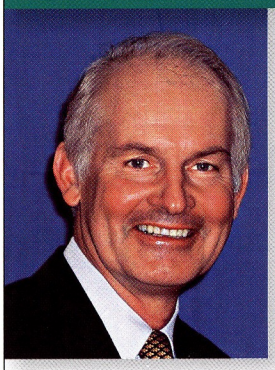

Turbo TUNNELS

Compiled by
Geoffrey M Knight

In a democracy, enterprises move forward in a competitive environment by improving the quality of the goods or services they deliver and the efficiency in which they are delivered. The professions are no exception.

The statutory franchises the professions have enjoyed have been eroded by deregulation and legislation by succeeding governments as they try to reduce the costs to the community of professional services.

Infection control and regulation has had a substantial effect on the costs of dentistry. One method of countering this effect is to seek ways of improving the efficiency of delivering dental care whilst at the same time improving the quality of the service provided.

"The major time constraint of this technique is the setting time of the glass ionomer cement" *Geoff Knight*

The traditional approach to treating a proximal cavity has been to access the lesion by removal of the proximal ridge. Apart from destroying more tooth structure than that caused by the lesion, such a procedure damages the structural integrity of the tooth predisposing to future cusp loss or internal fracturing.

The tunnel restoration is an alternative treatment option that requires removal of sound tooth structure to access the lesion but leaves the peripheral rim of the crown intact, preserving the structural integrity of the tooth. While there are dentists who feel that such a cavity preparation inhibits visual and mechanical access to a proximal lesion, a 'T' shaped access cavity enables an access comparable to a conventional Class II preparation.

As a tunnel preparation rarely involves a centric occlusal stop, a glass ionomer cement restoration is adequate to resist occlusal wear. One of the challenges of glass ionomer cements is to condense them into a tunnel restoration so there are no voids, especially in the proximal area, that could compromise the predictability of the finished restoration.

A further challenge facing restorative dentists is the contouring and finishing of a restoration. These are procedures that often exceed the combined time of tooth preparation and restoration placement.

The following clinical technique substantially reduces the time required to place a tunnel restoration and assures adequate condensation of the glass ionomer cement into the prepared cavity.

CLINICAL TECHNIQUE

This technique has the following benefits:

- A conservative preparation that protects the structural integrity of a tooth
- An access cavity with similar visual and mechanical access as a standard Class II preparation
- Assures complete condensation of the glass ionomer cement into the cavity
- Requires minimal contouring and finishing
- Affords fissure protection on the entire occlusal surface
- The major time constraint is the setting time of the glass ionomer cement.

The patient presented with a proximal lesion on the distal of an upper first premolar (Fig 1).

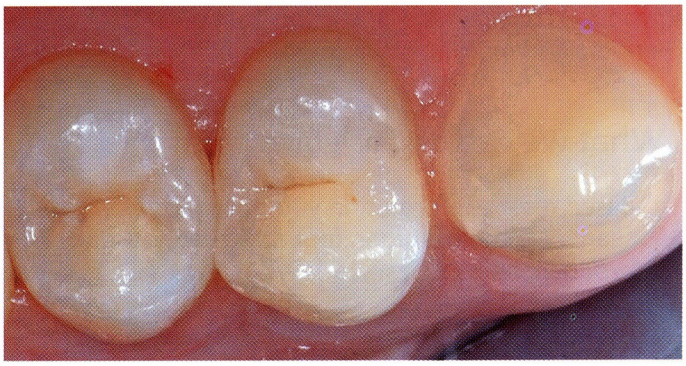

Fig1. Patient presented with a distal lesion on an upper first premolar.

Access to the lesion was achieved by cutting a vertical slot, depending on the size of the cavity, 2mm in from the marginal ridge with a high speed end cutting flat fissure bur. Once the lesion had been located an extension cavity in enamel was prepared 2mm bucally and lingually and 2mm into the central fissure to produce a 'T' access cavity to enhance visual and mechanical access to the lesion.

