# Restoring Without Implants

## Multidisciplinary Restoration of Compromised Teeth: A Case Report

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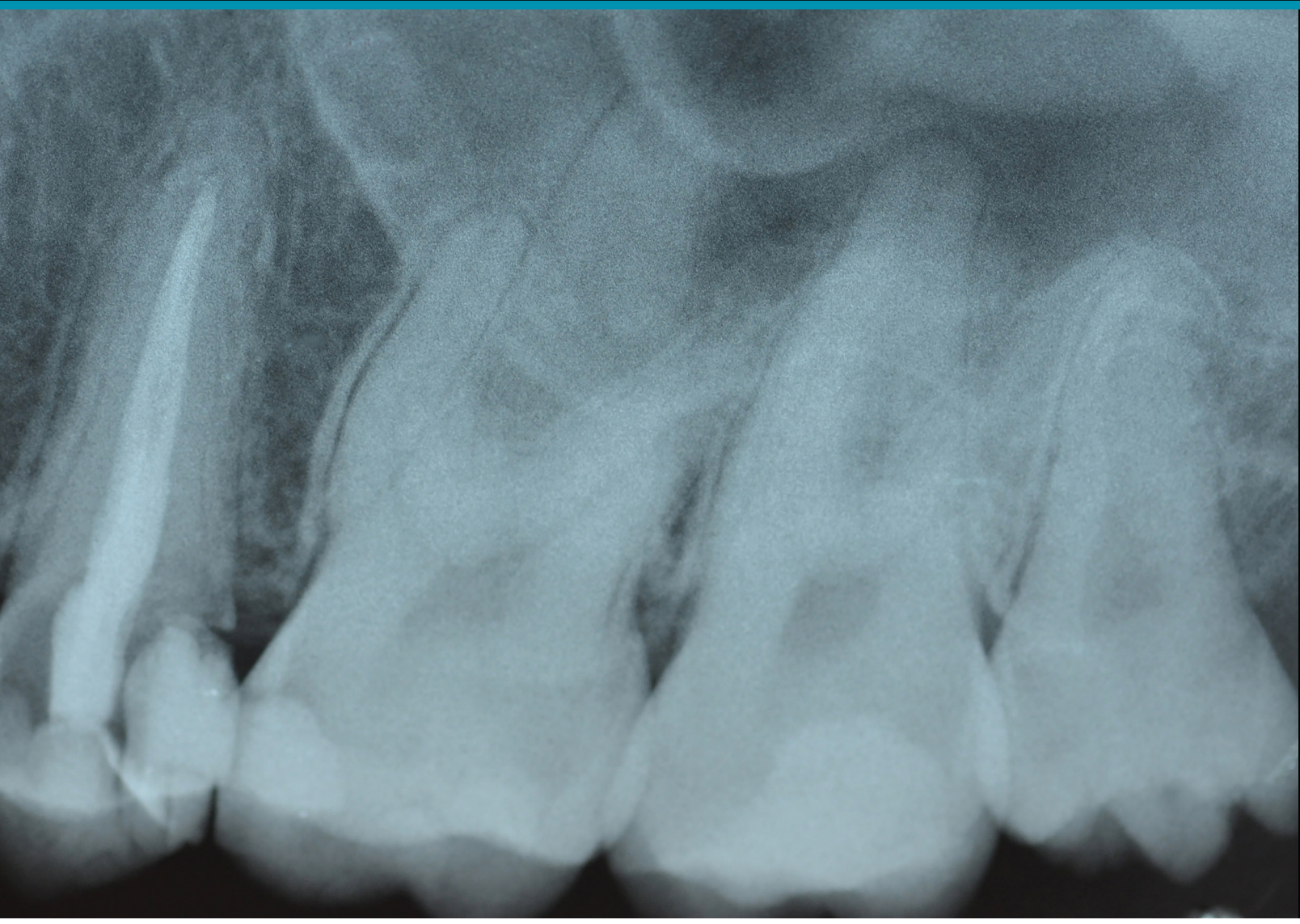

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## Abstract

In recent decades, manufacturers have developed endodontic instruments, surgical techniques, and metal-free restorative materials to restore compromised teeth. If used with appropriate protocols, these modalities can satisfy patients' and clinicians' esthetic and functional demands. Different treatment options are available today to restore compromised teeth, depending on the amount of periodontal support, enamel and dentin loss due to trauma, and caries and/or the size of the existing restorations that have to be removed. It is essential to diagnose and treat the periodontium conservatively to properly restore biomechanics, function, and esthetics. Clinicians must make major efforts to restore compromised teeth before considering implant placement, especially when treating younger or medically compromised patients for whom dental implants are not appropriate. The purpose of this case report is to provide clinical expertise on how to manage and restore a compromised tooth in patients who are not candidates for implant placement, with a predictable outcome utilizing a multidisciplinary approach.


