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Sculpting Anterior Guidance: A Customized Incisal Guidance Approach

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Abstract : *The establishment of anterior guidance represents a fundamental yet demanding component of comprehensive restorative treatment planning. When carefully designed, it is pivotal in achieving harmonious function, pleasing aesthetics, patient comfort, and optimal phonetics.*

This article describes the rehabilitation of a patient who sustained traumatic loss of the anterior teeth following a road traffic accident. The anterior guidance developed during the provisional phase was meticulously preserved through the use of a customized incisal guide table. This approach allowed for the precise transfer of established functional parameters to the definitive restorations, thereby ensuring accuracy, consistency, and a predictable clinical outcome.

Keywords: *Tooth avulsion, Anterior teeth, Aesthetic Rehabilitation, Customized Incisal Guidance table.*

I. INTRODUCTION

The establishment of functionally stable and biologically harmonious anterior guidance is a fundamental objective in restorative and prosthodontic rehabilitation. Anterior guidance governs mandibular excursive movements and plays a crucial role in achieving posterior disclusion, maintaining neuromuscular balance, ensuring temporomandibular joint stability, supporting phonetics, and enhancing aesthetic outcomes. Within the concept of mutually protected occlusion, the posterior teeth provide vertical support in maximum intercuspation, while the anterior teeth disengage the posterior dentition during protrusive and lateral movements, thereby minimizing potentially harmful horizontal forces on the posterior segments.[1]

The contour and angulation of the anterior teeth play a decisive role in determining the extent and pattern of posterior separation. A more pronounced anterior guidance typically results in increased posterior disclusion during excursive movements, whereas a shallower guidance tends to limit separation and may predispose to posterior interferences.[2] An excessively steep anterior guidance can lead to increased stress concentration on anterior restorations and their supporting periodontal tissues. Consequently, anterior guidance should be customized to the individual patient rather than determined arbitrarily using average articulator values.

Occlusal determinants are conventionally divided into fixed and adjustable components. Condylar guidance, determined by the anatomical configuration of the articular eminence and the temporomandibular joint, is regarded as a fixed determinant. In contrast,

anterior guidance is a variable factor that can be modified and refined to achieve harmony with the patient's functional mandibular movements.[3]

The interaction between these determinants defines the patient's envelope of function. Discrepancies between condylar inclination and anterior guidance may contribute to occlusal instability, abnormal wear, muscle hyperactivity, and temporomandibular discomfort.[4]

Traditional mechanical articulators are equipped with standard incisal guide tables that fail to precisely replicate patient-specific excursive movements. By customizing the incisal guide table with auto polymerizing resin or composite materials, clinicians can accurately record and reproduce individualized protrusive and lateral pathways. This approach enhances laboratory accuracy, minimizes the need for intraoral adjustments, and contributes to the long-term success of restorative treatment.[5]

The customization of anterior guidance is especially essential in cases involving full-mouth rehabilitation, advanced attrition, changes in vertical dimension, and extensive anterior restorative treatments. In these complex clinical scenarios, the anterior teeth fulfil not only an aesthetic role but also function as key determinants of the occlusal scheme and the long-term stability of the treatment outcome.[6]

The present case report describes a clinical protocol for sculpting customized anterior guidance through modification of the incisal guide table, emphasizing functional harmony, posterior disclusion, and improved restorative predictability.

II. CASE REPORT

A 47-year-old patient presented to the Department of Prosthodontics and Crown & Bridge with a history of tooth loss secondary to poor oral hygiene and compromised periodontal health. His primary concern was the replacement of missing teeth due to the resulting unesthetic appearance. The patient's medical history was non-contributory. A review of his dental history revealed that he had sought dental treatment eight months prior for restorations of the mandibular anterior teeth and extraction of several maxillary and mandibular anterior teeth due to mobility.

Intraoral examination revealed generalized attrition, along with existing restorations with respect to 32 and 33. The teeth 11, 12, 21, 22, 31, 41, and 42 were missing. Root stumps

Figure.1. Intraoral view

were present with respect to 36, and 46 was found to be carious (Figure 1).

