New clinical innovations and the benefit of magnification to ensure predictable posterior composite restorations – Part 2

Peet van der Vyver[1]

Introduction

The introduction of the Dental Operating Microscope (DOM) in dentistry has enhanced treatment possibilities in restorative dentistry. In Part one of this series the author discussed the benefit of magnification during pre-operative examination and cavity preparation for teeth that require direct posterior composite restorations. New clinical innovations that can be used for caries identification, isolation of the working field and devices for protection of adjacent teeth during cavity preparation were also discussed.

The DOM allows clinicians to perform treatment modalities with increased precision while they work in a more comfortable ergonomic position for longer durations (Khayat, 1998). Figure 1 shows the comfortable, neutral balanced posture of the author prior to placing a direct posterior composite restoration. According to van As (2005) clinicians is able to sit upright while using the DOM without fatigue, tension or stress in the neck or lower back.

This article will continue to review the benefit of magnification during the placement of direct posterior composite restorations with emphasis on how to achieve adequate interproximal contact, bonding procedures and composite insertion techniques.

Achieving Adequate Interproximal Contact and Integrity

One of the major clinical problems with direct posterior composite resin restorations is the clinician's inability to achieve an ideal interproximal contact (Burke and Shortall, 2001). The primary challenge with Class II composite restorations is to create functional, predictable proximal contact that emulates the physiological ideal (Morgan, 2004). According to Maitland (1993) some of the failures of composite restorations, which are a result of manipulative deficiencies, are open contacts which leads to continuous food impaction and periodontal disease, as well as inadequate proximal contours, faulty occlusion and excessive wear.

According to Varlan et al., (2008) you need a properly contoured matrix band that is stabilized and adequately adapted gingivally with a wedge to establish the correct interproximal contact and convex contour. If a conventional

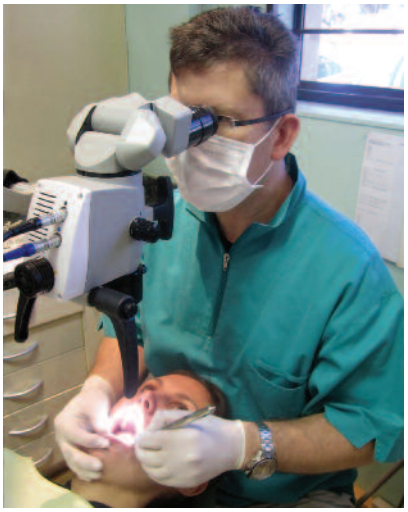

Figure 1: Comfortable, neutral balanced posture of the author prior to placing a direct posterior composite restoration using a Zumax 6-step Microscope fitted with LED illumination.

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Figure 2: Curved V3 matrix band (available in sizes from 3.5mm up to 7.5mm) designed with a rounded gingival contour and with an occlusal marginal ridge contour.

Figure 3: Universal (green) and Narrow (yellow) V3 Separating Rings.

Tofflemire matrix (uncontoured or contoured) is stabilized gingivally with a wedge it will still often result in open or light contact points if the clinician does not use additional separation (Wirshing et al., 2008). One of the major problems with a circumferential band is that the matrix often flatten out interproximally due to tensioning of the band and when the interproximal box preparation is very wide (bucco-lingual direction) an open contact is the only possible outcome (Boksman, 2010). The inability to properly condense composite resin materials, the fact that they demonstrate unconstrained volumetric shrinkage of 2-5% and that the matrix band itself take up some interproximal space during the placement phase are also reasons that can contribute to open contacts with posterior composite restorations (Boksman, Margeas and Buckner, 2008).

Precontoured sectional matrices in combination with separating rings can provide the clinician routinely with predictable interproximal contacts (Van der Vyver, 2002). The precontoured metal matrices are very malleable, they can usually be sealed more completely at the gingival margin to prevent overhangs and are less likely to lose their contour if aggressively wedged (Reality, 2001). Separating rings has become indispensable when the clinicians want to achieve tight interproximal contact. These rings are placed between the teeth adjacent to the box preparation after placement of the matrix band. The engaged ring then exerts a continuous separating force on the two adjacent teeth, creating a small space that will promote adequate interproximal contact. In addition, the tines of the ring can also ensure good adaptation of the matrix band against the preparation walls of the cavity preparation to minimise or eliminate any excess of composite material at the line angles (Reality, 2001).

It is well documented in the literature that precontoured sectional matrices in combination with separating rings will result in the strongest contacts (Boksman, Margeas and Buckner 2008; Loomans et al., 2006; Saber et al., 2010) and stronger marginal ridges (Loomans et al., 2008).

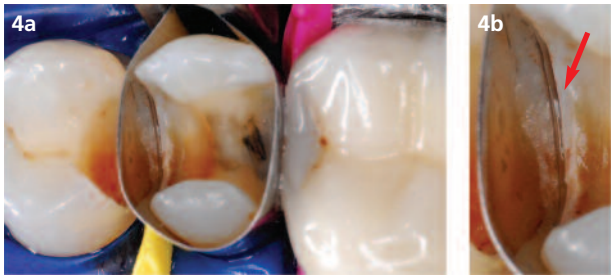
There are many sectional matrix systems on the market that can help the clinician to achieve good interproximal contact and convex contour (Table 1). The author prefers to use the V3 Matrix System (Triodent) that is also marketed as the Palodent Plus System (Dentsply) in certain regions.

