



Case Report

Comprehensive anterior rehabilitation for functional and esthetic enhancement: Case based insights

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Abstract

Purpose: To present two clinical cases demonstrating comprehensive anterior rehabilitation focused on re-establishing anterior guidance for optimal esthetics and function.

Background: Accurate anterior guidance is critical for protecting posterior dentition from excessive functional stresses and for achieving favorable esthetics, phonetics, and comfort. Faulty guidance can lead to premature contacts, restoration failure, and periodontal compromise.

Case Descriptions: *Case 1:* A 55-year-old male presented with severe anterior attrition, deep bite, and generalized posterior wear. Following endodontic therapy (13–23, 45–33) and crown lengthening (43–33), tooth preparations were performed according to biomechanical principles. A diagnostic wax-up and custom incisal guide table facilitated temporization and functional evaluation. Definitive monolithic zirconia crowns were fabricated and cemented with resin cement.

Case 2: A 19-year-old female with endodontically treated maxillary and mandibular anteriors sought esthetic improvement. A diagnostic wax-up and provisional phase preceded digital impressions. Layered zirconia crowns were CAD/CAM-fabricated for enhanced esthetics and cemented with resin-modified glass ionomer cement.

Discussion: Both cases highlight the importance of provisional restorations in verifying esthetics, phonetics, and functional dynamics prior to definitive rehabilitation. Customized incisal guide tables allowed precise replication of functional movements. Material selection was individualized, monolithic zirconia for strength in high-load situations, layered zirconia for superior esthetic outcomes. Digital workflows enhanced precision and predictability.

Conclusion: Successful anterior rehabilitation demands precise recording and transfer of anterior guidance, careful material selection, and thorough provisional evaluation. Integrating digital technology with established prosthodontic principles can deliver predictable, long-lasting functional and esthetic results.

Keywords: Anterior guidance, Occlusal rehabilitation, Zirconia crowns, Provisional restoration, CAD/CAM, Esthetic dentistry.

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1. Introduction

Restoring missing anterior teeth without proper functional planning can disrupt the envelope of motion, potentially resulting in premature occlusal contacts, cementation failures, and discomfort or trauma to the abutment teeth. Central to functional restoration is the establishment of appropriate incisal guidance, which is defined by the contact relationship between the maxillary and mandibular anterior teeth during dynamic mandibular movements. The steepness of this guidance is influenced by the degree of overjet,

overbite, and the anatomical contours of the palatal surfaces of the maxillary anterior teeth.

According to Dawson, anterior guidance is the dynamic interaction of the anterior teeth throughout all ranges of mandibular function. It plays a critical protective role by discluding the posterior dentition during protrusive and lateral excursions, thereby minimizing occlusal stresses. However, when anterior guidance is improperly designed, particularly in patients with compromised periodontal support or high occlusal loads, it can lead to alveolar bone loss, tooth mobility, and functional discomfort.

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Multiple factors affect the nature and efficacy of anterior guidance, including overjet, overbite, incisal edge level, contact area location, and the labiolingual alignment of the teeth. A deep overbite with minimal overjet results in a steeper incisal path, increasing the risk of off-axial loading on the anterior teeth. Conversely, adequate overjet provides clearance for anterior mandibular movement without jeopardizing periodontal health. Large or gingivally located contact areas can generate excessive horizontal forces, while irregular incisal levels or misaligned teeth may lead to uneven force distribution, contributing to flaring or instability of the anterior teeth.

In cases involving full-mouth rehabilitation or anterior restorations, the accurate recording and transfer of anterior guidance is essential for achieving long-term clinical success. This article emphasizes the importance of establishing incisal guidance through provisional restorations, which not only facilitate functional adaptation and patient comfort during the transitional phase but also serve as a validated reference for fabricating the definitive prosthesis.

2. Case Report 1

A 55-year-old male patient reported to the Department of Prosthodontics and Crown & Bridge with a chief complaint of hypersensitivity and progressive wear involving the anterior teeth. The patient's medical history was significant for type II diabetes mellitus, well-controlled with pharmacologic therapy for the past three years.

2.1. Clinical findings and treatment decision

Intraoral examination revealed advanced incisal wear of the mandibular anterior teeth, accompanied by palatal attrition of the maxillary anterior teeth, findings indicative of parafunctional activity and altered occlusal dynamics. A generalized pattern of posterior attrition was also observed, along with a pronounced anterior deep bite. (Figure 1,2) These clinical features are characteristic of chronic occlusal trauma and suggest the presence of underlying functional disturbances. Based on the extent of wear and occlusal discrepancy, a comprehensive occlusal rehabilitation, including reestablishment of anterior guidance and full-mouth restorative management, was advised. However, respecting the patient's preferences and chief complaint, primarily concerning anterior sensitivity and esthetics, treatment was limited to anterior rehabilitation at this stage.

