

Characterized Single Maxillary Denture- A Case Report

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ABSTRACT

Background: Creating a single maxillary denture often presents a significant challenge for practicing dentists. The main difficulty is ensuring the maxillary denture aligns with the occlusion of the natural mandibular teeth. The functionally generated pathway method records the posterior teeth's occlusal pathways in functional wax and is described as a "three-dimensional static expression involving dynamic tooth movement." Restoring edentulous patients involves reestablishing aesthetics, function, and comfort. Achieving balanced occlusion is crucial for denture stability and patient satisfaction. Constructing a complete denture poses a more complex challenge compared to working with natural dentition. The Functional Generated Path (FGP) technique is a dependable approach for recording mandibular movements and creating harmonious occlusal relations. This case report details the process of fabricating a single, characterized maxillary complete denture opposite a natural mandibular dentition, using the FGP technique to attain balanced occlusion and enhance prosthetic function..

Keywords: Mandibular denture, Single denture, Prosthodontics.

INTRODUCTION

Fabrication of a single complete denture opposing natural dentition presents significant clinical challenges due to the presence of irregular occlusal planes, supra-erupted teeth, and existing occlusal discrepancies. Conventional articulator settings may not accurately reproduce individual mandibular movements, leading to occlusal interferences and denture instability¹. Successful complete denture depends on many variables; three major factors which decide the success of complete denture are retention, stability, and support and esthetics. This is achieved by means of functionally generated path (FGP) technique. FGP is defined as a registration of the paths of movement of the occlusal surfaces of the teeth or occlusal rims of one dental arch in plastic, wax, or other medium attached to teeth or occlusal rims of opposing arch². The research of Pankey and Mann with improved materials has extended the prosthodontic applications of the functionally generated path technique. The procedure is simplified by the usage

of newer materials and techniques. Stansbury introduced a technique of functional chew-in based on the work of Meyer³. Meyer developed this concept to overcome the undesirable factors acting on the prosthesis and to overcome the deficiencies of articulators. Over the years, several names have been given to this technique such as "functional bite technique," "functional chew-in technique," "generated path technique" and "cuspal tracing technique. This article therefore discusses an alternative method to obtain a balanced occlusion for completely edentulous maxillary arch against mandibular natural dentition using FGP technique.

CASE REPORT

A 53-year-old woman approaches the Department of Prosthodontics with a chief complaint of missing teeth. On clinical examination, the patient presents with an edentulous upper arch and attrition in all mandibular teeth. The patient has a habit of eating

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peanuts for 10 years. Once all the desired procedures are established, preliminary impressions of the upper and lower arches are made. Primary impression of the mandibular arch is made with irreversible hydrocolloid material, and primary impression of the maxillary arch is made with a modelling plastic compound (Pyrax Co., Madhya Pradesh), and diagnostic casts are obtained. A special tray is constructed over the diagnostic cast of the maxillary arch using an auto-polymerising acrylic resin material (DPI Cold Cure; Dental Products of India, Mumbai), with the tray borders 2mm short of the sulcus. Border moulding is performed using low-fusing green stick compound (DPI Pinnacle, Tracing sticks Dental Products of India), and a wash impression is made up of a condensation silicone paste. After setting, the master cast is separated from the impression. Two denture bases are fabricated on the maxillary master cast using an auto-polymerizing resin material. Two occlusion rims, made up of modeling wax (Y-Dent, Madhya Pradesh) on one denture base and modeling plastic compound on another denture base, are fabricated. A lip support, lip fullness and desired vertical dimension of occlusion are to be established in the wax occlusion rim. A desired vertical dimension of occlusion is established where the phonetics, esthetics and inter-occlusal space are used as guides, and at this established vertical dimension, the centric relation is recorded. Then the face-bow transfer record is made clinically (Hanau™ Springbow). Using the face-bow transfer record, the wax occlusion rim is transferred to the semi-adjustable articulator.



Figure 1: Maxillary edentulous arch.



Figure 2: Mandibular natural dentition.



Figure 3: Primary impression maxillary arch.



Figure 4: Primary impression mandibular arch.

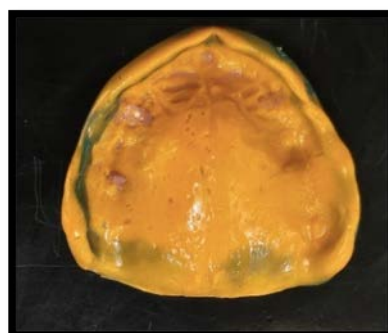


Figure 5: Final impression.



Figure 6: Facebow record.

