Composites

Dental Protection looks at the risk factors associated with composite materials

Composite fillings are naturally an attractive alternative to silver amalgam restorations, particularly in clinical situations where the restorations would otherwise be visible. Added to this, there has been concern expressed from some quarters, and a certain amount of media attention, focusing upon the safety of silver amalgam restorations, in view of their mercury content.

Meanwhile there has been a reappraisal of the clinical tenets that a generation of dentists had relied upon over many decades, and the advancement of new materials and techniques has placed at the dentist’s disposal exciting restorative possibilities for etch-retained, Gluma-enhanced and other ‘bonded’ restorations, and ‘adhesive’ dentistry, allowing a more conservative management of tooth tissue when planning for the retention of restorations.

All of these factors have together added further impetus to the rapid growth in the use of composite restorations, and the benefits of such restorations are very easy to convey to prospective patients. As a result, the acceptance rate of treatment plans involving these restorations is relatively high when compared to some other kinds of restoration – particularly fixed (cast) restorations, where the cost might well be considerably greater.

Failures

Many complaints and claims centre on the premature failure of composite restorations, and in particular the failure of large composite restorations which have been placed in posterior teeth. Such restorations are extremely technique-sensitive and can be deceptively difficult to place to a consistently high standard, especially when direct placement is carried out – as is often the case.

Amongst the common problems in these cases are micro-leakage due to polymerisation shrinkage of the deeper layers of composite materials, occlusal wear or fracture, defective contact points or interproximal contour and occasionally, marginal overhangs.

Central to most allegations of negligence is the question of consent. The patient who is faced with the need to have multiple composite restorations replaced after a short period, will understandably argue that they would never have proceeded with the treatment if they had been made fully aware of the likely outcome.

While it is easy enough to explain the benefits of composite materials, it is equally important to stress the limitations and disadvantages of the technique, particularly where large posterior restorations are contemplated. When these are embarked upon as an alternative to a fixed restoration – perhaps for reasons of cost – then this should be clearly set out in the patient’s clinical records, along with a summary of any discussions that took place prior to treatment.

It is perhaps on this question of considering the alternatives to composite material that cases are most likely to be won or lost, and no consent to the placement of composite fillings can be considered valid unless these issues have been properly explored.

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with the patient, and as fully as he or she wishes. Patients who allege that they were ‘talked into’ having composite restorations placed, without a proper discussion of the alternatives and how they compare, will find that their claim is greatly assisted by the absence of clear record card entries which can demonstrate otherwise; dentists beware.

Amalgam alternatives
This question assumes particular importance where practitioners have elected to avoid the use of silver amalgam altogether in their practices. Here, it is important to stress to patients that although this is the basis upon which this specific practice has chosen to operate, there are other practices that may take a different view and be willing to offer amalgam as an alternative. Ultimately, the choice must rest with each patient, having been presented with the facts in a fair, balanced and rational way.

There are no short cuts in the use of these materials, and one must ensure that sufficient time is allowed for the meticulous attention to detail that is required in order to maximise the quality and minimise the pitfalls inherent in their use. Composite resin restorations have an important place in modern restorative dentistry, but their use for large posterior restorations needs to be approached with great caution.

Materials
The successful use of composite resin materials relies upon a proper understanding of the wide range of available materials, their scientific basis and properties, their handling characteristics and not least, the rationale for the techniques involved in their placement. The different clinical situations in which composites are deployed, demand entirely different characteristics of the materials to be used. Strength, flowability, particle size/mix and aesthetics are critical features which assume greater (or lesser) significance on different occasions. The choice between self-cure, light-cure and dual-cure is another important consideration.

Composers, and luting and bonding materials have further widened the armamentarium of the up-to-date clinician seeking to use the right material on the right occasion, thereby minimising the chances of failure.

Interim measure
Some clinicians like to use composite resin materials as a short-term interim measure, or provisional restoration. When adopting this approach, it is important to make it clear both when speaking to the patient, and in the clinical notes, but this is not intended to be a final or permanent restoration.

Rubber dam
While the marginal seal of composite resin restorative materials can be excellent when bonded to previously etched enamel margins, any contamination by moisture, saliva, gingival or crevicular fluid, or blood, can severely compromise the final result. The use of rubber dam can therefore play an important part in reducing the potential for problems to arise from the placement of composite restorations.

Indirect composites
For the larger restoration, particularly in molar teeth, there are several reasons why the use of an indirect technique is less likely to lead to problems, than placing a large, multi-surface composite restoration directly.

Prominent amongst these, from a dento-legal perspective, is the difficulty of achieving an optimal contact point when placing a large composite restoration directly (perhaps leading to food packing and peridental problems), and the problems of shrinkage when curing larger restorations, even when placed incrementally.

There are of course other considerations, from a clinical perspective, but these are less likely to lead specifically to dento-legal problems.

Curing lights
Light cured composite materials present risks of an entirely different kind arising from the properties of the lights used in the process. Appropriate protection must be ensured for the eyes not only of the operator, but of any nursing staff and of course the patient. The same applies for any fourth party who may be present in the room – for example, the parent or other person accompanying a child patient.

Sensitivity
A problem which has been associated with direct composite restorations – particularly larger ones – is that of postoperative sensitivity. Usually attributed to shrinkage, or microleakage associated with voids in the material or deficiencies in the marginal integrity, this can lead to complaints unless the patient has been prepared in advance for this possible adverse outcome.

Anterior restorations
Composites can provide a conservative way of ‘masking’ surface blemishes and irregularities of anterior teeth, using a ‘veneering’ technique. It should certainly never be suggested that the use of bonded composite material in this way is entirely ‘reversible’. Patients may find the material attractive not only because it is often cheaper than many of the alternatives, but also because it allows single visit restoration and minimal tooth preparation.

When discussing these and other benefits, however, the patient needs to understand the limitations and disadvantages of the material and technique, before embarking upon the treatment. For example, it is important to explain to patients that the material may discolor over time – particularly at the margins, where staining can be prone to occur, and also that when used to restore unsupported incisal edges or angles – especially in the areas of high occlusal loading – they may not be as strong or as durable as other kinds of restorations.

Summary
One of the concerns in cases involving the multiple failure of posterior composite restorations, is that the quantum (ie financial value) of such claims is often very high indeed, compared to the cost of the original treatment. Not infrequently, the ‘remedial’ treatment involves root canal therapy and crowns, or implant-supported replacements for teeth that have been lost and there are invariably associated claims for other general and special damages.

‘The rationale for such treatment should be very carefully explained to the patient’