

Multidisciplinary Approach in Full Mouth Rehabilitation

Tanaya*, Pankaj Dhawan, Piyush Tandan, Shivam Singh Tomar, Divyesh Mehta

Department of Prosthodontics & Crown and Bridge and Implantology, Manav Rachna Dental College & Hospital, India

ABSTRACT

Mutilated dentition due to caries, tilted, drifted, rotated or malpositioned tooth results in compromised esthetics, alteration in phonetics and difficulty in mastication and thus handicapping a person physically and esthetically leading to disruption of one's everyday life.

To improve the patient's condition complete dentistry concept is required. This is only possible when optimum health of stomatognathic system is maintained by restoring anatomic form, functional harmony and occlusal stability. For this purpose, it is the duty of a restorative dentist to rehabilitate patient's full mouth. Full mouth rehabilitation (FMR) is correlation of all indicated and required dental treatment for a patient in order to restore the occlusion to normal function, improve esthetics and preserve tooth and its supporting structure.

Functional and esthetic rehabilitation starts with proper examination and evaluation of each and every component of masticatory system. Efficient diagnosis, conceptual analysis of need treatment and elaborate treatment planning requires thorough knowledge of FMR. There are various occlusion concepts in FMR. PMS philosophy is a preferred choice of for FMR. Prior to going for prosthesis rehabilitation, it is essential to prepare the mouth and get consultation from other dental disciplines as per the requirement of the case. Therefore, multidisciplinary approach helps in providing better understanding of patient's condition.

This involves periodontist, endodontist, oral surgeon and orthodontist. As per the requirement of condition of the patient, all the disciplines of dentistry should be consulted and involved in the treatment of the patient. The key to success is along with the multidisciplinary approach, constant communication with patients to make them understand the disorder and proactively participate in treating it.

Key words: Esthetics, Orthodontist, FMR, Malpositioned tooth, Anatomy

HOW TO CITE THIS ARTICLE: Tanaya, Pankaj Dhawan, Piyush Tandan, Shivam Singh Tomar, Divyesh Mehta, Multidisciplinary Approach in Full Mouth Rehabilitation, J Res Med Dent Sci, 2020, 8(5): 57-62

Corresponding author: Tanaya
e-mail ✉: tanayasamarpita@gmail.com
Received: 02/07/2020
Accepted: 14/08/2020

INTRODUCTION

In oral cavity, physical and chemical mechanism, or combination of both leads to physiological and pathological process like stress, friction, and corrosion [1]. Lack of knowledge and negligence cause these processes to continue for years leading to deformation of tooth structure. If taken further can end up in extensive destruction of patient's natural tooth form and its supporting structures. Mutilated dentition due to caries, tilted, drifted, rotated or malpositioned tooth results in compromised esthetics, alteration in phonetics and difficulty in mastication. Thus, handicapping a person physically and esthetically leading to disruption of one's everyday life.

To fulfill goal of dentistry for a patient's condition complete dentistry concept is required. This is only possible when optimum health of stomatognathic system

is maintained by restoring anatomic form, functional harmony, and occlusal stability. For this purpose, it is the duty of a restorative dentist to rehabilitate patient's full mouth. Management of badly mutilated dentition patients is a challenging task. But full mouth rehabilitation (FMR) is correlation of all indicated and required dental treatment for a patient to restore the occlusion to normal function, improve esthetics and preserve tooth and its supporting structure [2].

Functional and esthetic rehabilitation starts with proper examination and evaluation of each component of masticatory system. Efficient diagnosis, conceptual analysis of need treatment and elaborate treatment planning requires thorough knowledge of FMR and its concepts [3-5]. There are various occlusion concepts in FMR namely: Gnathological concept, Freedom in centric concept, Pankey Mann Schuyler (PMS) concept, Hobo twin table, Hobo twin stage and Youdelis occlusal scheme [6]. PMS philosophy is a preferred choice of for FMR. Prior to going for prosthesis rehabilitation, it is essential to prepare the mouth and get consultation from other dental disciplines as per the requirement of the case. Therefore,

multidisciplinary approach helps in providing better understanding of patient's condition. Thus, providing the patient with complete treatment [7].