The curved matrix bands (available in sizes from 3.5mm up to 7.5mm) of this system are designed with a rounded gingival contour as well as with an occlusal marginal ridge contour that routinely provide the clinician with an anatomically formed contact point, excellent marginal ridge contour and restorations that require minimal finishing (Figure 2).

The V3 separating rings (Figure 3) are available in two different sizes, a universal (green) and a narrow ring (yellow) (for narrow embrasure spaces) fabricated from nickel titanium. The nickel titanium ring is partially covered with

Table 1: Sectional Matrix Systems for Class II Posterior Composite Restorations

Separating Ring and Contoured Sectional Matrix System	Recommended Wedge	Manufacturer
V3 Matrix System Sectional Matrix System	Wave-Wedge	Triodent
Palodent Plus Sectional Matrix System	Palodent Plus Wedge	Dentsply
Composi-Tight Silver Plus Sectional Matrix System	Wedge Wands	Garrison Dental
Composi-Tight 3D Sectional Matrix System	Wedge Wands	Garrison Dental



Figures 4a (magnification 5X) and 4b (magnification 15X): Matrix assemblage on an upper right second premolar. Note the poor matrix adaptation at the gingival cavity margin allowing crevicular fluid (arrow) to contaminate the cavity margin.

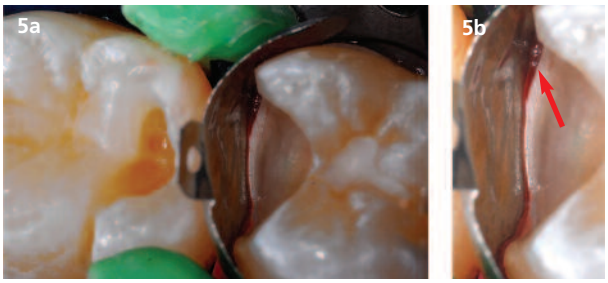


Figure 5a (magnification 5X) and 5b (magnification 15X): Matrix assemblage on an upper right first molar. Poor matrix adaptation at the gingival cavity margin allowing crevicular fluid and blood (arrow) from the sulcus area to contaminate the cavity margin.

glass reinforced plastic tines that are V-shaped. The wide occlusal foot print of the plastic tines ensure excellent adaptation of the matrix band against the cavity margins while the V-shape tips allow for easy placement over the wedge. However, more important is the fact that these V-Shaped tines allow the operator to move, replace or add additional wedges if needed during the procedure to ensure proper adaptation of the matrix band at the gingival margin, without disassembling the matrix setup as it is the case with many other systems.

Another significant cause of failure of posterior composite resin restorations is secondary caries. Gap formation at the cavity margins can also be a result of polymerization shrinkage of the composite resin (Eick & Welch, 1986; Lutz, Krejci & Barbakow, 1991). According to Letzel (1989) marginal gaps can permit the ingress of bacteriogenic bacteria and oral fluids (Mejare, Mejare & Edwardson, 1979; Quist, 1980), resulting in the formation of secondary caries. It can also lead to post-operative sensitivity, staining at the margins (Ericksen & Pears, 1978).

The author is of the opinion that gap formation and subsequent secondary caries formation can also be a result of poor matrix management at the gingival margins of the cavity preparations. With poor matrix adaptation to the gingival margins of the preparation, crevicular fluid, blood, saliva or a combination of these fluids will contaminate the adjacent enamel, dentine or cementum. This can compromise the bonds strength of the bonding system to the remaining tooth structure in this critical area of the preparation. Figures 4a (magnification 5X) and 4b (magnification 15X) illustrate a clinical case after cavity preparation and matrix assemblage on an upper right second premolar. Note the poor matrix adaptation at the gingival cavity margin allowing crevicular fluid (arrow) to contaminate the cavity margin.

Figures 5a (magnification 5X) and 5b (magnification 15X) depict another clinical case after cavity preparation and matrix assemblage on an upper right first molar. Poor matrix adaptation at the gingival cavity margin allowed crevicular fluid and blood (arrow) from the sulcus area to contaminate the cavity margin.

It is important to note that with Class II posterior composite resin restorations the function of the wedge is not to provide tooth separation but to seal the matrix at the gingival margin. The author prefers to use plastic wedges eg. Wedge Wands (Garrison Dental) or Wave-Wedges (Triodent).

The Wave-Wedges (Triodent) (Figure 6a) provide unsurpassed sealing capability at the ginigival margin. The wedges have an inverted V-shape (Figure 6b) at the bottom to acccomodate the gingival tissue and also allow the wedges to be stacked on top of each other (Figures 7a and b). It is also posiible to place one from buccal and one from palatal/ ligual aspect to increase the gingival seal. The wave

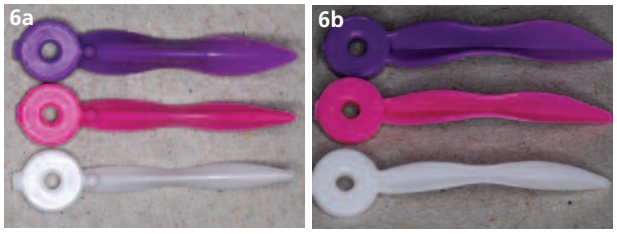


Figure 6a: Wave-Wedges (small, medium and large). Figure 6b: Inverted V-shape at the bottom to acccomodate the gingival tissue and also allow the wedges to be stacked on top of each other.

