IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 20, Issue 4 Ser.8 (April. 2021), PP 53-63
www.iosrjournals.org

Full mouth rehabilitation of worn-out dentition by modified Panky-Mann-Schuyler protocol: a case report

Dr. Aamir Godil[1], Dr. Arshi Kazi[1], Dr. Taha Attarwala[1], Dr. Kashif Gandhi[1], Dr. Aatif Khan[1], Dr. Smita Musani[1], Dr. Ramandeep Dugal[1], Dr. Makarand Lokhande[2]

[1]*(Department of Prosthodontics, M. A. Rangoonwala College of Dental Sciences and Research Centre, India)*
[2]*(Department of Periodontics, M. A. Rangoonwala College of Dental Sciences and Research Centre, India)*

Abstract:
Full mouth rehabilitation is a challenging treatment modality that aims to restore a harmonious state of functional as well as biological efficiency. It is dependent on the clinician to choose an appropriate occlusal scheme for a particular reconstruction. Pankey–Mann–Schuyler (PMS) philosophy is a commonly used, organized approach for oral rehabilitation. The principles of PMS are based on the spherical theory of Monson and functionally generated path technique (FGPT). However, due to certain drawbacks of FGPT, it has been avoided in this full mouth rehabilitation case report.

Key Word*:Restoration; Crown and bridge; Attrition, Functionally generated path.*

Date of Submission: 14-04-2021 Date of Acceptance: 28-04-2021

I. Introduction

Tooth wear is a gradual process that occurs due to certain physiological and pathological reasons.[1] These entities are broadly classified as attrition, erosion, and abrasion. Attrition is usually an age-related process that can occur at the incisal or occlusal surfaces and sometimes on the proximal surfaces of teeth.[2] Average annual tooth surface loss on the occlusal surface of about 29 µm in molars and 15 µm in premolars is considered normal.[1] Attrition is accelerated by a coarse diet, abrasive dust and parafunctional habits such as bruxism and clenching.[2] Therefore, a thorough evaluation followed by definitive diagnosis is mandatory, owing to the variability and multifactorial nature of occlusal wear.

Full mouth rehabilitation is a challenging treatment modality that aims to restore a harmonious state of functional as well as biological efficiency between teeth and their periodontal structures, the muscles of mastication and the temporomandibular joint (TMJ).[3] Optimal occlusion along with aesthetics according to the needs of the patient should be achieved in such cases. A single set rule cannot be applied to all the patients as chewing efficiency exists over a wide range of occlusal forms and types of occlusal schemes. It is dependent on the clinician to choose an appropriate occlusal scheme for a particular reconstruction to attain predictable long-term results. Pankey–Mann–Schuyler (PMS) philosophy is a commonly used, organized approach for oral rehabilitation introduced by Pankey, utilizing the principles of occlusion advocated by Schuyler.[4]The principles of PMS are based on the spherical theory of Monson and functionally generated path technique (FGPT). The concept of posterior disclusion has made the use of FGPT unnecessary in most occlusal restorations. As FGPT utilizes wax to obtain the record, there is great potential for errors. Furthermore, PMS technique cannot be used if the teeth are periodontally weak as FGP cannot be accurately recorded.[5] The utility and futility of this technique is debatable.

Therefore, this case report describes a full mouth rehabilitation treatment of a patient with severe generalized attrition using Pankey–Mann–Schuyler (PMS) philosophy without employing FGPT.

II. Case Report

A 65 year old male patient reported to our institute complaining of loss of tooth structure and unpleasant appearance since 4-5 years. He had difficulty in eating hard and chewy food. Patient was also concerned about the yellowish appearance of his teeth since the same time. He presented with no relevant medical history. According to his dental history, he had undergone extraction of a decayed tooth 10-12 years ago. Furthermore, he reported a history of tobacco chewing since the age of 20 years, which he quit 8-9 years ago.

Extra-oral examination revealed a squarish facial form and facial symmetry with drooping of the corner of the mouth, an evident sign of loss of vertical dimension. No TMJ pathologies were noted clinically or

radiographically. On smiling, unpleasant appearance of worn-out teeth with inadequate display of gingiva and teeth were observed.

