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Full Mouth Rehabilitation of Worn Out Dentition Using Pankey Mann Schuyler Philosophy – A Case Report

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Abstract

The art and science of restoring and developing form, function and aesthetics of a patient can be done by Prosthodontic rehabilitation. Rehabilitation of worn-out dentition not only restores functional and physiological harmony but also provides psychological contentment to the patient with comfort and satisfaction. Wearing of teeth is very common phenomenon and can occur due to mechanical or biochemical reasons. This case report describes treatment protocol for a 54-year-old female with severely worn-out dentition. Appropriate planning and analysis were done to restore the occlusion with fixed permanent restoration. Full mouth rehabilitation was done using Pankey Mann Schuyler philosophy. Anterior rehabilitation was carried out initially followed by occlusal plane analysis and posterior rehabilitation was done. Treatment plan also requires an interdisciplinary approach with surgical and endodontic therapies to achieve aesthetics and function leading to improved quality of life.

Keywords: full mouth rehabilitation, Pankey Mann Schuyler philosophy, worn-out dentition, occlusal plane analysis

Introduction

Depending on cause, tooth wearing can be classified as abrasion, erosion and attrition.[1] The wear of occlusal surfaces of natural teeth is a process that takes place during the lifetime of a person. In vivo research data shows that natural enamel wears about 30 µm/year or about 0.3 mm in 10 years.

Excessive wearing of dentition can however result in mutilated aesthetics, pulpal pathology, occlusal disfigurements and impaired function over time.[2] Wearing out of teeth causes loss of anterior guidance and loss of vertical dimension.[3] Rehabilitation of such cases need utmost care and comprehensive planning

employing various diagnostic, therapeutic and restorative play of action.

Prosthodontic considerations like analysis of the existing occlusion and occlusal plane, availability of freeway space, size and location of edentulous areas, number, position and condition of the existing teeth in each arch, the need for altering the vertical dimensions are needed to achieve favourable results.[4] However, the rehabilitation of the severely worn dentition is challenging when the space for restoration is not sufficient.

Multiple philosophies are documented and used for full mouth rehabilitation. The Pankey Mann Schyuler philosophy of full mouth rehabilitation has been used for the restoration of all teeth, which is the simple and effective means of achieving treatment objectives in a segmental manner. It aims at achieving the principles of occlusion advocated by Schuyler.[5,6] This case report demonstrates a successful approach to a functional full mouth rehabilitation of a worn out dentition.

Case Report

A 54 years old female patient reported to Department of Prosthodontics with chief complaint of difficulty in chewing food due to worn out dentition and requested crowns for root canal treated upper left anterior teeth wrt 21,22,23. Patient gives a history of areca nut betel leaf chewing from past twenty years. She had normal gait and built. Patient had no relevant medical history. On extra oral examination, face was symmetric with convex facial profile. TMJ had no clicking sound and showed no deviation from normal movement. Lymph nodes appeared normal on palpation. On intraoral examination revealed missing tooth wrt 43, root canal treated teeth wrt 21, 22, 23 and generalized loss of tooth structure that was greater in the maxillary left anterior and posterior teeth and mandibular premolars. (Fig.1a, b, c)

Diagnostic impressions, models and mounting was done to evaluate occlusion. Orthopantomograph (Fig.1d) and routine blood investigations were completed. On the basis of history, clinical findings and investigations a diagnosis of Generalized attrition with loss of vertical dimension (Turners and Missirlian Category-I).[2] Treatment plan was formulated with a multidisciplinary approach in various phases as follows:

1. Phase I – Oral hygiene instructions given and counselling was advised wrt habit history. Surgical extraction of hopeless teeth was done wrt 31, 37, 38, 47, and 48
2. Phase II – Endodontic treatment for exposed pulp canals was done wrt 25, 36, 45, 46, and 47
3. Phase III – Diagnostic mounting on a semi-adjustable articulator (Hanau™ Modular Articulator; Whip Mix) using a face-bow record. (Fig. 2)
4. Phase IV – Prosthetic phase – Full mouth rehabilitation using Pankey Mann Schuyler philosophy.