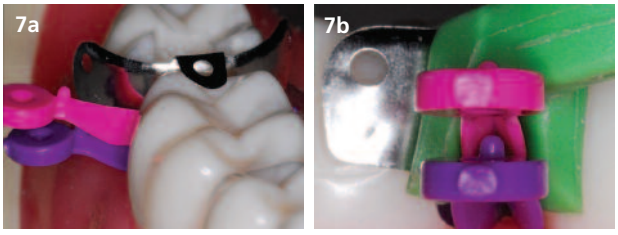


Figure 7a and b: Frontal and buccal view of Wave-Wedges stacked on top of each other.

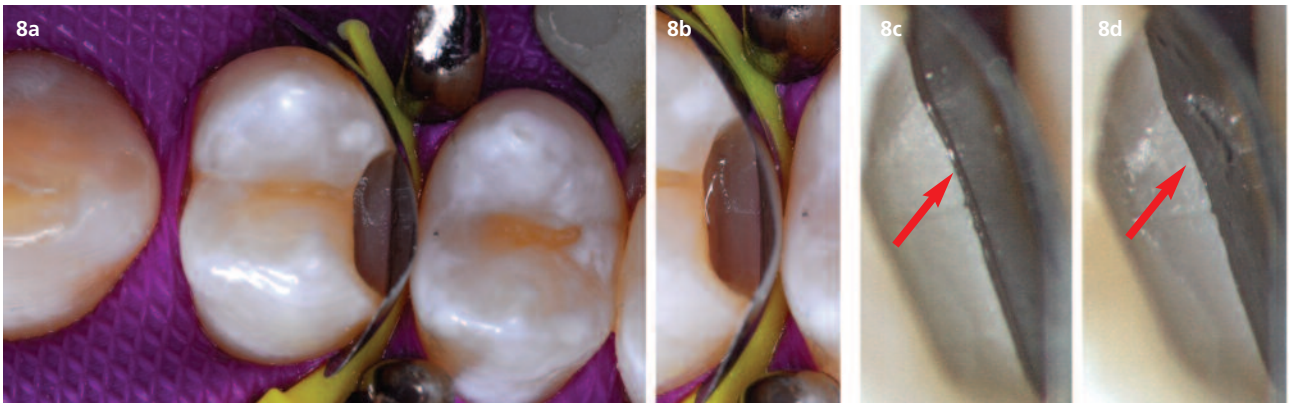


Figure 8a (magnification 3X) and 8b (magnification 5X): Class II cavity preparation on an upper left second premolar. After matrix assemblage, and examination the matrix adaptation at the gingival margin appeared to be satisfactory. Figure 8c (magnification 15X): Under high magnification it was evident that the matrix adaptation was not as good as observed at lower magnification. Note the crevicular fluid seeping in between the matrix band and gingival cavity margin(arrow). Fig 8d (magnification 15X): After the matrix assemblage was changed, excellent adaptation (arrow) between the gingival margin and matrix band was achieved.

shape of the wedge also allow for optimal approximation of the wedge when placed interproximally between two teeth ensuring a broad gingival seal by optimal adaptation of the interproximal space.

The interface between the gingival margin and the matrix band should be inspected under magnification (at least 10X) to ensure:

• Excellent adaptation between the gingival margin and the matrix band, ensuring the absence of any fluids penetrating between the matrix band and gingival margins. Figure 8a illustrates case where a Class II cavity preparation was done on an upper left second premolar. After matrix assemblage, and examination at 3X (Figure 8a) and 5X (Figure 8b) magnification the matrix adaptation at the gingival margin appeared to be satisfactory. However, under 15X magnification (Figure 8c), it was evident that the matrix adaptation was not as good as observed at lower magnification. Note the crevicular fluid (arrow) moving up in between the matrix band and ginigival cavity margin, that could compromise the bond strength of bonding systems to this gingival margin. After the matrix assemblage was changed Figure 8d demonstrates excellent adaptation between the gingival margin and matrix band(arrow), eliminating the presence of fluid contamination of the restorative margin and hopefully will ensure a more predictable long-term result.

• Adequate adaptation between the matrix band and the facial and lingual proximal margins. Figure 9 (magnification 8x) shows cavity preparation and matrix band assemblage on an upper first molar. Note the good matrix adaptation on the buccal proximal margin(asterisk), and very poor matrix adaptation on the palatal proximal margin (arrow). This poor matrix adaptation on the palatal proximal margin will lead to excess composite material in this area that will prolong finishing and polishing of the final restoration.

• Integrity of the gingival and proximal enamel margins. Unsupported enamel often chips off when the clinician exerts force on the margins during placement of the wedge (gingival margin) or the separating rings (proximal margins).

Etching of Enamel and Dentine

Enamel bonding plays an important adjunctive role in the long-term retention of adhesive restorations, and recent work confirms the strength and stability of the etched enamel bond (Van Meerbeek et. al., 1994). Traditionally, etching enamel with approximately 30 - 60% phosphoric acid solution for 30 - 60 seconds and appropriate washing and drying give reasonable good enamel bond strength.

