

## Case Report

### Complete Occlusal Rehabilitation Using Hybrid of Fixed and Removable Partial Denture Prosthesis

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#### ABSTRACT:

Prospering economies across globe have faced complacency by their respective population in terms of maintaining health, with dental caries being no exception. Consumption of sugar added foods has further complicated the control of dental disease. Saudi population have prevalence of dental caries despite having well established health care system. The onus is on the people to utilize these services and eliminate one of the most common dental diseases. We present a case of a grossly decayed natural dentition in an adult Saudi female, who reported to have never used toothbrush. The result was that she had a score in terms of decayed, missing, filled, treated (DMFT) index. The patient had multiple residual roots, incomplete endodontic treatments, multiple missing teeth which had culminated into a Kennedy class 3 modification 1 in the maxillary arch and a Kennedy class 1 partial edentulous situation in the mandibular arch. The treatment included a comprehensive occlusal rehabilitation based on Dawsons philosophy of occlusal rehabilitation that included extensive pre prosthetic mouth preparation (extraction, oral prophylaxis, crown lengthening, restoration, post core build-up) and a definitive fixed partial denture treatment that supported a cast partial removable prosthesis. The main objective of the treatment was to establish a functional anterior guidance which was split before rehabilitation and correct the existing occlusal plane. Treatment procedures were accomplished in a period of ten months, but concluded with the patient being highly satisfied with the outcome of the treatment especially in esthetics and mastication.

**Keywords:** Occlusion, centric relation, physiologic rest position, condylar guidance, anterior guidance

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#### INTRODUCTION

The health care facilities in a high-income country like the kingdom of Saudi Arabia have improved exponentially. However, dental health care of the population continues to lag behind mainly due to individual ignorance of the population who consume high sugar containing foods and neglect their routine oral hygiene. Grossly decayed dentitions have been reported to be more prevalent among female patients mainly due to delay in seeking oral health care. <sup>1</sup> This has led to a high incidence of caries among its population including children. Various systematic reviews have reported the mean DMFT (decayed, missing, filled, treated) index of 3.34 to 7.35 among the Saudi population. <sup>2,3</sup> One of the reasons of such high caries index in primary dentition has been attributed to parental neglect in early childhood, which later continues into the adulthood. <sup>4</sup> Dental caries that occur on the proximal surfaces affecting the contacts of the teeth brings changes in the entire

occlusion. <sup>5</sup> The magnitude of decay has a direct bearing upon the prosthetic rehabilitation and if the posterior teeth are lost then the rehabilitation usually involves combining a fixed prosthetic option with a removable prosthetic option. This makes complete occlusal rehabilitation more complex and sensitive to maintenance of oral equilibrium in terms of functional competency. Occlusal plane which is a two-dimensional analogue of a point but a three-dimensional space, <sup>6</sup> is also impaired once a tooth is lost and no replacement is made. Principally complete mouth rehabilitation is based on existence of rest position (physiologic), <sup>7</sup> recognizing a biocompatible vertical dimension and finally a functionally centric occlusion that falls in line with a centric relation. <sup>8,9</sup> Restoration of occlusion is fundamentally based on the presence or absence of the coronal tooth structure which in any case has to be present even if it is just a root. Reduction of coronal tooth structure in any case weakens the natural tooth and

additional means of strengthening the natural tooth structure (cast restorations) are sought to enhance the strength of weakened tooth.<sup>10</sup>

