



## CASE PRESENTATION

### Clinical management of tooth #1.5 with endopost and crown lengthening: a comprehensive restorative approach

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#### ABSTRACT

**Introduction:** the rehabilitation of endodontically treated teeth constitutes a relevant clinical challenge, since the loss of coronal structure compromises functionality and aesthetics, requiring interdisciplinary approaches to ensure long-lasting results.

**Objective:** to present a clinical case of comprehensive rehabilitation of tooth #1.5 through crown lengthening, endodontic treatment, and restoration with post-and-core crown.

**Case presentation:** the management of a 55-year-old female patient with a crown-root fracture in the upper right first premolar, accompanied by gingival hyperplasia and irreversible pulp involvement, is described. The therapeutic plan included crown lengthening surgery to expose the remaining dental structure, followed by endodontic treatment with root canal obturation and placement of a fiberglass post. Subsequently, the core was prepared and a zirconia crown cemented with dual resin was fabricated, ensuring marginal adaptation and biomechanical stability. The surgical procedure involved incision, flap elevation, osteotomy, and suturing, with adequate healing at seven days. Complementary examinations confirmed the need for comprehensive rehabilitation, including replacement of defective restorations and planning of implants for missing teeth. The final outcome showed functional and aesthetic recovery, with improvement in mastication, periodontal stability, and patient satisfaction.

**Conclusions:** the case demonstrates that the combination of crown lengthening and rehabilitation with post-and-core crown is an effective alternative for compromised teeth. Interdisciplinary collaboration between periodontics, endodontics, and oral rehabilitation was decisive in achieving stable and aesthetic results, highlighting the importance of rigorous protocols and clinical follow-up to ensure long-term success.

**Keywords:** Crown Lengthening; Tooth Crown; Dentistry; Rehabilitation

## INTRODUCTION

The restoration of endodontically treated teeth (ETT) has been widely discussed and remains controversial in dental literature. Clinical opinions on this topic have often been based on empirical philosophies due to the weak link between available scientific data and inconclusive clinical studies. ETT carry a higher risk of biomechanical failure compared to vital teeth, and fracture of these teeth is a common problem in restorative dentistry.<sup>(1)</sup>

Significant progress in restoring ETT was achieved with the introduction of adhesive techniques, facilitated by the development of effective dentin bonding agents. Adhesive restorations allow elimination of macro-retentive features, provided sufficient dental structure remains. In this context, the use of intraradicular posts has become less common compared to conventional restorative techniques. It is advisable to offer multiple options to restore both function and aesthetics while minimizing removal of healthy tooth structure.<sup>(2)</sup>

Oral rehabilitation can be performed through various approaches aimed at restoring masticatory function and patient aesthetics.<sup>(3)</sup>

In contemporary dentistry, the concept of minimal intervention has gained prominence, driven by increasing demand to preserve healthy dental tissue and develop preparations that minimize unnecessary loss. One of the most conservative treatment options is the fabrication of adhesive fixed prostheses.<sup>(2)</sup> Minimally invasive preparations with maximum conservation of healthy dental tissue are considered the gold standard for restoring ETT; thus, the endocrown represents a viable alternative for endodontically treated teeth with extensive coronal loss.<sup>(1)</sup>

This restoration provides full occlusal coverage and utilizes the pulp chamber to increase the adhesive surface area.<sup>(4)</sup> For endocrown placement, complete cusp coverage is performed, especially in cracked teeth, to reduce cusp flexure. In such cases, an onlay may be a suitable alternative to full-coverage crowns, as it uses the pulp chamber to enhance adhesion and mechanical macro-retention.<sup>(5)</sup>

One of the most frequently performed procedures to restore aesthetics in the maxillary anterior region is crown lengthening. This is indicated when there is insufficient clinical crown length, subgingival caries or fractures, or uneven gingival margins affecting smile esthetics.<sup>(6)</sup> Crown lengthening is a surgical procedure within periodontal flap surgery and is essential in modern periodontal therapy, as aesthetic and prosthetic demands have increased in comprehensive patient management. The procedure involves removal of gingival tissue and bone to create a longer clinical crown and apically reposition the gingival margin. Careful consideration of the biological width is essential during crown lengthening surgery.<sup>(7)</sup> Given this context, the present study was conducted to present a clinical case of comprehensive rehabilitation of tooth #1.5 using crown lengthening, endodontic treatment, and endo-post-crown restoration.

