

PHILOSOPHIES RELATED TO FULL MOUTH REHABILITATION: A SYSTEMATIC REVIEW OF CLINICAL STUDIES

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INTRODUCTION

The minimal and gradual wear of occlusal surfaces of teeth is a normal process during the lifetime of an individual. It can be due to congenital and developmental anomalies such as amelogenesis imperfecta and dentinogenesis imperfecta or can be acquired such as attrition, abrasion, and erosion.¹ However, excessive loss of tooth material may result in pulpal pathology, occlusal disharmony, impaired function, and aesthetic disfigurement and eventually mental distress. The management of tooth wear is becoming a subject of expanding enthusiasm in the prosthodontic field. This requires the full mouth rehabilitation which converts all the unfavourable forces on the teeth which inevitably induce pathologic conditions, into favourable forces that permit normal function and therefore induce healthy conditions and restoring quality life. Turner and Missirlian (T&M) in 1984 classified occlusal wear into three categories.² The rehabilitation of each category should be possible by any of the proposed philosophies of full mouth rehabilitation. These philosophies are Pankey Mann Schuyler (PMS), Hobo twin table and Hobo twin stage. However, all types of occlusal wear cannot be redressed by using any philosophy. PMS philosophy (1960) is based on the principles of the spherical theory of Monson and functionally generated path technique (FGPT) described by Meyer.^{3,4} It restores the anterior guidance first and then mandibular occlusion plane followed by maxillary occlusal plane. Hobo Twin table philosophy (1991) utilizes the two customized incisal guide tables, one with disocclusion and another without disocclusion.^{5,6} In this philosophy, posterior occlusion is rehabilitated first followed by the development of anterior guidance. Moreover, Hobo Twin Stage philosophy (1997) is based on the standard cusp angle which is used to build up the standard measure of disocclusion.^{7,8} A critical assessment of available literature on occlusal philosophies of full mouth rehabilitation requires an understanding of their historical development and proper

application. Occlusion plays a key role in establishing the synchronous harmony between components of the stomatognathic system. Henceforth, the selection of legitimate philosophy is the most important step in the prosthetic rehabilitation of a patient with mutilated dentition. The primary objective of this systematic review is to critically analyse the existing literature, including original articles and case reports of philosophies of full mouth rehabilitation, which will help in selecting an appropriate philosophy for an individual case. The secondary objective is to survey the occurrence rate of the category of T&M classification.

METHODS

Protocol and registration

A Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2009⁹ protocol for a systematic review was followed. This systematic review registered under the International Prospective Register of Systematic Reviews (PROSPERO) bearing registration number-164375.

Eligibility criteria

CAsE REport (CARE) 2013¹⁰ guidelines were followed for quality assessment. The following study characteristics, i.e., Population, Intervention, Comparison, Outcome, and Study design model was adopted:

Population

Male and female individuals irrespective of age having worn out dentition due to acquired or developmental diseases.

Intervention

The application of three philosophies; PMS, Hobo Twin Table, and Hobo Twin Stage.

Comparison

Three philosophies were compared.

Outcome

The philosophy which is clinically efficient, practically feasible, simple, and easy to apply within stipulated time resulting in patient's comfort and satisfaction to ensure a quality life. The selection criteria include basic research studies of 3 philosophies, case reports and case series, randomized clinical trials and implant therapy and published studies till 2018. Studies with missing data were excluded from the study.

Study design

Nonrandomized studies such as observational studies, case reports, and case series and randomized clinical trials were considered.

Information sources

A search of electronic databases, including PubMed, MEDLINE, EMBASE, CINHAI, Web of Science, Research Gate, Ebscohost, Google scholar, and Cochrane library exploration for applicable studies distributed from January 1960 to October 2018 was performed. In addition, 2 hand searches were carried out in textbook on “Osseointegration and occlusal rehabilitation” by Sumiya Hobo *et al.*, and textbook titled as “Functional Occlusion from TMJ to Smile Design” by Peter E. Dawson. Journals included were, Journal of Indian Prosthodontic Society, Journal of Prosthetic Dentistry, Journal of Advanced Prosthodontics, Indian Journal of Dental Advancement, International Journal of Dental Case Reports, International Journal of Prosthodontics and Restorative Dentistry and International Journal of Current Research.

