

Replenishing The Function With Esthetics –Full Mouth Rehabilitation Using The Hobo Twin-Stage Procedure

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Abstract:

Restoration of the severely worn dentition is one of the most challenging procedures in dentistry. In order to successfully restore and maintain the teeth, one must gain insight into how the teeth arrived at this state of destruction. Gradual wear of the occlusal surfaces of teeth is a customary process during the life time of a patient but excessive occlusal wear can result in pulpal injury, occlusal disharmony, impaired function and aesthetic deformity. In this article we are presenting a case report of full mouth rehabilitation for a patient with severe tooth wear, resulting in reduced VDO by using Hobo Twin table technique.

Keywords: hobo technique, full mouth rehabilitation, tooth wear, fmr

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I. Introduction

Tooth wear can result from abrasion, attrition, and erosion [1-5]. Term attrition is derived from the Latin word attritum. It means to the action of rubbing against another surface. Research has shown that these wear mechanisms rarely act alone and there is nearly always a combination of the processes [1-5]. Evaluation and diagnosis should account for the patient's diet, history of eating and/or gastric disorders, along with the present state of the occlusion. Emphasis must be placed on the evaluation of occlusal prematurities preventing condylar seating into the centric relation position [6]. Behavioral factors that may contribute to parafunctional habits and/or nocturnal bruxism are also important to understand and manage in order to successfully restore and maintain a healthier dentition [7]. Once a complete understanding of the etiology of the dentition's present state is appreciated, a treatment plan can be formulated, taking into account the number of teeth to be treated, condylar position, space availability, the vertical dimension of occlusion (VDO), and the choice of restorative material [8]. In many cases, the VDO is maintained by tooth eruption and alveolar bone growth. As teeth are worn out, the alveolar bone undergoes an adaptive process and compensates for the loss of tooth structure to maintain the VDO. By changing VDO in bruxers puts a severe overload on the teeth and often results in the destruction of the restorations or of the teeth themselves [2,3]. Therefore, VDO of the patient CASE

II. Report

A 57-year old male patient reported to post graduate department of Prosthodontics of career institute of dental sciences and hospital, with chief complaint of difficulty in chewing food and sensitivity to hot and cold. Patient did not have any significant medical history and also didn't report any sign of Temporomandibular joint disorder and myofascial pain dysfunction.

There was no gross asymmetry and muscle tenderness seen on extraoral examination. The mandibular range of motion was within normal limits. On intraoral examination revealed that both the arches were fully dentate with severely worn anterior teeth and posterior teeth. Advanced abrasion and or erosion were present on many buccal surfaces of the canines and premolar teeth. The patient related a history that included clenching and grinding. After assessment it was found that approximately 3 mm loss of VDO. After patient consent, finally full mouth reconstruction with the HOBOTWIN twin-stage technique was planned. This technique establishes canine guided disocclusion during eccentric movements. This technique reconstructs the attrited dentition in functional harmony to the stomatognathic system. It was decided to increase of 3 mm of VDO and increase in bite was verified by using the "Closest S-speaking space" or the "Freeway space" technique (Fig. 1, 2).



