



Case Report

Full-Mouth Rehabilitation of a Patient with Bruxism Using Hobo's Twin-Tables Technique – A Case Report

Dr. Gita Rani¹ and Dr. Amarjeet Gambhir^{2*}

¹Associate Professor, Department of Prosthodontics, Christian Dental College, Ludhiana, Punjab, India

²Assistant Professor, Department of Dental & Oral Maxillofacial Surgery, Lady Hardinge Medical College & Hospital, New Delhi, India

*Corresponding Author

Dr. Amarjeet Gambhir

Email: amarjeetgambhir@gmail.com

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Abstract: Complete mouth rehabilitation is a dynamic functional problem, and embodies the correlation and integration of all component parts into one functioning unit. A variety of techniques have been suggested in the literature for full mouth rehabilitation. Some advocate simultaneous restoration of arches; others suggest complete restoration of individual quadrants in a programmed sequence before proceeding to the next. This case report describes the rehabilitation of a mutilated dentition using twin-tables technique introduced by Sumiya Hobo. This technique ensures a restoration with a predictable posterior disclusion and anterior guidance in harmony with the condylar path thus maintaining the harmony of the stomatognathic system.

Keywords: Twin-tables, full mouth rehabilitation, posterior disclusion, anterior guidance.

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INTRODUCTION

Reconstructing dental arches with severe attrition is a distinct restorative challenge. The problem is heightened by widely divergent views concerning appropriate procedures for successful treatment (Schweitzer, J. M. 1981; Schweitzer, J. M. 1981; Goldman, I. 1952; Bronstein, B. R. 1954; Schweitzer, J. M. 1961; Turner, K. A., & Missirlian, D. M. 1984).

Though the treatment of these patients can be complex, there are some important principles applicable in most cases. The guidance provided by the lingual surfaces of the maxillary incisors during protrusive movement is called incisal guidance. The condylar guidance is the "path travelled by the mandibular condyle in the temporomandibular joint during various mandibular movements". The anterior guidance should be steeper than the condylar guidance for posterior teeth to be separated during the protrusive movement. To minimize these harmful horizontal occlusal forces during mandibular eccentric movements, the concept of molar disclusion was introduced, which involves "separation of opposing teeth during eccentric movements of the mandible". Shoosan (1964) and Scott (1964) stated that during lateral movement, the molars should disocclude more than 0.5 mm between maxillary and mandibular posterior teeth on non-working side. Thomas (1965) stated that when maxillary and mandibular cuspid have tip to tip relation during lateral movement, the molars should disocclude 1.0 mm. Hobo and Takayama (1993) derived standard values for the amount of disocclusion as 1.0 mm during protrusive movement, 1.0 mm on the non-working side and 0.5mm on the working side during lateral movements.

This article describes the method of creating molar disclusion using Hobo's twin-tables technique (Hobo, S. 1991;

Hobo, S. 1991). It presents a practical method of establishing the anterior guidance from the condylar path thus forming an occlusal scheme which reduces the vulnerability of the posterior teeth to wear and also maintains the harmony of the stomatognathic system.

CASE REPORT

A 70 year old female patient reported to the Department of Prosthodontics, Christian Dental College, and Ludhiana complaining of chipped, cracked and extremely worn teeth. Another area of concern was the sensitivity and continuous grinding of teeth during night.

Clinical Findings

Extra-oral examination: There was no deviation in path of closure or condylar displacement from rest position to the physical contact position of the teeth. A study of the temporomandibular joint positions relative to the occlusal pattern revealed no abnormality.

Intra-oral examination: She had all permanent teeth present except 22 and gold crown on 37. All the teeth showed yellowish brown discoloration. The molars were severely attrited, the enamel layer was very thin and cuspal structure was completely absent (Figure 1). The patient's occlusal vertical dimension and rest vertical dimension were assessed. The freeway space had increased because of attrition of posterior teeth.



Figure 1: Pre-operative intraoral view

A diagnostic mock up was subsequently prepared and shown to her.

Goals of Treatment

- To achieve the best possible esthetics
- To increase the vertical dimension of occlusion
- Restoration of the masticatory function and reduction of hypersensitivity of attrited teeth
- To achieve the organized occlusion by coordinated occlusal contact of maximum number of teeth when the mandible is in centric relation, canine guidance in lateral excursions, disclusion by anterior guidance of all the posterior teeth in protrusion, and heavier posterior teeth contact than anterior teeth in upright position

Clinical Procedure

1. Complete maxillary and mandibular arch impressions were made using irreversible hydrocolloid (Zelgan 2002; Dust free Alginate, Dentsply DeTrey GmbH, Konstanz, Germany).
2. Diagnostic casts were fabricated from type 3 dental stone (Lab stone; Kalabhai Karson, Mumbai, India) and mounted on a semi-adjustable articulator (JP 30 Gnathus articulator) using a face bow transfer (JP 30 Gnathus facebow) and centric relation record using base plate wax [Modeling wax; Hindustan company, Hyderabad, India].
3. Occlusal splint was fabricated and provided for a period of 4 weeks with increase in the vertical dimension of occlusion by 2 mm using Phonetics and Niswonger's technique.
4. Hobo's twin-tables philosophy of complete occlusal rehabilitation was followed wherein two incisal tables were used, initially to harmonize cusp shape to condylar path (incisal table without disclusion) and then to create predetermined disclusion in eccentric movement (incisal table with disclusion)^[5,6].