Search

Search terms used were, full mouth rehabilitation; occlusion; philosophies of FMR; PMS; PM instrument; Hobo philosophy; Hobo twin table technique; Hobo twin stage technique; oral rehabilitation; occlusal rehabilitation; implant occlusion; worn out dentition; T&M classification.

Study selection

This systematic review was performed independently by 2 clinicians and 1 methodologist, in a blinded standardized manner to avoid any bias. No disagreements were found among the reviewers. Original research articles, case reports and case series were included for the systematic review.

Data collection process

The first search hits were explored by two investigators to bar any duplications or studies not relevant to the research question. In selecting the publications, the titles and abstracts were reviewed to identify the relevant studies, which were then retrieved in full format and assessed by the third investigator for inclusion and exclusion criteria. The reasons for exclusion of studies were likewise noted. Finally, the selected studies were the ones that answered the review questions.

Data items

The variables considered for the study are (1) age, (2) gender of the patient, (3) the cause of the occlusal wear, (4) to which T&M classification the clinical condition belongs, (5) the

applied philosophy, (6) practical applicability of the philosophy, (7) follow-up period, (8) outcome of treatment, and (9) the patient's comfort.

Bias assessment

Careful assessment of the compiled studies applying the Case Report guidelines performed by two senior Prosthodontists to investigate the possible bias within and across the studies.

RESULTS

Study selection

A total of 54 published studies and 2 hand searches were screened and assessed for eligibility. Of these, 22 studies did not meet the eligibility criteria since they were not having any specific application of the philosophy of full mouth rehabilitation and 2 hand searches were found duplication. Hence, 24 studies were rejected. The full text of the remaining 32 studies was further reviewed and finally, 32 articles fulfilling the inclusion criteria were chosen.

Study characteristics

Methods

Among 32 articles, 8 were unique articles of the philosophies proposed and 24 were case reports. CARE guidelines checklist was followed in choosing the case reports.

Participants

The included studies involved 26 participants. The main inclusion criteria entailed worn out permanent dentition irrespective of age and gender.

Intervention

Application of any philosophy of full mouth rehabilitation.

Outcome

Primary

The assessment of all case reports showed that among 26 cases, 15 cases (57.69%) were rehabilitated by PMS philosophy, 2 cases (7.69%) by Hobo twin table and 9 cases (34.61%) by Hobo twin stage philosophy.

Secondary

Twenty-one out of 26 cases were showed for category number 1 (80.76%) And 4 cases for category number 2 (15.38%) And 1 case for category number 3 (3.84%) Of t&m classification.

DISCUSSION

Summary of evidence

The concept of complete mouth rehabilitation is dependent on three principles, the existence of a physiologic rest position of the mandible which is constant, the recognition of a variable vertical dimension of occlusion and the acceptance of dynamic, functional centric occlusion.³⁷ Once the aetiology has been determined for occlusal wear, the evaluation of diagnostic data that includes the occlusal vertical dimension and consultation with the patient to recognize the need for the restoration, and a comprehensive treatment plan should be formulated. This purpose requires a classification to determine the status of the existing condition and to plan a definitive treatment. The classification of worn-out dentition is useful to communicate with the professional about a case and to apply a particular philosophy for rehabilitation. The most widely applied classification system is T&M classification² given by T&M in 1984. Other classifications are additionally proposed for occlusal wear which includes Jones³⁸ classification in 1963 and Dawson's classification³⁹ in 1996 but are not that practically popular. The patient can be set into one of the three categories of T&M classification² relative to the occlusal vertical dimension associated with an appropriate treatment plan.

