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Alternative Technique for Class V Isolation of Resin-based Composite Restorations: A Case Report

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Abstract. Cervical lesions are increasingly more common in dental practice for many reasons, including high dietary sugar intake with oral hygiene neglect and a growing elderly population. Restoring a cervical lesion can be challenging due to its location, thus, making it a sensitive procedure. It is important not only to provide a quality restoration for the patient but also to eliminate the causative factor, whether by control of diet, increased water uptake for dry mouth, or improved oral hygiene habits, so that caries will not recur. This case report describes the clinical management of multiple cervical lesions, and the results thereof.

Keywords: Class V, Isolation, Resin-based composites.

Introduction

With the improved quality of medical treatment for people, younger generations are anticipated to live longer than their predecessors[1,2]. Enhanced preventive procedures for dental care (*i.e.*, fluoride uptake and fissure sealants) contribute to patients keeping their teeth longer and exposing them to the outcome of the aging process as an effect of a medical condition (*i.e.*, dry mouth in diabetics, and gingival recession), hence, resulting in high rates of root caries and cervical cavities. Restoration of these cavities, especially on buccal surfaces of anterior teeth, is recommended with tooth-colored restoration due to the patients' high demand for esthetics, and perhaps as a conservative approach to restoration[3,4].

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A successful tooth-colored filling must meet multiple criteria, including adequate polymerization, the use of appropriate composition/classification of resin material in an appropriate location of the cavity being restored, bond strength at the tooth/cavity interface, and proper isolation from oral fluids during restoration. The delivery of quality resin restorations are challenging in cervical lesions, especially when margins are located subgingivally[5]. This is due to both, (1) morphology and (2) location. 1) Morphology is when dentin/cementum is compared with enamel at the cavity/restoration interface. The bond strength will be inferior, it increases the possibility of microleakage and its consequent tooth sensitivity with recurrent caries. 2) Location, the more cavity margins are located subgingivally, the more the polymerization process may be compromised. The light-curing tip will be distanced from its curing margins, and its efficiency in delivering the appropriate energy may be reduced. Also, the difficulty in isolating the cavity from soft tissue at the sulcus, along with possible contamination by blood or saliva makes cervical cavity location an issue. Improper isolation during placement of tooth-colored restoration occurs whether resin-based composites, glass ionomers, or resin-modified glass ionomers. This may lead to fluid-contaminated restorative material, cavity preparation, or both, resulting in marginal breakdown, leakage, discoloration, and failed restorations. This could explain why the incidence of recurrent caries is high in Class V restorations[6,7].

There are different techniques for isolating the cervical cavity in preparation for restoration. These techniques can be divided into surgical and nonsurgical[8]. Surgical retraction and isolation can be performed by gingivectomy, electrosurgery, or conventional flap surgery in deep gingival margins. A main drawback of this class of techniques is the complication of surgeries, possible unexpected gingival recession, and increased healing time before a final restoration can be placed[9,10]. The nonsurgical method consists mainly of using a rubber dam or retraction cord. A rubber dam with clamp (ex. #212 or 9) combination is a conventional option, considered ideal. However, in deep subgingival lesions, its use is limited, and surgical retraction followed by rubber dam isolation is then required.

The aim of this clinical report is to document a simplified isolation method that helps provide a dry clear field in the restoration of gingival

margins of anterior teeth. It is to the author's knowledge; however, that the first clinical report of such technique was presented by Belvedere[11].

Clinical Description and Management

A 28-year-old medically fit male patient came to the clinic seeking dental treatment. Dental history showed previous dental treatments, including anterior tooth-colored restorations. Clinical intraoral examination revealed multiple active caries lesions, including recurrent caries in the maxillary anterior teeth (#13-23) with inflamed gingiva related to overhanging poorly filled restorations and poor oral hygiene (Fig. 1). All dental material involved in this report is documented in Table 1. The initial treatment approach involved scaling and root planning, recontouring of the existing overhanging restorations, and reinforcement of oral hygiene instructions. Upper and lower alginate impressions were made to fabricate trays to be filled with fluoride gel (PreviDent 5000, Colgate-Oral Pharmaceuticals, New York, NY, USA) to accelerate the remineralization of hard tooth tissue, by application twice a day for 5 min each time for 10 days. For maximum benefit of fluoride application, the patient was instructed not to drink, or swallow the gel (he was permitted to expectorate), as well as not to eat for at least 30 min after each application.