Intra-oral examination revealed generalized wear with loss of enamel and dentin exposure. Periodontal examination revealed, pale gingiva with no sign of mobility in all teeth. However, the gingival zeniths were asymmetric with adequate width of attached gingiva. Pit and fissure caries with 26 and poorly restored 17 was noted. Also, false partial anodontia was reported with 35.**(Fig. 1,2)** Radiographic evaluation showed generalized attrition with obliterated pulp chambers and no deformity of the temporomandibular joint on both sides. **(Fig. 3)**

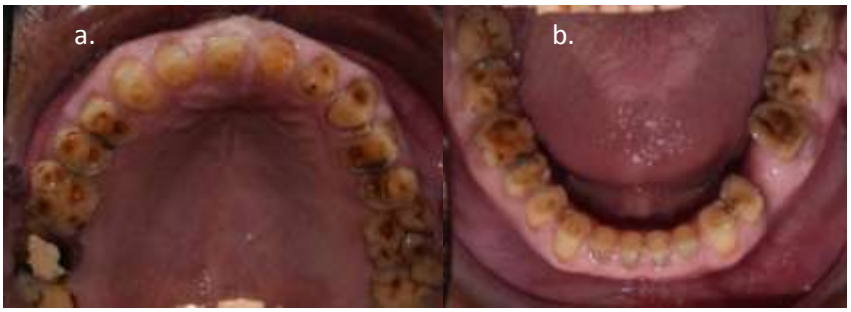

Fig 1. Pre-operative occlusal view: a. Maxillary, b. Mandibular

Fig 2. Pre-operative maximum intercuspation: a. Right, b. Front, c. Left

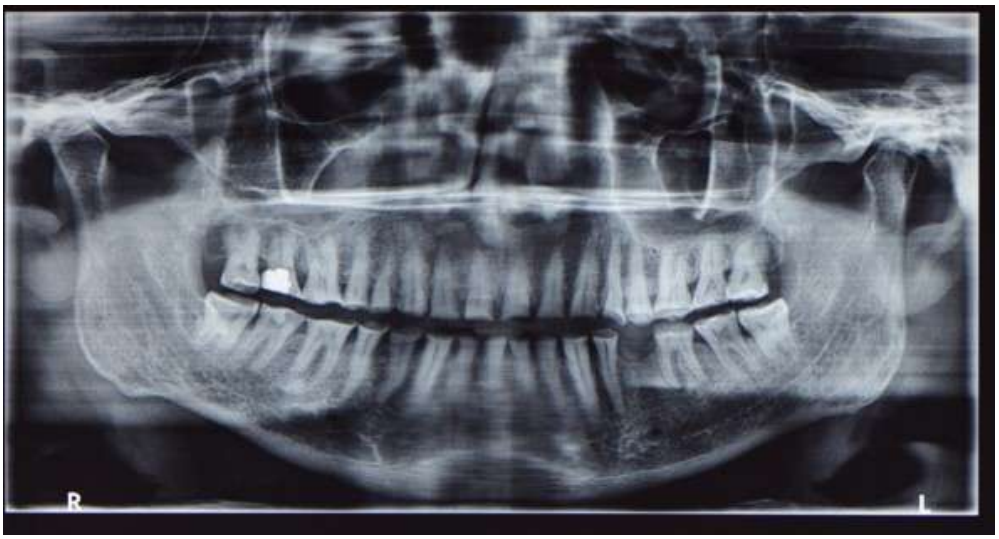

Fig 3. Pre-operative OPG

The patient was diagnosed according to Turner and Missirlain classification of worn dentition into category I: excessive wear with loss of vertical dimension of occlusion. A full mouth rehabilitation procedure was planned according to Pankey-Mann Schuyler philosophy without using the functionally generated path. The treatment plan was divided into four phases.