The advent of implant supported restorations along with strategies like immediate loading have brought new treatment options for patients who reject implants mainly due to the time involved in the treatment before results can be seen. Most patients prefer fixed partial dentures while very less prefer the option of a removable partial denture.<sup>11</sup> The choice of dental implants is dependent on patients' ability to maintain a highly effective oral hygiene, and if the adjacent teeth have evidence of decay or has restored then a fixed partial denture is preferred.<sup>12,13</sup> The use of other technique sensitive prosthetic options like precision attachments in partial denture prosthesis retention has also been advocated which in fact has been stated to uplift the standard of partial dentures.<sup>14</sup> Various philosophies of full mouth rehabilitation have been proposed (Pankey Mann Schulyer, Hobo Twin Table, Hobo Twin Stage, Nyman and Lindhe, Youdelis).<sup>8</sup> Irrespective of the philosophy the goal remains same which is to achieve a functionally biocompatible occlusion that restores all functions of natural teeth. Complete occlusal rehabilitation also involves mouth preparation that can be extended and can range from oral surgical procedures to endodontic and restorative procedures. This article presents a case of a complete occlusal rehabilitation using the flexible PMS philosophy that involved the use of multiple fixed partial denture treatment options (single crown and three-unit bridge) and removable partial denture options. The aim of this case report is to generate the hypothesis that states the use of hybrid treatments and the complexities involved in such treatments.

### CASE REPORT

An adult Saudi female aged 48 years who happened to be a housewife and had 10 children reported to the comprehensive care clinics for her comprehensive dental treatment with the chief complaint of pain in relation to maxillary left back tooth, poor aesthetics and mastication. The patient's family history revealed that both parents were diabetic and hypertensive. The patient in her dental history disclosed that a root canal treatment was done on the maxillary front tooth which was not completed due to long appointment schedule. The patient also reported a history of restorations in the maxillary arch (2 years back), extraction of posterior teeth (9 years back) and attempted but not completed endodontic treatment (15 years back). The patient was not habituated to brush her teeth and instead used local agents like Miswak to cleanse her teeth. Extra oral examination of the face, lips, lymph nodes and temporomandibular joints did not reveal any significant clinical abnormality. Intra orally, the negative findings for soft tissue included round gingival contour with blunt margins, soft and oedematous gingiva that bled on probing. Natural teeth showed multiple caries (tooth number

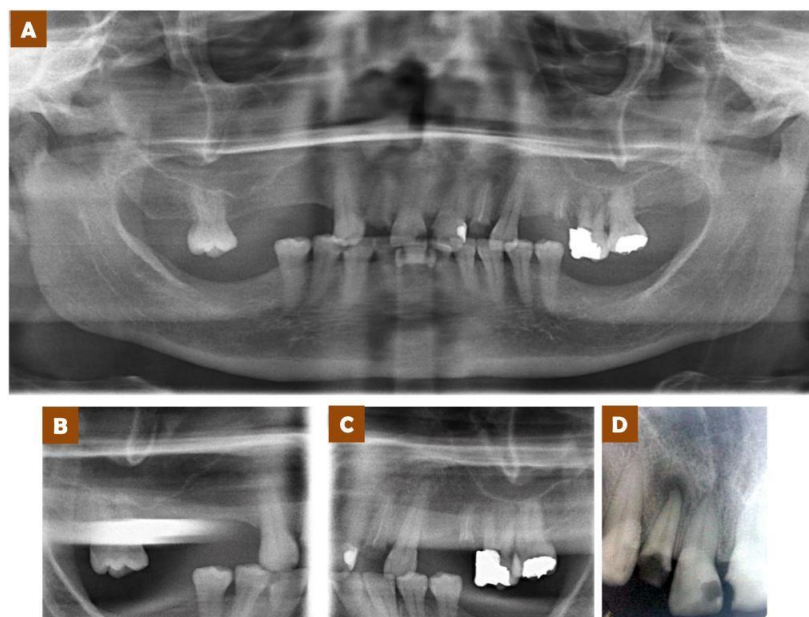
11,17,21,23,34,35,43,44,45), defective restorations (21,26,27), remaining roots (22,25), missing teeth (14,15,16,18,24,28,36,37,38,46,47,48) and generalized stains of anterior teeth (Figure 1 A to F). Clinically, the partial edentulous situation at first sight was that of a Kennedy class 1 partial edentulous situation in mandible and Kennedy class 3 modification 1 for maxillary arch. Radiographic investigation showed the presence of an overhanging restoration, root stumps and failed endodontic treatment (tooth no 22) in maxillary arch and multiple carious lesions in mandibular natural teeth (Figure 2 A to D). Since the patient presented with an emergency in related to maxillary left second premolar, the patient was given medication followed by the extraction of the same tooth. In order to implement minimum medication intake by the patient, all oral surgical procedures and crown lengthening procedures were planned systemically as mentioned in recent literature.<sup>15</sup> All residual gross caries was removed and pulp vitality tests were done on carious teeth. To diagnose and plan treatment maxillary and mandibular impressions were made of irreversible hydrocolloid (Jeltrate Alginate, Fast Set; Dentsply Intl, York, Pa) which was poured with type III dental stone (Elite Model; Zhermack, Badia Polesine, Rovigo, Italy). The maxillary cast was mounted on a semi adjustable articulator (Whip Mix series 3000; Elite Dental Services, Inc, Orlando, Fla) using an arbitrary facebow (Whip Mix; Inc, Orlando, Fla). The mandibular cast was then mounted with interocclusal records (Take 1, Kerr, Romulus, MI, USA) with programming of the articulator being accomplished using a protrusive interocclusal record. The need for altering the vertical dimension of occlusion was assessed by using a split diagnostic splint with various dimensions, which were physiologically verified on the patient.<sup>16</sup> The treatment plan for the patient was divided into 6 phases (emergency, prophylactic, restorative, reassessment, occlusal rehabilitation and maintenance).<sup>17</sup> Mouth preparation was done in the form of extraction of root stumps, oral hygiene maintenance (oral prophylaxis and patient education and motivation), replacement of defective restorations and placement of new restorations, endodontic treatment of indicated teeth (11, 26) (Figure 3 A, B, C and E). Prosthetic treatment options presented to the patient were implant supported single crowns, fixed partial denture (single crown and fixed partial denture) and cast partial denture. As part of prosthetic rehabilitation, a post core was done for maxillary left first molar (Figure 3 A, E). The missing maxillary anterior teeth were restored with a three unit fixed partial denture (Figure 3 A, C, D) while a surveyed crown was given for maxillary left second first molar (Figure 3 A, E). The surveyed crown was designed during the designing of the definitive cast partial denture which was done prior to designing fixed partial denture as guided by scientific literature.<sup>18</sup> All fixed partial dentures were fabricated in metal