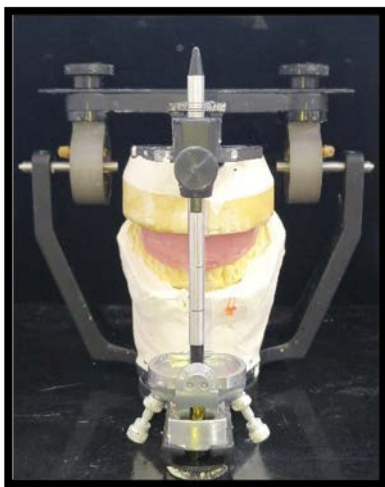


Figure 7: Mounting on semi-adjustable articulator.

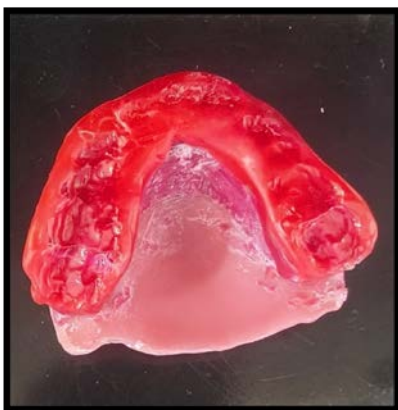


Figure 8: Functionally generated path recorded

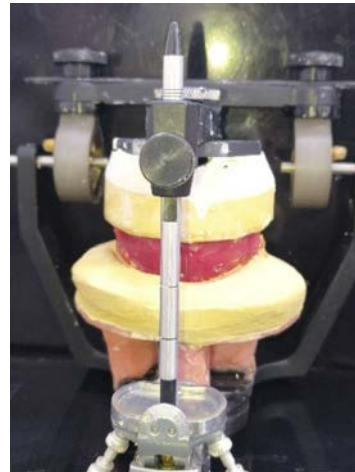


Figure 9: FGP mounted and plaster index made with jig.



Figure 10: Trial denture in centric occlusion.



Figure 11: Trial denture (In working side).



Figure 12: Trial denture (Non working side).



Figure 13: Final denture (centric occlusion)



Figure 14: working side occlusion



Figure 15: Non working side occlusion.



Figure 16: Mesh incorporated in final denture.



Figure 17: Smile transformation after final denture insertion.

The plastic occlusion rim was secured to its record base with retentive pins positioned beneath the recording material. After softening, the rim was adapted to the master cast and the articulator was closed to register the opposing mandibular tooth surfaces. The rim was adjusted to provide approximately 2 mm of clearance from the mandibular anterior teeth. Reference marks were established to preserve the selected vertical dimension during the FGP procedure. On the articulator, the buccal and lingual cusps of the posterior mandibular teeth were kept clear of the recording rim before the intraoral recording procedure.

The modeling plastic occlusion rim is inserted into the patient's mouth, and a tentative jaw relation record is verified. Carding wax is added to the full width and length of the occlusion rim for the functionally generated path procedure. This whole is placed into the patient's mouth and trained to close first into centric occlusion, and the mandibular anterior teeth tracings are recorded in registration wax. These tracings serve as stops in the future to record centric relations. The centric, protrusive and lateral excursion movements are recorded. Firstly, protrusive excursion movement is recorded by guiding the patient to bring the mandible into the forward position from the retruded position, approximately 6mm, anterior to the posterior position. Secondly, lateral excursion movements are recorded by guiding the patient to move the mandible to either right or left about 5mm and move back to the retruded position, and these movements produce a functionally generated path record. The generated wax-path was poured with type III dental stone into the wax pathways. The

wax is removed from the stone core after the set of the stone. The stone core is placed in the articulator in the position of the mandibular cast at the desired vertical dimension, and the occlusal contacts of the trial denture with the stone core are evaluated and grinded to fit the generated path record on the stone core.

Articulating paper was placed between the trial denture and the stone core, and protrusive and lateral movements were reproduced on the articulator. The resulting markings identified premature contacts and eccentric interferences. These contacts were selectively adjusted until the incisal guide pin contacted the incisal guide table, thereby establishing bilateral balance during centric and eccentric movements.

The trial denture is placed in the articulator to check occlusion prior to flasking. The trial denture is flaked, dewaxed and processed with incorporation of metal mesh. Then denture was characterized externally as patient want natural looking denture. Finally, the denture is inserted into the patient's mouth without any deflective occlusal contacts with a balanced and functional occlusion that characterizes the functionally generated path occlusion. The post-insertion instructions are given to the patient.