1. **Phase I: Planning**

- Diagnostic models
- Joint deprogramming and centric relation record
- Diagnostic wax mockup for anterior teeth
- Esthetic evaluation using wax mockup
- Posterior plane determination using Broadrick's occlusal plane analyzer

2. **Phase II: Pre-prosthetic phase**
- Oral prophylaxis and restorative procedures
- Excavate and evaluate for endodontic therapy - 17
- Crown lengthening procedure according to the diagnostic wax mockup
- Posterior
- Anterior

3. **Phase III: Prosthetic phase occlusal rehabilitation using Panky- Mann- Schyuler Philosophy**
- Teeth preparation and temporization
- Posterior
- Anterior
- Final prosthesis
- Gingival retraction and final impression
- Jaw relation
- Coping and bisque trial
- Cementation

4. **Phase IV: Maintenance phase**

Treatment Phase I:
The maxillary diagnostic cast was mounted according to the facebow record obtained from the patient. A lucia jig was fabricated with auto-polymerising resin and was used to deprogram the muscles. Centric relation was recorded by Dawson's technique and an interocclusal record was made with Aluwax (MAARC, India) followed by mounting of the mandibular diagnostic cast. **(Fig. 4)**

Fig 4. Centric relation record: a. Deprogramming with lucia jig, b. Mounting on articulator

A protrusive bite was recorded for programming thecondylar guidance on the articulator. Diagnostic wax mock-up was done for the anterior teeth. After evaluation of the esthetics and speech, an increase of 2-3 mm in the vertical dimension was planned for the patient.**(Fig. 5)**

Fig 5. Anterior mock-up: a. On articulator, b. Intra-oral esthetic evaluation

The diagnostic wax mock-up was completed for the posterior teethand the posterior plane was verified and corrected using Broadrick's flag. **(Fig. 6)**

Fig 6. Posterior teeth mock-up and verification of occlusal plane

Treatment Phase II:
Following oral prophylaxis, restorations were done for carious teeth. No elective endodontic procedures were planned for this case. Diagnostic wax-up models were duplicated, and a vacuum pressed thermoplastic sheet was used to fabricate a guide to achieve the desired gingival zeniths.Surgical crown lengthening of the posterior teeth was carried out using the guide.**(Fig. 7)**

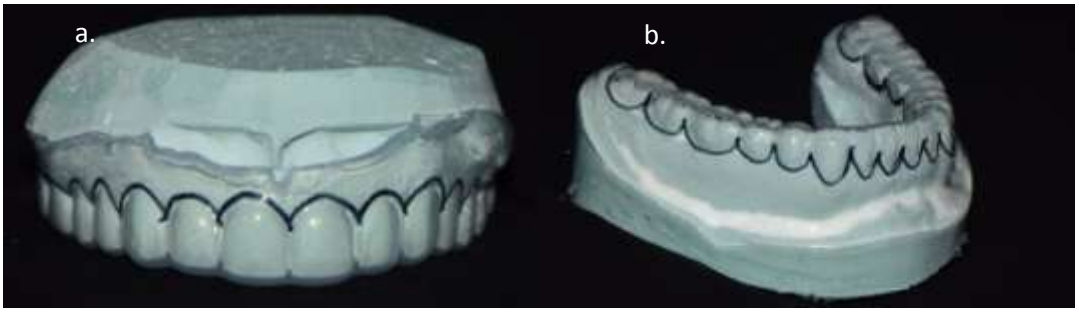

Fig 7. Stent for crown lengthening: a. Maxillary, b. Mandibular

Treatment Phase III:

Following crown lengthening, tooth preparation and temporization of the posterior teeth in both the arches was done. **(Fig. 8,9)**