Dentine bonding systems can consist of a conditioner/ etchant, primer and adhesive. Acids or conditioners are

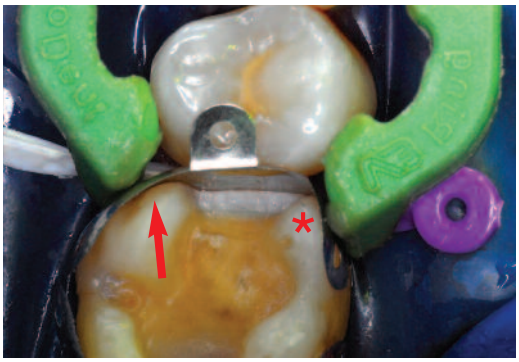


Figure 9 (magnification 8X): Matrix band assemblage on an upper first molar. Note the good matrix adaptation on the buccal proximal margin (asterisk), and very poor matrix adaptation on the palatal proximal margin (arrow).

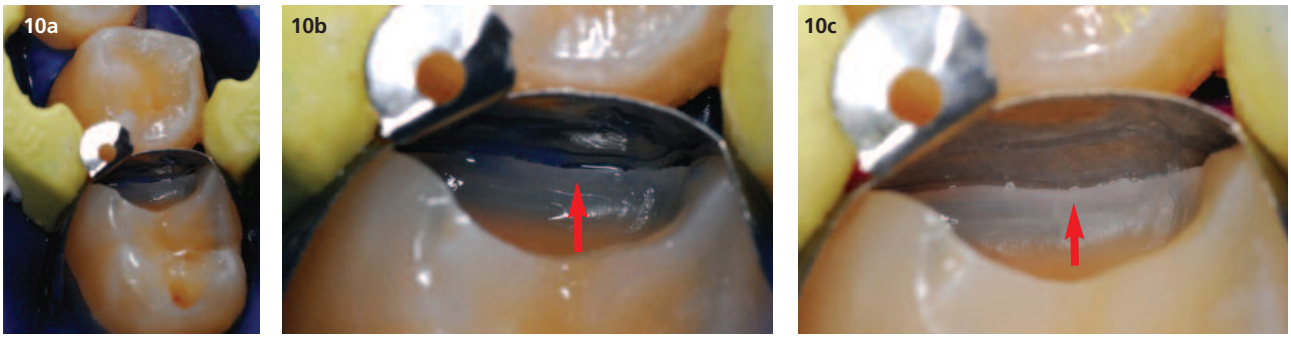


Figure 10a (magnification 3X): Clinical view after matrix assemblage and etching with 35% phosphoric acid on a lower right first molar. Figure 10b (magnification 10X): Higher magnification showed that not all the phosphoric acid (arrow) was rinsed away with water. Figure 10c (magnification 10X): Visible moisture (arrow) at the gingival margin due to poor matrix band adaptation at the gingival margin after removal of the phosphoric acid.

applied to the dentine surface in order to remove the smear layer (amorphous layer of cutting debris and bacteria that is left on the dentine after cavity preparation according to Eick et. al.,1970) and concurrently decalcify the underlying intertubular dentine.

The extent of the dissolution depends on the type and concentration of the acid, as well as the viscosity and the exposure time of the etchant (Van Meerbeek et. al., 1992). The dentine may be extensively demineralised and weakened if the concentration of the acid is too high or if the exposure time is too long (Wang and Nakabayashi, 1991). The depth of dentine demineralisation has become an important issue in dentine bonding (Perdigão and Lopes, 2001). The incomplete penetration of bonding resin into the demineralised microporous collagen network could result in a delicate zone inside the hybrid layer and the unaltered dentine that could be susceptible to continuous degradation (Sano et. al., 1994) and microleakage (Walshaw and McComb, 1998). Therefore, it is recommended that dentine should not be conditioned/ etched for longer than 15 seconds (Walshaw and McComb, 1998).

When a dentinal surface is etched with an acid and copiously washed with water, the surface is demineralised for about 3-5 microns (Perdigão, 1995), leaving a collagen network behind. To allow effective penetration of the primer and adhesive into this collagen network the dentinal surface must not be overly dried - if this happens the collagen network will collapse, resulting in low bond strengths (Gwinnett, 1992).

Magnification during the etching of enamel and dentine can benefit the clinician in following ways:

- It was observed under magnification that there is often incomplete removal of acid etchants at this margin. It is very common in mesial interproximal box preparations of premolar and molar teeth due to the limited perpendicular access of the three-one syringe to this part of the preparation. Leaving phosphoric acid and its by-products on the gingival margin prior to the application of the bonding resin system might influence the bond strength. It can lead to over-etching of the dentine in this area or to dilution and contamination of the bonding system components. Figure 10 demonstrates a case after cavity preparation, matrix assemblage and etching with 35% phosphoric acid. Figure 10a (magnification 3x) shows the result after rinsing of the phosphoric acid with water for 10 seconds. Under higher magnification (10x) (Figure 10b) it was evident that not all the phosphoric acid was rinsed away with water. Failure to remove this acid properly before application of a dentine bonding system can severely compromise the bond strength in the proximal box preparation. In the author's experience it is more prevalent in cases where there is poor matrix adaptation between the matrix band and the gingival margin. Figure 10c (magnification 10x) also illustrates visible moisture at the gingival margin due to poor matrix band adaptation at the gingival margin after removal of the phosphoric acid.
- Regulating the amount of water evaporation after etching to create a dry, moist or wet dentine surface (according to the bonding system used) and a dry, frosty white etched enamel surface.