2.2. Clinical workflow and management

2.2.1. Diagnostic phase

Intraoral and extraoral photographs were taken along with preliminary diagnostic impressions to fabricate study casts. A facebow transfer was performed, and the casts were mounted on a semi-adjustable articulator. A diagnostic wax-up was completed to evaluate esthetics, function, and occlusion. (Figure 3a,b) This wax-up served as a template for both temporization and fabrication of a customized incisal

guide table, which was used to replicate mandibular excursive movements and ensure accurate anterior guidance during prosthodontic procedures.

2.2.2. Radiographic phase

Preoperative radiographs were obtained to assess the periodontal and pulpal status of the maxillary and mandibular anterior teeth. Findings confirmed the need for endodontic treatment and surgical intervention in specific teeth, as well as subgingival preparation for definitive prosthetic margins.

2.2.3. Endodontic therapy

Endodontic treatment was carried out for teeth 13 to 23 and 45 to 33, ensuring proper disinfection and obturation prior to prosthodontic rehabilitation. The completion of endodontic therapy allowed for full coverage restorations without pulpal complications.

2.2.4. Surgical phase

Crown lengthening procedure (CLP) was performed in the mandibular anterior region (43 to 33) to increase clinical crown height and establish a healthy supracrestal tissue attachment. This also facilitated proper ferrule effect and improved the biomechanical stability of the final restorations.



Figure 1: a,b: Preoperative intraoral and extraoral photograph from front view



Figure 2: a: Showing right and left lateral view; **b:** Showing occlusal view of maxillary and mandibular arch

2.2.5. Prosthodontic phase

Tooth preparation was performed on maxillary and mandibular anterior teeth following established biomechanical and prosthodontic principles, preserving tooth structure, achieving proper taper, ensuring adequate

clearance, and finishing margins at an appropriate level to maintain periodontal health. Provisional restorations were fabricated based on the diagnostic wax-up and adjusted intraorally to refine esthetics and function. (**Figure 4**) These provisionals were maintained for a follow-up period of four weeks to evaluate patient adaptation in terms of phonetics, comfort, and occlusion.

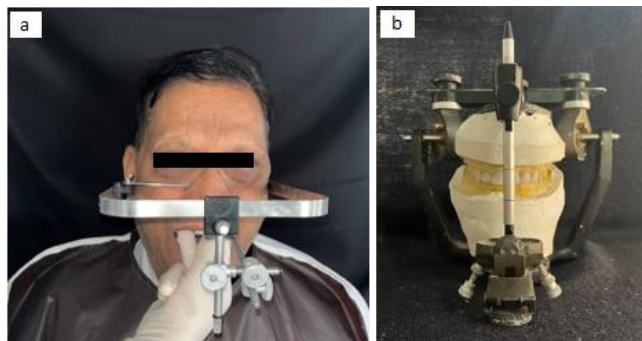


Figure 3: a: Showing facebow record; b: Diagnostic wax up



Figure 4: a: Temporization- Centric view; b: Protrusive view



Figure 5: Final preparation and gingival retraction



Figure 6: Final impression of maxillary and mandibular arch



Figure 7: Final cementation



Figure 8: Protrusive view



Figure 9: Extra oral view

After this period, final preparations were refined, (**Figure 5**) and subgingival margins were recorded using a two-step impression technique with addition silicone (putty and light body) (**Figure 6**). The definitive restorations were fabricated using full-contour monolithic zirconia crowns, providing optimal esthetics and strength. The crowns were tried intraorally, verified for fit, esthetics, and occlusion, and subsequently cemented using resin cement under proper isolation. (**Figure 7-9**)

3. Case Report 2

3.1. Case presentation

A 19-year-old female was referred from the Department of Conservative Dentistry and Endodontics to the Department of Prosthodontics for prosthetic rehabilitation of the anterior teeth. The patient was a college student and reported dissatisfaction with the appearance of her smile, which negatively impacted her confidence and social interactions.

3.2. Clinical examination

Intraoral examination revealed completed root canal treatments on the maxillary central and lateral incisors and the mandibular anterior teeth from canine to canine. All treated teeth exhibited extensive coronal destruction due to caries. The remaining dentition was sound, with no signs of carious lesions or periodontal compromise. (**Figure 10**)

3.3. Radiographic evaluation

Periapical radiographs demonstrated satisfactory endodontic obturations with no evidence of periapical pathology. Periodontal ligament spaces were intact, and the bone levels were within normal limits, indicating a favourable prognosis for prosthetic intervention.

3.4. Diagnostic phase

Preliminary impressions were made using irreversible hydrocolloid material, and diagnostic casts were poured. A wax-up was performed after mock tooth preparation on the diagnostic model to guide the prosthetic design. The wax-up was shown to the patient to facilitate visualization of the anticipated outcome and obtain informed consent.

