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Esthetic 7/8 Crown—The Tucker Technique

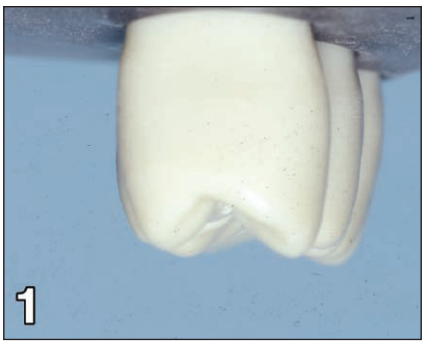
RJ Allan

This paper demonstrates and discusses the clinical relevance for the use of direct gold, especially in restoring virgin caries in the modern restorative dental practice. In addition, this article is intented to highlight the advantages for oral health of placing restorative materials with the highest probability of long-term success. Also, this paper demonstrates the use of the latest formula of direct gold {E-Z Gold}, developed by Dr Lloyd Baum of Loma Linda, CA, USA, and how this new product has made it practical to include direct gold restorations as an integral part of an active restorative practice.

TECHNIQUE

This article addresses the maxillary first molar (Figure 1). However, the same design principles, with minor modifications, can be used on maxillary bicuspids. Provided the clinician has determined that the buccal cusp has adequate stock and is free from fracture, the first step is to build-up the crown of the tooth with the material of choice to provide a platform for optimum preparation design.

For expediency, the initial occlusal reduction can be done with a straight diamond bur and refined with a straight fissure bur in the final stages. A notation must be made as to where the opposing functioning cusp will fall on the occlusal table and the central groove of the occlusal reduction placed accordingly. The inner incline of the mesial-buccal cusp is not reduced at this time (Figure 2). Using a Brasseler (Brasseler USA, Savannah, GA, USA) 860-012 (or similar) bur (Figure 3), the next reduction is on the mesial wall, taking particular care to have the mesial-buccal cavosurface margin parallel with the buccal surfaces of the anterior teeth in the arch, while extending past the point of contact as little as possible.



The buccal aspect of the mesial reduction should form roughly a 90° angle at the cavosurface. This is accomplished while establishing a concave or "hollow grind" contour to the mesial wall (Figure 4). Establishing the axial inclination of the mesial-buccal margin without over-extension is key to the esthetic success of this restoration and dictates the draw of the rest of the preparation, which is tilted slightly to the lingual.

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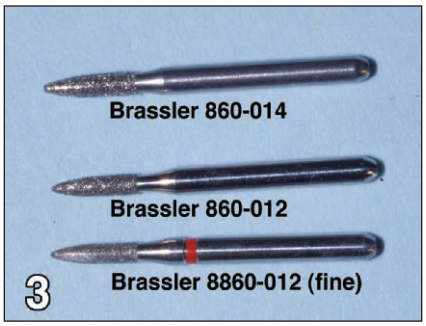
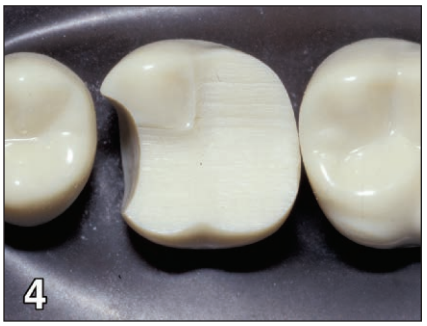
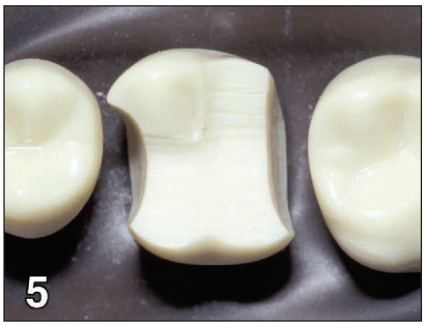
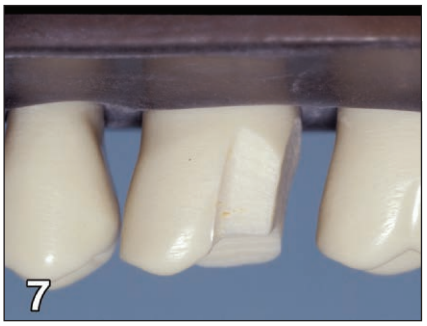
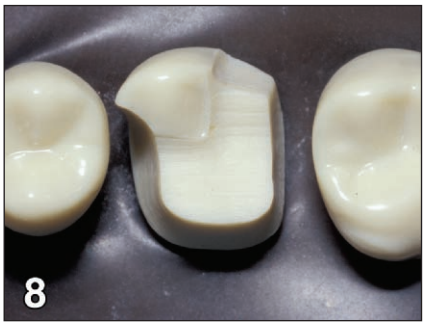
DOI: 10.2341/08-SA3