The patient was advised to undergo root canal treatment with respect to 12, 13, 23, 32, and 43. Primary impressions were made, and diagnostic casts were poured (Figure 2). Upon

recording the tentative jaw relation, it was determined that there was no requirement for an increase in the vertical dimension.

Figure.2. Maxillary and Mandibular primary casts

A facebow transfer was performed, and the casts were mounted on a semi-adjustable articulator. A diagnostic mock-up was subsequently carried out to establish anterior guidance that ensured disclusion of the posterior teeth during all eccentric movements.

Following this, tooth preparation was completed with respect to 12, 13, 23, 32, and 43. Provisional restorations were fabricated, finished, polished, and cemented using a non-eugenol temporary cement (Protemp II, 3M ESPE) to facilitate easy removal during subsequent appointments (Figure 3). The patient was maintained on these provisional restorations for a period of two weeks to assess aesthetics, phonetics, and functional efficiency, particularly in relation to the newly established anterior guidance.

Figure-3 PROVISIONAL

A few days following cementation of the restorations, the patient was recalled to assess comfort and satisfaction with the aesthetic outcome. At the follow-up visit, the accuracy of the occlusion was carefully evaluated and verified.

Maxillary and mandibular impressions were then made along with records of the provisional restorations, and the casts were mounted after performing a facebow transfer. A

customized anterior guide was fabricated using auto-polymerizing acrylic resin to accurately communicate the established anterior guidance to the laboratory technician (Figure 4).

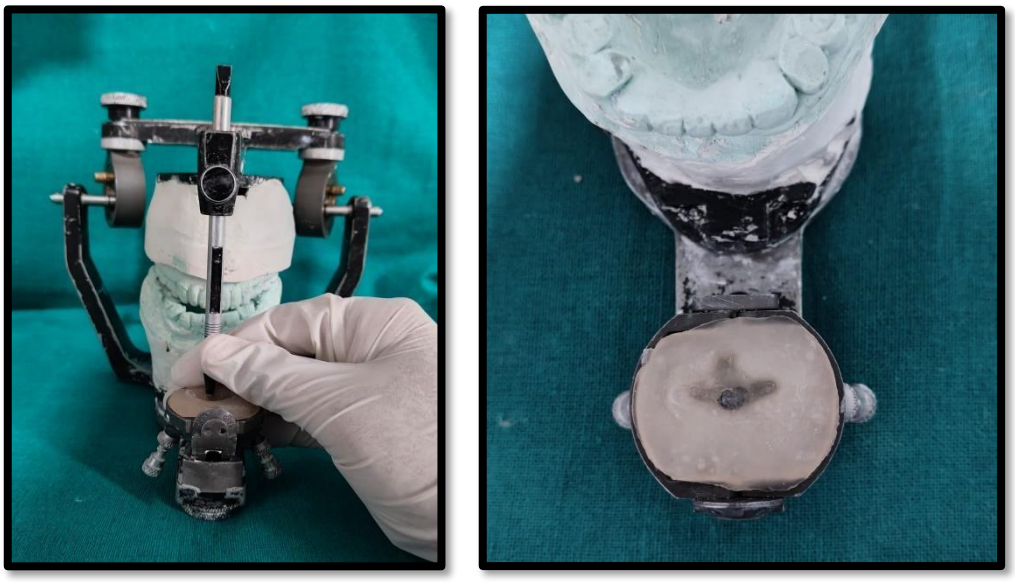

Figure.4. Customised Incisal Guidance

Final impressions were obtained, and intraoral scanning (3Shape IOS) was performed for digital smile designing and fabrication of the definitive prosthesis (Figure 5).
A new mandibular cast incorporating the prepared abutments was mounted on the lower member of the articulator, and the final mandibular restorations were fabricated accordingly. Subsequently, the maxillary cast was replaced with a new cast featuring the prepared maxillary abutments, and the definitive maxillary restorations were fabricated. The final restorations were then cemented (Figure 6).