Category number 1 includes excessive wear with loss of occlusal vertical dimension. The condition presenting excessive wear without loss of occlusal vertical dimension but with restorative space available is categorized as number 2. Moreover, those presenting excessive wear without loss of occlusal vertical dimension but with limited restorative space available is classified under category number 3. Occlusion plays a key role in establishing the synchronous harmony between components of the stomatognathic system. Hence, the selection of legitimate philosophy is the most important step in the prosthetic rehabilitation of a patient with mutilated dentition. A critical assessment of available literature on occlusal philosophies of full mouth rehabilitation requires an understanding of their historical evolution and appropriate application. Hence, this systematic review was performed to help the clinician to choose a suitable philosophy to treat an individual T&M classification.

For this systematic review, 54 published studies and 2 hand searches^{40,41} were collected. Of which only 32 studies were selected at first hit. The other 22 articles^{38,42-61} were omitted as these articles had not applied explicit use of any philosophy rather a general consideration about occlusal restoration was applied. Finally, among 32 included studies, 26 were case reports (1 case series with 3 case reports) and 8 were original articles from respective authors

of philosophies of full mouth rehabilitation. However, no higher levels of evidence such as randomized clinical trials are available related to this topic. Statistical assessment of case reports revealed that 21 out of 26 cases were presented for category number 1 (80.76%) and 4 cases reported for category number 2 (15.38%) and 1 case for category number 3 (3.84%) of T&M classification. The rehabilitation for each category of T&M classification done by any of the proposed philosophies of full mouth rehabilitation. These philosophies are PMS,^{3,4} Hobo twin table,^{5,6} Hobo twin stage,^{7,8} Nyman and Lindhe philosophy,³⁵ and Youdelis philosophy.³⁶ The literature showed that a particular category of T&M classification can be treated by a particular theory. For this systematic review, specifically three philosophies, i.e., PMS, Hobo twin table and Hobo twin stage were chosen; as the maximum of studies are available for these philosophies. Hence, these three philosophies of full mouth rehabilitation were systematically reviewed to explore the effectiveness of treatment in mutilated dentition, ease and duration of treatment and patient's comfort and satisfaction leading to improved quality of life. No evidence-based case reports or case series are available for Youdelis philosophy and Nyman and Lindhe philosophy except the proposal of the same techniques. Based on the reviewed data, we can infer that PMS philosophy was used for category number 1, Hobo twin table was applied for category number 2 and Hobo twin stage can be applied to both category number 1 and 3 of T&M classification.

The PMS philosophy is a very flexible concept as suggested by many authors. As indicated by Schuyler, the condylar guidance does not dictate the anterior guidance. Hence, this theory believes in harmonization of anterior guidance for best possible aesthetics, function, and comfort and the determination of an occlusal plane based on anterior guidance. According to Dawson, anterior teeth play a dominant role in establishing the functional path that mandible can travel. Hence, the position and the contours of lower anterior teeth should be the starting point of occlusal design as they are the beginning of functional movements that establish anterior guidance and envelope of motion. The philosophy uses PM instrument to establish a functional occlusal plane on the mandibular teeth. It uses group function occlusion scheme. The sequence of treatment advocated by PMS comprises four phases. The first phase includes; examination, diagnosis, treatment planning, and predicting prognosis. Then, anterior guidance is established in the second phase. Later during the third phase, mandibular posteriors are rehabilitated followed by maxillary posterior in the fourth phase using a FGPT.⁴ The PMS philosophy was found to be a more efficient, organized, and coherent procedure. Complications associated with this philosophy are exceptionally less as it divides the rehabilitation into separate series of appointments where anterior guidance is first

established and thus aesthetics of patient is maintained throughout the treatment. This provides a major psychological comfort to the patient. Furthermore, there is never a need for preparing more than eight teeth at a time. Its main drawback is that it uses FGPT which utilizes wax and it can get distorted easily. Furthermore, FGPT technique cannot be used in periodontally compromised cases. Furthermore, the original PMS technique requires PM instrument.

