



ORIGINAL RESEARCH PAPER

Prosthodontics

FULL MOUTH REHABILITATION WITH DENTAL IMPLANTS: A PARADIGM SHIFT IN QUALITY OF LIFE

KEY WORDS: Implant protective Occlusion, Re-organized approach, simultaneous arch technique, Anterior deprogrammer

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ABSTRACT

The planning for full mouth rehabilitation starts from the initial visit and needs a lot of brain storming, in the form of discussion, clinical examination or a series of investigations to reach a definitive conclusion. It is beyond doubt that any attempts of oral rehabilitation need a lot of confidence to be instilled by the patient in the clinician and thereafter posing a challenging task ahead for the prosthodontist. One more crucial and vital step in such therapy is the time frame, right from initiation to the completion of the treatment in a logical and sequential manner. This case report is an effort and falls no short in presenting a case report of full mouth rehabilitation consisting of multiple endodontic therapy, post and core build ups, bone grafts, sinus lift and implant placements and finally restoration with the prosthesis, achieving the desirable masticatory efficiency and esthetics matching to the satisfaction of the prosthodontist and expectations of the patient.

INTRODUCTION

Quality of life is more important than life itself. It has always posed a serious challenge to restore a severely worn dentition both in terms of esthetics and function. The major concern for the long term success is focused on the development of sufficient restorative space, without compromising the vital criteria of aesthetic, occlusion, and function. Reconstructing dental arches with severe attrition is a distinct restorative challenge¹. The execution of treatment plan requires a multidisciplinary approach. However, the overall responsibility and decision making relies with the prosthodontist in selecting the correct occlusal scheme at established vertical dimension; so as not to disturb the harmony of the stomatognathic system. The proposed techniques have varied significantly right from the most complex in nature to those which were simple to execute.

Case Report

A 59 years old, male patient reported with difficulty in chewing, loss of several lower back teeth, with multiple discolored, worn out upper and lower teeth and desired correction. Clinical examination revealed severe generalized attrition involving multiple maxillary and mandibular teeth with few having undergone endodontic therapy. The teeth missing were 17, 18, 26, 27 36, 37, 38, 45, 46 and 47 with root stumps of 26, localized periodontitis 35, impacted 48. A diagnosis was made of generalized attrition with loss of VDO (Turner & Missirlian Category I). The various treatment options which were available were:

1. Tooth and tissue supported overdentures
2. Cast partial dentures
3. Implant retained & tissue supported overdentures
4. Implant retained fixed prosthesis

However, since the patient did not want extraction of all teeth or any removable appliance, we went ahead with the option of full mouth rehabilitation with natural teeth and dental implants with definitive PFM screw retained implant prosthesis and full coverage restorations. A treatment plan was formulated consisting of Preliminary phase with extraction of hopeless teeth with poor prognosis i.e. 26, 35 and 48; Phase I of oral prophylaxis, Phase II comprising of surgical placement of dental implants, endodontic therapy of all remaining teeth. Fixed prosthesis were inserted in Phase III and finally Phase IV of Recall & Maintenance. Direct Sinus Lift procedure was performed through lateral window technique in relation to 17 region as the sinus membrane lining had close proximity with the alveolar crest, the distance being 4 mm. Bony window was created using piezo-surgical unit and bone fill was achieved using alloplastic graft TCP Putty [Nova-Bone]. A removable

self cure resin surgical guide template with acrylic teeth was fabricated for orientation and placement of dental implants in the missing teeth. Dental implants [AB Israel] were placed of dimensions 4.5 X 13 for 17, 4.5 X 10 for 37, 3.75 X 10 mm for 45; 4.5 X 10 mm for 46; 4.5 X 11.5 mm for 47 regions. Atraumatic tooth extraction was done for 35 having localized periodontitis, followed by immediate implant of size 4.5 X 11.5 mm. Post and core done was done using FRC posts [Angelus] and core built up using Para Core Dual Core resin cement [Coltene, Whaledent] for 14-24, 34-44.

Loss of Occlusal Vertical dimension (OVD) was assessed in the first premolar region with inter occlusal rest space of 6 mm. A raise of the bite by 3 mm was planned.

A permissive maxillary bite raising occlusal splint was made at increased vertical dimension using clear heat cure resin. This was inserted for duration of approximately 10 weeks, to ascertain that whether a proposed change in patient's occlusal scheme will be tolerated. It was worn 24 hours a day except for brushing & eating with no muscle or joint symptoms. The splint had only anterior tooth contacts. Maxillary diagnostic casts was mounted with a face bow transfer record and mandibular in centric relation record onto Wide View Hanau semi adjustable articulator. Mock tooth preparation was done and complete diagnostic tooth wax up was done to assess overbite and overjet.

Irreversible hydrocolloid [Dentsply] was used for the impression of the diagnostic wax up, followed by pouring and retrieval of the wax up stone casts. Vacuum form template, were fabricated and were used to fabricate chair side provisional restorations for all teeth.

Tooth preparation was done for all the teeth and gingival retraction was achieved using retraction gel [Racegel, Septodont]. Stage II surgery was performed for implant uncovering, cover screw was retrieved and healing cap was placed for two weeks. The transfer coping were fitted, locked on the implant and were picked up on to the final impression, which was made with addition silicone using single step putty wash technique using indirect close tray technique. The implant analogs were attached to the transfer coping in the impression. Gingival barrier [Gingifast Elastic, Zhermack] was placed around the assembly to mimic the gingival collar. Master casts were poured in Type IV die stone [Kalabhai]. Die cutting and ditching was done.

