



MANAGEMENT OF PARTIALLY EDENTULOUS PATIENT WITH FRICTION FIT REMOVABLE COMPLETE OVERDENTURE USING MILLED COPINGS: A CASE REPORT

Dental Science

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ABSTRACT

BACKGROUND: An overdenture is a removable prosthesis that is supported by a few retained teeth or teeth roots and or dental implants. In such treatment modalities, natural teeth are retained under the denture base which preserves the alveolar ridge, provide sensory feedback and improve the stability of the dentures. It is a versatile and successful means of achieving long-term restoration of partially edentulous arches. Furthermore, the use of copings and precision attachments on the remaining teeth enhances the retention of the denture.

OBJECTIVE: The main objective of this clinical case report is to provide the exceptional fit of the overdenture prosthesis and to prevent midline fracture by utilizing the concept of cold welding and metal reinforcement of the overdenture respectively.

CLINICAL CONSIDERATIONS: The endodontic therapy is performed on the remaining natural teeth, which provide support to the prosthesis, meticulously to prevent need of retreatment in the future. The metal copings are precisely milled to achieve parallelism and to prevent any interference in the path of insertion and removal. The main advantages of this technique are; patient can maintain good oral hygiene, excellent retention and interference free placement of the prosthesis.

CONCLUSIONS: The present case report utilizes the concept of friction fit or cold welding of the metal reinforced overdenture prosthesis by utilizing support of precision milled metal copings to provide excellent fit of the prosthesis.

KEYWORDS

Cast Partial Denture, Metal Copings, Overdenture, Retained Tooth.

INTRODUCTION

Any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants; a dental prosthesis that covers and is partially supported by natural teeth, natural tooth roots, and/or dental implants.¹ This treatment is not a new concept and practitioners have successfully employed existing tooth structures or retained roots to assist with complete denture treatment for more than a century.^{2,3} The loss of teeth is generally associated with esthetic, functional, psychological, and social impairment of the individual's life which may have a high impact of the patient's self-esteem and health.^{4,5} The main causes for the loss of teeth are periodontal disease and dental caries and are associated with cultural and social factors such as financial sources, educational level and the access to health services.^{6,7}

In regards to the rehabilitation alternatives such as the use of dental implants, fixed prosthesis, removable partial or complete dentures and attachments, the overdenture rehabilitation is a viable and simple alternative and has been demonstrated to be efficient in these clinical situations.⁸

In some situations, the dissatisfaction of the patient using conventional complete dentures/removable prosthesis is observed because of the instability of the prostheses. This instability is generated by prostheses movement over the soft tissue mainly in the mandibular arch. Thus, the preservation of roots are an effective way to improve prosthesis support and can be associated or not with retention systems.⁹ A method to minimize these problems is the use of tooth supported complete denture. Root-supported overdentures have been fabricated to correct periodontal and/or occlusal collapse. The teeth are preserved to support and/or retain the prosthesis, to maximize prosthesis stability, preserving proprioception, reducing bone loss, psychological benefits and improved mastication.⁹⁻¹¹

The aim of this clinical case report is to rehabilitate the maxillary arch with metal reinforced precision milled metal copings supported removable overdentures to prevent fracture of maxillary denture as well as excellent fit of the prosthesis.

CASE REPORT

A 65-year-old male patient with partially edentulous upper and lower arches (**Figure 1**) reported to the Private dental clinic, Delhi, India, with the chief complaint of replacing teeth. His major desire was to improve his masticatory function by retaining natural teeth.

History revealed that the patient was partially edentulous for the past

three years and was wearing acrylic partial denture for both the arches since then. There was no history of systemic disorders and the general health status of the patient was quite satisfactory. Intraoral examination revealed, maxillary and mandibular partially edentulous arches with a few teeth present in sound periodontal and bone support. The ridge was low well-rounded in both maxillary and mandibular edentulous area. There was sufficient inter arch space with an average mouth opening noticed. The old existing partial dentures were compromised in retention and stability due to under extended borders. The patient was explained about other treatment modalities like removable partial denture and dental implants. As the economic status of the patient was poor, he cannot afford for implant prosthesis. By taking into consideration his complaints about previous dentures, that there is no retention and stability, we have planned for metal reinforced precision milled metal copings tooth supported removable overdenture for maxillary arch and conventional cast partial denture for mandibular arch.