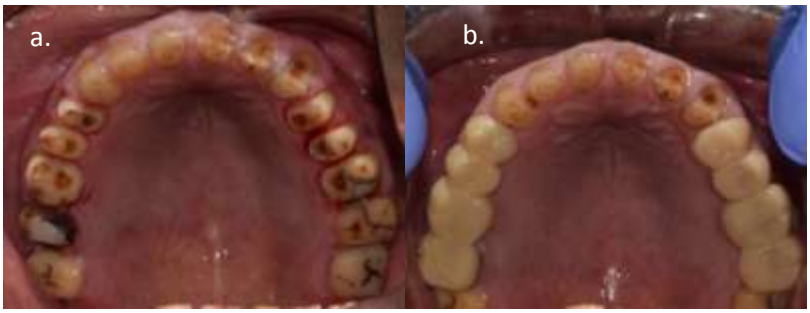

Fig 8. Maxillary (Posterior): a. Tooth preparation b. Temporization

Fig 9. Mandible (Posterior): a. Tooth preparation b. Temporization

The same procedure was repeated for anterior teeth in the next appointment.The prepared teeth were temporized for two months using heat cure temporaries fabricated by indirect technique. **(Fig. 10, 11, 12)**

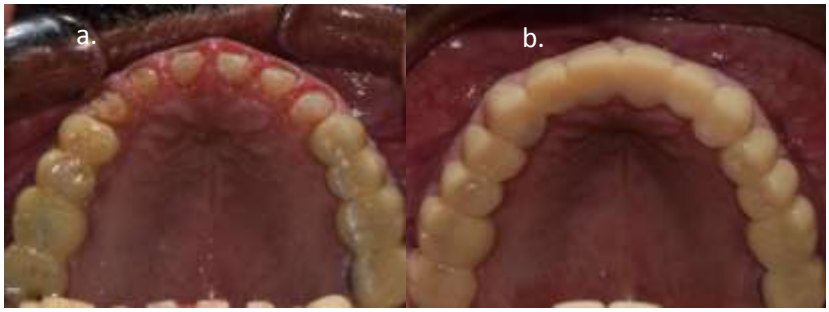

Fig 10. Maxillary (Anterior): a. Tooth preparation b. Temporization

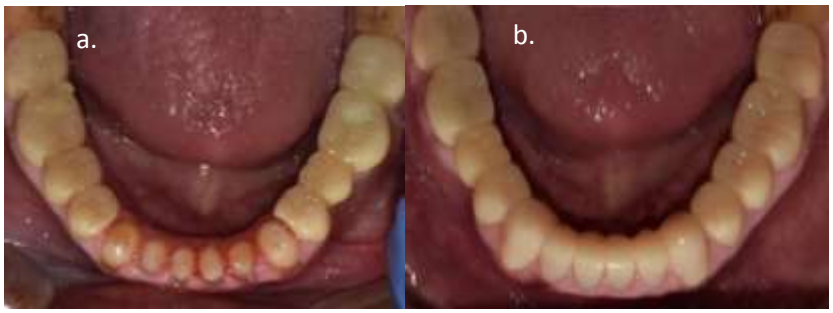

Fig 11. Mandibular (Anterior): a. Tooth preparation b. Temporization

Fig 12. Temporization in maximum intercuspation

Maxillary and mandibular casts were prepared from impressions of temporary restorations and mounted on the articulator with a facebow record.A customizedincisal guide table was fabricated for establishing the anterior guidance. **(Fig. 13)**

Fig 13. Fabrication of customised inicsal guide table

Shade selection was done referring to the existing temporaries, previous photographs and complexion of the patient. Gingival retraction of the maxillary and mandibular anterior teeth was done and final impressions of both the arches were made using A-silicone impression material (Zhermack, Italy) using two step putty wash technique.**(Fig. 14)**

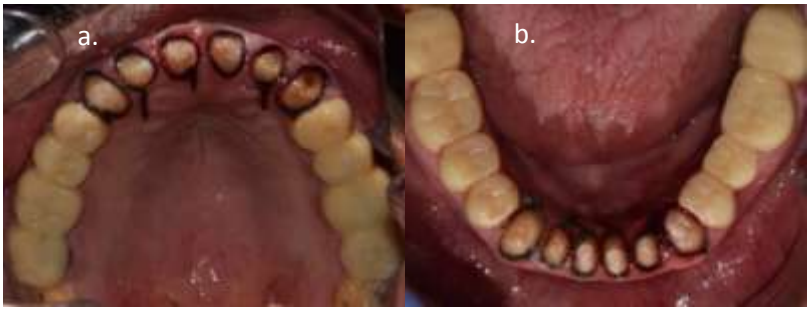

Fig 14. Gingival retraction of anterior teeth: a. Maxillary, b. Mandibular

The casts were mounted using the facebow record which was followed by coping fabrication and trial for the anterior teeth.**(Fig. 15)**

