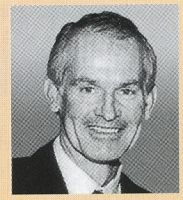
AESTHETIC UPDATE



Compiled by Geoffrey M. Knight

Tunnel restorations

The concept of accessing a proximal lesion from the occlusal surface and restoring the tooth with glass ionomer cement has been available for 20 years. During this time numerous papers have been published that have either endorsed or condemned this clinical procedure.

Essentially the benefits of restoring an initial proximal lesion with a tunnel restoration are as follows:

Maintenance of the marginal ridge

- Removal of the marginal ridge during a conventional Class II cavity preparation breaks the continuity of the 'peripheral rim' destroying the structural integrity of the tooth that substantially weakens adjacent cusps and predisposes them to future fracture. Shown in Figure 1.
- Due to cuspal inter digitation, the marginal ridge often acts as a centric stop and plays a significant role in stabilizing the occlusion.
- Maintaining the integrity of the marginal ridge prevents the iatrogenic problems associated with reconstructing the proximal surfaces.
- Maintaining the marginal ridge prevents proximal wear of restorative materials that may predispose to collapse of the proximal occlusion.

Minimizes enamel removal

When caries reach the dentino-enamel junction it proliferates along this margin in the dentine. Access to caries from the external surface requires the removal of substantial amounts of enamel to confirm that caries at the dentine interface have been completely removed.

Access internally enables a clinician to remove the dentinal caries leaving the enamel surface essentially intact. The use of glass ionomer cement as a restorative material adheres to and supports the undermined enamel eliminating the need for its removal.

Minimizes dentine removal

The minimal cavity preparation required to access the lesion means that much less dentine removal is required when compared to a traditional Class II cavity (Fig. 2).

Efficient cavity preparation and restoration

Tooth preparation

Initial proximal lesions on 24, 25 (Fig. 3). Tooth preparation of a proximal cavity can be carried out in much less time than a Class II cavity.

Access to the lesion is achieved by preparing a 'T' cavity in the enamel on the occlusal surface, about 2 mm in from the proximal margin and extending 2 mm in both a buccal and lingual direction and 2 mm across the occlusal surface.

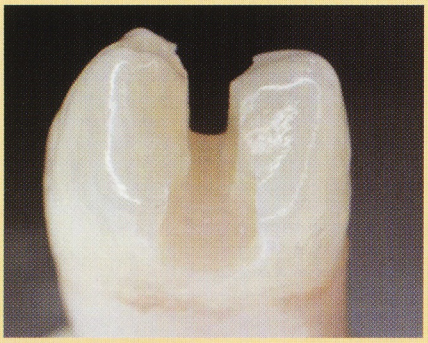


Fig. 1. Shows undermined cusps due to Class II cavity preparation.

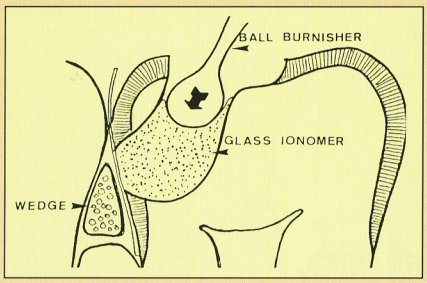


Fig. 2. Tunnel preparations are a conservative means of accessing proximal caries.

Fig. 3. Caries present on the distal surface of both bicuspids.

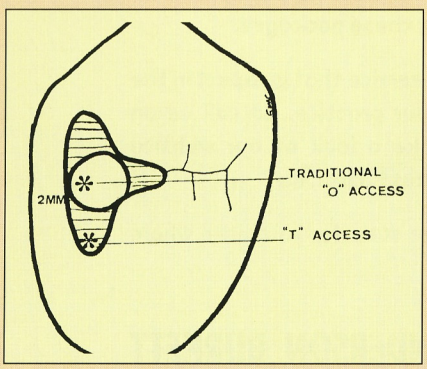


Fig. 4. Demonstrates the improved access of the 'T' shaped cavity compared to the 'O' design.

Fig. 5. 'T' shaped access cavities prepared and caries have been removed.

Fig. 6. Freezer bag occlusal matrix used to form occlusal surfaces of GIC restorations.

Fig. 7. Completed restorations with glass ionomer cement.

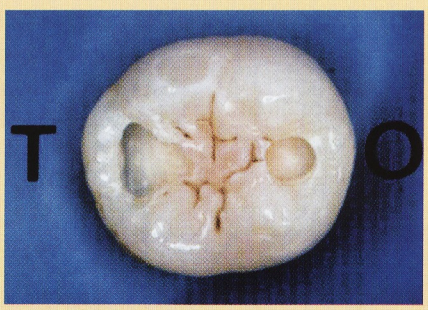


Fig. 8. Difference between a 'T' shaped access cavity and an 'O' shaped access cavity.