## CLINICAL CASE REPORT

A 55-year-old Ecuadorian woman, engaged in household duties, presented to the dental clinic reporting a "broken molar." Extraoral examination revealed a brachycephalic facial phenotype—characterized by a short, wide facial morphology where transverse proportions exceed vertical dimensions. Mild facial asymmetries were noted, with slight misalignment between the right and left hemifaces. Smile analysis revealed excessive gingival display (gummy smile). The patient

exhibited a concave facial profile, and Angle's classification was Class I, indicating normal posterior dental relationships relative to the skeletal base.

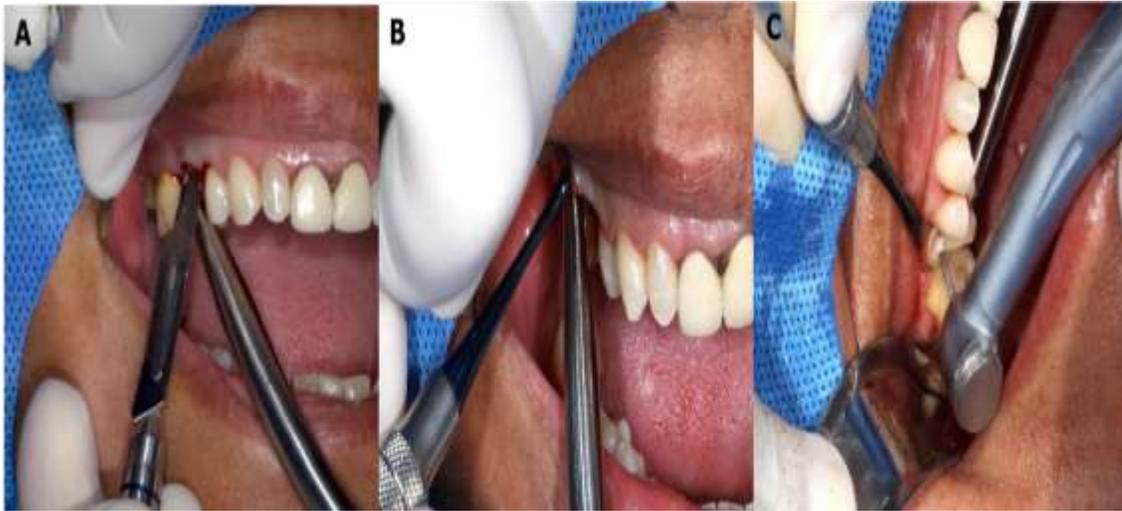
Intraoral examination revealed poorly adapted crowns with marginal leakage on teeth #1.1 and #2.1. Occlusal caries were observed on teeth #1.2, #1.4, #1.5, #1.8, #4.6, and #4.7. Additionally, a coronal fracture was noted on tooth #1.5, and edentulism was present at #1.7, #1.8, #2.7, #3.8, and #4.6. The patient reported no relevant medical history, allowing focus on the dental condition.

Radiographic examination (Figure 1) confirmed a crown-root fracture and pulpal chamber involvement, establishing the need for comprehensive management. Diagnosis included irreversible pulpitis and localized periodontal compromise, guiding the development of an interdisciplinary treatment plan.



**Fig. 1** Panoramic radiograph of maxillae.

The therapeutic plan comprised three main phases: crown lengthening surgery, endodontic treatment, and oral rehabilitation with an endo-post-crown. Periodontal surgery was performed using a flap technique, including a partial-thickness Newman incision, flap elevation, osteotomy, and bone contouring (Figure 2), followed by mattress sutures. The procedure successfully exposed the remaining dental structure (Figure 3), providing an adequate restorative margin. Healing was uneventful at seven days, with no postoperative complications.



Notes: A (partial Newman incision); B (flap elevation); C (osteotomy and bone contouring)

**Fig. 2** Surgical procedures performed.

**Fig. 3** Exposición dental y ósea.



**Fig. 3** Dental and osseous exposure.

Subsequently, endodontic treatment was completed over two sessions. Initial dental prophylaxis was performed, followed by endodontic treatment on teeth #2.5, #2.6, #4.7, and #4.8; replacement of leaking amalgam and composite restorations with aesthetic composites on teeth #1.2, #1.4, #1.5, #1.8, #4.6, and #4.7; glass fiber post and crown placement on tooth #1.5; crown replacement on teeth #1.1 and #2.1; and implant placement to replace teeth #2.7 and #3.6.