The review of the literature showed a maximum of cases is treated using PMS philosophy. Hence, we can say that it is a widely used theory for rehabilitation. Its relative indication is when anterior guidance is disturbed and has to be restored first as in the case of T&M category number 1. In literature, 15 cases^{11,13,16,18,19,21,25,26,28,30-34} out of 26 cases are treated by PMS philosophy from the year of its introduction in 1963 till 2018 which makes 57.69% of the cases. Twelve cases fall under category number 1 and 3 cases under category number 2 of T&M classification. In none of the cases, the PM instrument was used. The maximum number of case reports is seen on male patients with a broad age group ranging from 18 to 75 years. This age gap can be due to altered morphology seen in the younger age group and pathologic wear seen in the elder age group. Studies have shown satisfactory results at a short-term follow-up of 1 week–6 months.^{16,18,19,30,33} Furthermore, on long-term follow-up of 1 year–2 years, the comfort, function, and aesthetics were highly satisfied.^{26,32,34} No case report has been reported for implant therapy using PMS philosophy.

Another philosophy was given by Hobo and Takayama in 1991 which is named as Hobo Twin Table philosophy.^{5,6} It is based on the principle that anterior guidance influences the working condylar path and concluded that they were dependent factors. They believed in posterior disocclusion in eccentric movements, unlike the PMS philosophy where group function is achieved on the working side. Posterior disocclusion is dependent on the angle of hinge rotation and cusp shape factor. Hence, the concept developed anterior guidance to create a predetermined harmonious disocclusion with the condylar path. The technique⁶ utilizes two different customized incisal guide tables. The first incisal table is termed as an incisal table without disocclusion. It is fabricated by preparing die systems with the removable anterior and posterior segments. This table helps us achieve uniform contacts in posterior restorations during eccentric movements. The other incisal table is made when the articulator can simulate border movements by placing 3 mm plastic separators behind the

condylar element. This is termed as incisal guidance with disocclusion. Disocclusion of 0.5 mm was achieved on the working side and 1 mm on the nonworking side.

Hobo Twin Table technique is a methodical approach in which first occlusal morphology of posterior teeth is reproduced where the cusp angle coincident with the standard value of effective cusp angle produced according to the condylar guidance recorded. And second, anterior morphology is reproduced and anterior guidance provided which produced a standard amount of disocclusion. The drawback of this concept is that it makes the patient more uncomfortable because too steep cuspal angle makes the incisal table to be set at a too steep angle. Furthermore, it is a technique sensitive as anterior guide table was fabricated by resin moulding.⁷ The case reports for this philosophy are very limited in the literature. Two case reports,^{20,21} out of 26 total cases have been documented in the literature in the year 2012 and 2013 which makes 7.69% of all cases, and each case falls under the category number 1 and 2 of T&M classification. No short-term or long-term follow-up is seen in the studies. Moreover, no implant case reports have been documented.

Later after 6 years, the concepts changed and it was believed that the condylar path is unchangeable and anterior guidance can be changed suggesting that both are independent factors. It was proposed that the incisal path is not a reliable reference point, so Hobo and Takayama stated that the cusp angle is used as the main determinant of occlusion because of its reliability. Moreover, it is possible to accurately control the amount of disocclusion on the restoration without measuring the condylar path. This led to the introduction of a new philosophy in 1997 named as Hobo Twin stage.⁷ It reproduces the occlusal morphology of posterior teeth without anterior segment and produces cusp angle coincident with the standard values of effective cusp angle, referred to as “Condition 1.” Second, it reproduces the anterior morphology with the anterior segment and provides anterior guidance which produces a standard amount of disocclusion which is referred to as “Condition 2.”⁸