Caries were removed with a #5 slow speed round bur. In asymptomatic teeth with deep lesions it is advisable to leave

caries over the pulpal region as glass ionomer cement will assist with remineralization of carious dentine. Final cavity preparation was carried out with a # 3 round bur to form a moat in caries free dentine at the dento enamel margin. As caries spreads laterally once it penetrates the enamel, the size of the cavity opening on the proximal surface should be kept to a minimum (Fig 2).

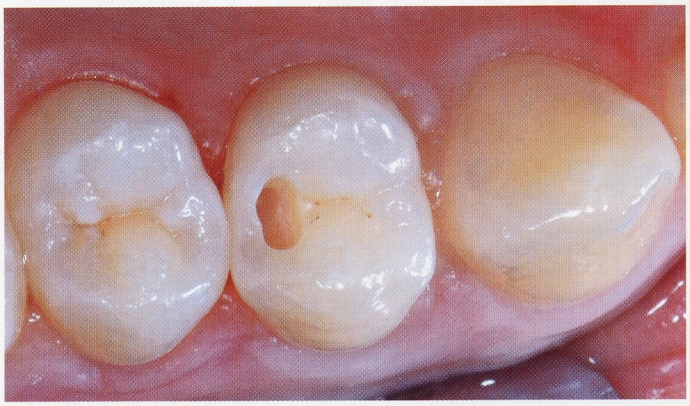

Fig 2. A 'T' access cavity was created in the enamel and caries removed with #5 round bur.

A wide Mylar strip was passed through the proximal surfaces. Prior to this step, it may be necessary to use an abrasive metal strip to open the margins slightly. Once the Mylar strip was in place, the ends of the strip were cut to extend no more than 1cm from the buccal and lingual margins. A wedge was inserted so that the strip was held tightly against the proximal surface of the cavity preparation (Fig 3).

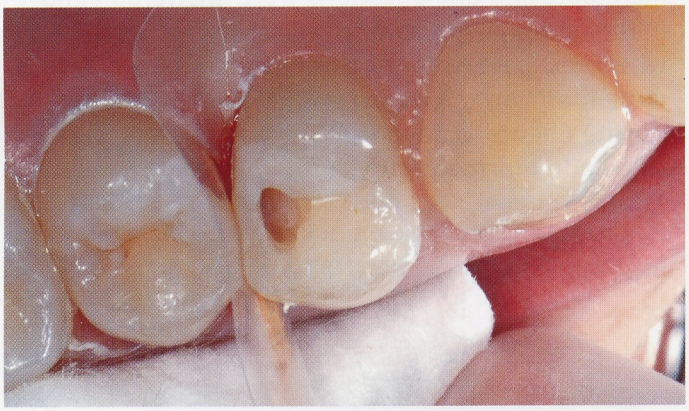

Fig 3. A short Mylar strip was placed interproximally and wedged against the cavity preparation.

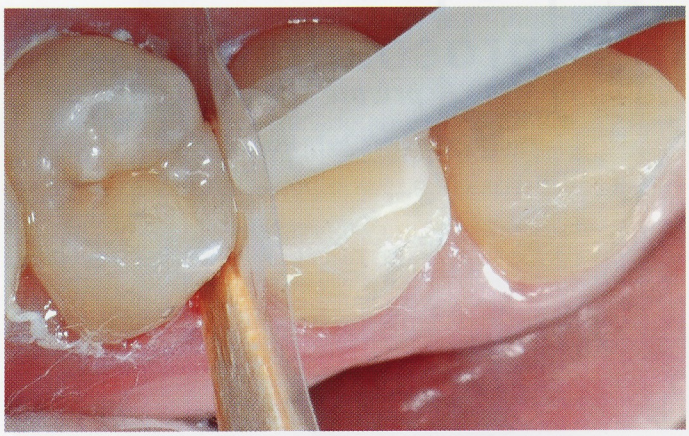

Fig 4. After etching glass ionomer cement was placed to slightly overfill the cavity.

The cavity was conditioned with either poly acrylic or phosphoric acid and dried with oil free air. At this stage, a remineralizing solution may be applied prior to placing the glass ionomer cement. After mixing the glass ionomer cement, the tip of the capsule was inserted into the depth of the cavity and the cement was squeezed out slowly while withdrawing the capsule to slightly overfill the cavity preparation (Fig 4).

