Class II
Direct Composite Restorations with the use of Sectional Matrix Systems

Procedure/Study by

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Composi-TightGold®

WedgeWands®

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Dr. Robert A. Lowe received his Doctor of Dental Surgery degree from Loyola University School of Dentistry in 1982, where he graduated magna cum laude and second in his class. After graduating, he completed a one-year residency program at Edward Hines Veterans Administration Hospital. He received postgraduate training in different areas of dental care, including restorative and rehabilitative dentistry, cosmetic dentistry, endodontics, prosthodontics, periodontics, oral surgery, and sedation dentistry, completing a rotation in surgical anesthesia. He served for 10 years in a full and part time capacity as an Associate Clinical Professor of Restorative and Rehabilitative Dentistry at Loyola.

Dr. Lowe went into private practice in Chicago after completing his residency, at which time he began to pursue another passion: clinical teaching. While running his own practice, Dr. Lowe served as a part-time lecturer of restorative and rehabilitative dentistry at Loyola University School of Dentistry. In 2000, he relocated to Charlotte.

Dr. Lowe's dedication to educating the dental professionals of the future has led to a number of honors, and he continues to be in demand for professional dental care lectures given his expertise and insight. Dr. Lowe has lectured at all of the major dental meetings in the United States, including the American Dental Association Annual Meeting, the American Academy of Cosmetic Dentistry, and the American Society of Dental Aesthetics. In 2005, he was nominated to receive Diplomate status on the American Board of Aesthetic Dentistry. This is an honor shared by fewer than 50 dentists in the entire United States.

Introduction

Class II (interproximal) decay and/or a failing restoration that involves a posterior proximal surface is still a common problem in daily practice. Many of these problems can be corrected utilizing directly placed restorative materials. The challenge with Class II restorations has always been to recreate contact to the adjacent tooth and at the same time, restore proper interproximal anatomic form given the limitations of conventional matrix systems. The thickness of the matrix band and the ability to compress the periodontal ligaments of the tooth being restored and the one adjacent to it can sometimes make the restoration of proximal tooth contact laborious at best.

Anatomically, the posterior proximal surface is convex occlusally and concave gingivally. The proximal contact is elliptical in the bucco-lingual direction and located approximately one millimeter apical to the height of the marginal ridge. As the surface of the tooth progresses gingivally from the contact point toward the cementoenamel junction, a concavity exists that houses the interdental papilla. Conventional matrix systems are made of thin, flat metallic strips that are placed circumferentially around the tooth to be restored and affixed with some sort of retaining device. While contact with the adjacent tooth can be made with a circumferential matrix band, it is practically impossible to recreate the natural convex/concave anatomy of the posterior proximal surface because of the inherent limitations of these systems. Attempts to "shape" or "burnish" matrix bands with elliptical instrumentation may help create non-anatomic contact, but only "distorts", or "indents" the band and does not recreate complete natural interproximal contours.

Without the support of tooth contour, the interdental papilla may not completely fill the gingival embrasure leading to potential food traps and areas for excess plaque accumulation. Direct Class II composite restorations can present even more of a challenge to place for the dentist because of the inability of resin materials to be compressed against a matrix to the same degree as amalgam, as well as the shrinkage factor of most composite materials. This article will describe the use of an innovative sectional matrix system (Composi-Tight Gold: Garrison Dental Solutions) and instrumentation designed to facilitate placement of the matrix to assure maximum results, both in physiological tight contact and in anatomic form. When utilizing this system with the latest in composite resin technology, direct Class II tooth colored restorations can be placed that exhibit natural anatomic proximal form and have predictable proximal contact.

Tooth Preparation and Matrix Armamentarium

Class II preparations that need a matrix band for restoration will require rebuilding of the marginal ridge, proximal contact, and often a large portion of the interproximal surface. The goal of composite placement is to do so in such a way that the amount of rotary instrumentation for contouring and finishing is limited. This is especially true for the interproximal surface. Because of the constraints of clinical access to the proximal area, it is extremely difficult to sculpt and contour correctly this surface of the restoration. Proper reconstitution of this surface is largely due to the shape of the matrix band and the accuracy of its placement. After removal of caries and old restorative material, the outline form of the cavity preparation is assessed. If any portion of the proximal contact remains, it does not necessarily need to be removed. Conserve as much healthy, unaffected tooth structure as possible. If the matrix band cannot be easily positioned through the remaining contact, the contact can be lightened using a Gateway 50-µm diamond strip (Brasseler USA).