Since the standard cusp angles were used as the main determinant of occlusion, the measurement of the condylar path was not necessary, and the tooth contact condition during eccentric movements was controlled precisely by every selected occlusal scheme. The Twin-Hoby Articulator (3M Dental) was designed for this purpose. However, there are certain limitations of this theory also as it cannot be used for maligned occlusion. It is again, commonly used for T&M category number 1 and occasionally number 3. In literature, 9 cases^{12,14,15,17,21,23,24,27,29} among 26 are reported from the year 2012–2017 applying Hobo Twin Stage philosophy, which makes 34.61% of total cases. Out of this, 8 cases belong to category number 1 and 1 case to category number 3 of T&M classification. A short period of

follow-up of 1 week has been documented.¹⁴ One case of implant therapy has been reported in the year 2012 where Hobo Twin Stage philosophy was used.¹⁷

According to Nyman and Lindhe Scheme³⁵ for extremely advanced periodontitis cases even contact should be provided in the intercuspal position, although no great emphasis is placed upon the type of contacts. When distal support is present, anterior disocclusion should be provided. When there is long tooth-borne cantilevered restorations, the aim is to achieve simultaneous working and nonworking side contacts on the cantilever as in balanced occlusion. All restorations should be fabricated on semi-adjustable articulators with average settings and supragingival margin placement.

Following the literature review, it was found that occlusal schemes were also formulated for oral rehabilitation in periodontal diseases. Schluger *et al.*³⁶ in 1971 proposed an occlusal scheme for advanced periodontitis diseases. The aim was to achieve simultaneous interocclusal contact of posterior teeth in centric relation position with forces directed axially. Anterior disocclusion is provided for protrusive excursions and canine disocclusion for lateral excursions. Cuspal anatomy is so arranged that if the canine disocclusion is lost through wear or tooth movement, the posterior teeth will drop into group function occlusion. For this concept, semi adjustable or fully adjustable articulators are recommended.

On the appraisal of all case reports, it demonstrated that out of 26 cases, 15 cases (57.69%) were treated by PMS philosophy, 2 cases (7.69%) by Hobo twin table and 9 cases (34.61%) by Hobo twin stage philosophy. Twenty cases of occlusal wear were seen as because of worn-out dentition (76.92%), 4 cases owing to amelogenesis imperfecta (15.38%) and 2 case due to enamel hypoplasia (7.69%). Furthermore, 18 cases have been reported for male patients (69.23%) as compared to 7 female patients (26.92%) suggestive of maximum occurrence of mutilated dentition among males. Further, the age group of treated cases belongs to 18–75 years. Maximum cases have been reported in the year 2012.

The treatment outcome and success rate of any philosophy cannot be commented as each philosophy is based on their unique principles. We suggest that further research work on randomized clinical trials of all the philosophies need to be carried out.

Limitations

Limited reports are available in the literature for philosophies of full mouth rehabilitation. The maximum number of studies are not having report on follow-up and outcome of treatment, neither the subjective nor the objective analysis.^{11,12,13,15,17,20-25,27-29,31} Few studies

have reported very constrained follow-up and outcomes based on the clinical and radiographic findings.^{14,16,18,19,30,33} Only 2 reports have documented 1 year^{26,32} of follow-up and 1 case report showed 2 years³⁴ of follow-up. No randomized clinical trials are available in the literature.