Patients were asked to place the tip of their tongue at the back of their palate to occlude in a retruded position and then slowly close their mouths. Just prior to closing, the Mylar strip was pushed over the occlusal cavity with a periodontal probe or plastic instrument.

This procedure has three benefits. It forces the glass ionomer cement into the cavity making sure there are no deficiencies or voids in the restoration. It helps to preform the occlusal surface and also forces the glass ionomer cement into the fissures on the occlusal surface (Fig 5).

Fig 5. As patients close their mouths the Mylar strip was pushed over the occlusal cavity, eliminating voids in the restoration and reducing the amount of occlusal contouring.

After the glass ionomer had set, the wedge and the Mylar strip were removed prior to finishing the preparation. Final finishing was carried out over the cavity preparation and occlusal fissures with a #5 slow speed round bur and a silicone rubber cone (Fig 6).

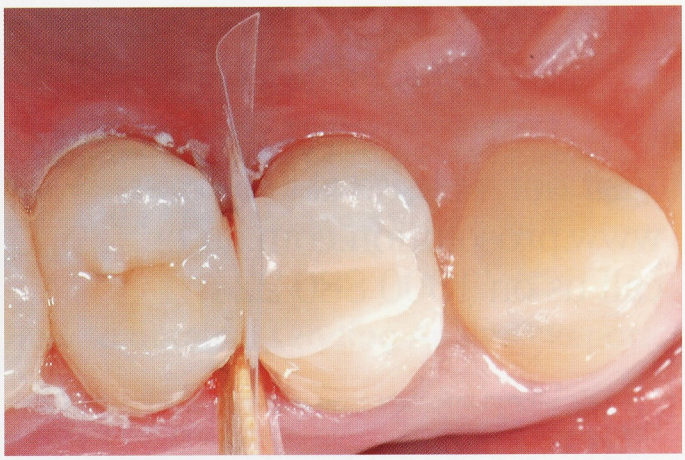

Fig 6. After setting the wedge and Mylar strip were removed and the restoration contoured and finished.

The completed restoration: the most conservative and most aesthetic option for restoring an initial proximal cavity (Fig 7,8).

Glass ionomer cements protect surrounding tooth surfaces from caries. However, in proximal locations, biofilm build up may prevent saliva from washing away organic acids on the

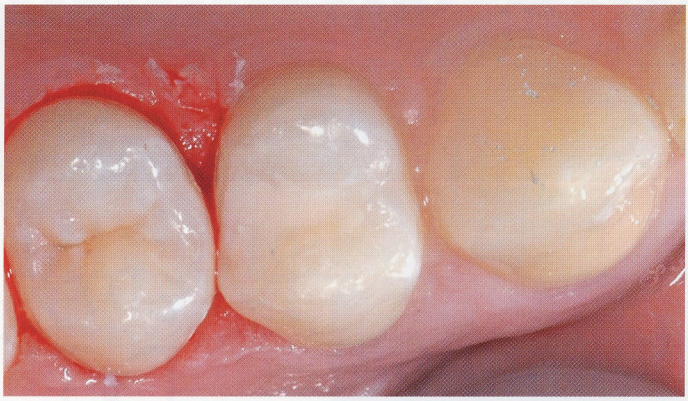

Fig 7. The completed restoration: most conservative and aesthetic option for restoring an initial Class II cavity.

Fig 8. Tunnel restoration 14 months after placement.

glass ionomer cement and will slowly degrade the surface over several years. There is evidence suggesting that applying a layer of protective varnish over the proximal and occlusal surfaces improves the hardness of the glass ionomer cement and may reduce the proximal surface degradation of the cement. Protective varnishes can be applied after finishing the restoration with a micro brush (Fig 9).

Fig 9. A layer of protective varnish may reduce proximal surface degradation of the glass ionomer cement.

CONCLUSION

Like any dental procedure, this technique does not have a universal application for all initial proximal lesions. However, where applicable, it provides patients with a superior outcome compared to a standard Class II restoration and produces a predictable restoration with considerable time savings for a busy practitioner.