**Key Words: compromised teeth, tooth restorability, single-tooth restoration, implants versus teeth**

## Introduction

Dental implants have shown to be predictable and reliable over time.[1,2] However, clinicians with younger or medically compromised patients who are not candidates for implant surgery must attempt to restore compromised teeth whenever possible. Indeed, if compromised teeth are adequately restored their performance over time is superior to that of implants.[1,2] Furthermore, with this approach, it is possible to delay implant placement that may contribute to a deformity of the surrounding tissues and avoid peri-implant complications such as perimucositis, peri-implantitis, and bone loss compromising esthetic areas.

When diagnosing compromised dentition, the tooth and adjacent tissues must be carefully evaluated and have the proper indications in order for the tooth to be restored. A multidisciplinary approach is essential in achieving a functional and esthetic final outcome.

## Case Presentation

### Patient and Chief Complaint

A 21-year-old female patient was unhappy with her compromised tooth #13 (maxillary left second premolar) **(Figs 1-3)** and referred pain in the upper left sextant due to caries.

### Treatment

With the patient's consent, crown-lengthening surgery was performed to gain adequate ferrule and a gingival scallop in harmony with the adjacent teeth **(Figs 4 & 5)**.[3,4] After suture removal, a rubber dam was placed to isolate #13 **(Fig 6)** and allow a root canal retreatment to be performed (Thermafil, Dentsply Maillefer; Ballaigues, Switzerland) **(Fig 7)**. Afterward, a pre-prosthetic restoration with a carbon fiber post (Ena, Micerium S.p.A.; Avegno, Italy) and composite material (Filtek Supreme XTE, 3M ESPE; St. Paul, MN) was accomplished **(Figs 8-11)**.[5-10] Reduction on #13 was then performed with coarse diamond burs (2979-012, Komet; Milan, Italy) to achieve a 360-degree rounded shoulder, which in this phase must be far away from the soft tissues to allow healing and maturation after crown lengthening. A temporary resin crown was cemented on the abutment (Protemp, 3M ESPE).

The old direct composite restorations were removed on #12, #14, and #15 (the maxillary left first premolar, first molar, and second molar). After caries excavation, a fine diamond bur (838-010, Komet) and ultrasonic tips (SFM7.000.2, SFD7.000.2, Komet) were utilized to refine the remaining sound tooth structure **(Figs 12 & 13)**.[11-14] A three-step etch-and-rinse adhesive protocol was performed (OptiBond FL, Kerr; Orange, CA)[15-19] and wooden wedges and sectional matrices (V3 Ring and Matrix, Triodent; Katikati, New Zealand) were positioned, allowing direct composite restorations to be layered on the three teeth **(Fig 14)**.[20] Since #17 (the mandibular left third molar) was missing, the antagonist tooth #16 was extracted to prevent distal tooth decay on the adjacent tooth.[21]

**Figure 1:** Preoperative; #13 was severely decayed and symptomatic.

**Figure 2:** Preoperative; buccal view.

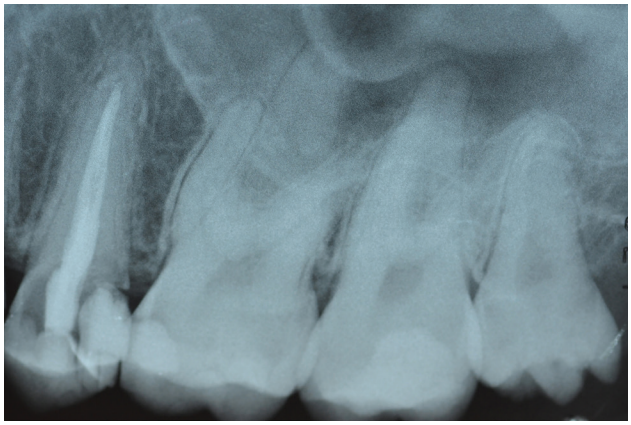

**Figure 3:** Preoperative radiograph.

**Figures 4 & 5:** Crown lengthening was performed to gain ferrule; occlusal and buccal views.

**Figure 6:** Field isolation after suture removal.

**Figure 7:** Caries was removed and root canal retreatment was initiated.

**Figure 8:** A matrix and wooden wedges were placed so that a pre-endodontic buildup could be carried out to hold sodium hypochlorite in the pulp chamber during endodontic treatment.