Figure.5. Digital Smile Designing using 3-Shape Software

Figure.6. Postoperative View

OUTCOME AND FOLLOW-UP

The patient was reviewed at regular follow-up intervals to monitor function, occlusion, and overall oral health. At each visit, the prosthesis demonstrated satisfactory clinical performance. The patient expressed high satisfaction with the aesthetic outcome and reported improved confidence. Additionally, he adhered diligently to the prescribed oral hygiene regimen, contributing to a favourable prognosis.

III. DISCUSSION

The effective rehabilitation of anterior tooth loss demands a thorough understanding of occlusal concepts, functional biomechanics, and aesthetic principles. In the present case, the treatment objective extended beyond simply replacing the missing anterior teeth; it focused on re-establishing a stable, patient-specific anterior guidance that would function in harmony with the individual's condylar guidance and neuromuscular system.

Anterior guidance functions as a protective component within a mutually protected occlusal scheme, steering mandibular movements and facilitating posterior disclusion during protrusive and lateral excursions. Loss or severe wear of the anterior teeth disrupts this protective mechanism, which may lead to posterior interferences, progressive occlusal wear, increased muscular activity, and possible temporomandibular discomfort.[7] The reconstruction of anterior guidance must therefore be approached systematically, ensuring that functional parameters are first validated in provisional restorations before being transferred to definitive prostheses.

The provisional phase in this case played a critical diagnostic and therapeutic role. Literature emphasizes that provisional restorations should serve as a functional blueprint for definitive treatment, particularly in cases involving occlusal reorganization.[8] By maintaining the patient on provisional restorations for a trial period, aesthetics, phonetics, envelope of function, and posterior disclusion were carefully evaluated and refined. This reversible phase minimizes biological and mechanical risks while allowing neuromuscular adaptation to the newly established occlusal scheme.

A key aspect of this clinical protocol was the fabrication of a customized incisal guide table. Conventional articulators equipped with flat or standard guide tables fail to reproduce patient-specific excursive pathways, potentially leading to discrepancies between laboratory fabrication and intraoral function.[9] Customization using autopolymerizing resin allows

precise recording of protrusive and lateral movements as developed intraorally. This ensures that the definitive restorations replicate the exact anterior guidance validated during the provisional phase, thereby reducing chairside adjustments and preserving the established occlusal harmony.

The relationship between anterior guidance and condylar inclination must also be considered carefully. According to occlusal principles, the steepness of anterior guidance should complement, rather than conflict with, the patient's condylar path to maintain posterior disclusion without generating excessive anterior loading.[10] An overly steep incisal path may increase stress concentration on anterior restorations and supporting structures, while an excessively shallow guidance may permit posterior interferences. In this case, the guidance was sculpted to achieve smooth anterior-protected articulation with consistent posterior separation during protrusive and lateral movements.

Digital workflows further enhanced the precision of treatment. The integration of intraoral scanning and digital smile design facilitated accurate communication between clinical and laboratory phases. Contemporary prosthodontics increasingly supports combining analog occlusal principles with digital technologies to improve accuracy, predictability, and efficiency.[11] However, despite technological advancements, the fundamental determinant of success remains sound occlusal planning and individualized functional analysis.

Long-term prognosis in such rehabilitations depends not only on restorative accuracy but also on patient compliance and periodontal stability. The patient's adherence to oral hygiene instructions and regular follow-up contributed significantly to maintaining the health of the supporting tissues and the stability of the prosthesis.

Overall, this case underscores that anterior guidance should never be arbitrarily determined using average articulator values. Instead, it must be sculpted based on patient-specific functional movements, validated provisionally, and accurately transferred using a customized incisal guide table. Such a structured and biologically oriented approach enhances functional harmony, minimizes mechanical complications, and ensures predictable restorative outcomes.

IV. CONCLUSION

This clinical report highlights the pivotal role of a customized incisal guidance table in the comprehensive rehabilitation of severely worn dentition. The precise establishment of anterior guidance using fixed dental restorations, combined with posterior rehabilitation guided by meticulous diagnosis and occlusal planning, contributed significantly to the overall treatment success. A systematic, evidence-based approach ensured functional harmony, aesthetic enhancement, and long-term stability.

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