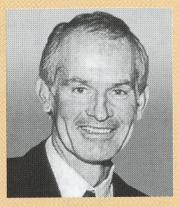
AESTHETIC UPDATE



Compiled by Geoffrey M Knight

Minimal intervention dentistry

'Minimal intervention dentistry aims to predict and arrest dental disease at its onset. Previously damaged teeth are prepared by minimal tissue removal and restored with biologically compatible materials that will maximize the potential of the teeth in which these restorations are placed.'

Minimal intervention (MI) is an emerging concept of dental care, driven by improvements in equipment and materials that have enabled dentists to recognize and conservatively manage incipient decay, minimize the surgical management of established caries and in many instances improve oral esthetics without preparation of healthy tooth structure.

Early diagnosis

Simplified saliva testing (Saliva-Check)* (Clinpro Cario L-Pop)† have facilitated the identification of high risk patients who can be counselled to improve diet and oral hygiene as well as externally protect tooth surfaces with fluorides, remineralizing and antibacterial solutions.

Laser fluorescence techniques (Diagnodent) predictably identify caries free occlusal fissures with a reading of five or less. Higher readings combined with clinical judgment facilitate a diagnosis to enable early intervention at the caries site.

Fissure protection

Fissure sealing with resins prevents freshly erupted tooth mineral from absorbing calcium, phosphate and fluoride ions needed for the formation of fluor apatite. Fissure protection with a thin layer of glass ionomer cement (GIC) protects the susceptible tooth surfaces from bacterial plaque with a semi permeable barrier that allows calcium and phosphate ions from saliva to cross and combine with fluoride ions in the glass ionomer to facilitate the formation of fluor apatite on the enamel surface beneath (Fig. 1).

Caries management

Restoring a carious lesion using a bonded composite restoration requires removal of carious dentine (infected dentine) as well as dentine that has been demineralized (affected dentine) by the advancing lesion.

Use of a glass ionomer lining enables a clinician to cease surgical tooth preparation once the carious dentine has been removed. Placement of a GIC lining will remineralize caries softened dentine. This affected layer may be up to 1mm in depth, a significant thickness, especially if pulpal tissue is 0.5mm below.

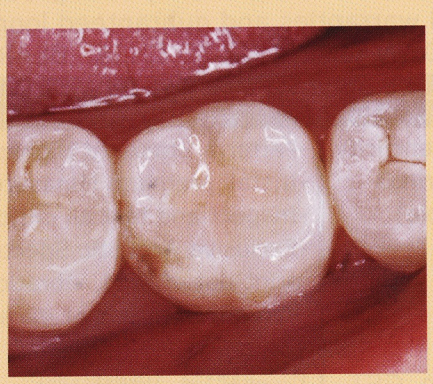


Fig. 1. GIC fissure protection enables enamel to remineralize under a protective layer.

Fig. 2. Air abrasion is ideal for conservative preparation of small occlusal cavities.

A future goal of MI caries management will be to modify carious dentine to incorporate it into the restorative base to form a bacterial seal against further decay.

Cavity design

Access to small occlusal lesions is best achieved using air abrasion that pinpoints removal of demineralized enamel and minimally interferes with the occlusal architecture. Wear resistant glass ionomer cements (Fuji IX, Ketac Molar)† are ideally suited as a restorative material for these cavities (Fig. 2).

Access to proximal caries by fracturing the marginal ridge does irreversible damage to the structural integrity of a tooth. A 'Tunnel Preparation' in the shape of a 'T' access cavity enables good visual and mechanical access to remove caries, maintains proximal form, prevents an open contact area as well as being an aesthetic and time

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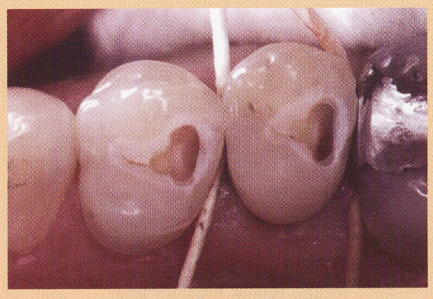

Fig. 3. Tunnel preparations maintain the integrity of the peripheral enamel.

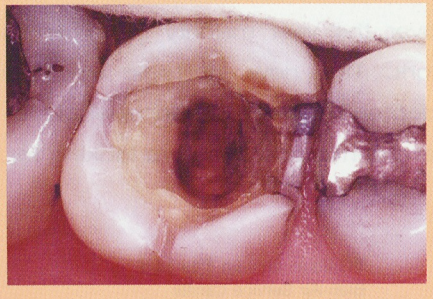

Fig. 4. Adhesive cusp overlay restorations protect cracked cusps from further breakdown.

saving restoration to place. As the preparation does not involve centric stops, wear resistant GIC's are again the material of choice to restore this type of cavity (Fig. 3).

Replacing 'amalgam bombs' where there has been multiple cusp cracking or loss provides a challenge for the MI dentist. An 'occlusal overlay' cavity design is more conservative that using a 'cusp overlay' technique and is just as effective in preventing future cusp loss (Fig. 4). The use of a glass ionomer cement, composite resin sandwich in which a core of GIC is used to replace dentine and composite resin used to replace enamel creates a stable, low stress restoration with a biocompatible base and a wear resistant occlusal surface (Fig. 5).

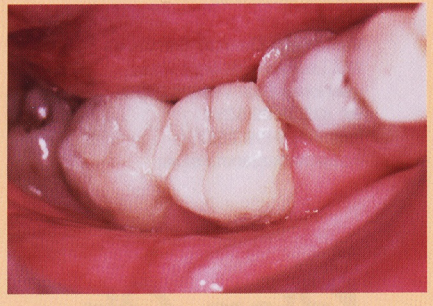

Fig. 5. GIC composite resin sandwich crowns provide a biocompatible base with a wear resistant occlusal surface.

Fig. 6. Direct laminates provide a generally reversible alternative to indirect laminate procedures.

Cosmetic dentistry

Cosmetic procedures requiring extensive tooth preparation can leave a patient with a severely compromised dentition, with little room to manoeuver if the desired outcome is not achieved.

MI direct placement techniques require minimal tooth preparation have low biological costs, low fiscal costs without the lab bill and importantly low emotional costs due to the reversibility of the procedures.

Fig. 7. Direct fibre reinforced resin bridges are a conservative alternative to implants or an indirect prosthesis.

Fig. 8. Composite resin can successfully restore occlusal dimension in severely worn dentitions.

Direct laminates

The successful placement of direct laminates requires training and skills beyond those taught at dental school. Once achieved however direct laminates are an emotionally and fiscally rewarding procedure that generates grateful patients and can become a significant practice builder (Fig. 6).

Direct fibre reinforced resin bridges

A conservative alternative to an indirect bridge or implant, these bridges can be placed immediately after an extraction with the added benefit of preventing resorption of the alveolar bone (Fig. 7).

Occlusal reconstruction

Severely worn occlusions can be rebuilt with composite resin by creating occlusal stops on the canines and first bicuspids to open the bite, followed by placing resin crowns on the incisor teeth. Acting as an anterior occlusal splint, patients soon get used to their new vertical dimension and eruption of the lateral segments creates a stable occlusion within three years (Fig. 8).

Conclusions

There is no doubt, the future will see less surgical intervention in dental procedures as new materials, and techniques become available. MI cosmetic procedures will increase due to better informed patients demanding reversible conservative alternatives to traditional invasive techniques. □