Muscle deprogramming was done using impression compound jig at an established vertical dimension of

occlusion. CR recorded with interocclusal bite record material (addition silicone) using triple tray technique. The master casts were articulated on Hanau articulator using inter-occlusal record. Broadrick's occlusal plane analysis (BOPA) was done to mark Occlusal plane survey centre and curve of Spee.

Silicone putty and plaster index were fabricated for wax scribing using wax knife.

Provisional restorations were cemented using Non Eugenol temporary cement [Rely X Temp 3M]. Occlusal prematurities were removed and impression of the cemented provisional was made and mounted using CR record. An anterior custom guide table and custom putty record of lower anteriors was fabricated to incorporate the same guidance in the definitive restorations.

Wax up was done for the full mouth definitive restorations. Custom abutments were fitted on the implant analogs and coping was fabricated both for the screw retained implant prosthesis and PFM restorations. Metal castings were finished and try in was done in the patients mouth. The bisque try in was done and mandibular remounting was done with squash bite, post occlusal equilibration.

Full mouth prosthetic rehabilitation was carried out with splinted bilateral screw retained implant FPD prosthesis, specific to the Kennedy's Class I. Remaining arch restored with multiple unit PFM crowns and FPDs with implant protective occlusion. Definite contacts were given on distal extension implant retained FPD in maximum intercuspation position while tapping with light and heavy bite intensity forces, with relief of 28 um on implant 17 region. The patient was advised regular tooth brushing and oral hygiene aids and has been on the follow up under the recall and maintenance phases.

DISCUSSION

Oral reconstruction and rehabilitation of the patient with attrited teeth is one the most challenging procedures confronting the full mouth rehabilitation. Triad of functional harmony, esthetics and the clinical efficiency of the operator are vital for successful rehabilitation. When it has been determined that restoration of all or most of the posterior teeth is necessary, the BOPA provides a simple and practical method to assist in determining the preliminary occlusal plane on diagnostic casts.² All the treatment protocols of FMR therapy must not perturb the normal functioning of both the TMJs, neuromuscular complex and the periodontium. Treatment of compromised dentition is designed not only to restore the vertical dimension but to provide functional and aesthetic occlusion to the patient as rightly said by Dawson that the occlusal stability forms the backbone of all occlusal treatment planning³.

The simultaneous arch technique was employed for occlusal rehabilitation. Simultaneous full arch technique which is although exacting, exhaustive and demanding provides for a structured stable and predictable articulation.⁴ The technique permits modification of occlusal plane, occlusal scheme, crown contours, embrasures, and finally esthetics, which is not the case with Segmental/Quadrant technique. However, it has numerous disadvantages associated with it, being uncertain visits of the patient, which are quite annoying to the patient, multiple occlusal records need to be taken at various stages and even there is always a chance of the prosthodontist losing the track of the vertical dimension which needs to be raised.

All our efforts for full mouth rehabilitation are directed towards re-establishing a state of functional efficiency in which the hard and soft tissues of stomatognathic system function in synchronous harmony.⁵ Dawson stated that interocclusal space is never lost and any loss is compensated

by tooth eruption, alveolar bone expansion and muscle action.^{6,7} The vertical dimension of occlusion (VDO) is not constant throughout life and therefore can be raised upto VDR, being the minimal muscle activity position.⁸ In 1984, Turner and Missirlian⁹ classified the patients requiring full mouth rehabilitation into three categories:- (i) Excessive wear with loss of VDO. (ii) Excessive wear without loss of VDO but space available. (iii) Excessive wear without loss of VDO but with limited space. The rationale behind alteration and raise of the vertical dimension by 5 mm was to permit adequate inter arch space for the permanent restorations. A moderate increase in vertical dimension of occlusion does not seem to be a hazardous procedure, provided the occlusal stability is established.¹⁰

Stuart and Stallard in 1957 proposed cuspid protected occlusion concept which was given to the patient as it had many advantages over the group function.¹¹ It had its origin in the work of D'Amico. D'Amico stated that cuspid protected occlusion and disocclusion were natural adaptations for preventing destructive occlusion.¹² Stallard and Stuart, and Lucia and the members of the Gnathological Society. They observed that in many mouths with a healthy periodontium and minimum wear, the teeth were arranged so that the overlap of the anterior teeth prevented the posterior teeth from making any contact on either the working or the non-working sides during mandibular excursions.¹³ Glossary of Prosthodontic Term-9, defines the canine-protected occlusion as a form of mutually protected occlusion, in which vertical and horizontal overlap of canines disengages posterior teeth in excursive movement of mandible.¹⁴

Hobo and Takayama studied the influence of condylar path, incisal path, and the cusp angle on the amount of disocclusion and concluded that cusp angle was the most reliable and used as a new determinant of occlusion.¹⁵ Canine guide occlusion was employed, which is far more stable option and discludes all posterior teeth on the working as well as on the balancing side, in all lateral and protrusive excursions.

CONCLUSION

The treatment protocol aims at restoring the centric relation and occlusion, eliminate posterior interferences, restore the worn out surfaces to optimum levels and improve and restore the chewing efficiency and esthetic profile. The expertise in recoding of all miniscule details along with proper diagnosis and treatment planning is roadway to success. It is ultimately the smile of the patient and the satisfaction and satiety of the treating prosthodontist which finally matters.

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