


Case Report

Building back the bite: A case report on Digital–Analog fusion in full-mouth rehabilitation

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Abstract

Severe tooth wear and partial edentulism often result in loss of vertical dimension of occlusion (VDO), impaired mastication, aesthetic compromise, and temporomandibular joint complications. This case report describes the full-mouth rehabilitation of a 55-year-old male patient with generalized severe attrition and root stumps in relation to tooth 16, managed using the Pankey–Mann–Schuyler (PMS) technique. This systematic and sequential approach, integrating digital workflows with the PMS philosophy, resulted in restoration of function, aesthetics, and patient comfort, highlighting the effectiveness of phased full-mouth rehabilitation in cases of severe attrition and partial edentulism.

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1. Introduction

Severe tooth wear, or attrition, can significantly compromise mastication, esthetics, and overall oral comfort.¹ Excessive loss of tooth structure may result in a collapsed bite, temporomandibular joint dysfunction, and impaired facial harmony.² Full-mouth rehabilitation offers a comprehensive solution to restore occlusal stability, re-establish function, and enhance a patient's quality of life.³

Tooth wear combined with partial edentulism presents a frequent clinical challenge, often associated with loss of vertical dimension of occlusion, reduced masticatory efficiency, joint-related complications, and compromised esthetics.⁴ Successful rehabilitation in such cases requires a carefully planned approach that harmonizes function and appearance, with particular emphasis on vertical dimension, occlusal plane orientation, and centric relation.⁵

The Pankey–Mann–Schuyler (PMS) technique provides a systematic and sequential approach for restoring such complex cases.⁶ The sequence begins with the lower anterior teeth, followed by the upper anterior, lower posterior, and finally the upper posterior teeth, each evaluated, waxed-up,

and restored accordingly.⁷ This philosophy also incorporates the principles of the curve of Spee and the curve of Monson to achieve a harmonious occlusal scheme.⁸

This case report presented the functional and esthetic rehabilitation of a male patient who had suffered from generalized severe attrition and partial edentulism, which had been managed using the Pankey–Mann–Schuyler (PMS) technique for full-mouth rehabilitation.

2. Case Report

A 55-year-old male patient reported with the chief complaint of difficulty in chewing and compromised esthetics. His medical history was noncontributory. Extraoral examination revealed no facial or skeletal abnormalities, and temporomandibular joint assessment showed normal coordination without deviation or crepitus (**Figure 1**).

Intraoral examination revealed generalized attrition, root stumps with respect to tooth 16, and severe tooth wear (**Figure 2**). The patient reported a history of progressive tooth wear spanning more than 10 years. An interocclusal rest space of 6 mm was recorded. Diagnostic impressions were

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obtained, and orientation jaw relation records (**Figure 3**) and bite registration were completed using Aluwax.

The diagnostic casts were mounted on a semi-adjustable articulator (Hanau Wide-View) using a facebow transfer, with the vertical dimension increased by 4 mm anteriorly (**Figure 4**). The Broadrick flag was used to determine the occlusal plane, facilitating harmonious development of the Curve of Spee and Curve of Wilson in relation to condylar guidance.



Figure 1: Pre-operative extraoral view



Figure 2: Pre-operative intraoral view



Figure 3: Lucia jig

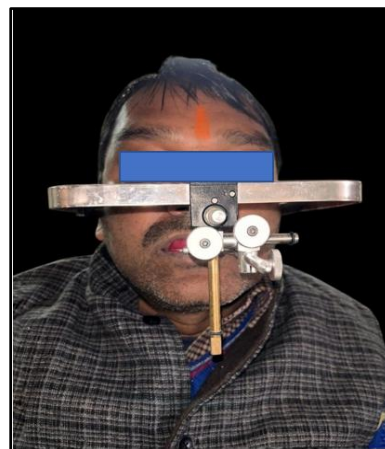


Figure 4: Facebow record

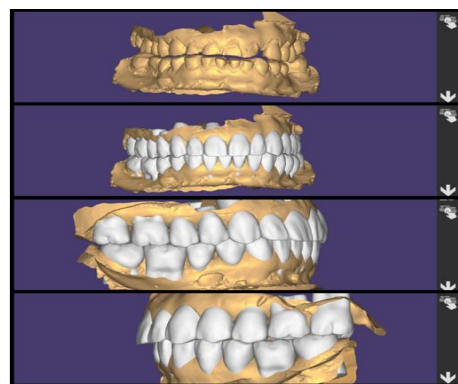


Figure 5: Digital mockup design



Figure 6: Temporization



Figure 7: Final prosthesis of anterior six teeth in the maxilla and mandible.