ceramic restorations with anterior teeth having full ceramic coverage while posterior teeth having a buccal facing. All fixed partial dentures were cemented using either a zinc phosphate cement (Harvard, Germany) or a polycarboxylate cement (Poly F Plus; Dentsply DeTrey GmbH, Konstanz, Germany). A cast partial denture was fabricated for replacing the missing teeth (Kennedy class 3 modification 1 in maxillary arch and a Kennedy class 1 for mandibular arch) (Figure 4 A). The occlusion was adjusted for a cast partial denture on either side

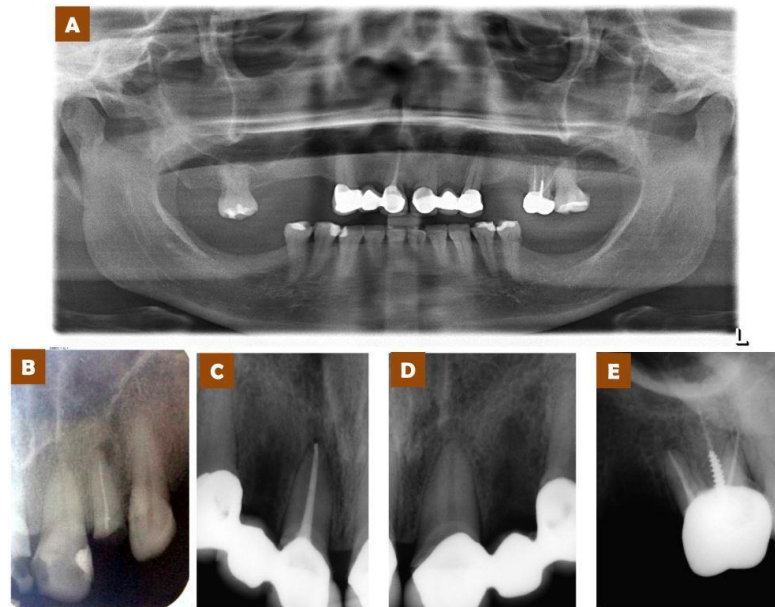
(Figure 4 B, C, D). The patient was put on a follow up of 1 week, 3, 6 and 12 months and the status of existing restorations and natural teeth was assessed for plaque control and gingival inflammation. The patient was given post insertion instructions for a cast partial denture, fixed partial denture verbally, written and multimedia mode. The instructions for fixed partial denture maintenance included hygiene, mastication, aesthetics and phonetics.<sup>19</sup> During subsequent follow up visits the patient expressed his satisfaction with the outcome of the complete occlusal rehabilitation.



