



## RESEARCH ARTICLE

### REHABILITATION OF A PATIENT WITH SEVERE ANTERIOR DISCOLORATION ALONG WITH WORN OUT DENTITION USING HOBOS TWIN STAGE TECHNIQUE

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#### ABSTRACT

Excessive occlusal wear can result in pulpal injury, occlusal disharmony, followed by functional and aesthetic deformity. Severe discoloration of anterior teeth causes esthetic concerns to the young patient. The collapse of posterior teeth also results in the loss of normal occlusal plane and in extreme cases, the reduction of the vertical dimension. This clinical report describes the use of the Hobo twin-stage procedure for rehabilitation of a patient with severe tooth wear along with anterior discoloration, resulting in poor aesthetic and functional condition.

**Key words:** Hobo twin stage, Worn out Dentition, Anterior Discoloration, Enamel Hypoplasia, full mouth rehabilitation.

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#### INTRODUCTION

Gradual tooth wear is normal phenomenon to human dentition, with time enamel layer gets eroded due to occlusal wear, Centric relation does not co inside with maximum inter cuspsation in maximum patients. Due to this discrepancy gradual wearing occurs. When this phenomenon is coupled with pathological tooth formation, situation gets worsened. Rapid tooth surface loss occurs, followed by reduced VDO and some times exposure of pulpal tissue.<sup>1</sup> Aforesaid condition needs to be managed by Full mouth rehabilitation which is a challenging treatment modality. It deals with restoration and reconstruction of the worn out dentition to maintain balance between temporomandibular joint, muscles of mastications, teeth and bones associated to orofacial region.<sup>2</sup> Prosthodontist decides to proceed for oral rehabilitation when patients presents with discolored teeth, attrition, erosion, broken teeth, developmental defects and worn out dentition.<sup>3</sup> Hobo's philosophy and Pankey Mann Schuyler (PMS) philosophy are generally used full mouth rehabilitations.<sup>4</sup> Pantograph and fully adjustable articulator is required to be used in PMS philosophy but condylar path is predetermined in Hobo's technique so there is no need to use previously mentioned instruments repeatedly. Therefore, the twin stage procedure is much simpler than the standard gnathological procedure yet it does not disobey gnathological principles. As condylar guidance is not treated as the main determinant of occlusion, this procedure is suitable for reconstructive work for patients with temporomandibular disorders. This philosophy can be incorporated easily with commonly used clinical techniques such as facebow transfer, various centric recording methods, and cusp-fossa waxing for restoration of occlusion.

There are few contraindications of this technique such as

1. Abnormal curve of Spee,

2. Abnormal curve of Wilson,
3. Abnormally rotated teeth,
4. Abnormally inclined teeth. This case report describes procedures of rehabilitation of a patient with moderately worn dentitions with decreased VDO. All-ceramic crowns in anterior tooth, PFM crowns in premolar region and metal crowns in molars have been provided to this patient for rehabilitation purpose to minimize the alteration in vertical dimension using the Hobo's twin stage technique. The patient's consent had been taken for publishing this case as scholarly article.

#### CASE REPORT

A 26-year-old female patient reported to department of prosthodontics and Crown & bridge, Burdwan Dental College and Hospital, with anterior severe discoloration and severely attrited posterior teeth. Her oral condition was diagnosed as congenital enamel hypoplasia, a pathological condition by the Department of oral pathology, Burdwan Dental College & Hospital. From clinical and radiographic examinations, it was revealed that severe tooth surface loss on the mandibular and maxillary posterior teeth and uneven occlusal surfaces along with anterior discoloration is causing unpleasant esthetic appearance to that patient (Figure-1).

Esthetic evaluation was done to patient. Findings are as follows

1. Symmetrical face with convex profile
2. Nasolabial angle less than 90°,
3. Facial midline coincides with dental midline,
4. Lips were symmetrical and competent with 30% mandibular teeth visible,
5. Lip length 18mm.

The vertical dimension was determined by Niswonger's Thomson's technique

1. Vertical dimension at occlusion (VDO) 56mm
2. Vertical dimension at rest (VDR) 60mm
3. Free way space of 4mm.

After obtaining written informed consent, treatment was carried out with diagnostic casts from primary impressions made with alginate (Tropicalgin, Zhermark, Rovigo, Italy).



**Figure 1. Pre operative condition**

Orientation jaw relation was taken using a face bow (Hanau spring bow) and centric relation was recorded by first using Lucia jig as deprogrammer for 30 minutes and then placing thumb on molars and rest of the fingers on lower borders of mandible antri guiding it to Centric position . These records were then transferred to a semi-adjustable articulator (Hanau Wide Vue) and casts were mounted. In the articulator VDO was increased by 2mm using the incisal guidance pin of the articulator to a new VDO of 58 mm. An occlusal splint was fabricated at the increased vertical dimension, using autopolymerising acrylic resin. The splint maintained uniform tooth contact only in centric relation (CR) and disocclusion of posterior teeth in an eccentric movement. After endodontic consultation the patient went through restorative treatment of 16, 17,26,27,34 36,37,48,47,46. The adaptation of this new increased VDO was evaluated for a period of one and half month using previously fabricated and adjusted occlusal splint, during this period, TMJ discomfort and muscle tenderness were not found. Diagnostic wax-up was done in the lab maintaining the VDO ie 58 mm on the mounted diagnostic cast. Putty index was then made on that waxed up model. Initial tooth preparation on 11,12,13,14,15, 17,21,22,23,23,24,25,26,31,32,33,34,35,41,42,43,44, 45,46 and 47 according to the requirement of placing allceramic, PFM or metal Crowns according to planning. After Impression was made with putty and light body and the cast was poured. Autopolymerizing Acrylic resin temporary crowns were fabricated using indirect method. Esthetics and phonetics were evaluated with the provisional fixed restorations prior to the cementation. After adjusting the provisional restoration, these were fixed with temporary luting cement (Freegenol Temporary Pack; GC Corp., Tokyo, Japan) over prepared teeth. Adaptation of these provisional restorations was evaluated after

