

Pizza Technique in Site 1 Restoration in Lower Second Molar Tooth : A Case Report

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Abstract

One of the techniques that can be used to achieve esthetic and functional posterior teeth is to make correct and accurate occlusal anatomy. The pizza technique is a modelling technique in which one increment is used for each cusp that resembles pizza slice in restoring occlusal cavity in the posterior tooth using direct resin composite. The aim of this case report to describe a novel technique in restoring a site 1 cavity in posterior teeth using direct resin composite that can be used to achieve esthetic and functional posterior teeth and to minimize polymerization shrinkage while at the same time generating a correct and precise occlusal anatomy. A 33 year old female patient came to the dental centre with D5, site 1, size 3 cavities in tooth 37 and the diagnosis was reversible pulpitis. The tooth will be restored using direct nanohybrid resin composite material with the pizza technique. The pizza technique is effective for class I direct composite resin restoration in the posterior tooth with hidden caries and extensive dentin involvement.

Case report (J Int Dent Med Res 2019; 12(2): 723-726)

Keywords: Nanohybrid composite restoration, Pizza technique.

Received date: 10 October 2018

Accept date: 19 November 2018

Introduction

According to the World Health Organization (WHO), dental caries are a major health problem worldwide with 60-90% prevalence in school-aged children and adults.^{1,2} Caries are a common oral disease and result in loss of tooth structure and requires restoration to restore the function, form and aesthetic of the tooth.³⁻⁵

Composite resins are the most widely used restorative materials today. Factors contributing to the increased use of composite resin restorations is the introduction of minimally invasive restoration procedures that emphasize the maintenance of sound tooth structures and usage of adhesive materials in the posterior region.^{2,6-8}

However, a composite resin has still drawbacks. This restoration has multiple procedures that are time-consuming and excellent operator skills and ability to achieved harmonious occlusal and cusp-fossa relationships with opposing teeth.⁶

Polymerization shrinkage is the most frequently encountered problem in composite resins. The distance between the monomer units in the polymer are closer than before the polymerization and undergo 2-6% volumetric contraction during the polymerization. This process forms a gap between the cavity wall and the restoration that can cause microleakage. This microleakage gives space for bacteria, liquids, molecules, and ion penetration. Microleakage is thought to be responsible for discolouration of marginal restorations and teeth, secondary caries, enamel fractures, and pulp sensitivity.⁹⁻¹³ The application of composite resins with incremental techniques have been recommended to reduce residual stress at tooth restoration interface. This technique will decrease polymerization shrinkage due to a decrease the volume of the polymerized composite resin material. Several studies have suggested that the incremental technique is an ideal technique for composite resins application.¹⁴⁻¹⁶

Recently, a new technique, pizza technique or sectional technique has been proposed as modification of oblique technique by Manauta J and Salat A (Style Italiano, 2012), which each increment is made cusp by cusp that resembles a pizza slice¹⁷. With this technique, small cavity walls bind to the composite resin and thus has fewer tendencies to cause microleakage. In addition the occlusal anatomy, it can also be

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formed precisely and accurately so that the composite restoration will have good aesthetics and functionality.

Case Report

A 33 year old female patient came to the dental centre with complaints of caries in the lower molar teeth and aches while drinking cold water. Intraoral examination revealed D5, site 1, size 3 cavities in tooth 37 and the diagnosis was reversible pulpitis (Figure 1).

Anamnesis, clinical photos, radiographic photos, and diagnosis were performed to determine a treatment plan and gain informed consent. The tooth was isolated using a rubber dam followed by tooth preparation. The caries retrieval was carried out using a round diamond bur. Unsupported enamel was removed with bur tapered fissures. After that etching and bonding procedures followed by a 2 mm composite resin application on a cavity floor (Figure 2 and Figure 3).



Figure 1. Initial clinical feature.