Figure 1: Pre-treatment: a) maxillary arch; b) mandibular arch; c) intraoral frontal view; d) OPG

Figure 2: Facebow transfer

Treatment Options

Various treatment options like full coverage porcelain veneered crown or full coverage zirconia for anteriors and full coverage metal, PFM or zirconia for posterior was informed to patient. Considering the edentulous areas, treatment options like removable partial denture, cast partial denture, implant supported fixed prosthesis were discussed with the patient. The patient was anxious about implant surgery, so this option was excluded. As there was clinical evidence of reduced VDO, full mouth rehabilitation with increasing VDO was planned and patient opted for full coverage PFM bridge.

Treatment Planning

After completion of phase I and phase II, Pankey Mann philosophy was employed for the prosthetic phase. According to this, treatment is divided into 4 stages.

Step 1: Examination, diagnosis, treatment planning and prognosis.

Step 2: Provisionalization and Harmonization of anterior guidance for the best possible esthetics, function and comfort followed by increase in vertical dimension.

Step 3: Selection of acceptable occlusal plane and restoration of lower posterior occlusion in harmony with anterior guidance in a manner that will not interfere with condylar guidance.

Step 4: Restoration of upper posterior occlusion using functionally generated path technique

After step 1, build up was done for insufficient tooth structure and tooth preparation of maxillary and mandibular anterior was done. Impression were made with PVS putty and light body for provisional crowns which were fabricated using auto polymerizing acrylic resin using indirect technique. There was a midline shift in the provisional crowns. So after harmonization of anterior guidance and correction of midline, permanent PFM restorations were given wrt maxillary and mandibular anterior teeth with 43 cantilever. Mid treatment OPG was taken for the record. (Fig: 3a, b, c, d, e)

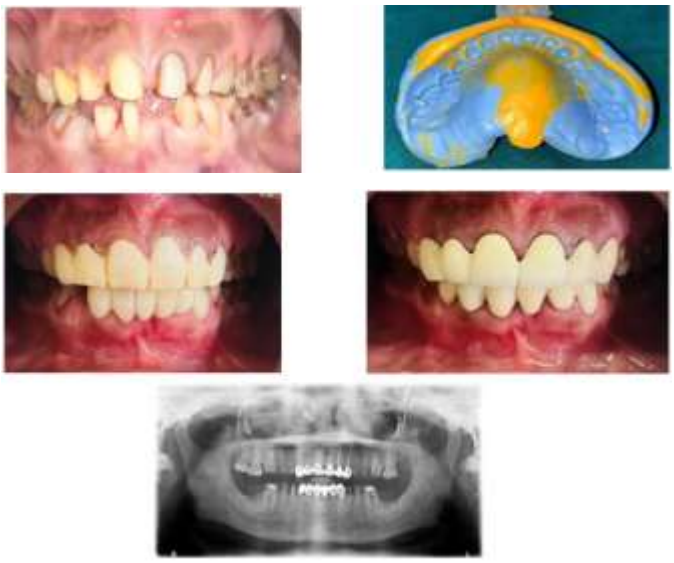

Figure 3: Mid-treatment: a) tooth buildup with preparation; b) PVS impression; c) anterior provisionalisation; d) anterior permanent restoration; e) OPG

Vertical dimension at rest was found to be 68 mm by using facial measurements after swallowing and relaxing and was verified using phonetics. VDO was found to be 63 mm using Niswonger's technique. Freeway space was 5 mm. The existing VDO was increased by 2 mm using posterior provisional teeth restorations to a new VDO of 65 mm. The adaptation of the patient to the increased VDO was evaluated during 2 months period. No muscle tenderness or temporomandibular discomfort was found. Increasing the VDO was mandatory to allow

the condyles to assume their most SAM position in intimate contact with the thinnest part of biconcavity of disc. It permitted the entire temporomandibular joint (TMJ) complex to attain an improved functional health and allowed the posterior avoidance patterns of occlusion to wane and a new vertical dimension to be established. (Figure 4a, b)