Fig 15. Coping trial of anterior teeth: a. Maxillary, b. Mandibular, c. Maximum intercuspation

During the bake trial of anterior restorations, the previously made customized guide table was used to re-evaluate the anterior guidance. At this stage, canine guidance was established.**(Fig. 16)**

Fig 16. Anterior bake trial with customized guide table

Glazing of the anterior PFM restorations was carried out after all necessary adjustments. The maxillary and mandibular restorations were cemented using glass ionomer cement (Type I, GC Fuji, USA). **(Fig. 17)**

Fig 17. Anterior final restoration: a. Maxillary, b. Mandibular, c. Maximum intercuspation, d. Protrusive, e. Right lateral, f. Left lateral

The posterior preparations were re-defined and final impressions of both maxillary and mandibular arches were made in the same way.**(Fig. 18)**

Fig 18. Gingival retraction of posterior teeth: a. Maxillary, b. Mandibular

The casts were mounted using a facebow record, followed by coping fabrication and trial for posterior teeth. **(Fig. 19)**

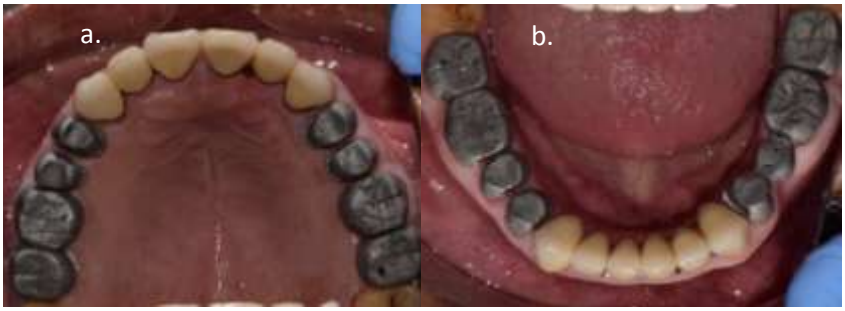

Fig 19. Coping trial of posterior teeth: a. Maxillary, b. Mandibular

The occlusion of the posterior teeth was adjusted in centric and eccentric movements during the bake trial using articulating paper of 40µm (Bausch, USA), thereby omitting the functionally generated path. **(Fig. 20)**

Fig 20. Bake trial of posterior teeth: a. Maxillary, b. Mandibular,

The patient was restored with canine guided occlusion on both the sides. After all occlusal corrections, the maxillary and mandibular posterior PFM crowns were glazed, and metal crowns were polished and cemented using glass ionomer cement. **(Fig. 21,22)**

Fig 21. Posterior final restoration: a. Maxillary, b. Mandibular, c. Maximum intercuspation, d. Protrusive, e. Right lateral, f. Left lateral

Fig 22. Post-operative OPG

Treatment Phase IV:

The patient was instructed on oral hygiene maintenance and recalled after 1 month, 3 months and 1 year.**(Fig. 23,24)**

Fig 23. Intraoral Pre-treatment and Post-treatment: a. Maxillary, b. Mandibular

Fig 24. Extraoral: a. Pre-treatment, b. Post-treatment

III. Discussion

Functionally generated path technique is an extremely sophisticated and practical method of capturing the precise border pathways that the lower posterior teeth follow. The cusps of the lower teeth are influenced by the anterior guidance anteriorly and the condylar guidance posteriorly.[6] The functionally generated path (FGP) is a traced eccentric movement of the mandibular posterior cusp tips from the centric position to achieve optimal articulation on the opposing side.[7] However, there are certain requirements for the use of FGP for the restoration of teeth; such as presence of an optimal occlusion, appropriate anterior guidance, absence of posterior interferences, no missing or broken down opposing teeth as they will not provide the occlusal pathway needed for shaping the occlusal surface.[6,8] Also, good laboratory support is a basic requirement, without which successful results are difficult to achieve. Like any other technique, the FGP technique also has certain disadvantages:

1.The operator needs thorough knowledge of occlusion and of mandibular movements; as it maylead to anincomplete generation of FGP.

