APPLICATION OF THE DOUBLE LAMINATED TECHNIQUE IN RESTORING CERVICAL LESIONS

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إن ترميم حفر الصنف الخامس الناتجة عن التأكل أو الناتجة عن النخر تسبب مشكلة ترميمية لطبيب الأسنان، على أي حال في هذا المقال سوف يقوم بمراجعة الطريقة السريرية الحديثة المستخدمة لترميم حفر الصنف الخامس. وهذه الطريقة تدعى بطريقة الزجاج المتيلمر المبطن لحشوات الكومبوزيت.
في هذه الطريقة إن الزجاج المتيلمر يستخدم كقاعدة فوق العاج مباشرة وتلتصق به، والمادة الراتنجية المرممة تلصق بمادة الزجاج القاعدية.

Restoring Class V erosion or a carious lesion is a problem for the restorative dentist. However in this paper, a recently introduced clinical procedure to restore Class V lesions is reviewed. This procedure is called the glass ionomer-composite sandwich technique. In this technique, glass ionomer is used as a base and then composite resin is bonded to the glass ionomer,

Introduction

The management of restoring Class V erosion or carious lesions is a problem for the restorative dentist. Many materials have been used to restore such cavities. These include direct filling gold, amalgam and restorative resin. However, these materials fall short of an idea! restorative material.

In 1972, glass ionomer cement was introduced by Wilson and Kent.[1] This material has some desirable properties such as ability to bond chemically to dentin, fluoride release and aesthetic superiority to metallic restorative materials. The ability of glass ionomer to bond to dentin reduces the need for a retentive cavity preparation. Despite all the desirable characteristics of glass ionomer cement, its opacity, limited shade selection, and poor finishability make the cement aesthetically less acceptable than composite resin.

In an effort to combine the esthetic superiority of composite resin and the bonding ability of glass ionomer cement, Mclean et al[2] recommended the so-called glass ionomer composite sandwich technique. The method is now known as the double laminated technique. In this technique, glass ionomer cement is used as a base to which composite resin is bonded. The wide shade selection, good finrshability and translucency of composite resin enhance the aesthetic quality of the restoration. Phair et al[3] studied the marginal gap formation in the composite resin/ glass ionomer cement Class V restoration. Although glass ionomer cement did not prevent marginal gap formation at the dentin, it was recommended that it should be considered for use as a liner or base under composite resin restorations with dentin margin.

This recommendation was due to the cement's biocompatibility, antibacterial properties and potential for fluoride release. Sneed and Louper[4] investigated the shear bond strength of composite resin to glass ionomer cement and reported that the bond between an etched glass ionomer and composite resin is stronger than the cohesive strength of the glass ionomer cement.

The aim of this paper is to present and discuss the clinical application of the double laminated technique for restoring cervical lesions.

Clinical Procedure

Abrasion lesions and large caries lesions having a dentin or cementum margin are typical indications for the glass ionomer composite double laminated technique. Figure 1 shows an extensive caries lesions and old composite restorations with recurrent caries. It also shows gross plaque deposits and inflamed gingivae. Prior to any restorative procedure, good gingival health

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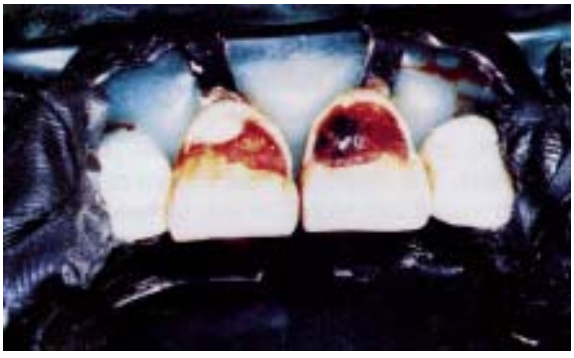
should be established. Gingivitis appears where ever plaque accumulation occurs, and the sites to be affected are determined by the presence and composition of the plaque. It has been shown that regular professional prophylaxis with motivation and instruction in daily oral hygiene demonstrates the most effective approach for prevention of plaque and gingivitis.[5] Stains also should be removed prior to selecting the shade. Cleaning may be accomplished by using pumice and prophy brush in a slow handpiece. In ionomer-composite technique, rubber dam isolation is essential. If the adhesive properties of the glass ionomer materials are to be properly utilized, the tooth surface must be well isolated. In addition, gingival tissue retraction should follow the rubber dam isolation. This will give the operator a contamination free access to the area to achieve a good finish of the restoration. An ivory no. 212 clamp* is best for gingival retraction in the anterior and pre-molar region. Figure 2 shows a modification of no. 212 clamp where half of the clamp was cut. This modification makes isolation of two adjacent teeth possible. A matrix of dead soft metal** was formed to the tooth surface and a handle, such as a match stick, was attached with sticky wax.

After proper isolation, carious tissue, if present, is removed [Fig. 3]. Although glass ionomer cement is considered a mild irritant to the pulp, a protective thin layer of calcium hydroxide is recommended in deep cavities [Fig. 4]. One of the requirements of adhesion is the ultimate contact between the adherent and the substrate. Therefore, several researchers have advocated removal of the smear layer.[2-4,6] This may be accomplished by applying a 40% polyacrylic acid solution for 10 seconds followed by thorough rinsing with water for 30 seconds. The solution is applied passively i.e. dentin is kept wet with the agent for the specified time without scrubbing [Fig. 5].