One week later, partial gutta-percha removal was performed, and a glass fiber post was placed. The post was pre-treated with hydrofluoric acid and silane to optimize adhesion. The root canal was conditioned with phosphoric acid and bonding agent, and the post was cemented with dual-cure resin, ensuring biomechanical stability.

The final phase involved core preparation and fabrication of a zirconia crown. Definitive impressions were taken using retraction cord and high-precision addition silicone materials, which were sent to the laboratory for prosthesis fabrication. Final cementation was performed with dual-cure resin, achieving excellent marginal adaptation and aesthetic integration.

The clinical outcome demonstrated significant functional and aesthetic recovery (Figure 4). The patient regained masticatory capacity, showed improved periodontal stability, and expressed satisfaction with the final appearance. Comprehensive management highlighted the importance of interdisciplinary collaboration among periodontics, endodontics, and prosthodontics, as well as strict adherence to clinical protocols to ensure durable results.



Notes: A (initial evaluation); B (after therapeutic intervention)

**Fig. 4** Clinical evolution of the patient.

## DISCUSSION

Endo-post-crown rehabilitation is a common technique for restoring structurally compromised teeth. In the case of tooth #1.5 (right maxillary first premolar), the clinical situation presented an additional challenge due to the need for crown lengthening. This procedure improves the clinical crown-to-root ratio and ensures an adequate seal between dental structure and restoration.

Crown lengthening is a surgical technique designed to increase the exposed clinical crown height. In this case, it was performed to establish an adequate restorative margin and optimize the final restoration's aesthetics and function. The primary indication for tooth #1.5 was extensive fracture or prior endodontic treatment compromising remaining tooth structure. Crown lengthening enhances restoration stability and longevity by exposing more enamel and dentin. The endopost, designed to provide additional structural support to endodontically treated teeth, was essential in this rehabilitation. The choice of post material—glass fiber versus metal—affects both durability and aesthetics. In this case, a material maximizing adhesion and providing

adequate strength was selected. The definitive crown, chosen based on shade, morphology, and function, played a critical role in functional and aesthetic recovery.

Zavanelli et al.,<sup>(8)</sup> compared the success rates of glass fiber posts, noting that the longevity of indirect restorations in endodontically treated teeth depends on several factors, with particular emphasis on the cementation of a fiber post—consistent with this case, where endodontic treatment preceded glass fiber post placement.

Castro-Aguilar et al.,<sup>(9)</sup> evaluated current considerations for metal-free single-unit crowns in the posterior region, concluding that zirconia meets high functional, biocompatible, and aesthetic expectations—aligning with this case report, where zirconia was selected as the definitive restorative material for the severely damaged tooth.

Fixed prosthodontic rehabilitation restores mastication and function, supports occlusal loads, and achieves optimal aesthetics. Similarly, this case achieved excellent functional and aesthetic outcomes, restoring patient comfort and masticatory support.<sup>(10)</sup> Literature also emphasizes that endodontically treated teeth not only lose pulp vitality but are also prone to fracture due to structural weakening, necessitating strict cementation protocols for treatment success—mirroring this case, where a rigorous cementation protocol ensured favorable outcomes.<sup>(11)</sup>

Compared to previous studies and similar documented cases, tooth #1.5 aligns with reported success rates for aesthetic and functional endo-post-crown rehabilitations. The literature suggests that combining appropriate techniques with high-quality materials generally yields high success rates. However, each case presents unique characteristics that may influence the final outcome.

## CONCLUSIONS

Comprehensive rehabilitation of tooth #1.5 using endo-post-crown and crown lengthening proved highly successful, achieving durable functional and aesthetic recovery. Interdisciplinary coordination among endodontics, periodontics, and prosthodontics was crucial to treatment quality, while crown lengthening enabled proper restorative adaptation and improved long-term prognosis. The intervention not only restored masticatory function but also met aesthetic standards, enhancing patient confidence and quality of life. Continuous clinical follow-up ensured result stability and underscored the importance of rigorous protocols and interdisciplinary collaboration for therapeutic success.

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