

Posterior direct composite restorations



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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 is the production of good contact areas/points and the reproduction of good interproximal form.

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. This 'How To Guide' will illustrate how to overcome some of the more common problems and present a novel, revolutionary way of simplifying and speeding up this process.

Objectives

Upon completion of this guide, the clinician will:

- A** Understand the advantages and disadvantages of the use of direct composites in posterior teeth.
- B** Understand the importance of using a sectional matrix system, e.g. Palodent® Matrix, for restoration of Class II cavities.
- C** Be made aware of recent advances in low-shrinkage, low-stress, flowable, bulk-fill composites.
- D** Have learnt a number of clinical tips and techniques to increase success rates in posterior direct composite restorations.

Step by Step Procedures

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 a 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 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 XP BOND™, Xeno® V 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

microleakage 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 having to keep the product refrigerated; it is therefore essential to read the instructions and to follow the protocol correctly for optimal results.

4 PLACEMENT OF MATRIX BANDS

The use of conventional "passive" type matrix bands such as Toffelmire and Siqveland types, which are suited to amalgam restorations, are often found to be inadequate for posterior composites. With composite materials, these passive matrices require a great deal of burnishing 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 Palodent® system (Fig 3-5); 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.

5 SIMPLIFIED PLACEMENT OF SDR™

Traditionally, we have been taught to incrementally layer a conventional hybrid composite in specific layers no greater than 2mm in depth in order to reduce the Configuration(C)factor. Some clinicians place a thin 0.5mm layer of flowable composite at the base of the box to increase adaptation of the material and to reduce microleakage. Owing to shrinkage and stress factors, flowable composite is not suitable for placing in greater depth. DENTSPLY with the launch of SDR™ has overcome this problem; the polymerisation stress in SDR™ is reduced by up to 60%, when compared to conventional composites. This, in turn,

enables bulk-filling of up to 4 mm. SDR™ comes in a compula tip, which is excellent for cross-infection control and has a fine tip which allows precise application, saving up to 40% in placement time. The material is chemically compatible with the majority of posterior composite materials such as Quixfil™ and universal/aesthetic composites such as Esthet.X™ HD, Ceram.X™ duo and Ceram.X™ mono. This composite is then used as a final layer to provide the desired aesthetics and wear resistance for the occlusal surface. SDR™ has been formulated for optimal flow and consistency so as to provide excellent cavity adaptation. It has self-levelling properties which eliminate the need to manipulate the material with an instrument.

6 MANIPULATION AND SCULPTING OF CAPPING COMPOSITE

DENTSPLY has produced a number of instruments which have working surfaces coated with Zirconium Nitride (ZNR™). These are specifically for the manipulation of composite material. The special coating is far less sticky than traditional stainless steel instruments and allows for better manipulation without the annoying pull and drag often seen. Correct instrumentation allows manipulation of the composite material to develop proper functional tooth anatomy. Proper shaping allows for minimal finishing which saves time and causes minimal heat and vibrational trauma to the restoration and tooth.

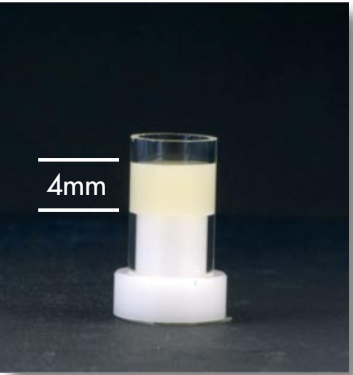
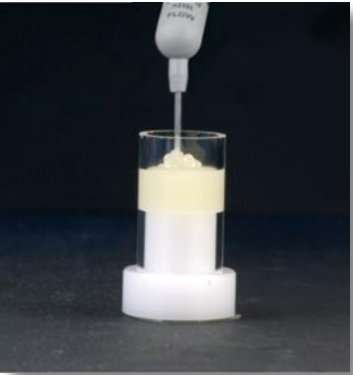
7 FINISHING AND POLISHING

Finishing can be performed with appropriate burs and/or scalpel blades. Polishing of the restoration allows a smooth glass surface to be achieved, which is both aesthetic and reduces plaque build-up. The use of Enhance® cups followed by Prisma® Gloss Aluminium Oxide polishing paste is recommended.



- Up to 40% time-saving versus conventional layering techniques¹
- Bulk-fill in 4mm increments due to 60% less shrinkage stress²
- Flowable viscosity for excellent cavity adaptation and reduced post-operative sensitivity
- Simple and effective placement of Class I & II restorations

SDR™ provides ideal self-levelling properties



1. Data on file; Inside Dentistry January 2010, In Practice Section of Materials: Buyer's Guide Pg. 84.
2. Data on file; polymerisation stress using photoelastic stress methodology (Ernst CP, University of Mainz, Germany); Polymerisation-Stress [NIST Tensometer] of SDR™ compared to other Universal/ Posterior Composite materials