The selected shade of type II glass ionomer cement is mixed according to manufacturer's instruction. The cement capsule*** is then placed in the gun and injected into the cavities [Fig. 6], The cervical metal matrix is firmly repositioned and gross marginal excess is removed. To protect the exposed margin from moisture contamination during the early setting stage, the exposed glass ionomer margin is coated with low viscosity resin bonding agent. After fifteen minutes, the matrix is removed and the contour is reduced to provide space for composite resin'[Fig. 7]. A cuttle disc on a slow speed hand piece is used to reduce 0.5 to 1 mm of the glass ionomer surface while at the same time a 0.5 mm enamel bevel is provided. The reduction slopes towards gingivae where the gingival margin is always left in glass ionomer. At this stage, glass ionomer must be protected from dehydration. Such protection may be accomplished by keeping the glass ionomer surface wet by frequent application of moist cotton roll. Enamel margin only is then acid-etched using 37% phosphoric acid for 30 seconds and then rinsed and dried without dehydration [Fig. 8]. A low viscosity resin bonding agent is placed over the entire cavity. Excess bonding resin should be removed with a gentle stream of clean, dry, compressed air before light activation. The selected microfil resin is placed over the glass ionomer cement, polymerized and finished in the usual manner [Figs. 9 and 10].

Fig. 1. An extensive cervical lesion in which ionomer-composite sandwich technique is indicated.



Fig, 2. Rubber dam isolation with a modified no. 212 clamp

*Columbus Dental Manufacturing Corp., St. Louis, MO
**Premier cervical matrix, Premier Co., Norris Town, PA
***Ketac FIL-ESPE, Germany

Fig. 3. Carious dentin is removed.

Fig. 4. Calcium hydroxide is placed in deep areas.

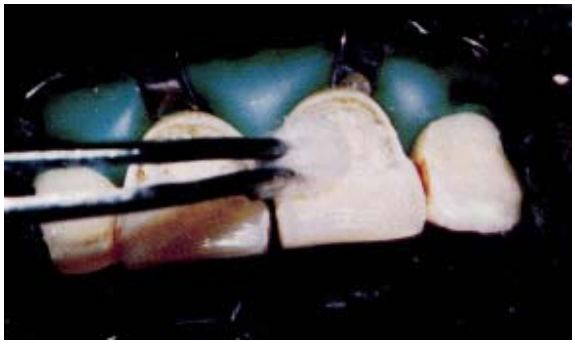


Fig. 5. Application of polyacrylic acid solution.

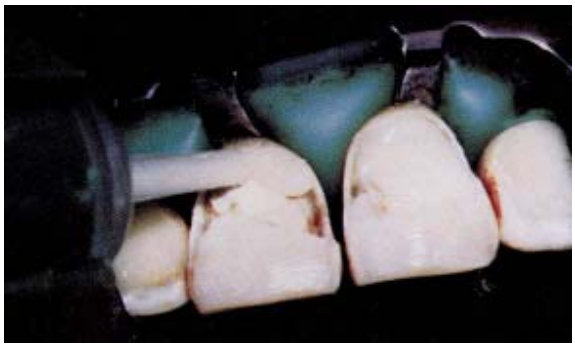


Fig. 6. Placement of glass ionomer cement.

Fig. 7. Reduction of the glass ionomer restoration contour.

Fig. 8. Phosphoric acid gel etchant is applied only to enamel.

Fig. 9. Placement of microfil composite resin.

Fig. 10. Restorations after six months

Discussion

Composite resin restorations of cervical lesions do not seal the dentin or cementum margin[7,8] since they do not bond to dentin or cementum. Glass ionomer cement has the potential of bonding to dentin. However, glass ionomer cement exhibits less esthetic quality when compared to composite resin. In the sandwich technique, the bonding ability of glass ionomer cement serves as a good substrate for the composite resin restoration while the superior esthetic quality of composite resin serves as a good veneer for the glass ionomer cement. Many researchers have advocated the etching of glass ionomer prior to bonding it to composite resin.[2,4,9,10] Maclean et al[2] in their original report recommended a 60- second etching period using a 37% phosphoric acid. Sneed and Looper[4], and Garcia-Godoy and Malone[9] reported on the sheer bond strength of a composite bonded to a 60-second etched glass ionomer cement. They found that the glass ionomer did indeed bond to the resin and that the bond was stronger than the cohesive strength of the cement. Hinoura and others[10] evaluated the bond strength between six glass ionomer cements and three composite resins. They compared the effect of glass ionomer surface treatment. A 60-second etching or roughening of the cement surface leads to a significant improvement in bond strength. Smith[11] investigated the effect of various periods of etching on the surface morphology of glass ionomer cement. Scanning electron microscopy examination indicated that the glass ionomer surface was destroyed with etching time of 45 seconds or longer. Quiroz and Lentz[12] in 1987, reported similar results. Subrata and Davidson[13] in 1989 reported that roughening the surface of the glass ionomer cement or partial dehydration followed by application of dentin bonding agent, resulted in a composite resin bond strength value comparable to that obtained with phosphoric acid-etch technique. Therefore, because of the deteriorating effect of phosphoric acid on glass ionomer cement, it is used to etch the enamel margins only. The rough surface of the reduced glass ionomer serves as a retentive aid for the composite resin.

Conclusion

A clinical procedure for ionomer-composite sandwich technique is discussed. For the restoration of large erosion or carious lesion of anterior teeth, the use of glass ionomer as a substrate for composite resin restoration can be recommended.

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