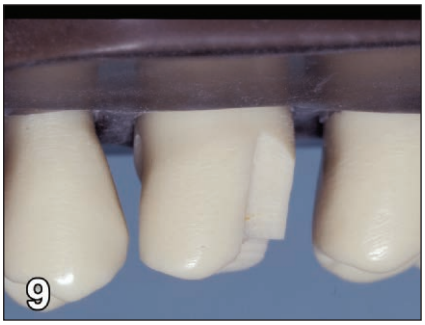


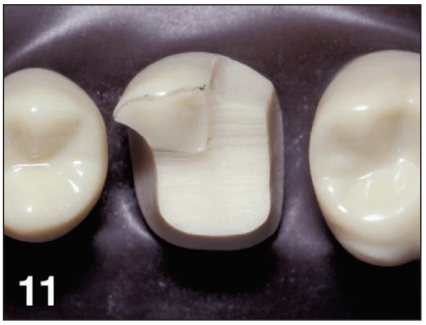






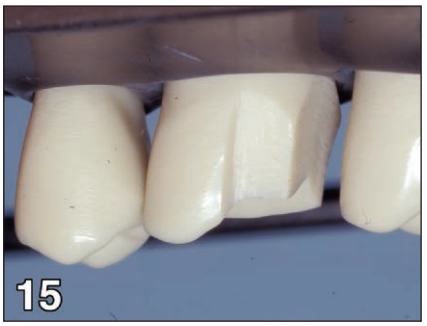


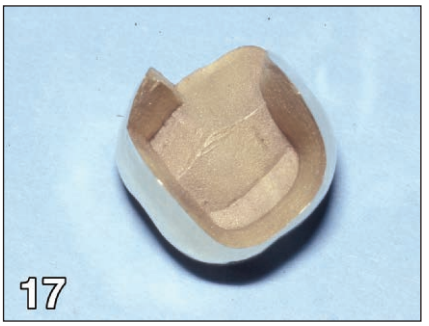


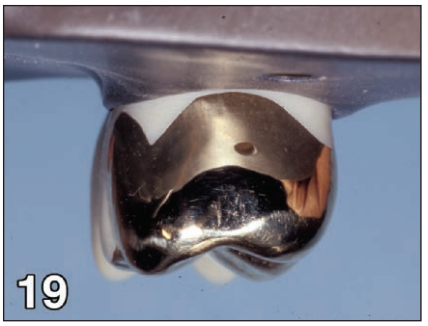


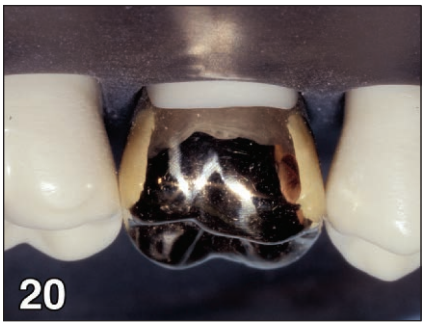
The distal wall is then defined to draw with the mesial. At this time, care is taken not to wrap the distal reduction around to the buccal, but rather to carry it straight out from the embrasure (Figure 5). The mesial and distal reductions are now joined by reduction of the lingual wall. The larger diameter Brassler 860-014 bur can now be used and, if space allows, it can be carried onto the mesial and distal surfaces to provide a more prominent chamfer and deeper hollow grind (Figure 6).