Application of the Primer or Primer/Resin Combinations

The modern trend is to saturate the exposed dentine and enamel with primer (multi-component systems) or primer/resin (single component systems) for approximately 15-20 seconds. After the recommended waiting time, the surface is lightly air-dried to volatilise the solvent of the primer/resin. According to Walshaw and McComb (1998), any solvent remaining on a primed dentine surface will

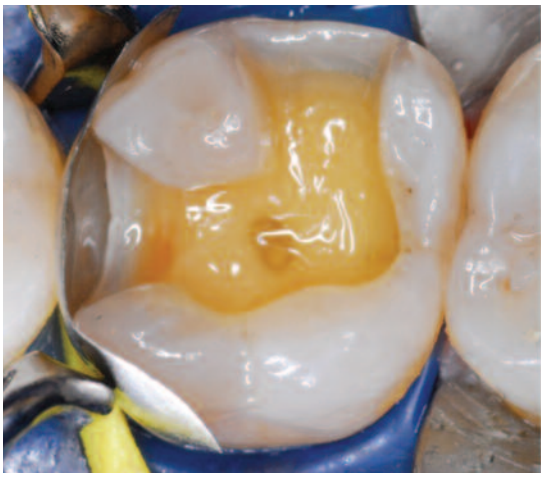


Figure 11 (magnification 10X): Magnified view of a cavity preparation and matrix assemblage on an upper right first molar. Note the shiny appearance of the dentine after several applications of primer and evaporation of the solvent.

prevent complete adaptation of bonding resin.

The primed surface should appear shiny. If it has a matt finish it probably indicates that the dentinal tubules are not properly sealed and the application of a second coat is advisable. Figure 11 (magnification 10x) shows a magnified view of a cavity preparation and matrix assemblage on an upper right first molar. Note the shiny appearance of the dentine after several applications of primer and evaporation of the solvent, prior to light-curing.

Application of the Bonding Resin (Multi-component systems only)

The adhesive resin must be placed in an even, thin layer without the need to air-thin. Air thinning of the bonding resin can lower the bond strength and cause surface defects (Hilton and Schwartz, 1995). The optimal thickness for adhesive resin layers is about 100µm (Moon and Chang, 1992) and when placed in such thick layer, the resin may act as a stress-relaxation buffer due to its high elasticity (Van Meerbeek et. al., 2001). After application the adhesive must be light-cured for 10 - 15 seconds for direct restorative techniques.

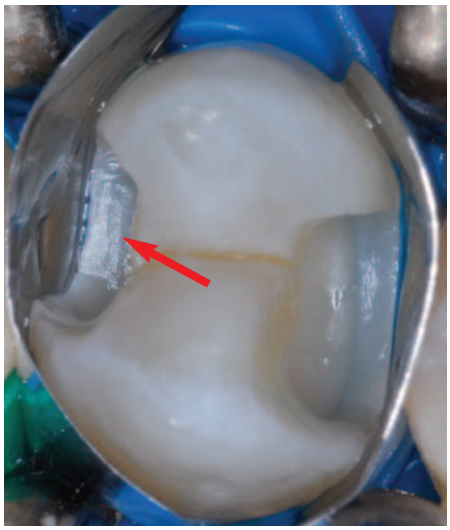


Figure 12 (magnification 10X): MOD cavity preparation with matrix band assemblage on an upper left second premolar. This magnified view revealed failure to coat the dentine in the mesial proximal box (arrow) adequately with primer / resin.

The benefits of magnification during primer/resin application include:

• Ensuring that all the etched dentine surfaces are adequately covered with the primer or primer/resin solutions. Assessing the quality of the primed or primer/resin surface - magnification allows the clinician to identify areas that does not appear shiny. Primer or primer/resin solutions can then be reapplied to these areas before application of the bonding resin or composite resin material. Figure 12 illustrates a clinical case of a MOD preparation on an upper left second premolar. Examination under magnification (10X)