Fig 1:-Preoperative Intraoral View with Splint

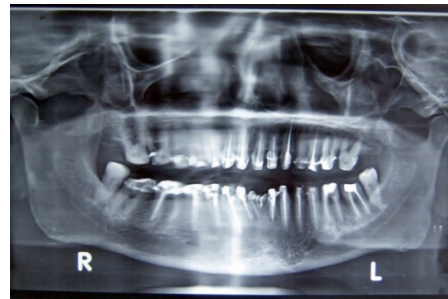


Fig. 2: pre-operative OPG

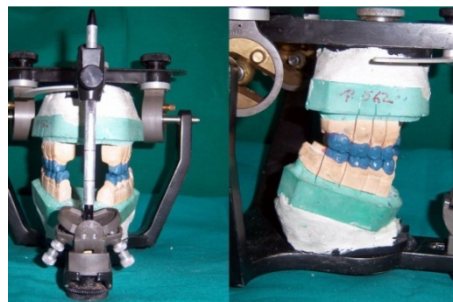


Fig. 3:Wax-up according to condition 1

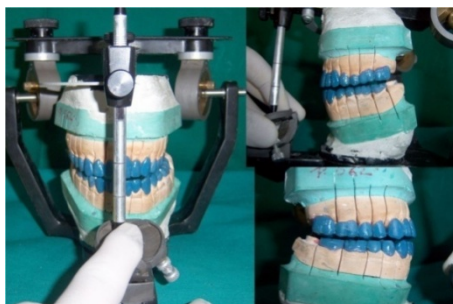


Fig 4:- Wax-up according to condition 2



Fig.5: Post Operative OPG



Fig.6: Post Operative Frontal View

III. Clinical Proceures:

1. An occlusal splint was provided to the patient as part of reversible interventional modalities to evaluate adaptation of the patient to altered VDO. The patient was kept in a diagnostic and observational period of 6 weeks before the definitive restorative phase of rehabilitation was started (Fig. 1).
2. The patient was comfortable with splint having no pain in TMJ and no muscle tenderness.
3. Again raised the incisal pin 1 mm and added a layer of clear auto –polymerizing resin so that we can raise the bite upto 3mm and recalled the patient after 6 weeks.
4. The occlusal splint was kept flat so that it could not restrict the centric and eccentric movements.
5. Impressions of maxillary and mandibular arches with reversible hydrocolloid material were taken first and diagnostic casts were obtained.
6. Maxillary diagnostic cast was mounted on semiadjustable articulator by facebow transfer and mandibular cast was mounted.
7. We raise the incisal pin 2 mm and made a occlusal splint with clear auto-polymerizing resin and closed the articulator so that we could get the indentation of maxillary teeth on splint.
8. Now diagnostic wax-up was done at the new VDO for posterior teeth without the anterior segment of maxillary cast in place. We set the condylar and incisal guidance according to condition 1 for producing standard effective cusp angle. At this position, the diagnostic wax-up was balanced in protrusive excursion and lateral excursions (Fig. 3).
9. Again we reset the condylar guidance and incisal guidance according to condition 2 and the wax-up was completed so as to generate posterior disocclusion (Fig. 4)
10. We made the sectional and complete putty index of waxed up maxillary and mandibular arch on cast.
11. The teeth were prepared and Stage I temporary restorations were fabricated chairside quadrant by quadrant during several appointments to minimize patient discomfort. The patient's VDO was maintained by using unprepared second molar teeth as occlusal vertical stops, which will be prepared later. Minimal occlusal reduction is indicated for patients scheduled for rehabilitation at an altered VDO .
12. The second molars were prepared and Stage II temporaries were fabricated using the putty index of the diagnostic wax-up(indirect technique) and cemented with ZnO non-eugenol cement and left for 3 weeks.
13. Once the patient is adapted with new VDO after cementing second stage full arch temporary restorations , a final full-arch impression for maxillary and mandibular teeth was made using poly (vinyl siloxane) impression material and casts were poured in die stone.
14. Die cutting and die ditching was done in both maxillary and mandibular cast.
15. Maxillary cast was mounted on semi adjustable articulator after face bow transfer.
16. Now, to transfer the vertical dimension and centric relation, temporaries were removed from both maxillary and mandibular left posterior region while the temporaries of right and anterior maxillary and mandibular region acted as a stop. Interocclusal recording material was injected between the left maxillary and mandibular prepared tooth. Likewise, the temporaries were removed from right maxillary and mandibular region while the temporaries were present in left an anterior region of both arches, interocclusal record was injected between the right maxillary and mandibular prepared tooth, and the same procedure was followed in the anterior region. The three segmental interocclusal records thus obtained were used to mount the mandibular cast.
17. It was decided to fabricate individual wax pattern for all teeth except bridge in relation to 41,31 and 32.
18. Final wax pattern was fabricated and occlusion buildup done according condition 1 and condition 2 .
19. Finally all wax patterns were cast and metal coping trial and shade selection were done.

20. After coping trial unglazed trial of all the pfm metal crowns and bridge were done to verify VDO, centric, esthetics and phonetics.
21. After glazing the PFM crowns were giving a vital and natural appearance with proper contour and shade.
22. Permanent cementation was done with GIC (3M ESPA) luting cement. Oral hygiene instructions were given and follow-up was carried out at regular intervals (Fig. 5,6)

CONDITION	CONDYLAR PATH SAGGITALBENNET ANGLE CONDYLAR PATH, INCLINATION		ANTERIOR GUIDE TABLE SAGGITAL LATTERAL INCLINATION WING ANGLE	
1	25	15	25	10
2	40	15	45	20

