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Clinical Technique/Case Report

Additional Uses for the Classic Matrix Band

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BACKGROUND

The use of metal matrix bands has had an evolving history of providing shape and resistance to the condensation of restorative materials. As early as 1864, one dental text described pinching the ends of a metal matrix band together around a tooth, then soldering the band to create a custom matrix band.[1] By 1900, another text described various "matrices" that could be tightened by using a small wrench to turn a single screw or a set of screws.[2] It was GV Black, in 1900, who chose not to use the "ready made" matrices but described his preference for a metal matrix drawn tightly around a tooth by multiple wraps of a ligature tied with a surgeon's knot.[3] It was not until 1946 that the Tofflemire matrix retainer was invented by a Navy dentist, Dr Benjamin Franklin Tofflemire. He described using an "arcuate" metal matrix band with his matrix retainer, which is similar to the Tofflemire bands in use today.[4] And, the changes and refinements have continued. Winstanley described the steel matrix band as part of an "automatrix" system that does not require a separate retainer and is tightened around the tooth with a special tool.[5] Blalock used a single Tofflemire retainer to hold two metal bands to restore two adjacent teeth.[6] Brackett and others described using the circumferential metal band and matrix retainer in conjunction with a bitine ring/s for improved interproximal contour of Class II composites.[7] Finally, in 2006, Mamoun and Ajmed reinforced the matrix band with smaller segments of a metal matrix band, resin saturated pieces of cotton and fast-polymerizing vinyl polysiloxane to support the restoration of a combined Class II and Class V carious lesion.[8]

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PURPOSE

Although the matrix band has been traditionally used to confine restorative materials within the tooth during its restoration phase, the matrix band has other uses that can help to solve certain clinical problems faced daily in the dental office. This paper will outline a simple clinical technique that will help clinicians solve many common problems.

TECHNIQUE #1

Grip the matrix band tightly between the thumb and forefinger of each hand to expose an approximately 1.0 cm working section of the band. Align the band with the inter-proximal contact, then rock the band into place (Figure 1). Rock the band in a buccal/lingual or facial-lingual movement, which is in alignment with the interproximal contact. The rocking motion is usually most effective when it pivots around the mid-point of the leading edge. Sometimes, a slight sliding of the band in a buccal-lingual or facial-lingual direction at the same time the band is rocked facilitates the most

effective placement of the band. Grasp the band as close to the tooth as feasible, and do not allow the band to become kinked as it is rocked into the interproximal space. Curve or twist the leading edge of the band against the area of the tooth to be smoothed. The square-edged shape of the band provides a scraping or planing blade that smoothes and planes rough/irregular edges and surfaces. It does not appreciably reduce the mesial-distal width of the tooth or the fundamental tightness of the contact. Since matrix bands are disposable, a new band can be used each time and it will always assure having a sharp edge.

Number 1 stainless steel Tofflemire bands come in two basic thicknesses or gauges, 0.0015 inch (15 gauge) and 0.002 inch (20 gauge). The thicker band has more rigidity and is less likely to collapse when the operator is rocking the band into tight interproximal contact. The thicker band also allows the operator to torque the band, with more force, into the most effective position for planing and smoothing.

TECHNIQUE #2

A second type of smoothing and shaping can be accomplished with the edge of the band at a 45° angle to the occlusal plane, partially seated in the interproximal space. Once this is accomplished, twist the edge of the matrix band across the marginal ridge of an amalgam or composite restoration (Figure 2). Then, hold the edge of the twisted matrix band against the occlusal-proximal line angle, as moving the band slightly in a buccal-lingual scraping motion will reshape the restoration. Where the contact is too tight to slide the band buccal lingual, the scraping movement of the edge of the band can be accomplished by rotating the band slightly buccal or lingual in a movement that forces the edge of the band gingivally and diagonally across the sharp edge of the marginal ridge. This technique can provide a curved shape to the occlusal-proximal line angle of the marginal ridge without ditching and without any appreciable decrease in tightness of the interproximal contact.

Potential Problems

Where access is limited, the effective use of the two-handed grip that is required for this technique may be too difficult; therefore, it can only be recommended where intraoral access is adequate for proper positioning of the fingers. The band must be held securely so that it will not slip and cut the gingiva. Only a carefully controlled force should be utilized. The patient may need to support the jaw with adequate pressure. In some cases, the practitioner may need to stand in order to deliver the appropriate force.