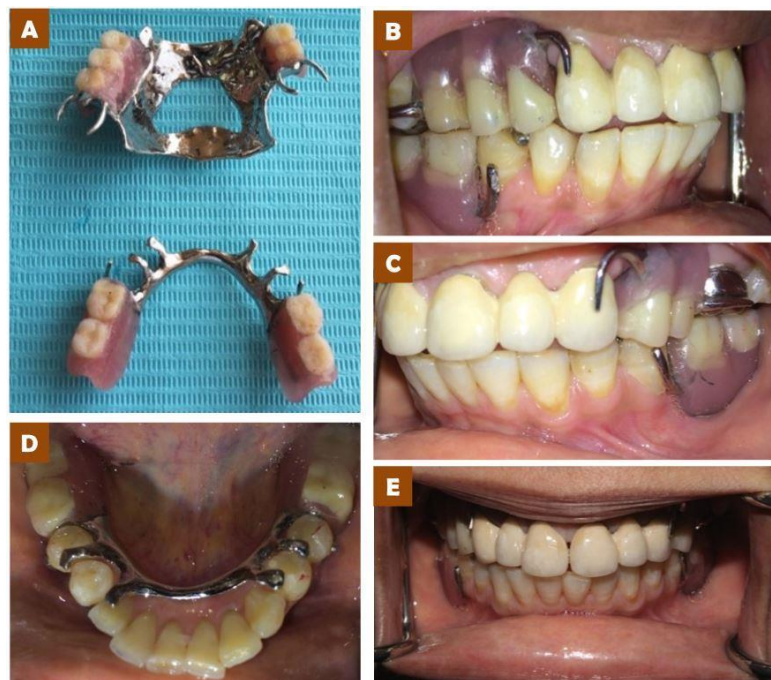
**Figure 1: (A) Extra oral view of the patient showing the high lip (smiling) line (B) Intraoral view showing remaining natural anterior teeth (C) Right sided existing occlusion (D) Left sided existing occlusion (E) Occlusal view of maxillary arch (F) Occlusal view of the mandibular arch**



**Figure 2: (A) Pre operative orthopantomograph showing residual roots, failed endodontic treatment and supraeruption (B) Intra oral Periapical radiographs of maxillary and mandibular right side (C) overhanging restoration in relation to maxillary left first molar (D) and periapical lesion in relation to maxillary lateral incisor**



**Figure 3: (A) Post operative orthopantomograph after completion fixed partial denture treatment and individual crowns (B) Intraoral peri apical view of retreated endodontic tooth (C) Left side maxillary fixed partial denture (D) Right sided maxillary fixed partial denture (E) Single crown after placing prefabricated screw post**



**Figure 4: (A) Individual cast partial dentures for maxillary and mandibular arch (B) Occlusal relation between the partial denture and natural teeth on the right side (C) Occlusal relation between the partial denture and natural teeth on the left side (D) Occlusal view showing the rests of cast partial denture fitting on the natural/single crowns (E) Post follow up intra oral view at 1 year showing the functional occlusion**

