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Case Report

A Functional Pathway: Mandibular Dynamics and Non-Rigid Connectors for Pier Abutment Solutions

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Abstract

The precise fabrication of cast prostheses that require minimal occlusal adjustment at the final seating is pivotal in prosthodontics, ensuring harmonious mandibular movement and preventing interference that can affect the stomatognathic and musculoskeletal systems. The functionally generated path (FGP) technique, established in the 1930s, allows for the customized creation of occlusal surfaces by utilizing the patient's natural mandibular movements. This technique surpasses traditional articulators in mimicking the comprehensive functionality of the stomatognathic system, thus facilitating better individual accommodation and prosthesis precision.

In the realm of fixed partial dentures (FPDs), connector type plays a critical role in the overall success and longevity of the prosthesis, especially in cases involving pier abutments. Rigid connectors, though commonly used, may not be suitable for scenarios where differential movement between abutments is necessary, as they can lead to stress concentration and prosthetic failure. Non-rigid connectors offer a viable alternative by acting as stress breakers that prevent excessive force transmission between segments, thereby protecting abutment teeth and enhancing prosthesis stability.

This study presents a clinical case involving a 32-year-old female who required a five-unit FPD for replacing a missing first premolar and first molar. The treatment incorporated a non-rigid connector on the distal aspect of the pier abutment and employed the FGP technique to capture functional mandibular movements in a successful prosthesis cementation with no post-insertion adjustments required.

The FGP approach mitigates occlusal discrepancies and enables corrections directly in the patient's mouth, promoting alignment between intraoral conditions and master dies. Conversely, challenges include the need for operator expertise, attention to detail, and appropriate occlusal relationships, with limitations arising from short clinical crowns, attrited teeth, and occlusal morphology abnormalities.

The comparative benefits of inlay wax over functional wax in occlusal path recording are noted, emphasizing reduced distortion and greater accuracy. The use of non-rigid connectors, as recommended

by experts such as Carl E. Misch, is crucial in distributing stress, preventing mesio-distal torque, and prolonging abutment life, despite potential drawbacks like additional laboratory time and increased cost. In conclusion, the successful rehabilitation of pier abutment cases hinges on the strategic use of non-rigid connectors and advanced occlusal recording techniques like the FGP method. These approaches minimize stress on abutments and reduce occlusal discrepancies, enhancing the longevity and function of FPDs.

While dental implants are an optimal solution in many cases, non-rigid connectors remain essential for patients with medical or financial constraints. Further long-term studies are recommended to validate these findings and optimize treatment protocols for complex prosthodontic cases.

Keywords

Functionally generated path; Pier abutment; Non-rigid connectors; Fixed partial dentures; Prosthodontic rehabilitation; Prosthodontic rehabilitation

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