FMR

FMR is the restoration of form and function of masticatory apparatus to as near normal as possible [8]. FMR being a challenging and elaborate time taking procedure should only be employed when it is necessary. Following are the definite signs, which requires FMR [9-11].

Worn down teeth: Teeth wear down with the age, but it is not normal to have excessive worn down or painful teeth. This can be caused by factors like bruxism, teeth grinding, eating, or crunching hard food and dental pathologies. Worn down teeth can lead to misaligned bite, infection of pulp and other serious issues.

Temporomandibular disorders: When the underlying cause of TMJ pain is because of occlusal discrepancy then it is essential to correct the symptoms.

Dental Trauma: Accidents, sports injury or any other traumatic event can cause teeth damage. They can be knocked out, chipped, or pushed out of alignment. In such cases, FMR becomes the choice of treatment

Assessment of the occlusal disease of the patient is of starting point. Occlusal disease is deformation or disturbance of function of any structure within the masticatory system that are in disequilibrium with a harmonious inter-relationship between TMJ, masticatory musculature and occluding teeth surfaces [1]. Attritional wear, enamel erosion, splayed teeth fremitus and soreness are the early stages. Of occlusal disease. If they are not taken care of the it leads to severe occlusal conditions. Various clinical situations require extensive prosthetic rehabilitation involving entire compliment of teeth are [12].

Mutilated dentition because of advanced attrition or abrasion or caries

Drifted, elongated, extruded teeth with loss of contacts and have involvement of periodontium.

Temporomandibular disorders with etiology involving occlusal disharmony

Discoloured or malformed teeth secondary to developmental disorders.

There are the conditions which do not need oral rehabilitation. Following are the factors need to be considered during treatment planning so that evaluation for the same can be done [13].

Not all points with severe tooth wear need complete oral rehabilitation.

Extreme tooth wear of occlusal surface may not be significantly reduced as compensatory occlusal tooth migration occurs.

In case chewing ability is satisfactory, cosmetic value is acceptable and there are no functional complaints then complete oral rehabilitation is not required.

The next step in FMR is diagnosis and treatment planning. Following are the criterias to be considered for the same [14].

Preservation of remaining tooth structure by identification of other possible contributing factors

Evaluating amount of wear, which is associated with esthetics, loss of teeth, tooth sensitivity and advancing age

Assessing of vertical dimension by evaluating phonetics (using sibilant & M sounds), inter occlusal distance, soft tissue contours and swallowing method

Inter occlusal distance should be measured at physiologic rest position and is between 2-4 mm. Freeway space more than 4 mm suggest loss of vertical dimension.

Use of FMR reorganizes the occlusion which will have self-sustained, self-maintaining masticatory mechanism. This will ensure health, harmony, and comfort of patient [3]. For fixed prosthodontic procedures there are two approaches, confirmative and reorganized followed. Confirmative approach is used for relatively small amount of restorative treatment. Reorganised approach is the one used for extensive restorations to optimize patient's occlusion [15]. Reorganized approach in full mouth rehabilitations should restore the structural and functional integrity of the dental arches that are compromised by decayed, missing, broken teeth. It should be more intellectually and technically planned and executed to optimize oral function, occlusal stability and esthetics. Keeping this in mind a clinician needs to plan out the treatment. To have clarity and smooth path to successful treatment one needs to understand, respect, and follow interdisciplinary approach [16].

MULTIDISCIPLINARY APPROACH

Multidisciplinary approach is essential for a comprehensive dental treatment [17]. In FMR, diagnosis gives an understanding of what procedures are required for mouth preparation prior to prosthetic restoration. Preliminary mouth preparation which require intervention from other departments needs to be completed before commencement of actual restorative procedure. These are:

Oral hygiene measures and home care instructions are given to patients, to understand the level of compliance, ability, and interest for the treatment before starting the extensive restorative procedures.