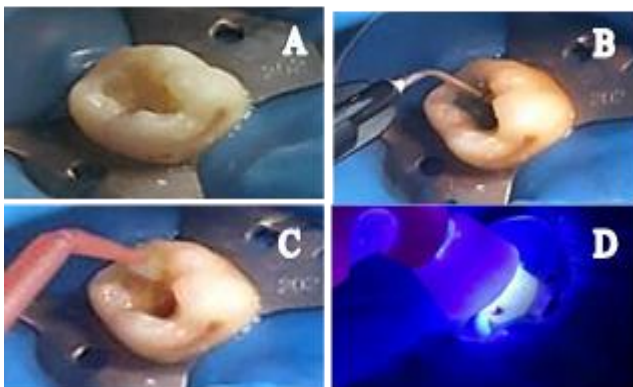


Figure 2. (A) Cavity preparation, (B) Etching application, (C) Bonding application, (D) Light curing for 10 seconds.

The pizza technique procedure starts from the mesiobuccal cusp with a thin layer of composite resin. Prior to polymerization, a slope formation is limited to the main sulcus. After the first cusps are polymerized further the formation of the distobuccal cusp. The formation of cusp distolingual and mesiolingual work in the clockwise direction. Slope formation is done using a rounded micropluggers and a brush to smooth the slope and eliminate roughness (Figure 4). Finally, the tooth undergoes finishing and polishing (Figure 5).

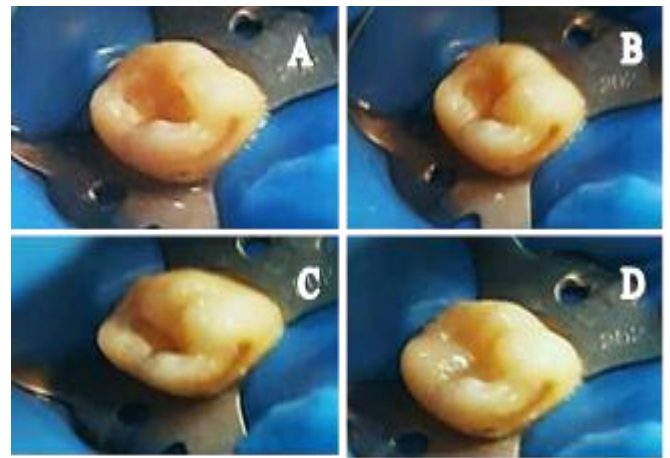


Figure 3. (A) Composite application at the cavity floor, (B) Cusp mesiobuccal developed with small increment, (C) Cusp distobuccal modelled, (D) Cusp distolingual modelled.

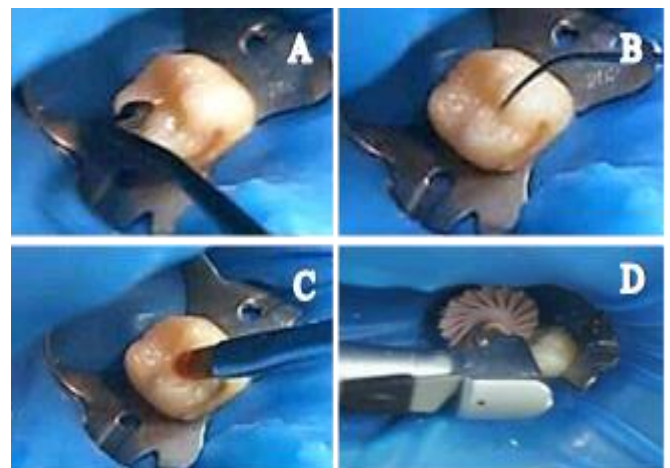


Figure 4. (A) Cusp mesiolingual modelled, (B) Slope with micropluggers, (C) Brush to slope smoothing, (D) Polishing.