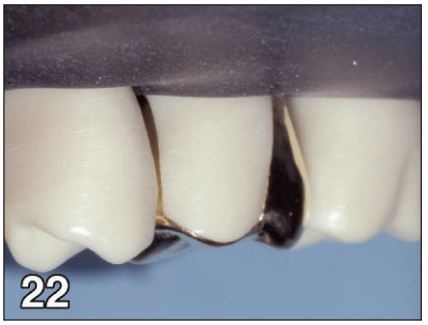
The buccal wall reduction is only done on the distal half of the tooth, and it need not extend any more gingivally than necessary to capture the extension of the previous restoration or provide adequate compliment to the resistance and retention of the rest of the preparation, specifically the mesial hollow grind. The line angle at the juncture of the distal and buccal walls remains quite precise and not rounded (Figure 7). Care must be taken not to finish the mesial aspect of the buccal reduction in the mid-buccal groove, which would impair optimum finishing of the margins with disks at cemen-

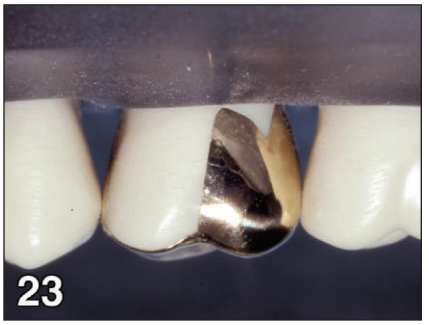


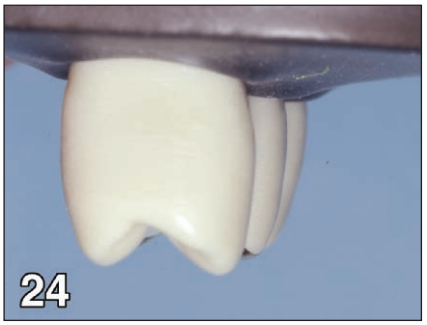












tation (Figure. 8). The distal reduction of the mesial-buccal cusp must draw with the mesial hollow grind (Figures 8-9).

The final stage is reduction of the mesial-buccal cusp. The inner incline must be reduced enough to allow adequate clearance for the opposing functioning cusp without reducing the height or altering the outline of the cusp tip. Using a mechanical pencil perpendicular to the cusp tip, the height of contour of the cusp is defined (Figures 10-11). Reduction of the inner incline is done with a #56 straight fissure bur parallel to an imaginary line joining the already established central groove and height of contour of the cusp tip (Figure 12). The rest of the occlusal reduction can be smoothed with the #56 bur at this time and the functional cusp counter bevel provided. Note the sharp line angle along the buccal cusp tip just to the height of the contour (Figure 13).

The buccal line angle distal to the mesial-buccal cusp is refined with a Suter (Suter Dental Mfg Co, Chico, CA, USA) 42S off-angle hatchet, first on the distal of the cusp, then on the buccal wall (Figure 14). This provides for a flat, slightly wider surface of gold to brace the distal aspect of the cusp and compliment the bulk of gold of the mesial hollow grind. The distal wall of the mesial-buccal cusp is planed with a medium garnet disk, maintaining a flat surface and providing a straight, precise cavosurface margin (Figure 15).

