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Clinical Technique/Case Report

The Tucker Technique: Conservative Molar Inlays Preserving the Transverse Ridge

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SUMMARY

Conservation of healthy tooth structure should be the aim of any restorative procedure. Two inlays may be an ideal choice for the treatment of maxillary molars to preserve the transverse ridge and maintain structural integrity.

INDICATIONS

When mesial and distal proximal surface restorations are indicated on the maxillary first molar that has an unaffected oblique ridge, separate two-surface cavity preparations are indicated rather than a mesio-occlusodistal preparation, inasmuch as strength of the tooth crown is significantly greater when the oblique ridge is intact.[1,2] Cast gold inlays have long been used to conservatively restore compromised tooth structure. Often the clinician is faced with two areas requiring restoration on a maxillary molar interrupted with an intact oblique ridge of ample stock. Ideally, the dentist would elect to maintain this transverse ridge to minimize the separating forces of occlusion that flex the buccal and lingual halves of the molar from one another. Various combinations of inlays are possible depending on the surfaces involved.

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TECHNIQUE

Tooth #14 (Figures 1 and 2) was observed to have an existing mesial-occlusal composite and separate occlusal composite in the distal portion of the occlusal surface. Although the restorations were still serviceable, the patient was a dental hygienist who understood that all restorations have a limited life span. The hygienist, having been informed of the clinical data available with respect to materials and techniques,[3] requested the removal and replacement of her composites with cast-gold restorations utilizing the Tucker Technique. Occlusion was evaluated, anesthesia administered, and a heavy weight rubber dam (Coltene/Whaledent, Cuyahoga Falls, OH, USA) placed. Typically, all the existing restorative material and any caries would be removed. However, in this case, the operator elected to utilize the existing composites as block-out with the knowledge that very little if any would remain after preparation with the remaining removed prior to cementation.

Initial occlusal preparation was performed using a #57 fissure carbide bur (Midwest/Dentsply International, York, PA, USA) taking care not to overextend to the buccal in the mesial-buccal aspect of the preparation. The depth of the central groove area was reduced to approximately 1.5 mm and the buccal and lingual walls 2.5 mm because of the inclines of the cusps. The #57 carbide was used to create an angulation of approximately 3–5 degrees on each of the occlusal walls, and therefore a preparation taper of 6-10 degrees was produced. A definite buccal dovetail feature was created in the buccal groove to prevent the proximal dislodgment of the casting and