CLINICAL PROCEDURE:

Diagnostic impression was made using alginate impression material (Cavex CA 37, Holland BV, Netherlands) and impression was poured. Face bow recording was performed to evaluate the inter-arch space and occlusion relationship. Endodontic therapy was performed on teeth number 11, 15 and 17, followed by teeth preparation (**Figure 2**) to receive metal copings. Wax up was completed on the master cast for all three teeth by using electrically operated dental lab parallel surveyor (**Figure 3**). Casting was done for all three copings followed by finishing and polishing. These copings were tried in in the patient's oral cavity and later on these copings were picked up using elastomeric impression material (Exaflex® GC America Inc., USA) (**Figure 4**) and the impression was poured into die stone. The metal copings were then surveyed using dental surveyor to double check the parallelism with each other (**Figure 5**). After surveying, the master cast was ready for the wax block out for converting into refractory cast, later on, wax pattern adaptation (bead design) for removable partial overdenture was performed (**Figure 6**). The casting was completed for the wax pattern for accomplishing metal framework (**Figure 7**); afterwards, border moulding and jaw relation recording were performed in a conventional manner. The metal copings were luted to the teeth using resin cement and mandibular cast partial denture framework was tried in in the patient's mouth (**Figure 8**). The wax up was completed on the articulator (**Figure 9**). Both, maxillary and mandibular dentures were processed in a conventional manner. Final finishing, polishing and laboratory remounting were done and the prostheses were delivered to the patient (**Figure 10**). The patient was given routine post-insertion

instructions and was encouraged to make an effort to familiarize to the new dentures. In a week time, the patient expressed satisfaction in mastication and phonetics and his aesthetic problem was reduced with the use of teeth retained maxillary partial overdenture and mandibular cast partial denture. Both the dentures were highly stabilize and retentive.

DISCUSSION

An overdenture is a removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants. The implants or modified natural teeth provide for additional support, stability and retention of the overdenture than the edentulous ridges alone can provide.⁹ It is also known as *Hybrid dentures* or tooth-supported removable complete dentures. It has been noticed that there is a reduction in the progression of bone resorption if one retain the natural teeth for the support of the prosthesis. Endodontically treated teeth are used in most of the cases. This treatment is usually indicated for patients with few remaining teeth that may be healthy or periodontally involved, with intact or grossly destroyed crowns and patients with severely compromised dentition.³ Selective extraction must be carried out after a thorough examination of the patient.

The canines and premolars are teeth that better exhibits characteristics associated with support for the overdenture and it is mainly because of its large root with greater periodontal area for attachment and also due to its localization in the transition area between anterior and posterior teeth.¹² Fenton and Hahn¹³ and by Toolson and Smith¹⁴, emphasized the problem of caries on abutment teeth and stressed the significance of sodium fluoride gel applied at regular intervals to decline the activity of cariogenic microorganisms. Derkson and MacEntee¹⁵ showed that a 0.4% stannous fluoride gel had valuable effects on the gingival health of overdenture abutments.

The most common problem associated with the maxillary overdentures is fracture in the midline area of the denture. So to increase the strength of denture, metal mesh is incorporated in the denture during packing of heat cure acrylic.¹⁶ Meng et al.¹⁷ did research on the reinforced acrylic denture base materials to improve the mechanical strength. Reinforcing agents in the form of cobalt-chromium wires¹⁸ and metallic wires¹⁹ have been added to PMMA matrix with considerable improvement in the strength. The present case report utilizes the cast cobalt chromium metal reinforcement in the overdenture to prevent the midline fracture of the prosthesis.

Various types of attachments (precision or semi-precision) are available and have been widely used with removable partial/complete denture prosthesis, segmented fixed prosthesis, and implant supported prosthesis. In this case report, author utilizes the milled metal copings for the friction fit of the removable overdenture to enhance the retention of the prosthesis. It is a cost effective way of rehabilitating the removable overdenture patients without using the expensive and technique sensitive precision attachments.

CONCLUSION

The tooth supported overdenture is a better alternative for a treatment option to conventional dentures since the proprioception is maintained and improves stability and retention. It is necessary to have patient awareness about good oral hygiene to maintain the roots so that treatment remains satisfactory for a long time.



Figure 1: Preoperative photograph of maxillary and mandibular arches of the patient



Figure 2: Tooth preparation to receive metal copings post endodontic therapy



Figure 3: Fabrication of wax coping using electrically operated dental lab parallel surveyor



Figure 4: Try in of the metal copings and pick up impression using elastomeric impression material



Figure 5: Surveying of metal copings using dental surveyor to double check the parallelism with each other

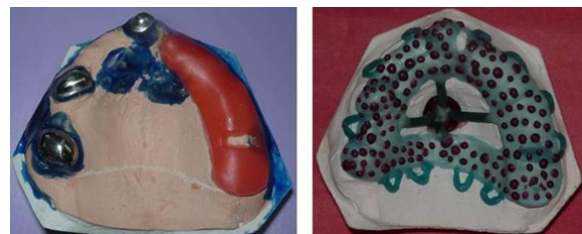


Figure 6: Arbitrary wax block out on master cast and wax pattern adaptation (bead design) for metal framework