#### DISCUSSION

A complete occlusal rehabilitation case that utilizes a hybrid treatment of both fixed and removable partial denture has been presented in this case report. The unique feature of the occlusal rehabilitation is the pre prosthetic mouth preparation done in various phases followed by fixed prosthodontic rehabilitation in the

form of single crowns and fixed partial denture that accommodated the placement of a removable partial denture. In any occlusal rehabilitation the main aim of the treatment is to produce restorations that are biocompatible with the stomatognathic system chiefly condylar guidance and anterior guidance.<sup>8</sup> While the condylar guidance cannot dictate the anterior

guidance, the anterior teeth however, play a very crucial role in establishing the mandibular movements that originate at or within the temporomandibular joint.<sup>20</sup> The overall health of the temporomandibular joint is essentially a combination of proper vertical dimensions of occlusion, a healthy physiological rest position of the mandible and the development of centric occlusion that coincided with the patient's centric relation.<sup>21</sup> The position of the cusps and the contours of each cusp can alter the path that the mandible travels in various centric and eccentric positions. The full mouth rehabilitation specifically has been attributed in terms of philosophies to the worn-out dentition as classified by Turner and Missirlian (T and M classification).<sup>22</sup> The worn-out dentition or attrition of natural teeth has been generally associated with parafunctional oral habits (bruxism/clenching).<sup>23</sup> However this case is different since the patient had existing functional anterior guidance which was intact, therefore this complete occlusal rehabilitation was accomplished using the Dawsons theory of occlusal rehabilitation.<sup>24</sup> The anterior guidance was however corrected in terms of incisal plane of the maxillary arch. Supra erupted incisor and molar in the maxillary arch were corrected in terms of the occlusal plane. The occlusal plane correction is essential in terms of aesthetics and allowing anterior guidance to function.<sup>6</sup> Pre rehabilitation the anterior guidance was semi functional since on each side the maxillary canine would contact individually. The semi functional anterior guidance cannot be replicated in the definitive restorations since it exaggerates all horizontal stresses on one particular tooth.<sup>25</sup>

The pre prosthetic mouth preparation in this case was extensive and include extraction of residual roots, surgical crown lengthening of supra erupted teeth, endodontic treatment and multiple restorations including that of post and core. The posterior teeth that were supra erupted created restorative space issues which hampered the placement of opposite restorations. Even though a removable partial denture occlusion was used in the opposite arch which could easily accommodate a short tooth, such treatment would render anterior guidance ineffective during protrusion and all the stress is placed on the tooth that occupies the restorative space.<sup>26</sup> Intentional endodontic treatment was done for a tooth that could not be corrected using conservative means of occlusal correction like enameloplasty.

## CONCLUSION

Hybrid complete occlusal rehabilitation involves using a cast partial denture on the fixed partial denture (single crown or fixed partial denture) that accommodates the component of cast partial denture especially occlusal, incisal or cingulum rest. The surveyed crown accomplishes this objective as it allows proper placement of cast partial denture components. Like in this case, all such cases should

have the final cast partial denture designed before the fixed partial denture treatment is initiated.

