

Restoring Subgingival Caries of Molar Using Deep Margin Elevation–A Case Report

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Abstract

Subgingival caries always poses a clinical challenge to the dentist. This article describes the management of a maxillary second molar with proximal caries extending subgingivally where rubber dam isolation was not possible. After routine endodontic therapy, the restorative margin was elevated to an isolatable level using deep margin elevation technique.

Keywords: Subgingival caries, Deep Margin Elevation (DME), composite restoration

Introduction

Caries extending deep below the cervical margin always poses a clinical challenge and compromise the use of indirect adhesive restorations (isolation, impression

taking, and delivery) and eventually affects their durability and relationship with the periodontal tissues(1).The different clinical problems encountered in the restoration phase of class II cavities with deep proximal caries below cementoenamel junction are :

1. Substantial loss of dental substance
2. Subgingival cervical margins
3. Partial or total sealing of the cervical margins in the absence of enamel (with dentin and cementum)(2)
4. Alteration in biologic width (3)

Such clinical challenges could be managed either surgically by apically displacing the supporting tissues or the proximal margins could be raised by placing a base of composite resin. The former technique may however lead

to attachment loss and anatomical complications such as the proximity of root concavities and furcations(2). Once exposed to the oral environment, the gingival margins can be difficult to maintain and may generate additional challenges. (1)The later technique was proposed by Dietschi and Spreafico in 1998(4).This procedure is known as deep margin elevation (DME) or coronal margin relocation(1)

Subgingival caries leads to the destruction of periodontal attachment and loss of biologic width. DME could lead to another kind of biologic width that is healthy, with a longer junctional epithelium along the material, and a smaller connective attachment along the remaining dentin height beneath the composite. (5)With current adhesive technology and modern composite resin materials it has become possible to restore even severely damaged teeth. Thus, minimally invasive techniques are used to save a maximum amount of sound tooth substance (6).

Case Report

A 33 year old male patient reported to the department of Conservative Dentistry and Endodontics with a chief complaint of pain irt upper right back tooth. His medical history was non –contributory to the routine dental care. Intraoral examination revealed a deep proximal caries irt 17 with chronic irreversible pulpitis. Radiographic examination shows proximal coronal radiolucency indicating proximal caries extends below the cervical margin(Figure 1).



Figure 1: Preoperative x-ray of tooth #17. The proximal cavity margin is located below the cervical margin (arrow).

Access opening was initiated. Working length was determined using electronic apex locator. Biomechanical preparation of the tooth was done . Master cone was then selected(Figure2) corresponding to the required biomechanical preparation and then the canals were obturated.



Figure 2: Radiograph showing master cone selection. Due to the proximal subgingival extension of the lesion, rubber dam isolation couldn't prevent the excess bleeding. Therefore, a Tofflemire matrix and sectional matrix insert

was adapted properly to the curvature of the tooth to the best cervical fit. Tofflemire matrix was cut to form a T shape and sectional matrix was adapted along the subgingival portion. Additionally, the teeth were isolated with cotton rolls. To ensure an optimal workflow a flexible saliva ejector was permanently used with utmost attention to prevent saliva contamination and to facilitate the operative procedures.



Figure 3: Tofflemire matrix and sectional matrix



Figure 4: Matrix adaptation

A layer of flowable composite and then packable composite resin was placed to elevate the gingival margin to a level where it can be sealed with rubber dam (Figure5) Thus the tooth margin was elevated to a restorable and isolatable level.(Figure6) Rubber dam isolation was done thereafter and composite resin was placed incrementally to fill up the cavity.(Figure7)Finally finishing and polishing was done.(Figure9)



