

Full mouth rehabilitation of a severely worn out dentition to functional harmony

Clinical Report

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ABSTRACT

Patients with severe tooth wear may require extensive restorative procedure to achieve appropriate function, esthetics, and comfort. Occlusal rehabilitation requires a correlation of biologic factors, mechanical principles, and esthetic requirements with treatment procedures. A combination of new generation materials, along with improved clinical procedures, works in tandem to produce an esthetic, long-lasting, and functional outcome, satisfying both the clinician as well as the patient. This clinical report describes the full mouth rehabilitation of a severely worn out dentition in functional harmony with the stomatognathic system. Twin-stage procedure was adopted to produce definite amount of disocclusion during eccentric movements.

KEY WORDS: Anterior guidance, centric relation occlusion, disocclusion, effective cusp angle

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INTRODUCTION

Restorative dentistry has created new dimensions in providing esthetic and functional rehabilitation for patients with severely worn out dentition. A combination of new generation materials, along with improved clinical procedures, works in tandem to produce an esthetic, long-lasting, and functional outcome, satisfying both the clinician as well as the patient. This clinical report demonstrates successful multidisciplinary approach to a full mouth rehabilitation of a patient whose dentition has been esthetically and functionally compromised.

CASE REPORT

Case history

A healthy 49-year-old male patient reported to the Department of Prosthetic Dentistry, A. B. Shetty Memorial Institute of Dental Sciences, Mangalore, with a chief complaint of unpleasant smile, generalized sensitivity, and difficulty in chewing. The patient gave a medical history of mild hypertension and gastric

regurgitation. The patient's dental history indicated periodic dental examinations; oral prophylaxis; extractions of 36, 45, and 46; and restorations. The patient denied any symptoms of temporomandibular joint disorder or myofascial pain dysfunction.

Clinical findings: *Extraoral findings:* The patient had no facial asymmetry, or muscle tenderness. Mandibular range of motion was within normal limits. The temporomandibular joints, the muscles of mastication, and facial expression were asymptomatic. *Intraoral findings:* The maxillary arch was fully dentate. The mandibular arch was partially dentate, with teeth 36, 45, and 46 missing. No gross abnormalities were detected in the overall soft tissue of the lips, cheeks, tongue, oral mucosa, and pharynx. Generalized attrition, abrasion, and erosion were noted. Glass ionomer restorations were present on 14, 15, 25, 32, and 36. Decay was noted on 16, 27, 47; and only root stumps of 44, 45 were seen. Teeth 11 and 21 had undergone root canal treatment with post core and metal crowns with acrylic facings.

Occlusal findings: The patient presented with a

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bilateral class I molar and canine relationship. The patient demonstrated a slide from centric relation to maximum intercuspation. The patient's lateral excursions showed balanced occlusion. The incisal edges glided along the palatal surfaces of maxillary anteriors during protrusion, along with posterior teeth interference. Freeway space of 2 mm was recorded. The patient was comfortable with the existing vertical dimension of occlusion. There was a high smile line with moderate gingival display of 2 mm. Maxillary midline was 1.5 mm to the right of the midfacial vertical plane, and mandibular midline was 1 mm to the left of the midfacial vertical plane.

Treatment goals

- To rehabilitate the entire severely worn out dentition in functional harmony with the stomatognathic system.
- Full coverage metal crowns with porcelain facings.
- Centric relation occlusion with maximum number of tooth contacts with no change in vertical dimension.
- To develop a mutually protected occlusion.
- Twin-stage procedure to produce definite amount of disocclusion during eccentric movements.