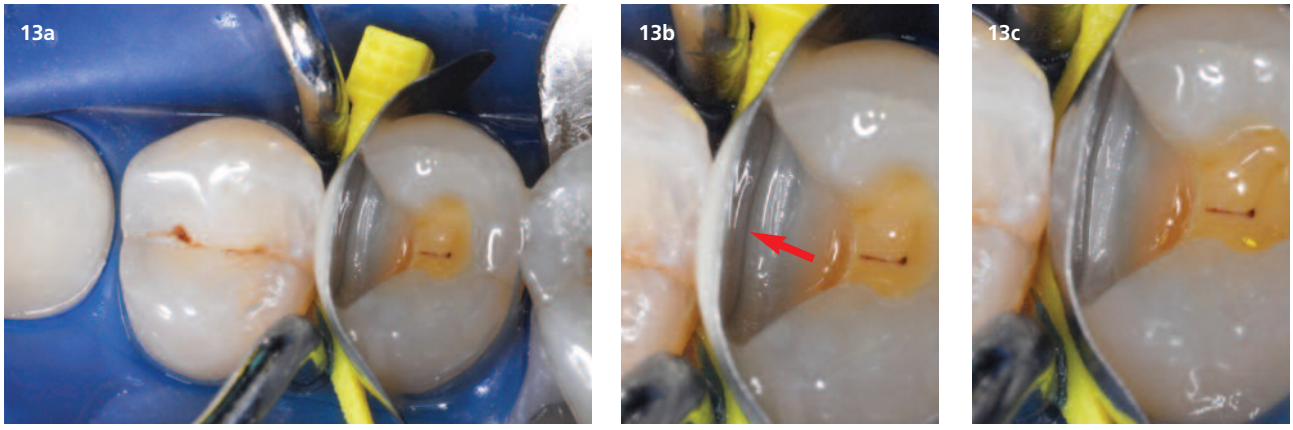


Figure 13a (magnification 3X): Clinical case where bonding agent was applied and air-thinned to a Class II cavity preparation on an upper right second premolar. Figure 13b (magnification 10X): Evidence of pooling of an excessive amount of bonding resin (arrow) at the junction between the gingival margin and matrix band. Figure 13c (magnification 10X): Final result after careful removal of the excessive amount of resin.

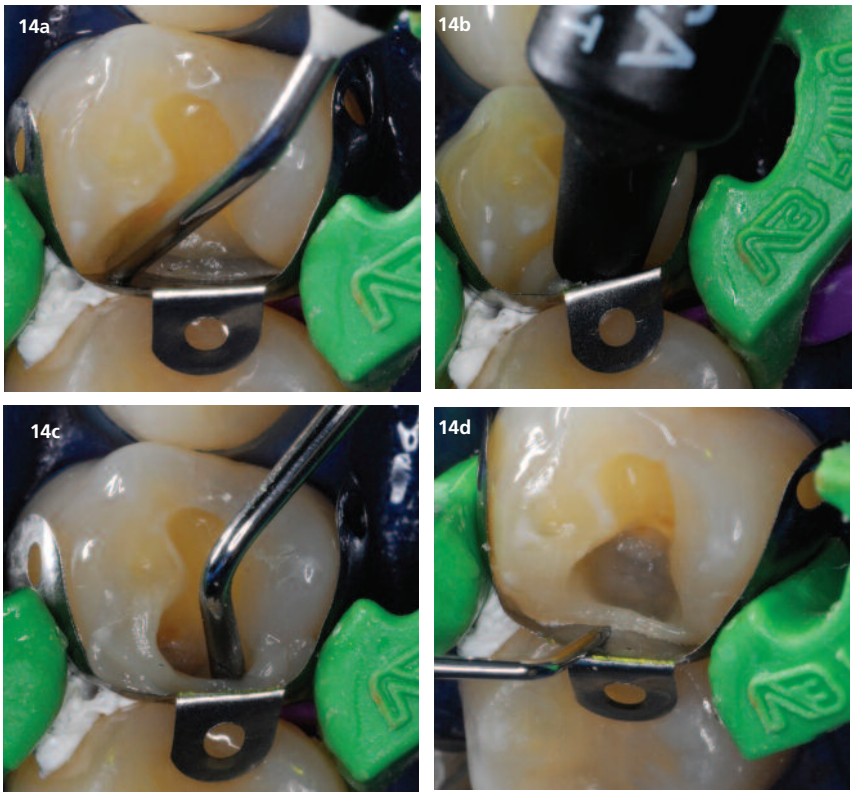


Figure 14a. Small drop of flowable composite is dispensed under magnification on the interface between the matrix band and gingival margin. Figure 14b. Regular viscosity composite resin (transparent or translucent shade) is then dispensed onto the uncured flowable material. Figure 14c. Composite material is condensed towards the gingival margin and towards the matrix band with a composite condenser (Sculp Condensor, Colténe Whaledent) until it forms a thin rim of material (1-1.5mm) extending from the buccal to the lingual proximal margin. Figure 14d. Excess composite material at the occlusal surface is removed with a sharp probe or composite instrument– ensuring the formation of an anatomically contoured marginal ridge.

revealed failure to coat the dentine in the mesial proximal box (arrow) adequately with primer/resin.

- Ensuring that most of the solvent in the bonding system is evaporated and eliminating excessive amounts of primer solution pooling up in areas that were not reached during the evaporation phase. Leaving excessive amounts of solvent in the mixture can also lead to incomplete polymerization of the bonding resin. Figure 13a (magnification 3x) demonstrates a clinical case where bonding agent was applied and air-thinned to a Class II cavity preparation on an upper right second premolar. On 10X magnification (Figure 13b), there was clear evidence of pooling of an excessive amount of bonding resin at the junction between the gingival margin and matrix band. Figure 13c (magnification 10x) shows the final result after careful removal of the excessive amount of resin.

Composite Insertion Techniques

The author prefers to use a modified centripetal build-up technique for Class II restorations as proposed by Bichacho (1994). With this technique the lost tooth structure is replaced from the periphery towards the center of the cavity, ensuring excellent marginal adaptation at the gingival margin. Effectively, a Class II preparation is transformed into a Class I preparation.

