The beauty of modern materials
Dr Ian Cline discusses how to achieve clinical success with posterior composites

Composite and ceramic tooth-like restorations are without doubt favoured by most patients. These restorations are also, increasingly, the choice of the clinician and a significant number of practices have now become amalgam-free. Posterior composite restorations offer a number of advantages over amalgam, such as excellent aesthetics, minimal preparation of tooth tissue, and the potential reinforcement of tooth tissue.

Amalgam has served the dental profession well for more than a century and is a fairly forgiving material in terms of placement and shaping. Composite on the other hand presents a number of difficulties in isolation, dentine bonding and material placement. In particular, when restoring interproximal lesions, technique and operator ability become of the utmost importance. Otherwise, numerous complications may result. These include post-operative sensitivity, premature failure of the restoration due to microleakage and recurrent caries. Of particular difficulty are the production of good contact areas/points and the reproduction of good interproximal form.

Clinical case to illustrate key aspects required for success (Figures 1-6).

When providing a posterior composite, there are several phases. At each phase, things can and do go wrong and each phase requires attention to detail. Of particular importance are:

1. Isolation
2. Tooth preparation
3. Bonding protocol
4. Matrix application

1. Isolation
Whilst rubber dam use is taught and practiced routinely at dental school, many dentists quickly fall into a habit of only using such isolation for endodontic treatment. Lack of familiarity with rubber dam can lead to reluctance to use it for posterior composites. However, the reluctant clinician should practice the use of a “one-shot” technique where the barrier is stretched over the frame and a winged clamp is used. This technique can be very fast and simple, often taking less than a minute to isolate one or two teeth and a couple of minutes for a quadrant. The advantages of rubber dam use outweigh the negatives of blood and saliva contamination which ruin bonding. The use of rubber dam should be practiced for the vast majority of cases.

2. Tooth preparation
Tooth preparation should be limited to access and removal of any failed restoration and caries. The cavity preparation should be rounded in form with no sharp internal angles so as to prevent potential stress concentration and to make it easier to adapt the composite material to the cavity. Placement of bevels on the vertical walls of the box of a Class II restoration has been shown to improve adaptation and reduce microleakage. Bevels on the occlusal surface only seek to disguise margins and may have a detrimental effect in terms of thin sections of composite on the biting surface, which may fracture with time.

3. Matrix application
The use of conventional “passive” type matrix bands, such as Tofflemire and Sipieland types (which are suited to amalgam restorations), are often found to be inadequate for posterior com-
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a great deal of barnishing and wedging apart of the teeth to produce adequate contact points, and the anatomical interproximal contour is often not accurately reproduced. The best way around this problem is with the use of a sectional "active" matrix system such as the V3 Ring System or the Palodent system. This comprises a very thin sectional metal band which is wedged and then held in place with a ring, not dissimilar to a rubber dam clamp. This ring, as well as holding the band in place, will push apart the teeth sufficiently so that when ring and matrix are removed, there will be a good tight contact point/area.

4. Bonding protocol

Understanding proper dentine bonding technique is essential. Enamel bonding is well understood and relatively simple and reliable. Dentine bonding, however, has undergone numerous changes over the past 15 years with several generations now available. The range of systems can be a little bewildering; however the use of high quality dentine bonding systems, such as Optibond Solo or Prime & Bond NT, if used correctly, will lead to good results.

Poor bonding technique can lead to post-operative sensitivity and premature failure of the bond leading to micro-leakage and secondary caries. The most important thing is to read the instructions; it is amazing the number of people who don’t! Each generation of bonding system has particular peculiarities to it, such as having to shake the bottle before use, or to having to keep the product refrigerated, it is therefore essential to read the instructions and to follow the protocol correctly for optimal results.

Fig 1 Failed restoration requires replacement

Fig 2 Rubber Dam placed and restoration removal

Fig 3 Placement of Sectional "Active" matrix system

Fig 4 Manipulation of Hybrid Composite

Fig 5 Finished restoration

Summary

Due to the extra demands of placing posterior composites, some dentists might be reluctant to provide this type of restoration. However, given a good understanding of modern materials and the application of sound clinical technique, posterior composites can be beautiful long-lasting restorations that please clinician and patient alike.

About the author

Dr Ian Cline B D S ( L o n d ) ( F D S R C ) ( I ) Ian is a Private Practitioner in London’s West End and is the Co-founder and Course Director of Cosmetic Dental Seminars www.cosmeticdentalseminars.org, the organisation devoted to providing state-of-the-art courses in aesthetic dentistry.