DISCUSSION

This case demonstrates a clinical approach for fabricating a single maxillary complete denture against an essentially unmodified natural mandibular dentition. The FGP method was selected to develop an occlusal scheme based on the patient's actual mandibular movements rather than relying solely on average articulator values. The technique is versatile and can help reduce deflective contacts by incorporating functional movement into the occlusal design.¹

In the present technique, a semi-adjustable articulator was used to reproduce the recorded protrusive and lateral movements and to facilitate refinement of the occlusal contacts.⁵

The clinical and laboratory procedures are done in the normal conventional manner. The grinding surfaces of the prosthetic teeth fit into the stone core that represents the generated path record. This stone core record looks somewhat bizarre as it

represents the dynamics of mandibular movements. In this technique, the patient's border movements of the mandible (both centric and eccentric) are recorded. The functionally generated pathway procedure produces harmonious occlusion with minimal processing errors compared to usual denture fabrication techniques. The FGP technique is utilized in the fabrication of a single crown, fixed partial dentures, removable partial dentures, complete dentures and dental implant restorations.^[7]

The Pankey-Mann philosophy emphasizes the development of stable occlusal contacts during eccentric mandibular movements.⁷ Other modifications of the FGP concept have also been described. Vig used a flattened resin extension on the occlusal surfaces, whereas Sharry described the use of softened wax incorporated into the maxillary rim. These approaches similarly aim to capture the functional pathways generated by mandibular cusp movements during protrusive and lateral excursions.⁸

In this clinical report, a balanced and functional occlusion is achieved in the trial denture itself, against the stone core before processing of denture. This gives more freedom of movement for the teeth to achieve balanced and functional occlusion. Only minor selective grinding of teeth is done to correct deflective occlusal contacts after denture processing. Articulators are capable of reproducing, to a greater or lesser degree, mandibular movements. Articulators are useful in analyzing functional relationships between maxillary and mandibular arches. The disadvantage that non-adjustable articulators result in improper prosthetic rehabilitation, and mean value articulators are used only in simple prosthetic reconstructions. The mean values reproduced by the mean value articulator do not correspond to the average clinical values. In this case report, the Hanau Wide-View articulator is used which is a semi-adjustable articulator. This articulator is capable of recording and reproducing the angle of eminence, the Bennett angle, the anterior guidance, the intercondylar distance and the patient's mandibular centric and eccentric movements. Hence, the materials and instruments used in this technique add information to the existing literature^[7]

CONCLUSION

The functionally generated pathway technique can be used in a variety of restorative procedures, including single crowns, fixed and removable partial dentures, complete dentures, single complete dentures opposing natural or reconstructed teeth, and implant restorations. By recording the patient's own mandibular movements, the technique provides a patient-specific basis for developing occlusion. In the present case, FGP helped establish a balanced and functional occlusal relationship for a single maxillary complete denture with minimal post-processing adjustment. A harmonious occlusion is essential for maintaining denture stability and retention, particularly when a complete denture opposes natural teeth.

REFERENCES

1. Bruce RW: Complete dentures opposing natural teeth. *J Prosthet Dent.* 1971, 26:448-55. 10.1016/0022-3913(71)90002-3 The glossary of prosthodontic terms. *J Prosthet Dent.* 2005, 94:10-92. 10.1016/j.prosdent.2005.03.013
2. Dawson PE: Long centric. *Evaluation, Diagnosis and Treatment of Occlusal Problems*, 2nd Ed. CV Mosby, St. Louis; 1974. 264-73.
3. Dawson PE: Anterior guidance. *Evaluation, Diagnosis and Treatment of Occlusal Problems*, 2nd Ed. CV Mosby, St. Louis; 1974. 274-81. Dawson PE: Functionally generated path techniques for recording border movements intraorally . *Evaluation, Diagnosis and Treatment of Occlusal Problems*, 2nd Ed. CV Mosby, St. Louis; 1974. 410-33.
4. Meyer FS: Dentures: causes of failures and remedies. *J Prosthet Dent.* 1951, 1:672-91. 10.1016/0022-3913(51)90005-4 Meyer FS: The generated path technique in reconstruction dentistry. Part I. Complete dentures . *J Prosthet Dent.* 1959, 9:354-66. 10.1016/0022-3913(59)90064-2
5. Upadhyay SR, Singh SV, Bhalla G, Kumar L, Singh BP. Modified functionally generated path technique for single complete denture against non-modified natural dentition. *J Oral Biol Craniofac Res.* 2012 Jan-Apr;2(1):67-71. doi: 10.1016/S2212-4268(12)60016-5. PMID: 25756037; PMCID: PMC3941280.
6. Kanaparthi DB. A Technique for Obtaining Balanced and Functional Occlusion Through Modified Wax-Path Record. *Cureus.* 2023 Aug 26;15(8):e44149. doi: 10.7759/cureus.44149. PMID: 37638262; PMCID: PMC10460126.
7. Foong KW, Patil PG. Fabrication of maxillary single complete denture in a patient with deranged mandibular occlusal plane: A case report. *Saudi Dent J.* 2019 Jan;31(1):148-154. doi: 10.1016/j.sdentj.2018.10.007. Epub 2018 Nov 12. PMID: 30705578; PMCID: PMC6349957.
8. Stansbury CB: Single denture construction against a non-modified natural dentition . *J Prosthet Dent.* 1951, 1:692-9. 10.1016/0022-3913(51)90006-6