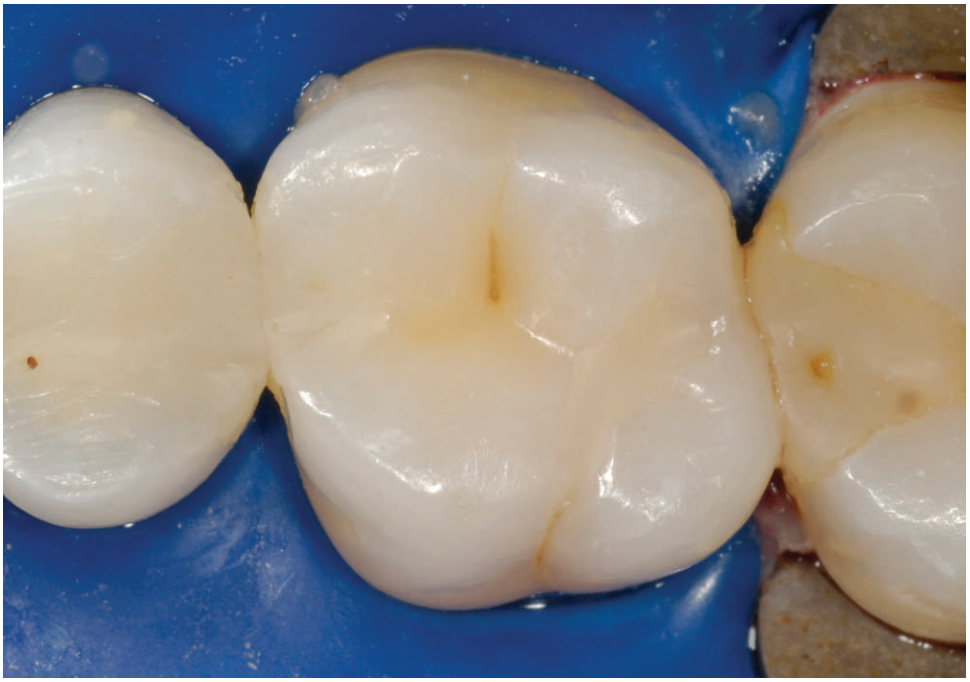

Figure 1. *Pre-operative view of tooth #14.*

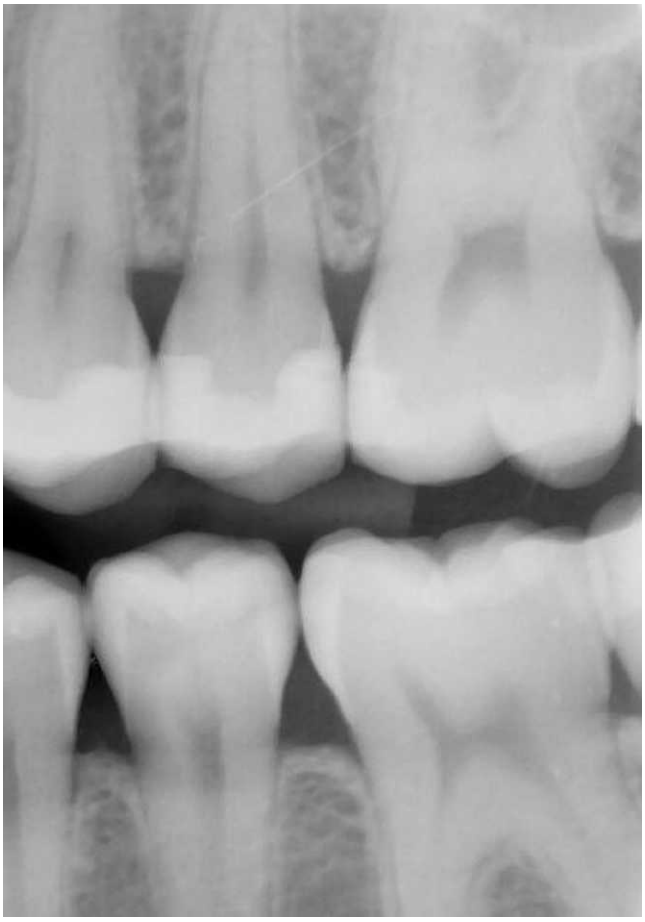

Figure 2. *Pre-operative radiograph of tooth #14.*

negate the need for an internal bevel in the proximal box. The #57 bur was used to establish a proximal box to a depth of 1.5 mm gingival to the pulpal floor or 4 mm from the proximal-occlusal cavosurface. The buccal wall of the proximal box was prepared with a 169L tapered fissure carbide bur held perpendicular to the occlusal surface to establish the mesiobuccal cavosurface and minimize extension to the buccal. The #57 carbide bur was used to prepare the mesiolingual wall of the proximal box and ensure that the axial depth of the proximal box had sufficient depth. A ½ inch sandpaper disc (E.C. Moore, Dearborn, MI, USA) was used to blend the mesiolingual with the lingual wall of the occlusal with slight flare to allow ease of finishing and create taper to be harmonious with the conservative taper of the mesiobuccal wall. The 42S chisel (Suter Dental, Chico, CA, USA) was utilized to remove any friable enamel rods and accentuate the axiogingival line angles and true the gingival floor. The axial wall was smoothed with the 43S chisel. A 0.5-mm external bevel was placed using a H248-009 beveled cylinder carbide bur (Axis, Coppell, TX, USA) and planed with the #233 Tucker gingival margin trimmer (Suter Dental).

The occlusal-lingual groove was prepared using a #7404 bur (Brassler USA, Savannah, GA, USA). This was a relatively simple preparation with a rounded pulpal floor and no line angle with draw created by