CONCLUSION

Full mouth rehabilitation of a mutilated dentition requires an accurate diagnosis and treatment planning. This requires meticulous identification of the oral condition. Most commonly applied classification in literature is T&M classification and maximum numbers of cases were recognized under category number 1. Furthermore, restoring the occlusion in every case is a challenging situation as every case is unique in itself. All the proposed philosophies are not universally applicable. Most commonly applied philosophy is PMS as it is well structured. Hobo Twin stage philosophy is the second-most common followed by Hobo Twin table. Maximum cases of T&M category number 1 were treated by PMS Philosophy. On follow-up periods, PMS philosophy has shown successful treatment outcomes.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Rajendran R, Sivapathasundharam B. Shafer's Textbook of Oral Pathology. 7th ed. New Delhi, India: Elsevier; 2012.
2. Turner KA, Missirlian DM. Restoration of the extremely worn dentition. *J Prosthet Dent* 1984;52:467-74.
3. Mann AW, Pankey LD. Oral rehabilitation. Part I: Use of the PM-instrument in treatment planning and in restoring the lower posterior teeth. *J Prosthet Dent* 1960;10:135-50.
4. Pankey LD, Mann AW. Oral rehabilitation. Part II: Reconstruction of upper teeth using a functionally generated path technique. *J Prosthet Dent* 1960;10:151-62.
5. Hobo S. Twin tables techniques for occlusal rehabilitation. Part I. Mechanism of anterior guidance. *J Prosthet Dent* 1991;66:299-303.
6. Hobo S. Twin-tables technique for occlusal rehabilitation: Part II-clinical procedures. *J Prosthet Dent* 1991;66:471-7.
7. Hobo S, Takayama H. Twin-stage procedure. Part I: A new method to reproduce precise eccentric occlusal relations. *Int J Periodontics Restorative Dent* 1997;17:112-23.

8. Hobo S, Takayama H. Twin-stage procedure. Part 2: A clinical evaluation test. *Int J Periodontics Restorative Dent* 1997;17:456-63.
9. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JP, *et al.* The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration. *PLoS Med* 2009;6:e1000100.
10. Gagnier JJ, Reily D, Altman DG, Moher D, Sox H, Kienle G. The CARE guidelines: Consensus-based clinical case reporting guidelines development. *Dtsch Arztebl Int* 2013;110:603-8.
11. Tipton P. Advanced restorative techniques and the full mouth reconstruction: Part two occlusal concepts. *Private Dent* 2010; 96-105.
12. Kar AK, Parkash H, Jain V. Full-mouth rehabilitation of a case of generalized enamel hypoplasia using a twin-stage procedure. *Contemp Clin Dent* 2010;1:98-102.
13. Baid GC, Lakshman SD, Marilingiah A, Lunkad H. Comprehensive treatment of compromised dentition: A interdisciplinary approach. *J Interdiscip Dent* 2012;2:205-10.
14. Shetty M, Joshi N, Prasad DK, Sood S. Complete rehabilitation of a patient with occlusal wear: A case report. *J Indian Prosthodont Soc* 2012;12:191-7.
15. Banerjee S, Chakraborty N, Singh R, Gupta T. Full-mouth rehabilitation of a patient with severe attrition using the Hobo twin-stage procedure. *Contemp Clin Dent* 2012;3:103-7.
16. Mete JJ, Dange SP, Khalikar AN, Vaidya SP. Functional and esthetic rehabilitation of mutilated dentition associated with amelogenesis imperfecta. *J Indian Prosthodont Soc* 2012;12:94-100.
17. Kalahasti D, Hegde V, Narayana AI, and Balakrishnan D. Rehabilitation of a patient using a Twin stage technique to achieve balanced occlusion in implant supported overdenture: A clinical report. *Int J Oral Implantol Clin Res* 2012;3:92-95.
18. Ahmed T, Kamath G, William C, Mody P, Kumar M. Full mouth rehabilitation of collapsed bite with increased vertical dimension of occlusion-A case report. *Indian J Dent Sci* 2012;4:47-9.
19. Chauhan C, Shah V, Shah D, Doshi P. Full mouth rehabilitation in a case of severely attrited dentition-A case report. *J Dent Med Sci* 2012;1:610-15.
20. Agrawal HS, Agrawal NH, Shah RJ. Full mouth rehabilitation of patient with enamel hypoplasia using hobo's twin table technique for occlusal rehabilitation-A case report. *J Adv Oral Res* 2012;3:23-9.