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## CONFLICT OF INTEREST

None

## REFERENCES

1. Alshammari FR, Alamri H, Aljohani M, Sabbah W, O'Malley L, Glenny AM. Dental caries in Saudi Arabia: A systematic review. *J Taibah Univ Med Sci.* 2021;16(5): 643-56.
2. Khan SQ, Khan NB, ArRejaie AS. Dental caries. *Saudi Med J.* 2013;34(7):744-9.
3. Al-Ansari AA. Prevalence, severity, and secular trends of dental caries among various Saudi populations: a literature review. *Saudi J Med Med Sci.* 2014;2(3): 142-50.
4. Mattoo KA, Gupta I, Darraj A, RA Muneera Gohal. Parental Neglect in Early Childhood Emerging to Adulthood Self-neglect. *Am J Med Case Rep* 2022;10(5):131-7.
5. Brunsvold MA. Pathologic tooth migration. *J Periodont.* 2005; 76(6): 859-66.
6. Darraj A, Mattoo KA. Full Mouth Rehabilitation Involving Occlusal Plane Correction-Case Report. *JMSCR* 2017;5(9): 28204-208
7. Mann AW. Examination, diagnosis, and treatment planning in occlusal rehabilitation. *J Prosthet Dent.* 1967; 17:73-8.
8. Thimmappa M, Katarya V, Parekh I. Philosophies of full mouth rehabilitation: A systematic review of clinical studies. *J Ind Prosthodont Soc.* 2021; 21(1): 19.
9. Marzola R, Derbabian K, Donovan TE, Arcidiacono A. The science of communicating the art of esthetic dentistry. Part I: patient-dentist-patient communication. *J Esthet Restor Dent* 2000; 12(3): 131-8.
10. Lakshya K, Aditya K, Mattoo KA. Full mouth rehabilitation involving multiple cast post core as foundation restorations – Case report. *Int J Med Res Pharm Sci* 2018;5(7): 11-15
11. Kapur KK. Veterans Administration Cooperative Dental Implant Study—comparisons between fixed partial dentures supported by blade-vent implants and removable partial dentures. Part IV: comparisons of patient satisfaction between two treatment modalities. *J Prosthet Dent.* 1991;66(4): 517-29.
12. Misch CE. *Dental implant prosthetics-E-book.* Elsevier Health Sciences; 2004 Sep 20.
13. Zitzmann NU, Margolin MD, Filippi A, Weiger R, Krastl G. Patient assessment and diagnosis in implant treatment. *Aust Dent J.* 2008; 53: S3-10.
14. Mattoo K, Singh M, Singh SP. Precision retained partial denture - A proxy treatment option for full mouth rehabilitation. *Medico Research Chronicles* 2014;1(2): 144-149
15. Darraj A, Mattoo KA, Nazish M. Scheduling multiple surgical procedures in immunocompromised

- rheumatoid patient on immune suppressant regimen. *JMSCR* 2017; 5 (08): 26828-833.
16. Rathi N, Mattoo K, Bhatnagar S. Extending the use of a diagnostic occlusal splint to overcome existing lacunae of vertical dimension transfer in full mouth rehabilitation cases. *Am J Med Case Rep* 2014; 2(12): 291-297
  17. Vijetha B, Sajjan C, Devanoorkar A. Multidisciplinary Management of Adult Rampant Dental Caries-A Rare Case Report. *RGUHS J Dent Sci.* 2015;7(2).
  18. Kang SH, Kim SK, Heo SJ, Koak JY. Survival rate and clinical evaluation of the implants in implant assisted removable partial dentures: surveyed crown and overdenture. *J Adv Prosthodont.* 2020; 12(4): 239.
  19. Jindal S, Mattoo KA, Arora P. Post care instructions for dental prosthesis (Fixed). LAP Lambert Academic Publishing; 2013; pp 1-72
  20. Khanna N, Khanna N. The envelope of function: understanding and importance. *Functional Aesthetic Dentistry: How to Achieve Predictable Aesthetic Results Using Principles of a Stable Occlusion.* 2020:35-53.
  21. Abduo J, Tennant M. Impact of lateral occlusion schemes: A systematic review. *J. Prosthet. Dent.* 2015;114(2): 193-204.
  22. Turner KA, Missirlian DM. Restoration of the extremely worn dentition. *J Prosthet Dent.* 1984; 52:467-74.
  23. Mattoo KA, Kumar L, Sarvar S. Full mouth rehabilitation in an occupationally stressed bureaucrat. *JMSCR* 2019; 7(10): 536-540
  24. 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.
  25. Gohal MRA, Mattoo KA, Nazish A, Youseef AM. Corrective Prosthodontics – Curating Semi Functional Anterior Guidance in Full Mouth Rehabilitation: Case Report. *JMSCR* 2017;5(08): 26777-781.
  26. Basutkar N, Alamoudi RK, Alharbi RM. Full Mouth Rehabilitation of a Patient with Restorative Space Issues-A Case Report. *Asian Journal of Pharmaceutical Research and Health Care.* 2020;12(2): 1-7.