**Figure 9:** A three-step etch-and-rinse adhesive protocol was performed.

**Figure 10:** After endodontic treatment, a carbon fiber post was tried in to check the fitting.

**Figure 11:** A pre-prosthetic restoration with carbon fiber and composite has been carried out. Tooth #13 will be prepared and a temporary crown will be cemented.

**Figure 12:** After field isolation, the old restorations were ready to be removed.

**Figure 13:** Caries excavation and cavity-finishing protocols were performed.

**Figure 14:** After a three-step etch-and-rinse protocol, the direct composite restorations were completed.

> A multidisciplinary approach is essential in achieving a functional and esthetic final outcome.

Approximately nine months after crown lengthening, final apical relocation and defining of the finishing line on the second premolar abutment tooth (#12) was performed with fine diamond burs (8979-012, Komet) and ultrasonic tips (TD1654, Komet). A two-cord approach (Ultrapak 000 and 00, Ultradent Products; South Jordan, UT) was utilized for the gingival margin and a final impression (Impregum, 3M ESPE) was taken **(Figs 15 & 16)** and sent to the laboratory technician to fabricate the permanent lithium disilicate crown **(Fig 17)**.[22-28]

Once the contact areas, fitting, shape, and color were evaluated, field isolation was achieved with a cord (Ultrapak 000) and a rubber dam (Nic Tone, MDC Dental; Zapopan, Jalisco, Mexico). The abutment tooth received a prophylaxis with pumice and was sandblasted prior to etching with phosphoric acid (Ena etch 37%). Following that, a copious rinsing was done and a three-step etch-and-rinse adhesive (Optibond FL) was applied **(Figs 18 & 19)**. The lithium disilicate restoration was etched with 5% hydrofluoric acid (Porcelain etch gel, Pulpdent; Watertown, MA) **(Fig 20)** and placed in an ultrasonic bath for five minutes before adding the silane (Ultradent) and bonding (Optibond FL) agents.[29]

A preheated light-cured composite (Enamel Plus, Micerium) was placed on the abutment tooth **(Fig 21)**, followed by the crown insertion with a progressive push to let the excess composite cement flow out. This was removed with a probe and floss until the crown was perfectly seated on the finishing line **(Figs 22 & 23)**. Light-curing was done (this can be done for six minutes with one lamp, or three minutes with two lamps, one minute for each surface of the restoration, to allow a perfect composite cement conversion) **(Fig 24)**.[30,31] A small potential for excess cement can occur during this step; it can be removed with a curette. Also, a dual-cure resin cement can be used to cement a lithium disilicate crown. The authors prefer light-cure cement due to better handling, and because the conversion of the cement begins only when the clinician decides.

Occlusal adjustments were made to the restoration. At the four-year follow-up appointment, clinical and radiographic evaluation showed a fully functioning and stable restoration **(Figs 25 & 26)**.

