

Restoration of Endodontically Treated Teeth in the Esthetic Zone: A Conservative Approach

Case Report

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Abstract

Restoring Endodontically Treated Teeth (ETT) in the esthetic zone presents unique challenges due to weakened tooth structure and high esthetic demands. This report details the conservative management of a 45-year-old male patient with discolored maxillary anterior ETT, previously restored with full-coverage metal-ceramic crowns. Significant gingival recession exposed the discolored cervical root surfaces, necessitating a comprehensive restorative approach. The treatment involved removal of existing crowns, re-evaluation of ETT, post and core fabrication, and placement of all-ceramic crowns. The case demonstrates that a conservative and systematic approach can restore form, function, and esthetics.

Introduction

One of the challenges for restorative dentists is restoring damaged anterior teeth to their proper form and function. This task becomes more complicated when one or more abutment teeth have undergone endodontic treatment. Endodontically Treated Teeth (ETT) are often weakened due to the access channels, previous restorations, and potential recurrent caries [1]. These issues are particularly significant in anterior teeth, where aesthetic demands and the direction of forces require more elaborate technical considerations [2]. This report presents a case involving a patient with multiple maxillary anterior ETT.

Case Presentation

A 45-year-old male patient with a non-contributory medical history presented with a chief complaint of discolored anterior teeth. Clinical and radiographic evaluations revealed that maxillary incisors

(#7,8,9,10) had been restored with full-coverage metal-ceramic crowns (Figure 1,2). Significant gingival recession around the teeth exposed the discolored cervical root surfaces of the endodontically treated teeth #8,9, and 10. The left lateral incisor (#10) had undergone a surgical apicoectomy, leaving a scar tissue. Except for tooth #9, none of the ETT had posts and cores. No active periodontal disease or other abnormalities were detected.

The treatment plan consisted of removal of existing crowns, reevaluation of ETTs (#8, 9, 10), post and core fabrication, and placement of all-ceramic full-coverage single crowns on all four maxillary incisors.

The metal-ceramic crowns were removed by preparing a slot on the labial surfaces and spreading them apart. The remaining tooth structure was evaluated both qualitatively and quantitatively (Figure 3).



Figure 1: Intraoral pre-operative, front view.

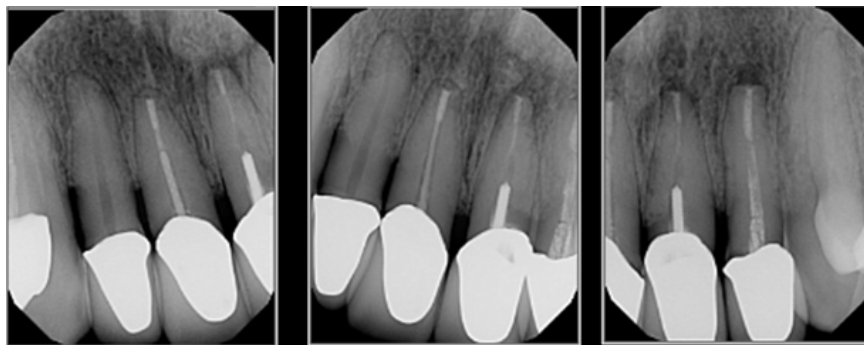


Figure 2: Pre-operative periapical radiographs, maxillary anterior teeth.



Figure 3: Maxillary incisors after removal of existing restorations.

Post space was provided, and appropriately sized fiber posts were cemented with a self-adhesive dual-cured resin cement (Relyx Unicem 2, 3M), followed by composite core buildup (Filtek Universal, 3M) (Figure 4) [3]. Provisional crowns were made with Bisacryl material and cemented with temporary cement (Tempbond, Kerr) (Figure 5). At the following appointment, and after the patient's approval of the esthetics and comfort, the provisional crowns and tooth preparations were scanned (iTero Lumina) and submitted to the dental laboratory for fabrication (Figure 6). The decision was made to fabricate the crowns with full-contoured multilayer zirconia ceramics (IPS ZirCAD, Ivoclar Vivadent) due to their superior mechanical and optical properties, biocompatibility, and chemical stability, making them ideal for high functional and esthetic demands [4,5].