A sectional matrix system, such as Composi-Tight Gold (Garrison Dental Solutions), is an excellent choice for class II composite restorations for many reasons. First, the matrix band is anatomically correct. Rather than being flat like conventional matrix bands, the sectional matrix band is kidney-bean shaped with a concave inner surface. This allows for the proper restoration of interproximal anatomy as described above. Secondly, the G-Ring, which holds the sectional matrix in place, also causes a slight separation of the affected tooth and the adjacent surface by compression of the periodontal ligament. When the G-Ring is in place and the matrix touches the adjacent tooth surface, proximal contact is assured.

Also, some instrumentation has been developed to aid in accurate placement of the sectional matrix to maximize the restorative result. Sectional matrix pliers known as Dryer-Pliers (DryerPliers, Inc) were developed specifically for use with sectional matrix systems to aid in the accurate placement and positioning of the matrix band. There is one plier for placement of the mesial sectional matrix and one for the distal. Since the sectional matrix band is extremely thin, it can be difficult to place with a hemostat or cotton pliers without deforming the band. The DryerPliers maintain the shape of the band while positively holding the matrix in the proper position for placement. After positioning of the matrix band, initial stabilization is secured through the use of a proximal wedge.

Wedge Wands (Garrison Dental Solutions) were developed as an adjunct to the Composi-Tight system to stabilize the matrix band and help create a gingival seal. The wedge is plastic, so it is bendable and able to conform better to the convex root (tooth) surface when pressure is exerted on it by the G-Ring. The delivery is unique, since the wedge is on a plastic handle and can be bent to the desired angle for placement prior to being placed in the oral cavity. Once positioned, a twist of the handle releases the wedge, and the handle is discarded. This delivery system avoids awkward placement using cotton pliers, where many times wedges are hard to angle into place and often dropped or mishandled.

Case Study

A technique has been described utilizing a sectional matrix system and associated armamentarium (Composi-Tight Gold, WedgeWands: Garrison Dental Solutions), DryerPliers, and a nanofilled microhybrid composite (Premise: Kerr Corporation) to create an anatomically precise Class II posterior composite restoration. Using this armamentarium, the interproximal surface has also been recreated with natural anatomic contour and has a predictable, elliptical contact with the adjacent tooth, with very little rotary finishing necessary. With proper occlusal and proximal form, this "invisible" direct composite restoration will service the patient for many years to come.

01

This occlusal preoperative view shows a Class I amalgam in tooth number 14 that is in need of replacement due to enamel fracture and recurrent decay.

02

An occlusal view after preparation is completed and the operative area is isolated in preparation for the restorative procedure.

03

A glass ionomer material (Fuji IX: GC America) is mixed and syringed into the cavity preparation.

04

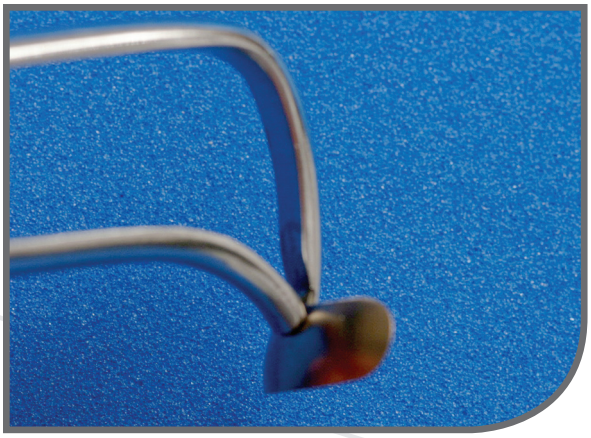
The glass ionomer material is condensed into the preparation as a base prior to the addition of composite restorative material.

05

This view shows the completed Class II cavity preparation after glass ionomer base insertion and refinement. The Composi-Tight Gold Sectional Matrix System was chosen to aid in the anatomic restoration of the mesial proximal tooth morphology of this maxillary first molar.

06

This slide shows a close up view of sectional matrix bands and "G-Rings" from the Composi-tight Gold system. The appropriate matrix band was chosen to best correspond anatomically to the tooth being restored, and also to the width and height of the proximal surface. The height of the sectional matrix should be no higher than the adjacent marginal ridge when properly placed.



07

A sectional matrix band is shown being held in the DryerPlier. This instrument was specifically designed to facilitate precision placement of sectional matrix bands without deformation.

08

The mesial DryerPlier is used to place the Composi-Tight sectional matrix band on the mesial surface of tooth number 14.

09

This facial oblique view shows how the DryerPlier facilitates access to posterior interproximal areas while maintaining a positive grip on the matrix band.

