cotton pellet to clean our cavity preparation.

Step 2: Establish Outline Form

The first step is to establish the ideal outline form. Penetrate with the high speed handpiece and place the pulpal floor 0.5 mm into dentin. Establish the ideal external and internal outline forms. When a tooth has a frank carious lesion which only minimally penetrates the dentin, the entire carious lesion is removed during this ideal cavity preparation. However, this is not the case when the carious lesion is extensive and extends beyond the ideal depth. In this case of an extensive carious lesion, an ideal outline form is established first, and only after the initial cavity preparation is completed, is the remaining carious dentin removed.

The purpose of completing the initial cavity preparation before extending axially or pulpally is twofold. First, it allows adequate visibility and convenience form for accessing and removing the remaining carious lesion. Secondly, completion of the initial cavity preparation allows immediate placement of a base or restoration, especially if there is a pinpoint pulpal exposure. This would not be possible if the carious lesion still needed to be removed along the lateral walls. The carious lesion is noted on the lateral walls, the buccal and lingual walls, as well as on the pulpal floor.

Step 3: Isolate the Lesion

The next step is to extend laterally to the point that the carious lesion is isolated. The goal is to place the walls $\frac{1}{4}$ to $\frac{1}{2}$ mm beyond the carious lesion. This extension is to isolate the carious lesion pulpally (or create a carious lesion island) by placing the walls in an intact, stain-free dentinoenamel junction (or a sound DEJ).

Step 4: Remove Caries

With the carious lesion exposed and isolated, and all the lateral walls and enamel rods supported by a sound dentinoenamel junction, removal of the remaining carious lesion may start.

The following instruments can be used to remove the remaining carious lesion:

- a) low speed handpiece with the largest round bur that will fit in the carious lesion used with light force and a wiping motion
- b) the largest spoon excavator that will fit in the carious lesion

The large spoon excavator will reduce the chance of a pulpal exposure. Forces of the removal of defective dentin should be directed laterally and not towards the center of the carious lesion. Carious removal starts from the lateral borders of the lesion.

The largest round bur that fits in the preparation is used in the low speed handpiece with a light touch and a sweeping motion to remove the carious lesion. In this case the #8 round bur fits.

Step 5: Confirm Removal

Check with the explorer to feel if all caries have been removed laterally. Do not exert excessive force with the explorer when over the pulp, as this force on the explorer may cause a pulpal exposure. Deeper penetration should only occur when all of the carious lesion has been removed laterally. A carious mass can often be peeled out in large portions early in the process. In the deeper areas, instrumentation should be done with a light force and extreme care. The carious lesion is removed in a **spiraling manner**, beginning with the **most superficial caries** at the outer lateral wall. As firm dentin is reached laterally, it is followed to the central area. The only area where the carious lesion remains is the very center; the lateral walls are clean. The deepest area of the carious lesion over the pulp is isolated and removed last. If a pinpoint pulpal exposure occurs, it will happen in the cleanest field possible and the exposure can be sealed immediately to minimize contamination of the pulp.

Step 6: Completion

Caries removal is completed when firm dentin with a shattering sound has been reached. The largest spoon excavator that will fit in the cavity should be used to test the dentin overlying the pulp. A sharp explorer should not be used to avoid a pulpal exposure. When caries removal is complete, the dentin appears shiny and not dull when washed and dried.

Step 7: Examine Stained Dentin

Rather than relying on only the dark color, the texture of the dentin must be felt. The tooth may remain stained even after caries removal is complete. The color of the dentin can range from yellow to black depending on the chronicity of the lesion. The dark color noted here does not mean that caries is still present. Stained dentin, as long as it is hard, should remain in place to minimize unnecessary loss of tooth structure. Because the dentinoenamel junction provides less resistance to the caries process than does either enamel or dentin, stained dentin is removed at the DEJ. Removal of the carious lesion is complete.