The finished crowns were tried in, the proximal contacts and occlusion verified, radiographs taken to evaluate the marginal seal,

and the patient was consulted regarding the esthetics and comfort of the new crowns. Once all criteria were met, the intaglio surfaces of the crowns were decontaminated with a cleaning paste (Ivoclean, Ivoclar Vivadent) to remove salivary particles, which may interfere with the proper bonding of resin cement to zirconia ceramics. After rinsing and drying, the intaglio surfaces of the crowns were primed with a ceramic primer (Monobond Plus, Ivoclar Vivadent) containing 10-Methacryloyloxydecyl Dihydrogen Phosphate (10-MDP) monomer. 10-MDP's phosphate groups chemically bond to calcium in the hydroxyapatite of teeth, creating a durable bond with both enamel and dentin, and bond with metal oxides of ceramic restorations. Self-adhesive dual-cured resin cement was used to cement the crowns [6,7]. (Post-cementation radiographs were taken to detect any remaining excess cement, and the patient was instructed to maintain good oral hygiene (Figure 7-10).



Figure 4: Maxillary incisors after tooth preparation.

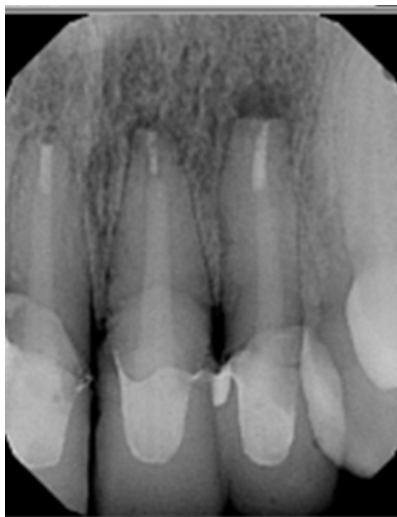


Figure 5: ETT with post and core and provisional crown delivery.



Figure 6: Digital scan of prepared maxillary incisors.



Figure 7: Post-cementation, frontal view.



Figure 8: Post-cementation, Palatal view.

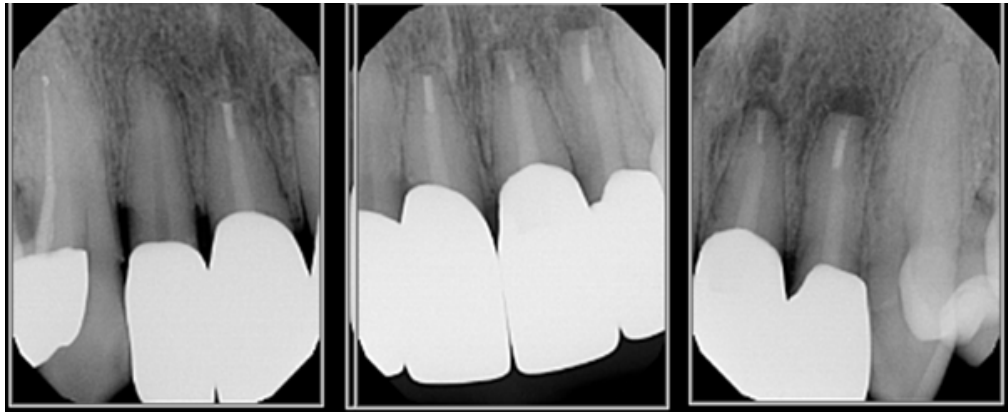


Figure 9: Post-cementation radiographs.



Figure 10: Post-operative smile view.

Discussion and Conclusion

With the development of high-strength dental ceramics such as Lithium Disilicate glass ceramics and Zirconium oxide polycrystalline material over the last two decades, clinicians can now provide highly esthetic and durable restorations for their patients. Advances in adhesive dentistry have enabled minimally invasive and long-lasting results without compromising esthetics. Endodontically treated teeth can be efficiently restored with fiber posts cemented with self-adhesive resins, followed by all-ceramic crowns, achieving seamless restorations with a good long-term prognosis.

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