21. Shetty BR, Shetty M, Prasad K, Rajalakshmi S, Jaiman R. Philosophies in full mouth rehabilitation - A systematic review. *Int J Dent Case Rep* 2013;3:30-9.
22. Basnet BB, Parajuli PK, Singh RK, Suwal P. A case report of full mouth rehabilitation of amelogenesis imperfecta with improved oral health impact profile. *Int J Dent Sci Res* 2014;2:233-36.
23. Avinash CK, B Chittaranjan, Charry NS, Reddy R, Jagini AS. Restoring the lost functional harmony in a mutilated dentition using Hobo's twin stage concept of full mouth rehabilitation. *J Clin Diagn Res* 2014;3:2021-3.
24. Verma K, Gowda EM, Kalra A, Verma R. Full mouth rehabilitation using twin stage procedure - A case report. *Ann Dent Spec* 2015;3:89-92.
25. Mishra SK, Rao SB, Chowdhary R, Patil PS. Full mouth rehabilitation of patient with severely worn dentition for function and esthetics. *J Indian Acad Dent Spec Res* 2016;3:29-32.
26. Qahhar MA, Alkhayrat FM, Hakami BM. A one year follow up of a full mouth rehabilitation for severely attrited dentition. *Saudi J Oral Dent Res* 2016;1;58-63.
27. Mohindra R, Kumar D, Katiyar P, Malviya A. Full mouth rehabilitation by using Hobo's twin stage technique- A case report. *Univ J Dent Sci* 2016;2:105-8.
28. Vyshnavi C, Taruna M, Sudhir N, Chittaranjan B. Functionally generated pathway to harmonise occlusion in full mouth rehabilitation. *Indian J Dent Adv* 2016;8:106-110.
29. Choukse V, Parmar A, Sharma N, Srivastava R. Full mouth rehabilitation using Hobo twin-stage technique. *Int J Preven Clin Dent Res* 2017;4:319-23.
30. Zinzala B, Javiya P, Sethuraman R, Tiwari A, Rutvik P, Jain J. Functional and esthetic full mouth rehabilitation of a patient with severely worn dentition: A clinical report. *Int J Oral Health Med Res* 2017;4:42-5.
31. Devassy JP, Sivadas A, Muhammad S. Full mouth occlusal rehabilitation: By Pankey Mann Schuyler philosophy. *IP Ann Prosthodont Restor Dent* 2017;3:29-33.
32. Darraj A, Matto KA. Full mouth rehabilitation involving occlusal plane correction-A case report. *J Med Sci Clin Res* 2017;5:28204-8.
33. Kaushik K, Dhawan P, Madhukar P, Tandan P, Tomar SS, Mehta D. Full mouth rehabilitation of worn dentition using Pankey Mann Schuyler technique & Broadrick flag method A case report. *Int J Adv Res* 2018;6:935-44.
34. Thimmaiah M. Full mouth rehabilitation of a patient with enamel hypoplasia – A case report. *Oral Health Case Rep* 2018;4:149.