The final step in preparation is to place a very fine counterbevel along the buccal cusp tip with a fine cuttle disk to eliminate loose enamel rods, taking care not to change the shape of the cusp tip outline, while smoothing the margin. Note the slight change in plane of the inner incline approaching the cusp tip (Figure 16). Examination of the casting reveals all details of the preparation steps (Figure 17). From the occlusal, the

Clinical Case 1

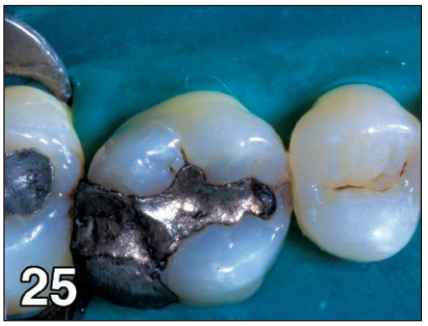


Figure 25. *Tooth #3. Failing alloy with replaced distal-lingual cusp.*

Figure 26. *Tooth #3. Fracture of the distal-buccal cusp.*

Figure 27. *Esthetic 7/8 crown prep. Note the minimal extention past the mesial contact point and the mesial margin of the buccal reduction being short of the buccal height of contour of the mesial-buccal cusp. There is a more ideal lineangle between the mesial hollow grind and the lingual reduction.*

Figure 28. *Supragingival lingual margin at insert.*

Figure 29. *Note the rounded, simple anatomy and buccal margin placement for optimum esthetics.*

Figure 30. *When viewed directly down the buccal surfaces, the gold is hidden.*

Figure 31. *The mesial-buccal cusp appears unrestored in direct view, and the gold will not show when talking or smiling. Note the tooth color and contour, which cannot be matched by a ceramic restoration.*

buccal-axial margin is short of the buccal height of contour and not in the concavity of the buccal groove, while the occlusal-buccal margin finishes at the height of contour of the cusp tip (Figure 18). When viewed from the distal, the sharp lineangle between the distal and buccal reductions is reflected by the presence of an "ear" of enamel at the casting margin (Figure 19).

The lingual margin can be kept supragingival, owing to the extremely retentive design, provided the old restoration and tooth stock allows this. The height of both buccal cusps are the same as the pre-operative state and match the second molar (Figure 20). The gold on the buccal wall distal to the mesial-buccal cusp is blocked from view by contour of the mesial-buccal cusp, while on the mesial, the mesial gold of the casting is well hidden in the embrasure. There is slight plus gold covering the counter bevel to be reduced in finishing (Figure 21). If visible at all, the gold on the mesial buccal cusp is not readily noticeable, providing that the margin is harmonious with the buccal contours of adjacent teeth (Figure 22).

In the buccal view, the buccal cusps match the pre-operative form and are harmonious with the second molar (Figure 23). The mesial-buccal cusp will initially show a slight "plus gold" covering the cusp tip counter-bevel (Figures 22 and 23). However, after proper finishing with disks, the "plus gold" is eliminated, as it is reduced to blend with the height of contour of the cusp tip at the counter-bevel margin (see clinical cases—Figures 25-35). The finished casting approximates the original cusp height but appears unrestored, owing to the esthetic margin technique (Figures 1 and 24).

When prepared properly in the right clinical circumstances and using proper finishing techniques, there is no more superior restoration combining preservation of tooth structure, longevity, biocompatibility and optimum esthetics than the Esthetic-Buccal 7/8 crown.

Clinical Case 2

Figure 32. *Tooth #13. Note the discoloration, owing to old alloy.*

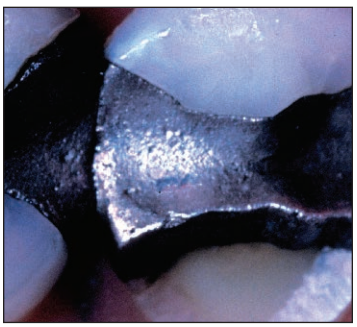


Figure 33. *Tooth #13. Fractured lingual cusp.*

Figure 34. *Classic esthetic 7/8 design with narrower buccal reduction for the bicuspid tooth. Note the return of natural tooth color.*

Figure 35. *Casting is undetectable. Note the natural tooth color blending with the first molar and in contrast to the amalgam restored first bicuspid.*

Acknowledgement

All castings were fabricated by Akos Mankovits, Garden Court Dental Lab, Abbotsford, British Columbia.