Achieving caries control by adequate conservative procedures if required prescribing endodontic therapy. In few instances, intentional endodontic therapy must be performed to establish occlusal plane.

Periodontal therapy should also be completed. Adequate time should be allowed for tissue maturation before final procedure.

Necessary extraction should be done earlier so that tissues heal properly before starting treatment.

Orthodontic procedures are done to correct and stabilize occlusion.

Periodontists could offer a hand for soft and hard tissue management to prepare sites for successful prosthetic treatments. Active periodontal disease shows signs. They are pocket formation, the presence of bleeding on probing or suppuration, and tissue changes of gingiva. If they are not controlled cascade of following events occurs, persistent inflammation, bone resorption and eventually tooth loss. In other words, function and lifespan of the prosthesis will be compromised if periodontal diseases remain uncontrolled delivery. Thus, it is essential to eliminate or control active periodontal diseases and contributing factors [18-20].

They share a close connect in multiple aspects of fulfilling FMR treatment, like treatment planning, executing procedures, achieving outcomes, and maintaining oral health post restoration. In treatment planning periodontal parameters such as furcation involvement, tooth mobility, severity bone loss helps us in understanding the condition of supporting structures. In executing procedures, evaluation of teeth helps us understand about the biological width and ferrule present. Periodontal procedures required are surgical crown lengthening [21].

Surgical crown lengthening

To treat patients with attrition is the application of a surgical crown lengthening is also a treatment modality. It is a procedure to correct the discrepancy in gingival margins and achieve greater retention and resistance for future restorations. This procedure is followed by elective endodontic treatment, post, and core build-ups, and restoration of the teeth.

Surgical crown lengthening could be performed via multiple techniques [22-24]:

External Bevel gingivectomy

Internal Bevel Gingivectomy with or without bone reduction

Apically positioned flap with or without bone Reduction

Before prosthesis rehabilitation, all caries must be removed and restored. Endodontist specialize in saving teeth by restoring the teeth or root canal treatment (RCT). Instead of going for an extraction of carious tooth until necessary, conserving them helps in achieving comprehensive dental treatment. Intentional RCT's followed by post and core for abutment teeth with ferrule less than required is the advised procedure. But when examination and evaluation of mouth reveals that a tooth is beyond saving then it has to go for extraction. These conditions can be mobility of tooth to be restored, periodontally compromised tooth, grossly decayed teeth, root stumps and tooth which cannot be saved periodontal therapy or endodontic treatment [25].

Preprosthetic orthodontic intervention is necessary to optimize tooth esthetics and function aspects of dental treatment. It is required in various situations. Orthodontics treatment with multiple missing teeth, Correction of anterior deep vertical overlap, Anterior worn dentition, Up-righting tilted teeth, and Orthodontics crown lengthening are procedures stating the requirement of multidisciplinary approach to fulfill FMR treatment. The need for orthodontic tooth movement prior to restorative treatment is necessary for some patients, in order to optimize both esthetic and functional aspects of dental treatment [26,27].

Defining the correct occlusal vertical dimension for patients is one of the most important steps for function and esthetics rehabilitation. Any alterations in the occlusal vertical dimension (OVD) during clinical procedures may affect the stomatognathic system. Use cephalometry as a diagnostic tool in prosthodontics is an efficient method to help determine the OVD. A well-performed cephalometry can be an accurate and convenient tool to make the treatment planning and prognostic of the occlusal vertical dimension reestablishment more predictable. An accurate evaluation of the facial vertical dimension is essential to a successful prosthetic treatment, but the dentist cannot indiscriminately increase or decrease the OVD beyond the patient's physiologic requirements. A cephalometric analysis can represent a solid parameter from which the OVD can be established. Cephalometry is a standardized method of assessing dental and facial proportions and their interrelation. In the technique, the patient is positioned within the cephalostat using adjustable ear rods placed within each auditory meatus. The mid sagittal plane of the patient is vertical and perpendicular to the X-ray beam, and the visual axis is horizontal so that the patient is positioned with the head held in the natural position [28].