Incisal Table without Disclusion

The study casts were initially prepared by making the anterior portion of the maxillary cast removable with the dowel pins (Figure 2). The anterior portion was subsequently removed to eliminate the effects of the anterior guidance. The cusp shape factor of disclusion was incorporated by making the maxillary and mandibular casts interdigitate evenly during the eccentric movement. Chemical-cure acrylic resin was placed in the dough stage on the flat incisal table, and the resin was molded by moving the incisal pin through protrusive and lateral movements (Figure 3). A second incisal table was prepared identically.



Figure 2: Anterior portion of the maxillary cast made removable with dowel pins



Figure 3: Incisal table without disclusion

Incisal Table with Disclusion

For disclusion to occur, the anterior guidance should be made steeper than the condylar path. This incisal table incorporates the pre-determined degree of disclusion.

To produce the average disclusion during the *protrusive movement* of the mandible (using the second incisal table without disclusion), two 3mm thick plastic spacers were inserted behind the right and left condyles on the articulator and a vinyl sheet 1.1mm thick was applied to the mesiobuccal cusp tips of right and left mandibular first molars, and the articulator was closed. Clear acrylic was used to form the cone which marks the three-dimensional position of the tip of the incisal pin at a 3mm protrusive movement with 1.1mm molar disclusion.

To ensure the average disclusion during the *lateral movement*, a 3mm thick plastic spacer was placed behind one of the condyles and 1mm thick vinyl sheet was positioned on the tip of the mesiobuccal cusp of the mandibular first molar on the non working side and a sheet of 0.5 mm on the working side. A resin cone was again inserted between the incisal pole and the incisal table.

The three cones were connected with chemical cured acrylic resin to make walls between the cones. This results in a molded surface that is one continuous concavity from the area where the incisal pin contacts in centric relation to all the eccentric movements (Figure 4).



Figure 4 : Incisal table with disclusion

1. Maxillary and mandibular posterior teeth were prepared to receive full ceramic crowns.
2. Definitive impressions of the prepared maxillary and mandibular posterior teeth were obtained using polyvinylsiloxane impression material using putty wash technique (Reprosil; Dentsply India, Bangalore, India). Final casts were generated from type 4 die stone (Kalrock; Kalabhai karson PVT.LTD, Mumbai, India) and mounted on the articulator using inter-occlusal records. Metal copings were prepared and tried in the patient's mouth (Figure 5).
3. The fabrication of final restorations was done by removing the anterior segment and then placing the incisal table without disclusion and finishing the posterior wax up. The incisal table with disclusion was then used to fabricate the anterior wax up, thus providing the predetermined disclusion during the eccentric movements.
4. Ceramic build up using putty index of final wax up was completed.

5. Any occlusal corrections were carried out prior to glazing and the glazed crowns were cemented with resin cement (RelyX ARC Adhesive Resin Cement; 3M ESPE, USA). The outcome of the treatment in terms of function and esthetics satisfied the expectations of both the patient and the dentist (Figure 6 & Figure 7).
6. The patient was monitored at three months interval for one year and then once a year for check up with satisfactory results.



Figure 5: Metal copings



Figure 6: Post-operative intraoral view



Figure 7: Post-operative extraoral view

DISCUSSION

Full mouth rehabilitation combines the art of cosmetic dentistry with sound knowledge of principles of gnathology. A variety of techniques have been suggested in the literature for full mouth rehabilitation. Some advocate simultaneous restoration of arches while others suggest complete restoration of individual quadrants in a programmed sequence before proceeding to the next. However, the planning and co-relation between the condylar guidance and the anterior guidance should be established for co-ordinated functioning of the TMJ, muscles of mastication and occlusion.

In this article, Hobo's twin table's method was used to create a pre-determined harmonious disclusion with the condylar path. The three factors which determine the tooth contact during the eccentric movements are: condylar path, incisal path, and the cusp angle (Hobo, S., & Takayama, H. 1997). In normal occlusion, the incisal path should be steeper, and the cusp shape should be shallower than the condylar path (Schweitzer, J. M. 1961).

This article describes the practical method of establishing the anterior guidance from the condylar path. It

emphasized on *angle of hinge rotation* which is produced by the angular difference between the incisal path and the condylar path and the *cusp form* which is created by establishing the appropriate form of the posterior cusps aligned parallel to the condylar path. Thus both these factors contributed to the posterior disclusion which minimized the vulnerability of the restored posterior teeth should the anterior teeth wear after restoration and the guidance which they provide becomes less effective.

The experimental fact that the condylar path can be controlled by anterior guidance means the condylar path can be changed by altering occlusion. The occlusion is the cause and the condylar path is the effect. It means that if occlusion is improper, then the condylar path may adapt to it. As a result, an undesirable effect such as sagittal deviation of the working condylar path or immediate mandibular translation may occur. This can eventually lead to temporomandibular dysfunction. The mentioned technique can be utilized to prevent this by fabricating the restoration having ideal disocclusion, allowing the condyle to move as programmed by the articulator, hence preventing temporomandibular dysfunction and maintaining the stomatognathic system in good physiologic condition.

This occlusal scheme can also be applied in restoration with complete denture prosthesis, fabrication of a single crown, osseointegrated implants and fixed prosthesis.

CONCLUSION

The reconstruction of a severely mutilated dentition is a complex and demanding procedure representing a real challenge to the dentist. Proper diagnosis and multidisciplinary treatment planning with adequate knowledge and judgement are key factors for success. The present case report describes the full mouth rehabilitation of worn out dentition with Hobo's twin-table philosophy. This technique is relatively simple and does not need any sophisticated armamentarium. It can be easily adopted by clinicians to achieve more predictable outcomes.

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