3.5. Prosthetic procedure

Tooth preparation was carried out on the affected anterior teeth, following principles of crown preparation appropriate for all-ceramic restorations. **(Figure 11)** Gingival retraction was performed, and temporization was done using the silicone index derived from the wax-up. The provisional restorations were luted with temporary cement and evaluated for esthetics, phonetics, and occlusion. The patient approved the provisional outcome, which was maintained to allow soft tissue adaptation and functional assessment. **(Figure 12)**

After ensuring optimal gingival health and soft tissue contour, intraoral digital impressions were captured using an optical scanner under proper isolation. Based on esthetic and functional demands, layered zirconia crowns were selected to mimic the natural translucency and shade of anterior dentition. The definitive crowns were digitally designed using CAD software to ensure precise fit, morphology, and esthetic harmony with the adjacent dentition. **(Figure 13)**



Figure 10: Preoperative intraoral and extraoral photograph from front view



Figure 11: Intra oral photographs of tooth preparation

Shade selection was carried out using the VITA Classic shade guide under natural daylight, and photographic records were sent to the dental laboratory for precise characterization.

The definitive restorations were evaluated for marginal integrity, proximal contact, occlusion, and esthetics before cementation. The crowns were luted using resin-modified glass ionomer cement following standard bonding protocols. **(Figure 14)**



Figure 12: Temporization



Figure 13: Digital designing using CAD/CAM Software



Figure 14: Final cementation



Figure 15: Pre and post-operative extra oral view

3.6. Outcome and follow-up

Post-cementation, the patient exhibited a marked improvement in smile esthetics and self-confidence. The final restorations demonstrated excellent esthetic integration with the adjacent dentition and harmonious soft tissue response. At a 1-month follow-up, the patient reported satisfaction with both function and appearance. Oral hygiene instructions and maintenance protocols were reinforced. (**Figure 15**)

4. Discussion

Anterior guidance plays a pivotal role in protecting posterior teeth during functional movements by disengaging them in protrusion and lateral excursions, thus minimizing occlusal loading on posterior dentition and preventing parafunctional wear.^{1,2} The clinical cases presented demonstrate the significance of accurately recording and transferring anterior guidance during rehabilitation, especially in patients with pre-existing occlusal wear or esthetic concerns.

In Case 1, the patient exhibited severe attrition and deep bite, leading to a loss of functional anterior guidance and altered occlusal dynamics. Establishing guidance through provisional restorations allowed functional adaptation before final zirconia crown placement, a step emphasized by Dawson³ as essential for long-term stability. Additionally, the use of a customized incisal guide table facilitated precise replication of the patient's functional movements, minimizing the risk of introducing iatrogenic occlusal discrepancies.

Case 2 involved a younger patient with satisfactory periodontal health but significant coronal destruction following endodontic therapy. The application of layered zirconia crowns provided excellent esthetic and mechanical outcomes. The incorporation of CAD/CAM technology enhanced precision, marginal fit, and esthetic harmony.^{4,5} The staged provisional phase promoted gingival adaptation and allowed verification of phonetics and smile esthetics, as supported by studies highlighting provisionalization as a key determinant of success in anterior esthetic rehabilitation.^{6,7}

Material selection also played a crucial role. Monolithic zirconia, used in Case 1, offers superior strength and wear

resistance for patients with high occlusal loads, while layered zirconia in Case 2 provided a more lifelike translucency suitable for a high-esthetic zone.^{8,9}

Both cases underscore that anterior guidance rehabilitation should not be viewed solely as a restorative procedure but as a functional reprogramming of the stomatognathic system. Failure to restore proper guidance can result in overloading, tooth mobility, and restoration failure.¹⁰ The use of provisional restorations as a “functional test-drive” before definitive placement aligns with the principles of minimally invasive prosthodontics and patient-centered care.

Conclusion

Restoration of anterior guidance is fundamental for both functional efficiency and esthetic integrity in anterior rehabilitation. The two cases presented demonstrate that:

1. Accurate recording and transfer of anterior guidance through customized incisal guide tables ensure functional predictability.
2. Provisional restorations allow assessment of esthetics, phonetics, and occlusion, promoting patient adaptation before definitive rehabilitation.
3. Material selection should be individualized, balancing mechanical strength and esthetic demands.
4. Integration of digital workflows enhances precision, fit, and patient satisfaction.

Adhering to these principles can lead to long-term stability, optimal function, and improved patient-reported outcomes.

5. Author's Contributions

Dr. Vaidehi Kesaria-Writing original draft, Dr. Lavina Punyarthi-Data Acquisition, Dr. Prabhakar Angadi-Supervision, Dr. Ritesh Gandhe visualisation.

6. Patient Consent

In this study patient written and informed consent has been taken.

7. Source of Funding

None.

8. Conflict of Interest

None.

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