

## **A Clinical Workflow for Fractured Cusp Management Using Deep Margin Elevation and Adhesive Dentistry**



Dr. Dennis Marangos

Dr. Dennis Marangos, a graduate from the University of Toronto Faculty of Dentistry in 1986. Dr. Marangos stays abreast of current concepts in the fields of Restorative Dentistry and Adhesion. Over the years, he has enriched his restorative expertise through programs such as the Esthetic Dental Continuum at SUNY Buffalo and the KOIS Center's program on Creating Restorative Excellence.

Throughout his career, he has devoted a significant portion of his practice to treating patients with TMD, Craniofacial Pain, Occlusal problems, and sleep-disordered breathing. Dr. Marangos holds numerous certifications including the American Board of Craniofacial Dental Sleep Medicine and the American

Board of Craniofacial Pain. With memberships in numerous organizations related to TMD, craniofacial pain and Sleep Disordered Breathing, Dr. Marangos stays abreast of current concepts in the fields of TMD, Craniofacial Pain, Restorative Dentistry and Occlusion.

Recognized for his dedication to excellence, Dr. Marangos achieved Fellowship in the Academy of General Dentistry in 2021. With his extensive experience and steadfast commitment to his profession, Dr. Dennis Marangos continues to make significant contributions to dental care and beyond.

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A fractured posterior cusp doesn't always mean crown lengthening—or immediate endodontic treatment. When the margin is accessible, deep margin elevation can provide a conservative pathway from fracture to a predictable crown preparation.

### Background

A 69-year-old male presented to our practice as a new patient 12 months earlier. A comprehensive examination was completed, including a full-mouth radiographic series, intraoral photography, an iTero Wellness Scan and the Kois Diagnostic Opinion Form.

The patient was assessed as low risk for periodontal and dentofacial/esthetic disease, moderate risk for function and high risk biomechanically. A comprehensive treatment plan was presented. Except for periodontal therapy, the patient initially declined treatment of the biomechanically compromised teeth (Image 1).



Image 1: The initial presentation of tooth #26

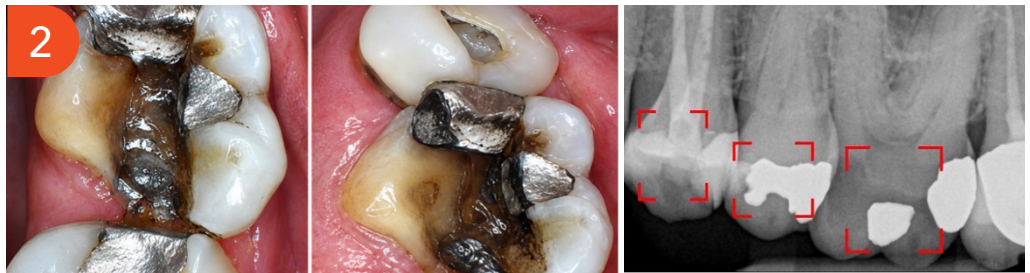


Image 2: One year later, he presented with an emergency: a fractured palatal cusp on tooth #26

One year later, he presented with an emergency: a fractured palatal cusp on tooth #26 (Image 2).

Clinical and radiographic evaluation demonstrated a supra-osseous fracture, with no indication for endodontic treatment. Because the fracture remained accessible and did not require surgical exposure of the osseous crest, periodontal crown lengthening was not indicated at that time.

Teeth #24-27 had originally been treatment planned for indirect restorations. Following discussion of treatment options, the patient elected to proceed with deep margin elevation (DME) followed by crown treatment of teeth #24-27.

This case demonstrates the restorative sequence used to stabilize tooth #26 and establish a predictable, accessible margin prior to definitive crown preparation.

### The Clinical Workflow

#### 1. Isolation First

A rubber dam was placed before restorative treatment (Image 3).

For adhesive dentistry, isolation is not simply a matter of convenience. Contamination from saliva, blood or crevicular fluid can compromise the bonding procedure. In this case, rubber dam isolation also provided the visibility and access necessary to manage the deep cervical margin.