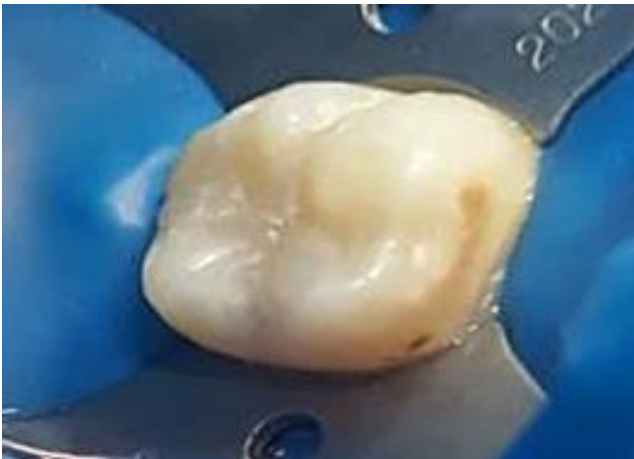


Figure 5. Final clinical feature.

Discussion

Primary caries lesions of posterior teeth may present an intact occlusal structures despite the injury exceeds dentino enamel junction (DEJ) in terms of depth. To achieve necrotic dentin, a number of healthy emanels should be prepared. Consequently the natural anatomy of the existing tooth is lost.^{17,18} Restoration of the composite resin in the posterior tooth is a challenge for the dentist because it requires recontouring of anatomical tooth surfaces.

One of the important issues to be considered of composite resins is polymerization shrinkage. Restoration techniques with composite resin materials should be able to reduce polymerization shrinkage.¹² During polymerization, the monomer volume is reduced and a gap occurs between the composite resin material and tooth structure. This causes reduced retention and increased leakage. Gaps occur when the composite polymerization pressure is greater than the composite bond strength with the tooth structure.^{10,19,20} Several methods for reducing polymerization shrinkage have been reported in posterior restorations, such as the use of liner materials with a low elastic modulus, techniques of curing, and application technique of composite resin material.^{19,20}

Incremental technique has been reported to reduce microleakage with resin composite restoration. With this technique the cavity walls are bonded with less resin composites (small c-factor) and less contraction occur. The degree of polymerization higher due a thin layer of polymerized restorative material is proven reduces stress by polymerization and deflection

cusps.^{14,19,20} Another advantage of this technique is adequate of light curing due to the thickness of the composite material applied maximum only 2 mm.^{19,20}

Some incremental techniques for class I restoration have been used such as incremental horizontal, oblique incremental, and horizontal split. These techniques are considered quite complicated and time consuming.^{14,15,22,23}

Currently, the pizza or sectional technique is a newly developed novel technique. Polymerization shrinkage can be minimized and at the same time generate a correct and precise occlusal anatomy. It has been well proven that single shade stratification techniques sole the majority of cases correctly. This technique is done by applying one increment for each cusp. Each one of these increments, when correctly modelled, resemble pizza slices. The procedure starts with the simple cusp and then a cusp is added one at a time to acquire more anatomical references and to define the remaining and more difficult structure. The composite resin application in this technique will minimize shrinkage stress by reducing the class I c-factor ratio from 5 to 1. Cavity configuration factor, or c-factor, has been defined as the ratio of the bonded area to the free surface area of the cavity. Higher c-factors have been reported to produce higher shrinkage stress by limiting the flow capacity of resin composite. During the polymerization process, plastic deformation or flow composite resin occurs and a part of it compensates for shrinkage stress. Irreversible plastic deformation occurs during the early stages of polymerization, when shrinkage stress exceeds the elasticity limit of the composite resin. Within the polymerization process, contraction and flow decreases gradually as the material becomes more rigid. Flow compensation is influenced by the cavity configuration factor. The higher c-factor the greater the shrinkage stress on adhesive bonds. Only a free surface of cavity act as a plastic deformation reservoir during the early stages of polymerization.^{22,24,25}

Conclusions

The pizza technique is effective for class I direct composite resin restoration in posterior tooth with hidden caries and extensive dentin involvement. Polymerization shrinkage can be minimized and at the same time generate a correct and precise occlusal anatomy.

Declaration of Interest

The authors report no conflict of interest and the article is not funded or supported by any research grant.

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