10

This slide shows the WedgeWand during clinical application. The wedge portion is bent at a 90-degree angle to the handle. This one-piece application eliminates the clumsy positioning and handling of wedges using cotton pliers or other types of instrumentation.

11

"G-Ring" forceps are used to correctly position the "G-Ring" in place to stabilize the matrix band against the proximal surface of the prepared tooth. The feet of the G-Ring are placed behind the flexible wedge, and the ring is released from the forceps. The force of the G-Ring causes a slight separation of the teeth due to periodontal ligament compression. It also bends the flexible wedge to adapt and conform better to the external tooth surface, creating an excellent seal at the gingival margin of the preparation.

12

37% phosphoric acid etchant is placed on the enamel margins for 10 seconds.

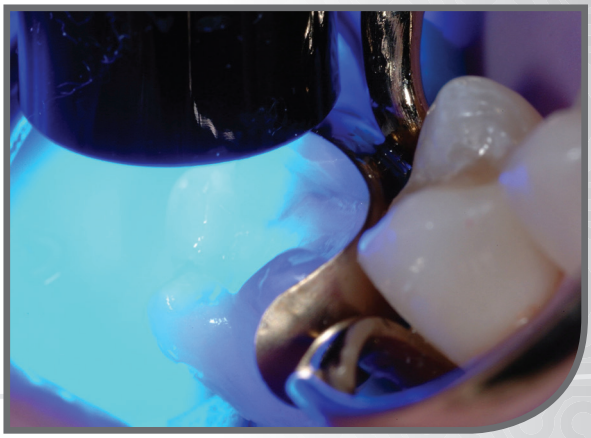
13 After a 10 second etch of enamel surfaces, the dentin is etched for 5 seconds giving a total etching time of 15 seconds for the prepared tooth structure.

14 Rinse the etchant away thoroughly with water for at least 15 to 20 seconds.

15 AcQuaSeal desensitizer (AcQuaMed Technologies, Batavia, IL) is applied after air-drying to disinfect and rewet the preparation surface. Initial penetration of the low molecular weight monomer HEMA will help to seal dentinal tubules and potentiate the formation of the hybrid layer.

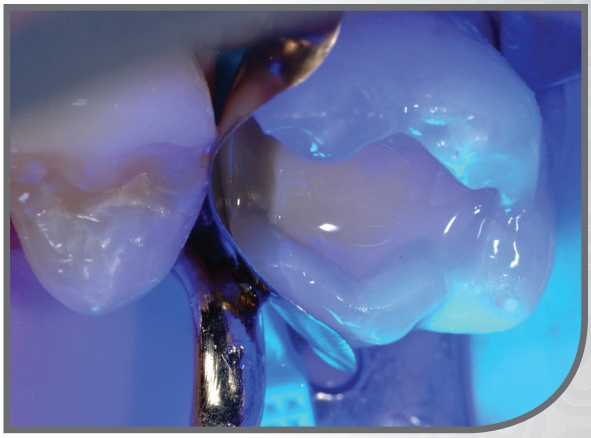
16 Application of dentin and enamel adhesive (Optibond Solo Plus: Kerr Corporation) to the cavity preparation.

17 The solvent (ethanol) is evaporated with a stream of air across the cavity preparation.



18 The dentin and enamel adhesive is light cured using an LED curing light (Demetron LED: Kerr Corporation) for 20 seconds.

19 Flowable resin (Revolution 2: Kerr Corporation) is applied as the first restorative increment.



20 The flowable layer is light cured for 20 seconds.

21 The MO cavity preparation is shown after the proximal increment and pulpal floor have been condensed using microhybrid composite (Premise: Kerr Corporation) and a non-serrated plugger.

22 Ochre composite stain (Kolor Plus: Kerr Corporation) is applied to the pulpal floor prior to placement of the enamel increments of composite.

23 The buccal increment is placed using a composite placement instrument and refined with a #2 Keystone brush. Notice the anatomic placement of cuspal inclines and marginal ridge.

24 The palatal increment is smoothed toward the margin with the #2 Keystone brush. Note the anatomic placement of the marginal ridge into facial and palatal increments.

25 An occlusal view of the completed MO direct composite after condensation and light curing.

26 The DryerPlier is used to remove the matrix band after removal of the "G-Ring" and flexible wedge.

27 An occlusal view of the completed restoration after rubber dam removal prior to placement of the surface sealant.

28 Application of surface sealant using a #2 Keystone brush.

29 An occlusal view of the direct MO composite restoration.

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