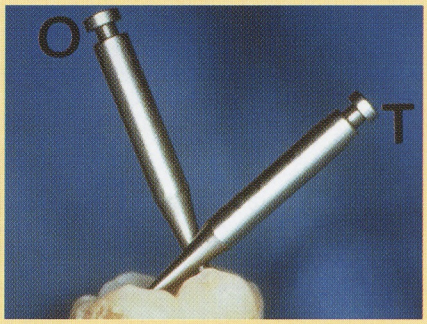


Fig. 9. Demonstrates improved mechanical access to caries using a 'T' shaped design.

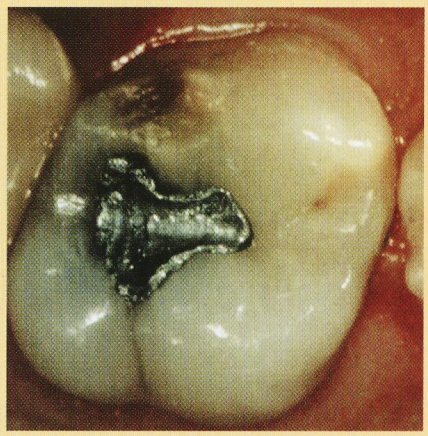


Fig. 10. Shows a molar with an initial proximal lesion.

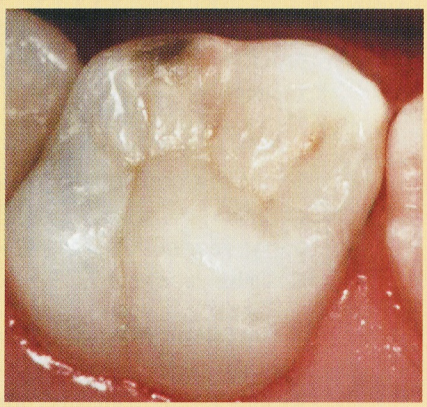


Fig. 11. Demonstrates an aesthetic restoration using a GIC base with a composite resin overlay.

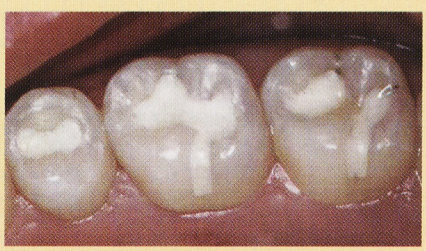


Fig. 12. A conservative alternative to the initial diagnosis of three coronal restorations.

Continued from page 27

After enamel preparation, dentine is removed to access the lesion. The use of a 'T' preparation provides access to caries both visually and with rotary instruments (Fig. 4).

Confirmation of caries removal may be enhanced with caries detector dyes.

Restoration placement

A variety of techniques may be employed to contain the proximal surface of the restoration. Often the placement of a Mylar strip wedged with either a paper or gutta percha point is sufficient (Fig. 5).

Insertion of the glass ionomer cement using a capsulated delivery system ensures adaptation of the restorative material throughout the cavity.

Finally, placing a 3 cm square section of freezer bag over the restoration and asking the patient to close until the glass ionomer solidifies ensures that the material cures in both the absence of oxygen and moisture and simultaneously generates the occlusal contour so that minimal finishing is required (Fig. 6).

Finishing

Finishing the restoration requires minimal occlusal adjustment when an occlusal matrix system is used.

Furthermore, the time consuming task of contouring the proximal ridge is eliminated (Fig. 7).

Arguments against tunnel restorations

Marginal ridge fracture

One of the main criticisms levelled at the tunnel restoration is the potential of the marginal ridge to fracture. This phenomenon will occur in a small percentage of preparations especially during the time that a clinician is becoming familiar with the technique. This can not be used as a justification to destroy every marginal ridge by continuing with a traditional Class II cavity preparation.

Access

A number of papers have sighted poor visual and mechanical access to the lesion and the possibility of leaving residual caries as a reason for avoiding tunnel restorations. This may be overcome by using the 'T' shaped cavity configuration. Caries detector dyes may be used to identify residual caries, especially at the dentino enamel interface (Figs. 8 and 9).

Damage to adjacent proximal surfaces

Papers have suggested that during preparation of the proximal surface damage may occur to adjacent proximal surfaces. The nature of dental caries is such that the lesion develops well below the contact area and it is difficult to make bur contact with the adjacent proximal surface.

Clinical options

The identification of an initial proximal lesion presents dentists with a series of clinical decisions that will have a significant bearing on the tooth involved.

- Traditional Class II cavity preparations and subsequent restoration with amalgam alloy creates unsupported associated cusps and will eventually result in their fracture, leading on to more complex restorative procedures that further compromise the viability of the tooth.
- Indirect cusp overlay procedures are unnecessarily complex and require significant amounts of tooth removal.
- The choice of a tunnel preparation that is restored with glass ionomer cement is a minimal preparation that maintains the mechanical integrity of a tooth. Furthermore, it is the most efficient clinical way of treating such a lesion with possibly the most aesthetic outcome (Figs. 10 and 11).

Conclusion

The decision to restore an initial proximal lesion with a restoration other than a GIC tunnel restoration may significantly compromise the future viability of the tooth involved (Fig. 12). □