2.The occlusal details are not similarto the ideal anatomical configuration although the surface is functionally ideal.

3.Cannot be used with short clinical crowns and unfavorable occlusal morphology of the opposing teeth.

4.Patients lacking proper neuromuscular control cannot be selected for this technique.

5.In patients having disharmony in occlusion (e.g., deep bite and crossbite).[9]

6.Cannot be used if the teeth are periodontally weak.[5]

The success of functionally generated path apart from the dentist is dependent on the patient's movement as well as the ability of the dental laboratory to fabricate accurate prosthesis.[10] The notion of attaining posterior disclusion has made the use of FGP unwarranted in most occlusal restorations. As FGP technique utilizes wax to obtain the record there is great potential for errors. Also, verification of the record obtained is difficult. Inspite of using the FGP, certain occlusal corrections are required during the bake trial. It does not remove the complete possibility of occlusal errors. FGP can be avoided, and occlusal corrections can be done on a semi-adjustable articulator during the trial stage using an articulating paper referring to the patient's eccentric movements. This reduces the time of treatment and ensures patient comfort as they do not have to undergo the cumbersome procedure.

IV. Conclusion

It can be concluded that, FGP is not a necessity for full mouth rehabilitations. Alternatively, the occlusion can be directly verified during the trial stages to reduce treatment time.

References

[1]. Lambrechts P, Braem M, Vuylsteke-Wauters M, et al: Quantitative in vivo wear of human enamel. J Dent Res 1989;68:1752-1754
[2]. Meshramkar R, Lekha K, Nadiger R. Tooth wear, etiology, diagnosis and its management in elderly: a literature review. Inter. J. Prosth. Rest. Dent. 2012;2:38-41.
[3]. Kazis H, Kazis AJ. Complete mouth rehabilitation through fixed partial denture prosthodontics. J Prosthet Dent. 1960;10:296–303.
[4]. Mann AW, Pankey LD. Oral rehabilitation: part I. Use of the P-M instrument in treatment planning and in restoring lower posterior teeth. J Prosthet Dent. 1960;10:135–150.
[5]. Tiwari B, Ladha K, Lalit A, Naik BD. Occlusal concepts in full mouth rehabilitation: an overview. The Journal of Indian Prosthodontic Society. 2014 Dec 1;14(4):344-51.
[6]. Dawson PE. Evaluation, diagnosis and treatment of occlusal problems. 2 nd Edition, The C.V. Mosby Company, St.Louis, Baltimore, Toronto 1989:410-33.
[7]. Meyer FS. The generated path technique in reconstruction dentistry: Part II. Fixed partial dentures. The Journal of prosthetic dentistry. 1959 May 1;9(3):432-40.
[8]. Shillingburg HT, Hobo S, Whitsett LD, Jacobi R, Brackett SE. Fundamentals of fixed prosthodontics. 3 rd ed, Quintessence Publishing Co., Inc 1997:355-64
[9]. Prashanti E, Sajjan S, Reddy JM. Fabrication of fixed partial dentures using functionally generated path technique and double casting. Indian Journal of Dental Research. 2009 Oct 1;20(4):492.
[10]. Saafi J, Debbabi I, Alremthi HA, Hajjami H, Cherif M. A Modified Functionally Generated Path Technique (FGP) for Making Posterior Unit Metal-Ceramic Crown. Journal of Oral Health and Dental Science. 2017;2(1):1.

Dr. Aamir Godil, et. al. "Full mouth rehabilitation of worn-out dentition by modified Panky-Mann-Schuyler protocol: a case report."*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(04), 2021, pp. 53-63.