IV. Discussion

Full mouth rehabilitation is challenging and often involves complicated clinical and laboratory procedures. The success of treatment depends on diagnostic skills, perceptual treatment planning and by using more appropriate technique for rehabilitation. A critical aspect in treating such patients is to determine the occlusal vertical dimension and adopt a systematic approach that can lead to a proper predictable and favorable treatment prognosis[9-12]. There has been a conflicting opinion on whether to work simultaneously or work on different segments of the arch individually. Full mouth reconstructions involving full arch preparations, impressions, provisional restorations, and master casts are regarded as simultaneous reconstructions. Various techniques may be used in simultaneous constructions to obtain complete arch dies and mounted casts. These techniques assist in concomitant laboratory construction of the units. When all of the prepared teeth are on a single articulator, there is flexibility in developing the occlusal plane, occlusal theme, embrasures, crown contour and esthetics. But the disadvantages include arduous, unpredictable patient visits, full arch anesthesia, full arch chairside treatment restorations, multiple occlusal records, and possible loss of the vertical dimension of occlusion [13]. Fullmouth rehabilitation can be done by completing one quadrant before beginning with the other. The advantages of such an approach are that it is primarily chairside and includes preparation and final impressions of select teeth, maintenance of vertical dimension, quadrant anesthesia, and shorter appointments. The disadvantages include restrictions for achieving ideal occlusion when altering the vertical dimension, occlusal plane and embrasure development. The twin stage technique developed by Hobo and Takayama which reproduces disocclusion and anterior guidance more precisely and scientifically. It differs from the existing techniques of occlusal reconstruction and is based on scientific data and mathematical analyses of mandibular movement. In using the twinstage procedure the cusp angle is used as the main determinant of occlusion which accurately controls the amount of disocclusion on the restorations without measuring the condylar path. The average calibrations of condylar, lateral and incisal guidance and cusp angle provide an easy approach of management with lesser skills needed. Full mouth rehabilitation is a treatment modality which not only focuses on the esthetics and functional aspect of the dentition but also improves upon the health of the whole stomatognathic system. Full mouth rehabilitation involves the procedures necessary to produce healthy, esthetic, well functioning masticatory system [10]. Three prime requirements are healthy TMJ, harmonious anterior guidance and noninterfering posteriors [13]. These 3 factors are interrelated and any disharmony between these will affect the stomatognathic system. The diagnostic wax-up should always precede the treatment so as to decide on the appearance, to remove occlusal interferences and act as a predictor to the amount of tooth preparation that is required. Diagnostic wax-up is done to establish the desired esthetics, tooth contour, position of tooth, and occlusal plane. It also helps in fabrication of provisional restoration less time consuming. The anterior teeth are usually restored first so as to achieve functional and esthetically viable anterior guidance. Anterior guidance plays a very important role in full mouth rehabilitation following centric relation [3,13]. The anterior guidance forms the anterior control to provide posterior disclusion. The job of anterior guidance is to protect the posterior teeth from lateral or protrusive stresses. The facebow transfer is must to relate the anterior guidance with the opening and closing axis. It is required to reproduce the arc of closure from patient to the articulator. The three main things to be taken into consideration while replacing posterior teeth, are achieving posterior disclusion, establishing the plane of occlusion and deciding type of occlusal scheme. Disclusion refers to separation of the opposing teeth during eccentric movements of mandible, as reported by Christensen, D'Amico [13]. Posterior occlusion should have equal simultaneous contacts so that it does not interfere with either TMJ in the back or the anterior guidance in front. Deflective occlusal interferences should be removed. A proper plane of occlusion must permit disclusion of all teeth on the balancing side when mandible is moved laterally. The reconstruction of vertical dimension of occlusion should be done at the centric level and it should be acceptable for the patient at the neuromuscular level [12]. Turner in 1984 classified the treatment of a severely worn dentition by the amount of loss of VDO and available space to restore. His

classification and conventional treatment, which includes raising VDO with multiple crown lengthening procedure, have been widely used up to present. According to Pankeymann-Schuyler theory anterior guidance is first established followed by restoration of posterior teeth. Previously, the condylar path was the principle focus of attention for gnathologists, since it did not change during adulthood and the determination of anterior guidance remained the sole discretion of the dentist. Thus, anterior guidance and the condylar path were considered independent factors. According to Dawson, condylar path was not a determination of anterior guidance, and it did not matter whether the anterior path was flat, curved, concave, convex or parabolic, the rotating condyle sliding down the unchanged condylar path permits the lower anterior teeth to follow any number of path variations without interferences [4]. The contraindications of Hobo twin-stage procedures are [11]:

- Abnormal curve of Wilson
- Abnormal curve of spee
- Abnormally tilted teeth
- Abnormally rotated teeth.

V. Conclusion

Hobo twin-stage procedure has been discussed for rehabilitation of severely attrited teeth. The amount of disclusion of teeth is significantly controlled by condylar and incisal guidance. Full mouth rehabilitation is a treatment modality which not only focuses on the esthetics and functional aspect of the dentition but also improves upon the health of the stomatognathic system. A definitive diagnosis and treatment planning is necessary to achieve predictable success.

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