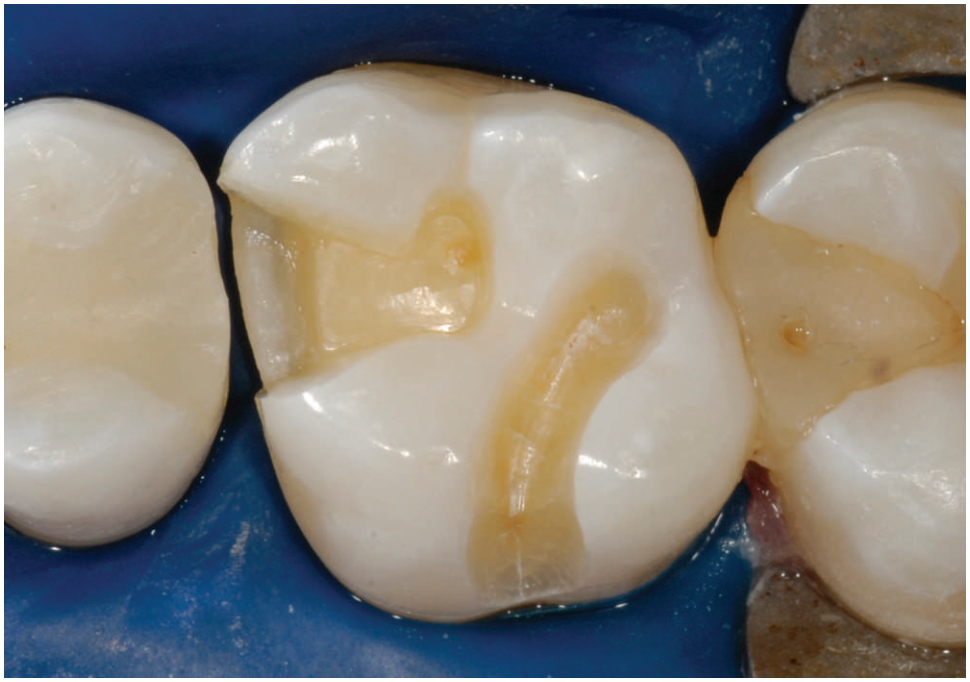

Figure 3. *Completed preparation.*

the shape of the bur. Retention was maximized by keeping the #7404 bur at a consistent perpendicular angle to the occlusal surface as the bur follows the groove. Care was taken to create enough depth in the lingual extension for bulk of gold during casting and accuracy of fit when seating and finishing. Instead of the groove being prepared as a gentle arc from occlusal to lingual, resistance form was enhanced by creating more of an acute angle from the occlusal to lingual aspect (Figure 3). Try-in prior to cementation verified the superb retention and resistance of this preparation design. It was also noted that at the

Figure 4. *Initial seating of the restoration showing the casting slightly overfinished.*

Figure 5. *Post-operative occlusal view.*

occlusal mesiobuccal cavosurface, the casting was slightly over finished and would need to be addressed with finishing (Figure 4).

Seating involved anesthesia, removal of the provisional, and placement of a heavy weight rubber dam. Castings were tried in together to verify fit and proximal contact. The castings were seated one at a time using separate mixes of zinc phosphate cement (Fleck's Cement, Myerstown, PA, USA). The zinc phosphate was slaked with a small amount of powder in the liquid until the liquid appeared clear

Figure 6. *Post-operative buccal view.*

Figure 7. *Post-operative lingual view.*

and then mixed according to the manufacturer's directions. Cement was applied to the castings, and an orange wood stick was used to seat the castings along with light malleting. A shortened orange wood stick was then used between the castings and lower molar until the hydraulic pressure of cementation had dissipated. A series of sandpaper disks (medium garnet, fine sand, and fine cuttle; E.C. Moore), strips, and polishing powders were used to refine the tooth to gold interface. Often the operator will find that only the fine sand and fine cuttle discs are necessary and that the medium garnet may introduce unnecessary scratches in the gold that will require additional finishing time. In this case, no garnet discs were utilized. Wet #4 laboratory pumice (Kerr Corp, Romulus, MI, USA) was used next with a ribbed prophy cup (Young Dental, Earth City, MO, USA). A light touch rotating from casting to tooth was employed to avoid the uneven removal of tooth and gold if the pumice was used too aggressively or for too long. Next, wet 15-micron aluminum oxide powder (Micro Abrasives Corp, Westfield, MA, USA) with a new ribbed prophy cup was used. Important to note is that in between polishing steps, a thorough rinse and dry of the area should be performed to prevent incorporating scratches late in the sequence. Final polishing was performed dry with 1-micron aluminum oxide powder (Micro Abrasives Corp) and again a new ribbed prophy cup. No finishing strips were deemed necessary in this case (Figures 5 through 7).

Once the rubber dam was removed, the occlusion was checked and the patient released.

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