Pre-prosthetic orthodontic intervention is needed in a variety of situations. They are Orthodontics treatment with multiple missing teeth, Correction of anterior deep vertical overlap, Anterior worn dentition, Up-righting tilted teeth and Orthodontics crown lengthening. The influence of orthodontic treatment on esthetic and functional outcomes facilitate proper planning of restorative treatment [23].

The loss of teeth and, consequently, the provision of full prosthetic dentures have always generated great interest, for patients as well as for professionals who work in the area. The use of cephalometric radiographs and the analyses of these to establish the positioning of the posterior and anterior teeth, and consequently the VDO, not the guarantee on an easy determination of the facial height, owing to the accentuated intraoral variability. Cephalometric analyses can facilitate or determine lower facial height, thus aiding in the construction of full prostheses, partial prostheses and prostheses for those in extensive prosthetic rehabilitation [28].

Orthodontics intrusion of worn anterior teeth

A scenario of FMR where multidisciplinary approach will facilitate the treatment is short anterior clinical crowns due to a habit of anterior bruxism, combined with posterior teeth of normal height that maintain their vertical dimension. In this, anterior teeth continue to erupt with the bone and surrounding tissue (compensatory eruption), thereby maintains contact with the opposing teeth, resulting in short clinical crowns and inconsistent marginal gingiva. For correction of this condition, following modality can be used [29].

Orthodontic intrusion is a lengthy treatment that requires a high degree of patient compliance but is considered an ideal treatment option because of its less invasive nature. During planning phase, the clinician can use amount of tooth displayed at rest and amount of lip mobility to determine how he or she will lengthen the short worn out anterior teeth. In most cases, the treatment will be a combination of orthodontic intrusion followed by their restoration. The guide for intrusion will be determined based on adjacent non-worn teeth. The width-to-length proportion of the final restorations that fit the patient's aesthetic is an important determinant for intrusion.

Following orthodontic correction, the position of the teeth should be maintained for at least 6 months to aid in reorienting the periodontal fiber into a more stable position, which will prevent re-extrusion of the teeth. After the worn anterior teeth have received final ceramic or metal-ceramic restorations, the patient should be provided with a bite splint to wear it while sleeping. This is as a method of stabilizing the occlusion and helps to protect the final restorations [30].

Orthodontics extrusion for crown lengthening purpose

Maintenance of the restorative margins within 0.5 to 1 mm in the gingival sulcus and approximately 3 mm coronal to the bone level is crucial for ensuring the health of the periodontium. The clinician must choose one of two options: surgical crown lengthening or orthodontic crown lengthening with rapid and high extrusion forces, which may result in movement of the tooth without the attachment apparatus. The advantages of orthodontic extrusion over surgical crown lengthening are that orthodontic extrusion provides a more favourable crown to root ratio, eliminates the risk of compromising the alveolar bone support of the adjacent teeth, and will not compromise the aesthetic of the tooth that requires crown lengthening [31].

As Dawson said, never begin any restorative procedure unless all the procedures that follow are outlined in advance and properly related to one another in correct sequence and result is visualized and understood. So, patients who multidisciplinary treatment most logical and orderly approach is to execute through an evaluation of the existing occlusion and comparison of that condition to an occlusal scheme that would be

physiologically, functionally and aesthetically most durable [1].

DISCUSSION

Decimated occlusion when starts to affect the esthetic and function of a person, it needs to be treated. To treat this condition, we need to keep in mind the primary therapeutic goal, which is to restore and maintain health, function, and beauty of stomatognathic system [16]. This system is the functional unit of the body responsible for chewing, speaking, and swallowing [32]. To create a smile which is not only esthetic but also functionally comfortable for these patients, FMR is required. Satisfactorily restoring a patient to a state of physiologic health is a challenge that requires that the clinician not only be an acute diagnostician but also having adequate knowledge of a wide range of treatment modalities. Thorough diagnosis and examination are the key to draw a systematic treatment planning [33]. One should not start the restorative procedure without visualizing the result. Clinician must seek multidisciplinary approach when required. To ensure an overall successful FMR treatment achieve the common goal of creating pleasing esthetics with harmonious stomatognathic system clinician must have frequent and efficient communication. This involves periodontist, endodontist, oral surgeon, and orthodontist. As per the requirement of condition of the patient, all the disciplines of dentistry should be consulted and involved in the treatment of the patient. Thus, fulfilling the role of a responsible restorative clinician.