**Figure 15:** A two-cord approach was employed after finishing line relocation.

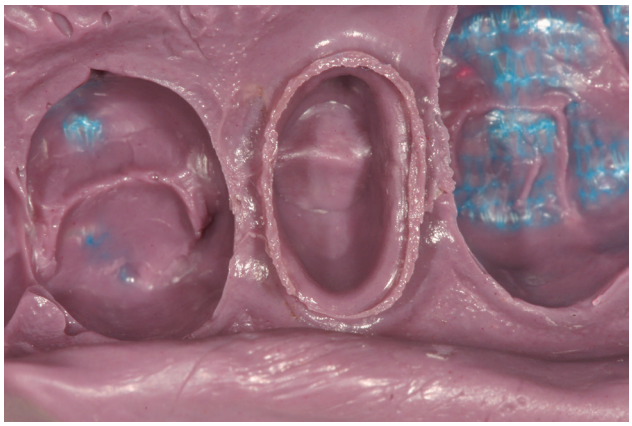

**Figure 16:** Final impression.

**Figure 17:** Bilayered lithium disilicate crown for #13.

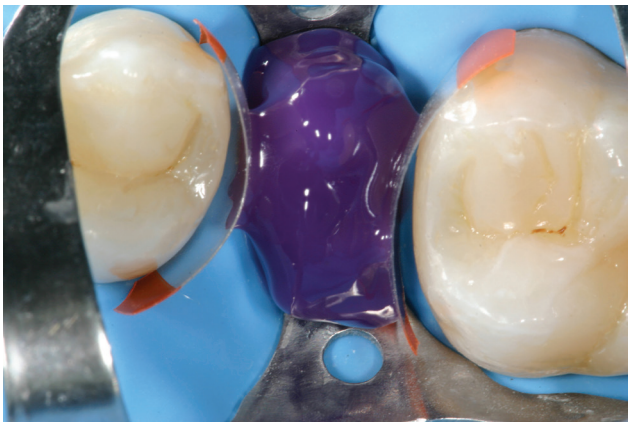

**Figure 18:** After field isolation, a three-step etch-and-rinse was performed to achieve adhesive cementation.

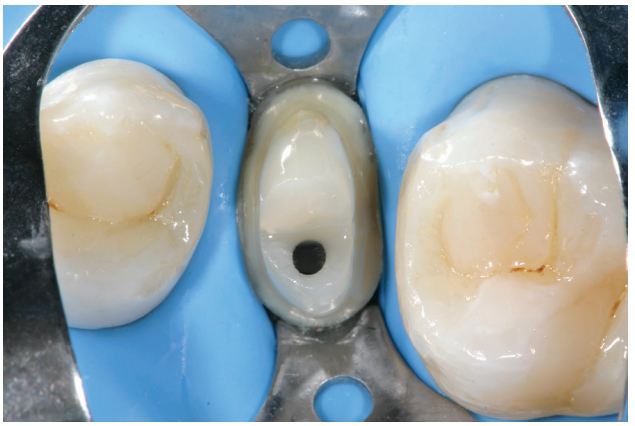

**Figure 19:** Bonding applied on the abutment tooth.

**Figure 20:** Etching of the lithium disilicate crown with 5% hydrofluoric acid for 20 seconds.

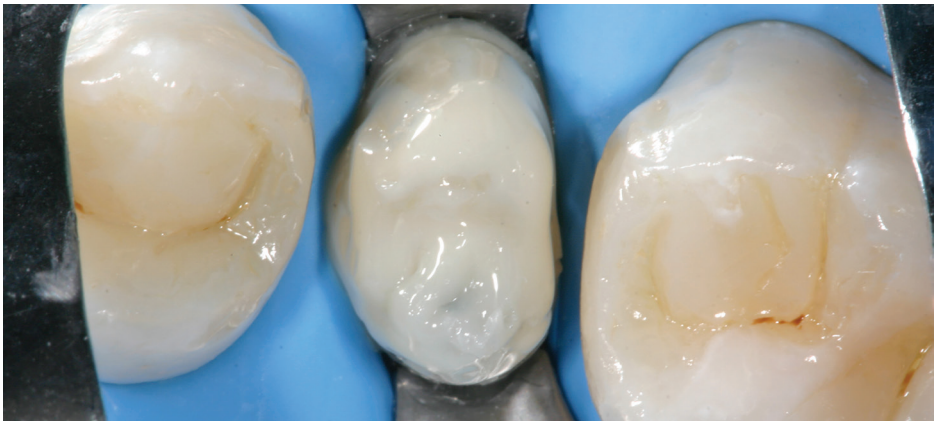

**Figure 21:** A preheated light-cured composite was placed on the abutment.

**Figure 22:** The excess composite cement was removed while the crown was seated.

**Figure 23:** Floss was used to remove excess composite cement in the proximal areas.

**Figure 24:** Light-curing of the final restoration, #13.

**Figure 25:** At the four-year follow-up, buccal view.

**Figure 26:** Radiograph at the four-year follow-up appointment.


## Summary

Clinicians are obligated to use their greatest efforts, knowledge, and skills to save compromised teeth, especially in young or medically compromised patients. There are numerous techniques and materials available today that allow us to treat eroded and abraded teeth in a highly conservative manner,[32-36] even with "no-prep" protocols. Furthermore, current composite materials enable us to perform very conservative restorations due to minimally invasive preparation, which means that less sound tooth structure is removed, providing a more suitable restoration from a biomechanical perspective.[37] These restorations have good esthetics and are affordable and long lasting. Repairing fractures is relatively easy without having to perform a more aggressive procedure or redo the entire restoration. Implant placement should be considered for cases with a hopeless prognosis.


> "...crown-lengthening surgery was performed to gain adequate ferrule and a gingival scallop in harmony with the adjacent teeth.

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Disclosures: The authors did not report any disclosures.