Image 3: A rubber dam was placed before restorative treatment

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A 2021 Cochrane review found low-certainty evidence that rubber dam isolation may improve the short-term survival of some direct composite restorations, although the evidence at longer follow-up periods remains uncertain.<sup>1</sup>



Image 4: A soft-tissue laser was used to expose the clinical margin.

## 2. Establishing Access to the Margin

Existing amalgam was removed, and the final tooth preparation was completed. A soft-tissue laser (Blue Wave Diode Soft Tissue Laser, Clinician's Choice) was then used to expose the clinical margin sufficiently to permit adaptation of the Garrison Dental Solutions DME Band (Images 4 and 5).

The objective was not simply to "fill the box." The goal was to create a clean, accessible and controllable restorative margin.



Image 5: Deep Margin Elevation band adapted to the cervical margin.

## 3. Deep Margin Elevation

The DME Band was carefully adapted to the cervical margin.

DME—also referred to as cervical margin relocation or proximal box elevation—uses bonded restorative material to relocate a deep cervical margin coronally. This can facilitate isolation, matrix adaptation, bonding and subsequent restorative procedures.<sup>2,3</sup>

Current reviews suggest that DME can be a conservative alternative to surgical crown lengthening in appropriately selected cases. However, the technique is highly dependent on three factors:

- The ability to achieve effective isolation.
- A well-adapted matrix that produces a sealed cervical margin.
- Respect for the periodontal tissues and the connective-tissue attachment.<sup>2,3</sup>

Importantly, much of the current DME evidence remains laboratory-based, with relatively limited long-term clinical data.<sup>2,3</sup>

## 4. Total-Etch Dentin Adhesion

Following preparation, the dentin was treated :

- a. With pumice followed up with air abrasion (PrepStart Air Abrasion System, Danville Materials) to endure a clean surface ready for adhesive dentistry.
- b. OptiBond FL (Kerr) a three-step total-etch/etch-and-rinse protocol.

After etching and rinsing, the dentin was re-wetted using G-5 (Clinician's Choice) before application of the adhesive.

The three-step etch-and-rinse technique remains one of the best-documented approaches to dentin adhesion. It separates the clinical functions of etching, priming and adhesive resin application, allowing each component to perform a specific role in creating the resin-dentin interface.<sup>4</sup>

OptiBond FL has demonstrated strong dentin-bonding performance in laboratory studies and long-term clinical evaluations of three-step adhesive systems have demonstrated favorable retention and marginal outcomes.<sup>5-7</sup>

## 5. Composite Base for the DME

Evanesce BC (Clinician's Choice) was selected as the DME composite base.

Its flowability allowed adaptation to the cervical margin and the internal aspect of the matrix. It was also selected due to its bio-adaptive technology and unlimited depth of cure. The material was carefully placed and polymerized to complete the margin elevation (Image 6).

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The result was a new, more accessible coronal restorative margin. (Image 7)



Image 6: The material was placed and polymerized to complete the margin elevation.



Image 7: A more accessible coronal restorative margin achieved.

### 6. Sectional Matrix and Contact Management

With the DME completed, tooth #26 and tooth #25 were restored using the Garrison Dental Solutions ReelMatrix and Quad Sectional Matrix system (Images 8 and 9).



Image 8: Tooth #26 and tooth #25 were restored using the Garrison Dental Solutions ReelMatrix and Quad Sectional Matrix system

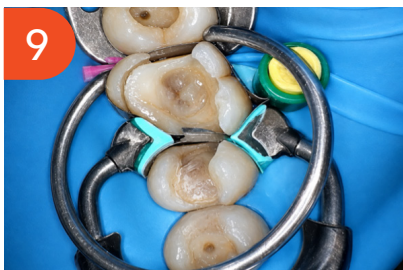


Image 9: Tooth #26 and tooth #25 were restored using the Garrison Dental Solutions ReelMatrix and Quad Sectional Matrix system

Proper wedging was particularly important.

The matrix creates the contour; the wedge creates the seal.