Table 1: Materials used in this case.

Materials	***Type***	***Manufacturer***
Jeltrate	Alginate impression	Dentsply Pharmaceuticals, York, PA, USA
PreviDent 5000	Fluoride gel	Colgate-Oral Pharmaceuticals, New York, NY, USA
2% Xylocaine Dental	Local anesthesia	Dentsply Pharmaceuticals, York, PA, USA
330 Bur	Pear-shaped carbide bur	Brasseler USA Dental, Savannah, GA,USA
Contour Strip	Clear band	Ivoclar-Vivadent, Amherst, NY, USA
Heliobond	Unfilled resin	Ivoclar Vivadent, Amherst, NY, USA
Optilux 501	Light-curing unit	Kerr, Romulus, MI, USA
Ultra-Etch	Acid-etchant gel	Ultradent, South Jordan, UT, USA
Excite	Bonding agent	Ivoclar Vivadent, Amherst, NY, USA
Heliomolar	Microfilled resin composite	Ivoclar Vivadent, Amherst, NY, USA
Ultradent Finishing bur	Flame carbide finishing bur	Ultradent, South Jordan, UT, USA
Soflex disc	Finishing and polishing discs	3M, Neuss, Germany

Figure 1. Pre-operative clinical status. (a) Facial view, (b) lateral right view, and (c) lateral left view.

After two weeks of preventive treatment, the patient was scheduled for a restorative procedure. A buccal infiltration was administered to the patient by 2% xylocaine (Dentsply Pharmaceuticals, York, PA, USA), with a 1:100,000 epinephrine ratio, by means of a short needle (27-gauge); two carpules were used. Removal of the existing restoration and excavation of recurrent caries was done with a 330 carbide bur (Brasseler USA Dental, Savannah, GA, USA) mounted in a high-speed handpiece. All enamel margins were beveled at 45° to enhance final retention of the resin restoration. For each tooth restored, a clear band, Contour Strip (Ivoclar Vivadent, Amherst, NY, USA), was used for isolation (Fig. 2). The contour strip was folded to provide equal band endings on both sides. The cervical collar of the contour strip band was beveled and flared by the round serrated handle portion of a hand mirror (Fig. 3). This provided both a better U-shaped design and sealed once inserted into the sulcus of the prepared tooth. The sequence steps for the contour strip placement were as follows:

1. The two wings of the U-shaped matrix were slipped from the buccal side and through the proximal contacts (since we restored an anterior cavity), with the equal lengths in the mesial and distal wings.

2. The cervical collar was inserted and pressed into the sulcus until the feeling of resistance at the base of the free gingiva and the creation of gingival blanch (Fig. 4).

3. Both the cavity side and the gingival tissue side of the strip were dried with air.

4. To prevent loose proximal contact or excess bleeding at proximal sides. The gingival third of the proximal sides was dried. Subsequently, the small, saturated, cotton pellets were inserted to work as a fine wedge to hold the band and protect the cavity from contamination due to bleeding (Fig. 5).

5. Unfilled resin [Heliobond (Ivoclar Vivadent, Amherst, NY, USA)] was applied as drops only around the gingival tissue side of the strip and cured with a light-curing unit (LCU) (Optilux 501, Kerr, Romulus, MI, USA) for 5-10 sec (Fig. 6).

6. The cavity was isolated to be ready for the restorative procedure (Fig. 7).

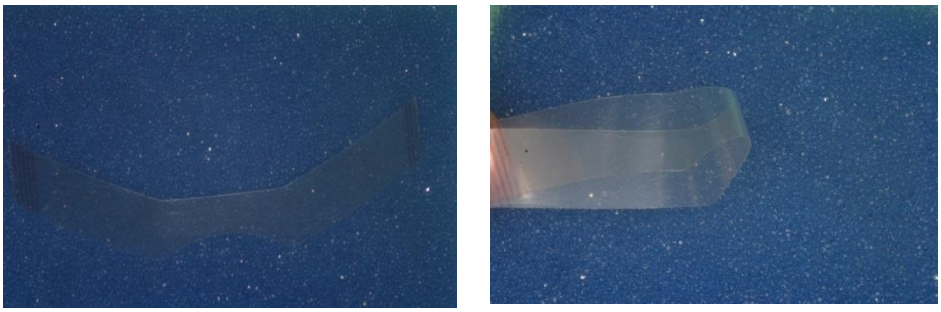

Fig. 2. Contour strip band.