List of Materials

A 20 gauge #1 stainless steel Tofflemire matrix band (0.0020" thick) was used.

Figure 1.

Figure 2.

Technique #1

The technique described above can be used to solve the following clinical problems commonly encountered in daily practice.

Tight Interproximal Contact

Every dentist has experienced the challenge of placing dental floss into a tight interproximal contact, resulting in the dental floss breaking or shredding. Usually, this is caused by the edge of a wear facet, the rough edge of an existing restoration or an edge of enamel where the restoration is slightly under contoured or ditched from wear. This situation not only makes it difficult for the patient to floss, but also makes rubber dam placement far more difficult. Although it can be argued that the band only creates a temporary separation of the teeth, the author's patients have reported a permanent reduction in difficulty flossing a tight contact once this procedure has been implemented.

Conservative Preparation with Minimal Interproximal Clearance

Many dentists may also identify with the difficulty encountered when placing a thin matrix or a concave matrix next to a conservatively prepared interproximal box.

The matrix may hit the edge of the preparation as it is seated and become wrinkled or kinked. If the wrinkled band is subsequently seated, the "wrinkle" may present an irregular shape that is undesirable for contouring the interproximal restoration. A similar problem may exist when placing a circumferential band for a Class II restoration through the adjacent tooth contact. This technique can clear the path through the interproximal space for floss or a matrix band to pass.

Clearing Excess Restorative Material from the Interproximal Contact and Embrasure

Advances in dental materials have brought new cements with more adhesive ability and an accompanying challenge: the ability to remove the cement from the interproximal embrasures or contacts. This technique can be used to loosen interproximal cement from veneers or crowns where dental floss has repeatedly been shred or broken.

This technique is also helpful when finishing Class II, III and IV composite restorations by removing excess flash of the bonding agent and restorative material from the interproximal area. At the same time, with effective angulation, the band can shave small areas of the new composite to help create a rounded contour without resorting to an abrasive strip, which may reduce tightness of the interproximal contact.

Preparing the Interproximal Space to Receive Orthodontic Spacers

Stretchable orthodontic separating rings can be difficult to place in rough interproximal spaces. This technique can be used to clear the path for the separating rings in the same way that it clears the path for placement of dental floss.

Removing Interproximal Calculus

Periodontists and hygienists sometimes encounter patients with very heavy anterior calculus that extends into the interproximal contact area. This calculus may be in a space that is too narrow to be reached by conventional curretes or scalers. The author has noticed that some hygienists will reach for abrasive strips to remove this calculus. Once again, a Tofflemire band utilized via this technique can be positioned in such a way as to scrape away the calculus in the contact area without reducing the tightness of the interproximal contact.

Using Technique #2

Rounding a Sharp Marginal Ridge

Many dentists have faced the challenge of rounding a sharp marginal ridge of restorative material that is butted against the adjacent tooth with a 90° degree occlusal-proximal edge. Using a bur or disk can easily result in ditching the marginal ridge embrasure, leaving a stepped or uneven contour. Because of the sharp 90° shape, the restorative material presents a small cross-sectional area to the forces of the matrix band that can be effectively rounded and smoothed. Technique #2, as described above, can help to round the sharp angle and form a smoother emergence profile/contour from the interproximal contact to the marginal ridge.

SUMMARY OF ADVANTAGES AND DISADVANTAGES

The Classic Matrix Band (#1 Tofflemire 0.002 inch thickness) is a useful tool for smoothing interproximal tooth surfaces without appreciable abrasion or reduction of the essential tightness of the interproximal contact. Other dental tools, such as a saw-toothed metal strip or an abrasive strip, have rougher edges and surfaces and are more likely to scratch and/or abrade the interproximal contact surfaces and cause a reduction in tightness of the interproximal contact. The strength and rigidity of the .0020 inch-thick band facilitates its use in rough/tight interproximal surfaces that may be too difficult to access with floss or an abrasive strip. The Classic Matrix Band is both an economical and effective tool when used creatively and cautiously to resolve some of the daily challenges faced in the dental office.

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