Figure 4: a & b) increased vertical dimension by 2 mm right and left posterior teeth

In third part of treatment wherein came the occlusal plane analysis, Broadrick's occlusal plane analyser was used. A point was selected on pre-molar, wherein needle point of caliper was placed with a 4 inch radius an arc was scribbed on flag, marking the anterior survey line. Then, the needle point of caliper was held against the condyle ball of articulator and another arc was scribbed on the flag. Now, keeping the needle point at the intersection of first two lines, a line was scribbed from molar to canine, marking the acceptable occlusal plane for lower posteriors. After obtaining this plane, wax mock-up was repeated for the posterior teeth. (Figure 5)

Figure 5: wax mockup using broadrick's occlusal plane analyser

After establishing occlusion in the mandibular posterior teeth using broadrick's occlusal plane analyser, final finishing of tooth preparation was done. Metal coping trial for cross verification followed by permanent PFM restorations were given to the patient. (figure 6 a, b, c)

Figure 6: a) prepared tooth; b) & c) left and right mandibular metal coping trial

The definitive restorations for maxillary posterior teeth were fabricated using Functionally Generated Pathway (FGP).7 An acrylic template was prepared using autopolymerising polymethylmethacrylate and functional recording of mandibular movements was made using pattern resin. The FGP record was used as a guide to prepare wax pattern for definitive maxillary posterior crowns (Fig. 7a, b).

Figure 7: a) FGP record; b) wax pattern using FGP guide

All laboratory procedures were followed to fabricate PFM crowns and were cemented using glass ionomer cement. Occlusion was evaluated for centric and eccentric contacts. The prosthetic rehabilitation improved aesthetics, phonetics, mastication and significantly improved the self confidence of the patient. Post operative OPG were taken along with intraoral and facial photographs. (figure 8 a, b, c, d, e)

Figure 8: a) post operative intraoral view; b) post operative OPG; c) & d) maxillary and mandibular permanent PFM restorations

Figure 9: Pre-operative front profile

Figure 10: Post-operative front profile

Discussion

One of the aim of full mouth rehabilitation treatment is to convert unfavourable forces on the teeth into favourable ones permitting normal function and thereby resulting in healthy conditions.8 In this case, due to gastric erosion a gradual continuous wearing off of the tooth structure had occurred. The transitional prosthesis that was fabricated on the proposed vertical dimension provided a room for neuromuscular adjustment thereby allowing validation of VDO and functional occlusion prior to initiation of definitive treatment.9 Patient was kept on continuous follow-up and reported no problems thereafter. Pankey Mann Schyler philosophy is a well-organized practical and logical procedure that progresses smoothly with less wear and tear on the patient operator and technique.10 It offers multiple advantages like it's a well-organized logical procedure, divides the procedure into easy lab and clinical steps, requires to prepare less than 8 teeth at a time, there is no danger of losing patient's vertical dimension, the functionally generated path and centric relation are rebuilt at the desired vertical dimension and requires no complicated instruments. Optimum oral health should be prime objective of the rehabilitation procedures, because the ultimate goal will always be to restore the mouth to health and preserve this status throughout life of a patient.11 Instrument for occlusal plane analysis was introduced by Pankey and Mann, but here we used a simplified version of the same i.e. customized Broad rick flag analyzer.

Conclusion

Abnormal occlusal conditions are overlooked in many patients because of negligence or lack of knowledge, the key to success is a multidisciplinary treatment approach. An ideal esthetic treatment plan attempts to achieve perfection in every way. It is important to review a range of treatment options to achieve an esthetic smile while maintaining a healthy oral environment. Recognizing that form follows function and that anterior teeth play a vital role in the maintenance of oral health is paramount. In this clinical report, raising VDO based on accurate diagnosis ensured successful rehabilitation. Taking the guidance into account during provisionalization, ensures

minimal adjustments in the definitive restorations and greater long term predictability. PMS technique is a reliable, predictable, understandable and functional technique for a successful full mouth rehabilitation of a worn out dentition. A properly executed case of full mouth rehab not only improves function but also provides psychological gratification to the patient.

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