AESTHETIC UPDATE

Compiled by Geoffrey M. Knight

The fractured cusp

When dentists are asked to identify their most frequent restorative procedure, the answer is inevitably 'repairing a fractured cusp', usually in association with an existing amalgam restoration. While this may be helping many dentists through the recent economic downturn, it also identifies a need for the profession to seek alternative restorative techniques that have less potential for future tooth damage.

A common solution to this clinical situation has been to place a cast restoration, by either crowning a tooth or overlaying the remaining cusps. It can be argued that these procedures are a resort to tooth carpentry, disregarding healthy tooth structures to enhance the prognosis of a restoration. Such techniques carrying high biological and fiscal costs are potentially incompatible with the principals of minimal intervention dentistry.

It can also be argued that to simply repair a tooth will leave it susceptible to further cusp loss or vertical fracture and jeopardise the viability of the tooth itself. Whilst a decision to repair or crown a tooth is unique to each clinical situation, anecdotal evidence suggests that teeth respond well to repair with adhesive restoratives and are seldom compromised by further cusp fracture. Teeth that do end up with multiple fractures are genuine candidates for full coverage; the final clinical option.

Quality Assurance has produced substantial benefits for industry by way of efficiency increases and quality improvements in goods and services. The dental profession too must initiate QA or face increased regulation. Some of the QA issues that involve dentistry are: standards of training and continuing education, peer review, infection control, waste disposal, standards of equipment and materials, and the appropriateness and cost of a procedure for a given clinical situation.

This article shows a technique for repairing a fractured cusp with minimal biological and fiscal costs without compromising the tooth to future restorative options. The procedure is simple, predictable and user friendly, creating productivity improvements that enable fiscal saving for patients and improved hourly returns for practitioners.

Technique

The technique is demonstrated on an extracted tooth with a fractured cusp against a large amalgam restoration (Fig. 1).

As caries are seldom associated with these lesions, tooth preparation is minimal and rarely requires local anaesthesia. The amalgam surface was roughened with a high speed diamond bur and tooth surfaces were lightly brushed with the bur to smooth fractured enamel and remove remaining plaque or pellicle (Fig. 2). A mini sandblaster may be used as an alternative to a bur to clean and etch amalgam and tooth surfaces.

After isolation from the oral environment with either rubber ►

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dam or cotton rolls, a matrix band was placed around the tooth and the preparation treated with 37 per cent phosphoric acid for 10 seconds (removing the smear layer from the dentine and etching the enamel), washed, and dried with clean oil free air (Fig. 3).

A plastic instrument (perio probe) was used to place a small increment of light-cured glass ionomer cement to cover exposed dentine and the cavo surface of the amalgam then cured to manufacturer's instructions (Fig. 4).

In Fig. 5 a further layer of light-cured glass ionomer cement was placed onto the preparation. A small increment of light-cured resin was added and both materials were puddled along the margins of the preparation with a ball-ended burnisher (Fig. 6, Diagram 1) and then simultaneously cured for 40 seconds.

There are two distinct benefits in carrying out this procedure. Firstly, by adding the resin into the glass ionomer cement it is much easier to manipulate the uncured restorative mass and achieve a marginal seal. The second benefit is that as the resin cures before the glass ionomer, polymerisation shrinkage occurs within the resin before the glass ionomer sets, all but eliminating one of the major clinical problems of composite resins. A dark shade of glass ionomer cement was used to demonstrate the cement at the marginal interface when the matrix was removed (Fig. 7).

A further layer of cement was placed onto the preparation and an increment of resin was puddled into it almost up to the occlusal margins prior to further *simultaneous curing* (Fig. 8, Diagram 1). As the resin cures before the cement the polymerisation shrinkage is taken up by the cement before it sets, enabling the placement of a single increment of ►


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resin, avoiding tedious incremental placements.

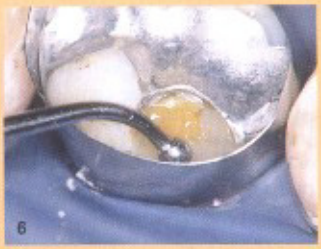
Light-cured glass ionomer cements exposed to occlusal surfaces do not wear well under masticatory loads and to avoid this, it is prudent to place a final increment of resin over the restoration. A layer of bonding resin was lightly brushed over the surface of the preparation (Fig. 9) and the final layer of resin was applied (Fig. 10).

After curing for 40 seconds, the matrix band was removed followed by a further 20 second curing of the lingual and proximal surfaces after which the restoration was contoured to accommodate the occlusion and given a final polish (Fig. 11).

Principles

The principles of this technique have evolved over two years and the clinical performance during this time has been most satisfactory. There have been significantly fewer restorative failures when compared to the conventional 'sandwich' technique and tests at the Australian Dental Standards Laboratory have shown a 50 per cent increase in fracture resistance to a comparable sandwich restoration.

Furthermore, whilst offering improved strength, there are less clinical steps, making the technique more predictable and requiring about half the time of a conventional glass ionomer-resin laminate. □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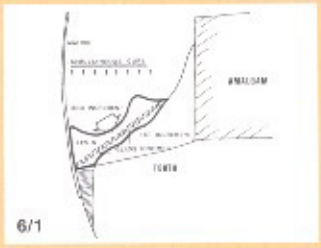

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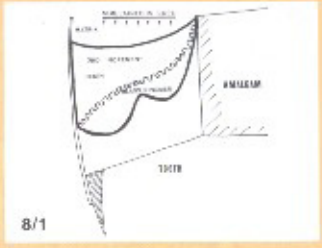

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