35. Nyman S, Lindhe J. Considerations on the design of occlusion in prosthetic rehabilitation of patients with advanced periodontal disease. *J Clin Periodontol* 1977;4:1-5.
36. Schluger S, Youdelis RA, Page RC, Johnson RH. *Periodontal Diseases*. Philadelphia, London: Lea & Febiger; 1990. p. 541-5.
37. Mann AW. Examination, diagnosis, and treatment planning in occlusal rehabilitation. *J Prosthet Dent* 1967;17:73-8.
38. Jones SM. The principle of obtaining occlusion in occlusal rehabilitation. *J Prosthet Dent* 1963;13:706-13.
39. Dawson PE. A classification system for occlusions that relates maximal intercuspation to the position and condition of the temporomandibular joints. *J Prosthet Dent* 1996;75:60-6.
40. Hobo S, Ichida E, Garcia LT. *Osseointegration and Occlusal Rehabilitation*. Tokyo, Japan: Quintessence Publishing Co Ltd.; 1989.
41. Dawson PE. *Functional Occlusion from TMJ to Smile Design*. 1st ed. St. Louis, Missouri: Mosby Elsevier; 2007.
42. Kazis H. Complete mouth rehabilitation through restoration of lost vertical dimension. *J Am Dent Assoc* 1948;37:19-39.
43. Goldman I. The goal of full mouth rehabilitation. *J Prosth Dent* 1952;2:246-51.
44. Gill JR. Treatment planning for mouth rehabilitation. *J Prosthet Dent* 1952;2:230-45.
45. Landa JS. An analysis of current practices in mouth rehabilitation. *J Prosthet Dent* 1955;5:527-37.
46. Kazis H, Kazis JK. Complete mouth rehabilitation through fixed partial denture prosthodontics. *J Prosth Dent* 1960;10:296-03.
47. Nuttall EB. The principle of obtaining occlusion in occlusal rehabilitation. *J Prosthet Dent* 1963;13:699-705.
48. Binkley TK, Binkley CJ. A practical approach to full mouth rehabilitation. *J Prosthet Dent* 1987;57:261-66.
49. Schuyler CH. The function and importance of incisal guidance in oral rehabilitation. 1963. *J Prosthet Dent* 2001;86:219-32.
50. Krishna MG, Rao KS, Goyal K. Prosthodontic management of severely worn dentition: Including review of literature related to physiology and pathology of increased vertical dimension of occlusion. *J Indian Prosthodont Soc* 2005;5:89-93.

51. Pokorny PH, Wiens JP, Litvak H. Occlusion for fixed prosthodontics: A historical perspective of the gnathological influence. *J Prosthet Dent* 2008;99:299-313.
52. Song MY, Park JM, Park EJ. Full mouth rehabilitation of the patient with severely worn dentition: A case report. *J Adv Prosthodont* 2010;2:106-10.
53. Sudhir N, Parkash H. Full mouth rehabilitation with group function occlusal scheme in patient with severe dental fluorosis. *Indian J Dent Adv* 2011;3:627-31.
54. Kamble VD. Rehabilitation of severely worn dentition and partial edentulism by fixed and removable prostheses: A clinical report. *Int J Prosthodont Restorative Dent* 2013;3:57-61.
55. DuVall NB, Rogers PM. Application of the functionally generated path technique to restore mandibular molars in bilateral group function occlusion. *J Prosthodont* 2013;22:226-32.
56. Singh RG, Sinha P. Functional and aesthetic full mouth rehabilitation of a severely worn dentition to restore vertical dimension: A case report. *J Indian Prosthodont Soc* 2014;14:210-14.
57. Warreth A, EL Swiah JM, Ramadan MMM, Elemam R. Fundamentals of occlusion and restorative dentistry. Part I: Basic principles. *J Irish Den Ass* 2015; 61:201-08.
58. Parmar A, Choukse V, Palekar U, Shrivastava R. An appraisal on occlusal philosophies in full mouth rehabilitation: A literature review. *Int J Prosthodont Restorative Dent* 2016;6:89-92.
59. Singh A, Mishra R, Yadav R, Parashar A, Malviya A, Verma G. Full mouth approach with interdisciplinary approach in a patient with severe dental fluorosis: A case report. *Int J Current Res* 2016;8:37279-82.
60. Jain A, Palekar U, Srivastava R, Choukse V. Basic concepts in full mouth rehabilitation – An overview. *NDJSR* 2016;1:1-5.
61. Kesharwani PN, Tiwari RV, Jairaj A, Tiwari H, Mathew P, and David J. Full mouth rehabilitation of partially edentulous jaws with implants and prosthesis. *Saudi J Oral Dent Res* 2018;3:303-06.