A well-adapted wedge helps prevent composite from being extruded into the gingival sulcus and minimizes the need for difficult subgingival finishing. This becomes even more important when the cervical margin has been relocated with DME.

### 7. Adhesive Protocol—Again

For the definitive restoration, the tooth was again treated with the total-etch technique using OptiBond FL, followed by G-5 rewetting agent (Image 10).

The objective was consistent adhesive management on the newly prepared tooth structure and the DME surface.



Image 10: Tooth was treated with the total-etch technique using OptiBond FL, followed by G-5 rewetting agent

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### 8. Layered Composite Restoration

The Tetric PowerFill System (Ivoclar) was selected for the definitive direct restoration.

Tetric PowerFill Flow was first placed as a base, followed by Tetric PowerFill Composite, shade A (Image 11).

The restoration was then anatomically contoured and prepared for finishing and polishing (Images 12 and 13).



Image 11: Tetric PowerFill Flow was first placed as a base, followed by Tetric PowerFill Composite, shade A



Image 12: Restoration was then anatomically contoured and prepared for finishing and polishing



Image 13: Postoperative view demonstrates a clearly defined palatal and gingival margin, providing a predictable foundation for the subsequent crown preparation

Glycerin was placed over the composite surfaces before final polymerization to minimize the oxygen-inhibition layer.

The immediate postoperative view demonstrated a clearly defined palatal and gingival margin, providing a predictable foundation for the subsequent crown preparation.

### Why DME Worked in This Case

The key advantage of DME was margin relocation.

Rather than immediately moving to surgical crown lengthening, the restorative margin was relocated coronally using bonded composite. This simplified access to the margin while preserving tooth structure and avoiding an additional surgical procedure.

The literature supports DME as a viable approach for selected localized subgingival defects, although clinicians should recognize that long-term clinical evidence is still limited.<sup>2,3</sup>

The technique is therefore less about the composite itself and more about control:

- Control the field.
- Control the matrix.
- Control the adhesive interface.
- Control the cervical contour.

When those four variables are controlled, the deep margin becomes much less intimidating.

### Clinical Pearls

1. Isolate before you elevate.

DME is only as predictable as the isolation allows.

2. The matrix is everything.

A perfectly adapted DME band establishes the foundation for a clean cervical margin.

3. Respect the periodontium.

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DME is not a substitute for surgical crown lengthening when the margin violates the periodontal attachment.

#### 4. Don't underestimate the wedge.

Good wedging is essential to preventing gingival composite excess and establishing a clean cervical contour.

#### 5. Total-etch is the gold standard.

A three-step etch-and-rinse system provides a well-established approach to dentin bonding and has substantial supporting laboratory and clinical literature.<sup>4-7</sup>

#### 6. Think "margin relocation," not "box filling."

The objective of DME is to create a controllable restorative environment that makes everything that follows easier.

### Conclusion

This case demonstrates a conservative restorative pathway for a fractured posterior cusp with a deep but manageable cervical margin.

By combining rubber dam isolation, soft-tissue management, DME, a three-step total-etch adhesive protocol, meticulous matrix adaptation and layered composite placement, the deep cervical margin was relocated to a more accessible position.

The immediate result was a clean, well-defined margin suitable for subsequent crown preparation.

DME doesn't eliminate the challenges of a deep margin—it moves the challenge to a place where we can control it.

### Materials Used

- Rubber dam isolation system
- Blue Wave Diode Soft-tissue laser, Clinician's Choice
- PrepStart Air Abrasion System, Danville Materials
- Garrison Dental Solutions DME Band
- Garrison Dental Solutions ReelMatrix
- Garrison Dental Solutions Quad Matrix System
- OptiBond FL – Kerr
- G-5 Rewetting Agent – Clinician's Choice
- Evanesce BC Composite – Clinician's Choice
- Tetric PowerFill Flow – Ivoclar
- Tetric PowerFill Composite, Shade A – Ivoclar
- Glycerin
- Finishing and polishing instruments

### Reference

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