Figure 7: Metal framework after casting

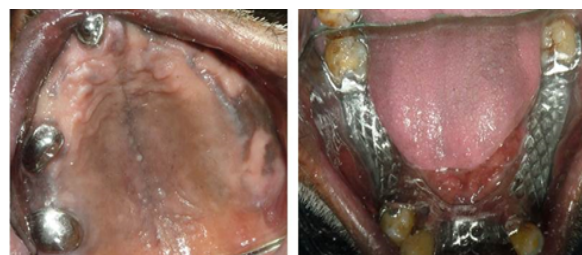


Figure 8: Cementation of metal copings in maxillary arch and try in of mandibular cast partial denture framework



Figure 9: Final wax up after try in of maxillary and mandibular dentures



Figure 10: Postoperative photograph of the patient with maxillary overdenture and mandibular cast partial denture

REFERENCES

1. The glossary of prosthodontic terms. *J Prosthet Dent* 2017;117(5S):1–105.
2. Fenton AH. The decade of overdentures: 1970–1980. *J Prosthet Dent* 1998; 79:31–36.
3. Morrow RM, Powell JM, Jameson WS, Jewson CG, Rudd KD. Tooth supported complete dentures: an approach to preventive prosthodontics. *J Prosthet Dent* 1969; 21:513–522.
4. Okoje VN, Dosumu OO, Alonge TO, Onyeaso C. Tooth loss: Are the patients prepared? *Niger J Clin Pract* 2012;15:172-5.
5. De Marchi RJ, Hilgert JB, Hugo FN, Santos CM, Martins AB, Padilha DM. Four-year incidence and predictors of tooth loss among older adults in a southern Brazilian city. *Community Dent Oral Epidemiol* 2012;40:396-405.
6. Saintrain MV, de Souza EH. Impact of tooth loss on the quality of life. *Gerodontology* 2012;29:e632-6.
7. De Marchi RJ, Leal AF, Padilha DM, Brondani MA. Vulnerability and the psychosocial aspects of tooth loss in old age: A Southern Brazilian study. *J Cross Cult Gerontol* 2012;27:239-58.
8. Hug S, Mantokoudis D, Mericske-Stern R. Clinical evaluation of 3 overdenture concepts with tooth roots and implants: 2-year results. *Int J Prosthodont* 2006;19:236-43.
9. Brkovic-Popovic S, Stanisic-Sinobad D, Postic SD, Djukanovic D. Radiographic changes in alveolar bone height on overdenture abutments: A longitudinal study. *Gerodontology* 2008;25:118-223.
10. Dileep Nag V, Ravindra P, Thirupathi Reddy B. A simplified chair-side technique with pre-fabricated directional rings in a case of divergent root retained overdenture. *J Indian Prosthodont Soc* 2011;11:130-2.
11. Gorakhnath BS, Wadkar AP. Overdenture: A way of preventive prosthodontics. *Indian J Dent Res* 2012;4:863-5.
12. Jayasree K, Bharathi M, Nag VD, Vinod B. Precision attachment: Retained overdenture. *J Indian Prosthodont Soc* 2012;12:59-62.
13. Fenton AH, Hahn N. Tissue response to overdenture therapy. *J Prosthet Dent* 1978;40:492-8.
14. Toolson LB, Smith DE. A 2-year longitudinal study of overdenture patients. Part I: incidence and control of caries on overdenture abutments. *J Prosthet Dent* 1978;2013:486–91.
15. Derkson GD, MacEntee MM. Effect of 0.4% stannous fluoridegel on the gingival health of overdenture abutment. *J Prosthet Dent* 1982;48:23-26.
16. Polyzois GL. Reinforcement of denture acrylic resin: The effect of metal inserts and denture resin type on fracture resistance. *Eur J Prosthodont Restor Dent* 1995;3:275-8.
17. Meng TR, Latta MA. Physical properties of four acrylic denture base resins. *J Contemp Dent Pract* 2005;6:93–100.
18. Uzun G, Hersek N, Tinçer T. Effect of five woven fiber reinforcements on the impact and transverse strength of a denture base resin. *J Prosthet Dent* 1999; 81(5):616-20.
19. Vojdani M., Khaledi AAR. Transverse strength of reinforced denture base resin with metal wire and E-Glass fibers. *J Prosthet Dent* 2006; 3(4):167-172.