three weeks. After which impressions were made using polyvinyl siloxane (Reprosil; Densply, USA). The maxillary cast was mounted with the face bow record and centric relation was recorded with the help of Lucia jig with the anterior provisional in place. The articulator was programmed to condition 1 of Hobo's twin stage procedure that requires condylar guidance and incisal guidance both are 25 degree.



**Figure 2. Posterior disocclusion in protrusion**



**Figure 3. lateral movent (Rt)**



**Figure 4. Occlusion in Centric relation**

Posterior wax-up was done in relation to the values of condition 1, ie cuspal angulation was kept in 25 degree (Hobo twin stage technique) after that articulator was reprogrammed in relation to condition 2 ie: anterior guidance to be set at 45 degree and condylar guidance at 40 degree.after that anterior wax up was done. Verification of posterior disocclusion in protrusive and laterotrusive movements the wax patterns was done in articulator and these patterns were sent for the fabrication of all ceramic restoration for anterior teeth, porcelain fused

to metal restoration for premolars and metal restoration for molars (Figure 2,3,4,5) after that crowns were cemented in mouth and minor adjustment has been done.



Figure 5. Left lateral movement

## DISCUSSION

Previously it was thought that condylar guidance is fixed and it cannot be altered or influenced. Anterior guidance was considered to be an adjustable component. McCollum and Stuart concluded from a study conducted on 10 patients that condylar guidance is dependent on the anterior guidance<sup>6</sup>. In prosthodontics, the condylar path has been considered the main determinant of occlusion. According to the twin-table technique by Hobo, the cusp shape factor and the angle of hinge rotation are derived from the condylar path.<sup>6</sup> These factors contribute to the determination of an ideal anterior guidance. However, in the twin-stage procedure, the cusp angle was considered as the most reliable determinant of occlusion. This was according to the proven data from studies that the cusp angle was four times more reliable than condylar and incisal paths<sup>7</sup>. In the twin-stage procedure, to provide disocclusion, the cusp angle should be shallower than the condylar path. To make a shallower cusp angle in a prosthesis, it is important to wax-up the occlusal morphology to produce balanced occlusion or articulation so that the occlusal cusp angle becomes parallel to the cusp path of opposing teeth during eccentric movements<sup>8</sup>.

Since anterior teeth help to produce disocclusion, anterior portion of cast causes an obstruction to dentist during waxing up the posterior occlusal morphology. In this conditional approach described by Hobo, a cast with a removable anterior segment is fabricated. Reproduction of the occlusal morphology of the posterior teeth is done without the anterior segment and a cusp angle coincident with the standard values of effective cusp angle is produced (referred to as "condition I").<sup>9</sup> Second, reproduction of the anterior morphology with the anterior segment is done and anterior guidance which produces a standard amount of disocclusion is provided (referred to as "condition II").<sup>9</sup>

The vertical dimension of occlusion (VDO) is maintained even after rapid wear because of compensatory alveolar process elongation by progressive remodeling of the alveolar bone.<sup>5</sup> It is important to establish the cause of wear before the intervention to help improve the effectiveness of any preventive and restorative care.<sup>8</sup> VD lost can be verified by a combination of various techniques such as phonetics, esthetics, interocclusal distance.<sup>2</sup>

In our case, approximately 4 mm of loss of VDO was established and the amount of bite raise to be achieved was evaluated using the "closest S - speaking space" and the amount of "Freeway space". According to Turner's category -2 excessive wear with moderate loss of VD, removable splint for 6-8 weeks with minimally increased VD should be given to the patient followed by fixed provisional restoration for 2-3 weeks before planning permanent restoration.<sup>3</sup> As suggested by Dawson, we have tried to minimize the alteration of VD using metal posterior crowns and stabilization of occlusion using heat-cured provisional restoration for a 3 weeks<sup>5</sup>. Thus, full mouth rehabilitation is a challenging procedure involving complicated clinical and laboratory steps. The twin stage technique formulated by Hobo and Takayama reproduces disocclusion and anterior guidance more precisely and scientifically. In this case we have utilized the same procedure to achieve targeted esthetics and function.

## CONCLUSION

By understanding the individual risk factors both esthetically and functionally, a treatment plan was designed to minimize any additional risk to the remaining dentition. Correct diagnosis and a systematic phase wise approach are of utmost importance in full-mouth rehabilitation. The maintenance of severe wear cases can be ensured by the development of proper cuspal angulation and anterior guidance that allows for posterior disocclusion within the patient's envelope of function. Taking this guidance into account during temporization ensures minimal adjustments in the definitive restorations and a greater long-term predictability and better prognosis of the case.

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