There are various occlusion concepts in FMR namely: Gnathological concept, Freedom in centric concept, Pankey Mann Schuyler (PMS) concept, Hobo twin table, Hobo twin stage and Youdelis occlusal scheme. PMS philosophy is a preferred choice of for FMR. It helps to complete the treatment easily, quickly, and comfortably for the patient and clinician. PMS system is a very flexible concept [6]. Treatment models can vary from simplest technique for beginners to most precise details for experts. This concept rationalizes the necessity of disclusion to reduce the horizontal stresses by developing canine guided or mutually protected occlusion. But to fulfil this thorough knowledge of the various factors which play a key role in maintenance of occlusal harmony, function and esthetics is essential. Knowledge of some of the essential concepts which include vertical dimension, anterior guidance, centric relation, occlusal scheme, occlusal morphology, and plane of occlusion are of utmost importance.

But with advent of new materials and techniques, tremendous progress has occurred in the field of restorative dentistry. From the procedure of impression making till the designing of prosthesis everything is getting digitalized. This is making restorative dentistry easier, faster, accurate and precise in the approach. But saying this, thorough knowledge of the concepts required for FMR is the foundation of its success.

CONCLUSION

The clinician must be aware of the requirements that a physiologic restoration be made that is not only aesthetic and functional but that also remains in harmony with the entire gnathostomatic system. So, optimum oral health should be the prime objective of all rehabilitation procedures. The clinician not only be an acute diagnostician but also having adequate knowledge of a wide range of treatment modalities. Using PMNS philosophy of occlusal rehabilitation fulfils the most exacting and sophisticated demands, with great simplicity and orderliness of technique. Treatment objectives can be achieved by accurate diagnosis, meticulous treatment planning together with a dedicated team approach involving different disciplines in dentistry. The key to success is along with the multidisciplinary approach, constant communication with patients to make them understand the disorder and proactively participate in treating it.