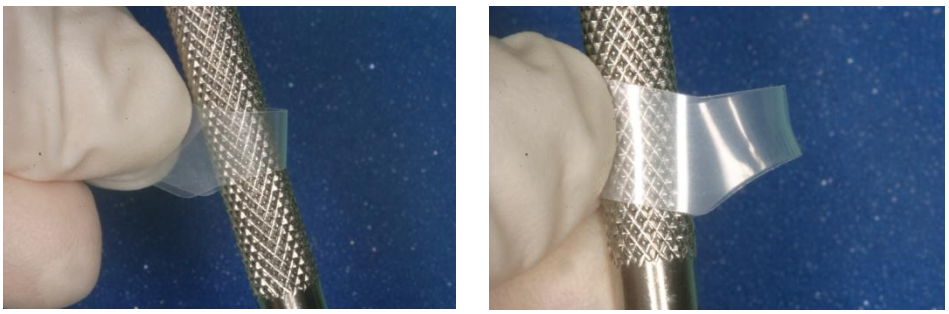

Fig. 3. Beveling collar of the contour strip with mouth mirror handle.

Fig. 4. Gingival tissues blanch, confirming tight seal in the gingival sulcus.

Fig. 5. Application of cotton pellets to reduce irritation of inflamed gingiva and reduce bleeding tendency.

Fig. 6. Heliobond fixing and stabilizing the modified contour strip after light-cure.

Fig. 7. Prepared cavity, sealed and ready for restoration.

Fig. 8. Pre- and post-clinical images: (a) Frontal view; (b) lateral right view; and (c) lateral left view.

For bonding procedure, total-etch two-step technique was applied using a 37% gel-type phosphoric acid etchant (Ultradent, South Jordan, UT, USA) to the facial cavities for 10-15 sec, then rinsed for 15 sec with air/water. The enamel was allowed to dry and the dentin wet/dry. Afterwards, an alcohol-based adhesive bonding agent was applied (Excite, Ivoclar Vivadent, Amherst, NY, USA), followed by light air drying of the bonding layer to:

1. Spread the bonding agent around the cavity,

2. Make the bonding layer thickness mostly even in all cavity walls, and
3. Vaporize the alcohol solvent in the bonding agent.

The next step was polymerization of bonding agent using LCU for 20 sec. Multiple increments of resin-based composite were applied using a microfilled composite(Heliomolar [Ivoclar Vivadent, Amherst, NY, USA]). Each increment was cured directly, with the light tip in contact with the tooth surface for 40 sec. After the completion of resin-based composite application in the cavity, the contour strip was removed. The attached bonding layer and access were trimmed. Followed by a final modification of the contour of the Class V restorations using fluted carbide burs (Ultradent, South Jordan, UT, USA). The final stage, polishing, was done with the Soflex disc system (3M, Neuss, Germany), with fine and extra-fine discs. Occlusion was checked in centric and eccentric positions to ensure no interference with the new restorations. A two-week follow-up appointment showed total satisfaction by the patient; both improved gingival healing and esthetics (Fig. 8).

Conclusion

For providing easier and more successful Class V resin-based composite restorations in anterior teeth; multiple clinical steps in this case report were presented and an alternative isolation technique was described.

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طريقة بديلة للعزل في حشوات الصنف الخامس عند استخدام الحشوات التجميلية (تقرير وصف حالة)

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المستخلص. أصبحت النخور العنقية شائعةبشكل متزايد في ممارسة طب الأسنان لعدة أسباب تتضمن تناول الأغذية المحتوية على السكريات بتركيز عالي بالإضافة إلى إهمال الصحة الفموية وكذلك ارتفاع معدل أعمار السكان. إن ترميم النخور العنقية يمكن أن يكون تحد وذلك بسبب الموضع مما يجعل الترميمإجراءً حساساً.من المهم ليس فقط عمل حشوة ذات جودة ولكنأيضا يجب إزالة العامل المسبب وذلك إما باتباع حمية أو زيادة شرب الماء في حالات جفاف الفم أو بتحسين العادات المتبعة في الصحة الفموية. وبذلك لا يحدث نكس للنخور .هذا تقرير لحالة يصف المعالجة الإكلينيكية لنخور عنقية متعددةنتائجها.