Figure 5: Placement of packable composite after basing with flowable composite



Figure 6: Radiograph after elevating the cervical margin

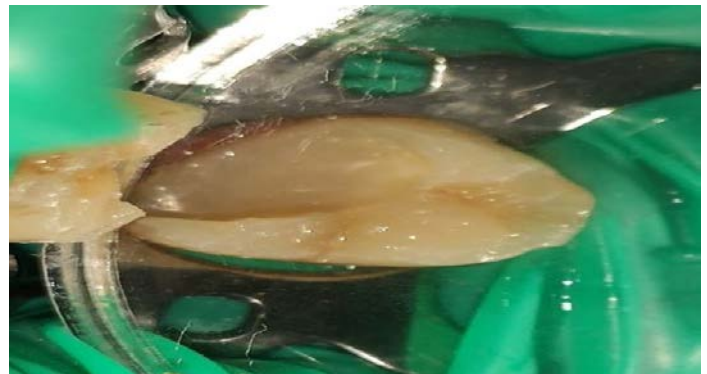


Figure 7: Placement of composite incrementally after rubber dam isolation

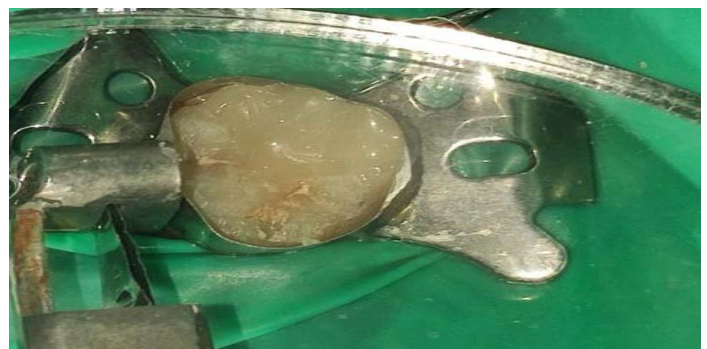


Figure 8: Post endodontic build up using composite



Figure 9: Immediate post operative image after finishing and polishing composite



Figure 10 : Immediate post operative radiograph after finishing and polishing composite

Discussion

Restorative margins completely surrounded by sound enamel are an ideal situation for structural conservation of surrounding soft and hard tissues. Extensive and undermining carious lesions or severe trauma often provide the possibility of placing restorative margins in dentin. Additionally, the degree of difficulty in placing deep subgingival restorations increases dramatically because of inferior insight into and access to the cavity, leading to problematic marginal control, management of undermining areas, and moisture control.(6)

Successful and long-term composite resin restoration of cavities reaching below the CEJ is only possible if

adequate moisture management is possible.(6) Deep margin elevation technique is a useful non invasive alternative to surgical crown lengthening to manage such cases. It facilitate the placement of large direct composite restoration (1)

In a literature review, Brunsvold and Lane could show that the prevalence of marginal overhangs was between 25% and 76% in all restored surfaces. Subgingival restorative margins, and especially marginal overhangs, contribute to plaque accumulation, chronic inflammation, attachment loss, and bone resorption(6) Marginal gaps along the interface between restoration and cavity floor and walls are considered stagnation sites for biofilm accumulation and retention. To improve marginal adaptation of DME restorations, the use of flowable composite resins has been advocated.(7) A further advantage of the DME technique is the immediate dentin sealing (IDS).The sealed dentin is protected from bacterial invasion during the provisional phase, and the luting procedure of any definite porcelain restoration requires less or no anesthetics at all.(7)

In the clinical case presented in this article the occluso-proximal restoration margin was located well below the CEJ.DME technique using composite was used to elevate the cervical margin to a isolatable and restorable level.A possible explanation for the sound periodontal and gingival condition in the presented case may be the polished, planed, and nonirritating subgingival margin.

In restorative dentistry, the search for an ideal material to restore the apical part of deep proximal cavities is not new. Glass ionomer cements, polyacid-modified resin composite materials and composite resin systems are discussed intensely regarding their role in long-term durability. (6)

However in recent years, several new techniques, for example the DME the elastic cavity wall and the Snowplough technique were developed to increase clinical

success in managing difficult situations. They provide promising approaches to manage complex direct resin restorations on severely decayed teeth. Remarkably, these techniques are mainly designated for building up only parts of teeth. The violation of the biological width within a limited extent, under the precondition of superior oral hygiene, can be successful. Further experimental and clinical research should be encouraged to gain further information on relevant questions, such as the tolerable extent of violation of the biological width, favorable materials in the subgingival area and their long-term bond strength and surface characteristics, and the evaluation of patient characteristics.(6)

Conclusion

From a clinical point of view, DME seems to be well tolerated by the periodontium when a good bonding with a proper isolation is performed, leading to very few or no signs of clinical inflammation. More research is needed to validate the deep margin elevation technique. Nonetheless, this approach represents a useful option for patients who cannot afford more invasive procedures. Deep margin elevation conforms to the main goal of restorative dentistry: the conservation of tooth structure.

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