The first step is to re-establish the proximal wall. A small drop of flowable composite is dispensed under magnification on the interface between the matrix band and gingival margin (Figure 14a). A regular viscosity composite resin (Enamel shade) is then dispensed onto the uncured flowable material (Figure 14b). The material is condensed towards the gingival margin and towards the matrix band with a composite instrument (Sculp Condensor, Coltène Whaledent). This layer of composite material is manipulated until it forms a thin rim of material (1-1.5mm) extending from the buccal to the lingual proximal margin (Figure 14c).

Excess composite material at the occlusal surface is removed with a sharp probe or composite instrument (Sculp Carver, Coltène Whaledent) (Figure 14d) - ensuring the formation of an anatomically contoured marginal ridge. The

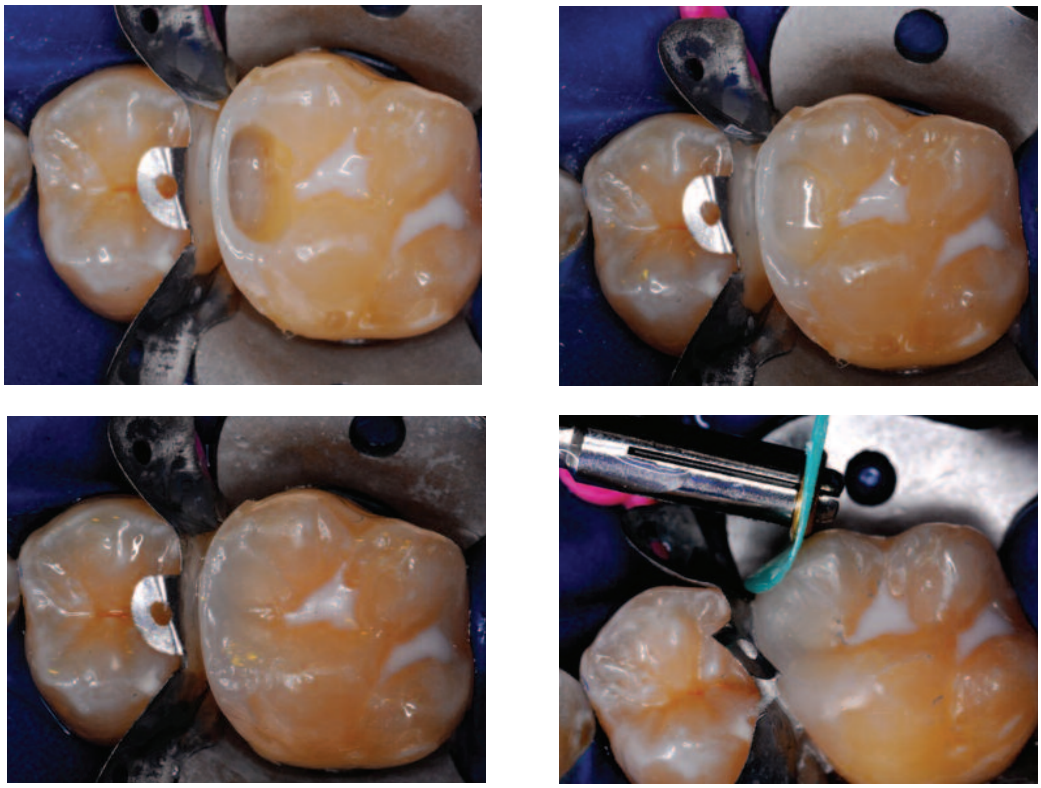


Figure 15a (magnification 5X): Ends of the sectional matrix band is reflected back towards the adjacent tooth. The band will still protect the newly established contact point against possible iatrogenic damage that might occur during finishing and polishing. Figure 15b (magnification 5X): Horizontal layer of dentine shade composite material (1.5 - 2mm) is placed into the remaining Class I cavity outline. Figure 15c (magnification 5X): Oblique layer of translucent enamel material is packed from the surface of the horizontal layer of dentine material up to the external buccal cavity margin and light-cured for 10 seconds. A second oblique layer, extending from the margin formed between the horizontal dentine and oblique enamel material is packed towards the external lingual cavity margin. Figure 15d (magnification 5X): Excess composite material at the cavity margins is removed under magnification with a small medium grit polishing disc (OptiDisc, Kerr). Note that the sectional matrix band is protecting the interproximal contact during this finishing step.

height of the marginal ridge should correspond with the marginal ridge height of the adjacent tooth, unless otherwise observed during the initial inspection of the tooth prior to the restorative phase. Overcontouring is one of the most common placement errors with direct posterior composite restorations (Morgan, 2004). Overcontouring of the marginal ridge often leads to subsequent overcontouring of the entire restoration, resulting in excessive finishing and polishing procedures. This envelope of composite material is light-cured for 40 seconds.

At this stage, it is advisable to remove the separating ring and check if a tight contact was established (Figure 15a) (magnification 5x). This is done with an attempt to pull on the sectional matrix band. If the band is firmly wedged between the composite resin and the adjacent tooth, it generally confirms the establishment of an adequate contact. However, if the band can be removed with light force, the contact is inadequate, and the proximal wall should be removed and replaced before proceeding to the next step. The ends of the sectional matrix band are reflected back towards the adjacent tooth (Figure 15a) (magnification 5x) to protect the adjacent tooth and the newly established proximal contact against possible iatrogenic damage that might occur during finishing procedures at a later stage. In addition, it also allows the clinician full view and access to the occlusal surface during placement of composite resin into the remaining Class I restoration.