REFERENCES

- Dawson PE. Evaluation, diagnosis and treatment of occlusal problems. 2nd Edn. Cv Mosby Company, St. Louis Baltimore, Toronto 1989.
- Barman JS. Occlusal considerations, concepts and treatment planning for full mouth rehabilitation of mutilated dentition. Indian J Stomatol 2014; 5:102-107.
- Avinash KVN, Ritika S, Swathi AL, et al. Pankey mann schuyler philosophy: Critical analysis. World J Pharma Res 2019; 8:1249-1253.
- Angitha K. Interdisciplinary approach towards full mouth rehabilitation-A case report. Annals Prosthodont Restorative Dent 2017; 3:25-28.
- <https://www.biblio.com/book/research-report-gnathology-mccollum-bb-stuart/d/473083836>
- Tiwari B, Ladha K, Lalit A, et al. Occlusal concepts in full mouth rehabilitation: An overview. J Indian Prosthodont Soc 2014; 14:344-351.
- Devassy PJ, Sivadas A, Muhammed S. Full mouth occlusal rehabilitation: By Pankey Mann Schuyler philosophy. Annals Prosthodont Restorative Dent 2017; 3:29-33.
- The Academy of Prosthodontics. The glossary of prosthodontic terms. J Prosthet Dent 2005; 94:10-92.
- LeVos K. Full mouth rehabilitation: A staged approach to treating the worn dentition. Compendium Continuing Edu Dent 2014; 35:358-361.
- Song M, Park JM, Park EJ. Full mouth rehabilitation of the patient with severely worn dentition: A case report. J Adv Prosthodont 2010; 2:106-110.
- Wilkins R. Long term provisional bonded composite restorations make full-mouth rehabilitation possible. Compendium Continuing Edu Dent 2016; 37:326-331.
- Sudhir N, Parkash H. Full mouth rehabilitation with group functionocclusal scheme in a patient with severe dental fluorosis. Ind J Dent Adv 2011; 3:627-631.
- Dahl BL, Carlsson GE, Ekfeldt A. Occlusal wear of teeth and restorative materials: A review of classification, etiology, mechanisms of wear, and some aspects of restorative procedures, Acta Odontologica Scandinavica 1993; 51:299-311.
- Shetty M, Joshi N, Prasad DK, et al. Complete rehabilitation of a patient with occlusal wear. A case report. J Indian Prosthodont Society 2012; 12:191-197.
- Song MY, Park JM, Park EJ. Full mouth rehabilitation of the patient with severely worn dentition: A case report. J Adv Prosthodont 2010; 2:106-110.
- Vaishnavi R, Tamore S, Salagundi BS. Full mouth rehabilitation. Guident 2020; 13:12-16.
- Baid GC, Lakshman SD, Marilingaiah A, et al. Comprehensive treatment of compromised dentition: An interdisciplinary approach. J Interdiscip Dent 2012; 2:205-210.
- Becker W, Becker BE, Berg LE. Periodontal treatment without main-tenance. A retrospective study in 44 patients. J Periodontol 1984; 55:505-509.
- Becker W, The long term evaluation of periodontal treatment and maintenance in 95 patients. Int J Periodontics Re-storative Dent 1984; 4: 54-71.
- McGuire MK , Nunn ME. Prognosis versus actual outcome. II. The effectiveness of clinical parameters in developing an accurate prognosis. J Periodontol 1996; 67:658-665.
- Karateew ED, Newman T, Shakir F. Crown lengthening and prosthodontic considerations. Adv Periodont Surg 2019; 2020:193-205.
- Hsu YT, Huang NC, Wang HL. The relationship between periodontics and prosthodontics: The two-way street. J Prosthodont Implantol 2015; 4:2-9.
- Alfallaj H. Pre-prosthetic orthodontics. Saudi Dent J 2020; 32:7-14.
- Kokich VG. Altering vertical dimension in the perio-restorative patient: the orthodontic possibilities. In: Cohen., M. (Ed.). Interdisciplinary treatment planning: Principles, design, implementation. Chicago: Quintessence. Altering vertical dimension in the perio-restorative patient: The orthodontic possibilities. 2008.
- Thumati P, Reddy RK. Multidisciplinary approach in full mouth rehabilitation – From ruins to riches in oral health. J Dent Med Sci 2013; 12:25-29.
- Lux CJ, Conradt C, Burden D, et al. Three dimensional analysis of maxillary and mandibular growth increments. Cleft Palate Craniofac J 2004; 41:304-314.
- Schillingburg HT, Hobo S, Whitsett LD, et al. Fundamentals of fixed prosthodontics. 3rd Edn Chicago: Quintessence; 1997; 28.
- Bloom DR, Padayachy JN. Increasing occlusal vertical dimension- Why, When and How. Br Dent J 2006; 200:199-203.

29. Pandey A, Tiwari L. Full mouth rehabilitation of the patient with severely worn dentition: A case report. *Int J Res Health Allied Sci* 2019; 5:151-154.
30. Lynch CD, Mc Connell RJ. Prosthodontic management of the curve of spee: Use of the broadrick flag. *J Prosthet Dent* 2002; 87:593-597.
31. Meenakshi, Harishnath. Functionally generated path technique: A prosthodontic review. *University J Surg Surgical Specialities* 2018; 4.
32. Saafi J, Debbabi I, Alremthi HA, et l. A modified functionally generated path technique(FGP) for making posterior unit metal-ceramic crown: A case report. *J Oral Dent Sci* 2018; 2:103.
33. Keough B. Occlusion based treatment planning for complex restoration: Part-1. *Int J Perio Rest Dent* 2003; 23:237-247.