Treatment procedure

1. The patient received oral prophylaxis, periodontal therapy, and oral hygiene instructions. Proper tooth brushing and flossing was re-emphasized, and the patient was called for reevaluation.
2. The patient was advised extracting of root stumps of 44, 45.
3. The patient was advised to undergo pulp space therapy for 14, 31, 32, 33, 41, and 42.
4. Maxillary and mandibular impressions were made and diagnostic casts were obtained. Maxillary cast was mounted using a earpiece face bow (Hanau Springbow, no. 0103280) onto a Hanau arcon articulator (ALL 182/183 Wide-View Series, Waterpik, USA) and mandibular cast mounted using inter-occlusal Aluwax (Aluwax Dental Products, Michigan, USA) record. Anterior wax-up was done to proper size, shape, and contour. Mandibular posterior occlusal plane was analyzed using occlusal plane analyzer. On analysis, all mandibular teeth followed the curve of spee. Maxillary left first molar was supra-erupted due to absence of opposing teeth, which required occlusal correction.

Maxillary occlusal wax-up was done to maximum intercuspation. Anterior wax-up was checked for proper anterior guidance to achieve disocclusion in eccentric movements.

5. Tooth preparations for full coverage metal ceramic crowns were completed for the entire dentition. A final full-arch impression for maxillary and mandibular teeth was made using polyvinyl siloxane (Aquasil, Dentsply, Detrey, Germany) impression material with double-mix single-impression technique; and casts were poured in die stone (Kalrock; Kalabhai Pvt. Ltd., Mumbai, India), which was later secured to a die lock tray. This assembly was mounted on a Hanau arcon articulator using a face bow (Hanau Springbow) and centric inter-occlusal record made in Aluwax at previously determined vertical dimension. Provisional restorations were made from the diagnostic wax-up template with autopolymerizing acrylic resin, and esthetics and occlusion were evaluated. Provisional crowns were then cemented with zinc oxide non-eugenol (Rely X™, 3M ESPE, Germany) provisional cement.
6. Articulator was programmed to condition I of twin-stage procedure (as in Table 1), and posterior teeth wax build-up was completed to achieve balanced articulation, which helped in achieving a standard effective cusp angle of 25°. [1] Then, anterior wax build-up was carried out after the values had been adjusted to condition II of twin-stage procedure [Table 1] to achieve an incisal guidance of 40°, which produced a standard amount of disocclusion. [1]
7. All the wax patterns were cast, and all metal units were tried-in and adjusted as needed for proximal contact and occlusion. Definite restorations with porcelain fused to metal crowns exhibiting a vital and a natural appearance with proper contour, shade, and optimal incisal translucency were designed. Permanent cementation was done with glass ionomer type I (GC GoldLabel, GC Corp., Tokyo) luting cement. Oral hygiene instructions were reviewed, emphasizing brushing habits and the use of floss threaders and dental floss.

DISCUSSION

The treatment goal was to provide proper restorative treatment — to restore the centric relation occlusion, eliminate posterior interferences, restore the worn

Table 1: Articulator adjustment values for the twin-stage procedure (deg)

Condition	Condylar path		Anterior guide table	
	Sagittal condylar path inclination	Bennett angle	Sagittal inclination	Lateral wing angle
Condition 1: without anterior teeth	25	15	25	10
condition 2: with anterior teeth	40	15	45	20

out surfaces to enhance mastication, and to improve the esthetic appearance. D'Amico stated that cuspid-protected occlusion and disocclusion were natural adaptations for preventing destructive occlusion.^[2] Stuart and Stallard in 1957 proposed the scheme of mutually protected occlusion, which has been widely accepted today.^[3]

Hobo and Takayama studied the influence of condylar path, incisal path, and the cusp angle on the amount of disocclusion. They concluded that cusp angle was the most reliable and was used as a new determinant of occlusion.^[1] Twin-stage procedure proposed by Hobo

and Takayama was adopted for wax build-up because studies have proved that it is possible to accurately control the amount of disocclusion on the restoration without measuring the condylar path.^[4] Twin-stage procedure helps in achieving a standard disocclusion of 1 mm on protrusion, 1 mm on nonworking side, and 0.5 mm on working side in eccentric movements at 3-mm protrusion from centric relation. Returning condyle path always passed above the eccentric condyle path in sagittal plane. This procedure also aimed in achieving disocclusion in both eccentric path and returning path.^[5]

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