After successful creation of the translucent envelope, a horizontal layer of dentine shade composite material (1.5-2mm) is placed into the remaining Class I cavity outline (Figure 15b) (magnification 5x), to within 1-1.5mm of the cavosurface margin. This layer is light-cured for 20 seconds. An oblique layer of enamel shade material is packed from the surface of the horizontal layer of dentine material up to the external buccal cavity margin. A composite instrument (Sculp Condensor, Coltène Whaledent) is used to shape the resin and to define anatomy using the remaining cuspal inclines as an indicator. After light-curing this layer for 10

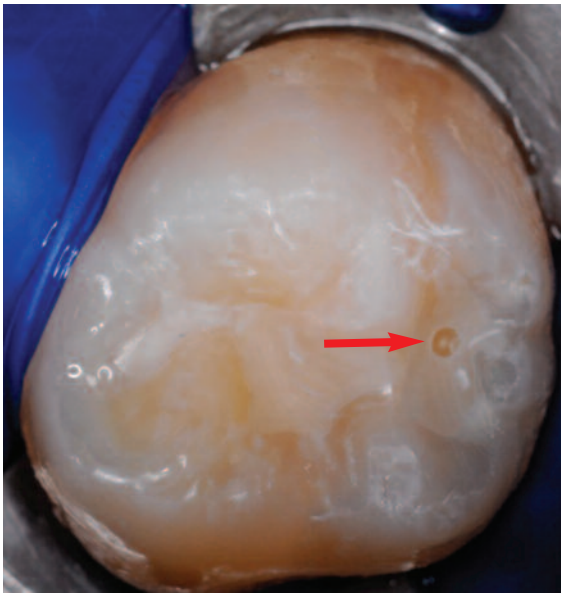


Figure 16 (magnification 10X): Class I composite restoration on an upper right first molar. Note the porosity (arrow) in the composite material that was evident after examination under magnification.

seconds, a second oblique layer, extending from the margin formed between the horizontal dentine and oblique enamel material is packed towards the external lingual cavity margin, using the same method. Before this layer is light-cured for 20 seconds, occlusal characterization is done with a sharp composite instrument (Figure 15c) (magnification 5x). The tooth is covered with a thin layer of glycerine gel and light-cured for 20 seconds. This step ensures the transformation of the oxygen inhibit layer to a smooth, completely cured surface that will eliminate clogging of uncured resin into the finishing instruments. The restoration is then fully cured from different angles (buccal, lingual and occlusal) for a total of 60 seconds.

If any excess composite material is visible at the margins of the buccal and lingual proximal margins, it can be removed under magnification with a thin carbide bur. A series of finishing disks (OptiDisc, Kerr) (Figure 15d) (magnification 5x) can be used to contour the marginal ridge and polish the proximal areas. The sectional matrix band is still protecting the interproximal contact against iatrogenic damage during this finishing step and should only be removed once the operator is satisfied with the final contour of the proximal wall.

Rubber dam is removed and occlusal adjustments are made where necessary. It is recommended that accessible margins must be sealed with a surface sealant to reseal any microcracks that might have been caused by trauma of finishing procedures. Application of a surface sealant can reduce the wear rate of posterior composite restorations (Dickenson & Leinfelder, 1993). Clinically, the restoration margins are etched with phosphoric acid, rinsed and dried before a surface sealant (Fortify, Bisco Dental Products or Permaseal, Ultradent) is applied and adequately light-cured. These products also produce an oxygen inhibited layer and should be cured through a glycerine gel. Alternatively, BisCover (Bisco Dental Products), an acrylate based light-cured surface resin that does not produce a oxygen-inhibited layer, can be used. According to Morgan (2004) it can either be placed as a surface sealant after acid etching to fill any micro-cracks or it can even be placed on the enamel layer of partially cured composite resin (instead of glycerine gel) to interact with the oxygen-inhibited layer and prevent its formation.

The advantages of packing the composite material into the cavity preparation under magnification include:

- It is easier to pack a thin even layer of material against the matrix band and to ensure good adaptation of the composite material to the cavity walls
- Packing of the oblique layers of composite right up to the cavity margins without any excess material. This will minimize the finishing procedure and provide the patient with a restoration with improved physical and mechanical characteristics (Terry, 2005). Duke (1993) demonstrated that a reduction in finishing results in less damage to the composite material, In addition, the restoration will demonstrate less micro-fracture, improved wear and clinical performance.
- Improved precision when any excess of material is removed with rotary instruments.
- Identification of any cracks or microscopic porosities that might have formed during the polymerization or finishing procedures. Figure 16 (magnification 10x) illustrates the final result after placement of a Class I composite restoration on an upper right first molar. Note the porosity (arrow) in the composite that was evident after finishing of the restoration with a carbide bur.

Conclusion

This paper has described innovative materials and techniques that can be used clinically to improve the long-term success of direct posterior composite restorations. The use of magnification is highly beneficial in eliminating many of the procedural errors that can occur during the restorative phase, thereby improving the overall quality of the bonded restoration.

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