Figure 8: Final prosthesis after 1 Month follow-up

The diagnostic casts and wax-up were digitally scanned for prosthesis design. The wax-up-guided occlusal plane orientation was used to design the temporary teeth in Exocad software (**Figure 5**). A digital mock-up was subsequently 3D printed, and snap-on provisional prostheses were fabricated to evaluate esthetics and functional adaptation at the increased OVD (**Figure 6**). The patient was instructed to wear the snap-on prostheses for three weeks. Unlike conventional occlusal splints, this design permitted normal function, including mastication, while remaining easily removable in case of discomfort. After 21 days, the patient reported no discomfort or TMJ-related symptoms; therefore, the snap-on prostheses were continued as provisional restorations.

Tooth 16 (root stumps) was extracted, and prosthetic rehabilitation was carried out in phases. The mandibular and maxillary anterior teeth were prepared first, with posterior provisionals maintained to preserve the vertical dimension. After one week, a metal try-in was performed, and the anterior restorations were cemented (**Figure 7**). The posterior segments were then prepared sequentially, temporized, and definitively restored, with final cementation carried out using glass ionomer cement (**Figure 8**).

3. Discussion

Full-mouth rehabilitation (FMR) is a highly complex treatment modality that aims to re-establish function, esthetics, and occlusal harmony in patients with severe tooth wear and partial edentulism. A diagnostic wax-up serves as a valuable tool in such cases, as it allows three-dimensional evaluation of proposed changes and provides a visual and functional preview of the final treatment outcome.⁹

The complexity of FMR often necessitates a multidisciplinary approach involving prosthodontists, periodontists, orthodontists, endodontists, and oral surgeons.¹⁰ This collaborative strategy ensures comprehensive management of underlying etiological factors while achieving a harmonious occlusion and stable esthetic result.¹¹ Central to success is the establishment of an occlusal scheme that supports function, distributes occlusal forces evenly, and minimizes stress on the temporomandibular joint.¹² Equal emphasis must also be placed on preserving the biological width, ensuring periodontal health, and maintaining pulpal vitality during extensive restorative

procedures.¹³ Advances in digital dentistry—such as CAD/CAM technology, virtual articulators, and 3D printing—have further enhanced precision, predictability, and patient comfort in FMR.¹⁴ Additionally, the use of interim prostheses to evaluate esthetics, phonetics, and vertical dimension of occlusion plays a crucial role in treatment planning and patient adaptation. A systematic, phased approach that integrates biological, mechanical, functional, and esthetic considerations is therefore indispensable for long-term success and patient satisfaction.

Tooth wear and partial edentulism often lead to collapse of the vertical dimension of occlusion (VDO), altered occlusal plane, and esthetic compromise.⁴ Abnormalities in the occlusal plane can arise from supra-eruption, drifting, or rotation of the remaining teeth, and correcting these discrepancies is critical to restoring function and esthetics. The Broadrick flag method, employed in this case, allowed accurate determination of the occlusal plane and harmonization with condylar guidance.

In the present case, the VDO was increased by 4 mm anteriorly, which was verified through the use of 3D-printed snap-on provisional prostheses. Unlike conventional occlusal splints, these provisionals allowed the patient to perform normal functional activities, including mastication, while also serving as a trial for neuromuscular adaptation. The patient reported no discomfort or TMJ-related symptoms after three weeks of use, confirming tolerance of the new VDO.

Definitive prosthetic rehabilitation was carried out in a phased manner following the principles of the Pankey–Mann–Schuyler technique. Sequential restoration of the mandibular and maxillary anterior teeth, followed by posterior segments, ensured preservation of the vertical dimension throughout the treatment. Fixed metal–ceramic restorations were cemented using glass ionomer cement, providing optimal retention and biocompatibility.

This systematic approach resulted in improved esthetics, restoration of masticatory efficiency, and maintenance of joint health. Over a 6-month follow-up period, the patient remained asymptomatic and satisfied with the treatment outcome, demonstrating the effectiveness of phased full-mouth rehabilitation in cases of severe attrition and partial edentulism.

4. Conclusion

Full-mouth rehabilitation in patients with generalized attrition and partial edentulism is a complex but rewarding procedure that requires meticulous diagnosis, careful treatment planning, and a sequential approach. The Pankey–Mann–Schuyler technique, combined with digital tools such as CAD/CAM design and 3D-printed provisional prostheses, provides predictable outcomes by restoring vertical dimension, function, and esthetics. This case highlights that

a phased rehabilitation protocol can achieve long-term comfort, functional stability, and patient satisfaction.

5. Source of Funding

None.

6. Conflict of Interest

None.

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