



Indonesian Dental Association

Journal of Indonesian Dental Association

<http://jurnal.pdgi.or.id/index.php/jida>
ISSN: 2621-6183 (Print); ISSN: 2621-6175 (Online)



Case Report

Tooth-Supported Overdenture Retained with Ball Attachments and Custom-made Coping: A Case Report

Sandeep Singh^{1§}, Manu Rathee¹, Pankaj Gahalaut¹, Sanju Malik¹, Poonam Wakure¹

¹ Department of Prosthodontics, Faculty of Dentistry, Pt. B.D Sharma University of Health Sciences, Rohtak, India

Received date: February 5, 2022. Accepted date: March 28, 2022. Published date: May 17, 2022.

KEYWORDS

ball attachments;
custom copings;
over denture;
prosthodontic rehabilitation;
tooth-supported

ABSTRACT

Introduction: Tooth-supported overdentures is a simple and cost-efficient modality that helps preserve bone. This concept is completely supported by DeVan's maxim: "Perpetual preservation of what is left is more important than the exact replacement of what is lost." The preserved tooth structure beneath the denture base prevents alveolar ridge resorption, enhances proprioception, and improves denture support and stability. Additionally, using copings on the remaining teeth improves the denture's retention. **Case Report:** A 49-year-old female patient reported having the chief complaint of difficulty in chewing food due to missing teeth in the upper and lower arch. An intraoral examination revealed a partially edentulous maxillary arch with denture-induced stomatitis as the patient had a faulty maxillary removable partial denture for five years. The mandibular arch was also partially edentulous, and only mandibular left second premolar and right first and second premolar were present. The patient was advised to stop using maxillary removable partial denture (RPD) altogether and was given an antifungal tablet as well as a multivitamin tab and topical clotrimazole. This case report describes prosthodontic rehabilitation of a mandibular's partially edentulous arch with tooth-supported overdenture using ball attachments and custom-made coping. **Conclusion:** For edentulous patients with few remaining teeth, a mandibular tooth-supported overdenture is one of the best and most practical, feasible, and comfortable treatment alternatives. The patient was satisfied with the treatment outcome.

[§] Corresponding Author

E-mail address: drsandeepsingh011@gmail.com (Singh S)

DOI: [10.32793/jida.v5i1.782](https://doi.org/10.32793/jida.v5i1.782)

Copyright: ©2022 Singh S, Rathee M, Gahalaut P, Malik S, Wakure P. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium provided the original author and sources are credited.

INTRODUCTION

Tooth-supported overdentures constitute an important concept in preventive prosthodontics. According to Glossary of Prosthodontic Terms (GPT 9), an overdenture is a complete or removable denture that rests on one or more remaining natural teeth, roots, or dental implants; a dental prosthesis that is partially supported by natural teeth, tooth roots, and/or dental implants. It is also known as overlay prosthesis, overlay denture, and superimposed prosthesis.¹

In tooth-supported overdentures, the teeth are maintained as part of the residual ridge as it provides psychological benefit to the patients, one of its most important advantages. Overdentures are a modest and cost-efficient procedure compared to implanting overdentures. The presence of periodontal ligaments in tooth-supported overdentures plays an important role in shock absorption, the maintenance of proprioception, and functional stimulus for bone preservation, which improves the retention, stability, support, and masticatory efficiency of the patient.²

A complete denture wearer experiences a series of events, including the loss of tooth proprioception, increased alveolar bone loss, and most importantly, a loss of self-confidence. The use of an overdenture decreases resorption, increases denture foundation area, and improves masticatory effectiveness.³ This clinical case report describes prosthodontic rehabilitation of a mandibular's partially edentulous arch with a tooth-supported overdenture using ball attachments and custom-made coping.

CASE REPORT

A 49-year-old female reported having the chief complaint of difficulty chewing food due to missing teeth in the upper and lower arch for the past five years due to caries and periodontitis. Intraoral examination showed a partially edentulous maxillary arch with erythematous mucosa due to denture-induced stomatitis, as the patient had had a maxillary removable partial denture for five years (Fig. 1a). The mandibular arch was also partially edentulous and only mandibular left second premolar and right first and second premolar were present (Fig. 1b). No mobility or periapical pathology with good bone support was revealed in the clinical and radiographical investigations. The patient was told to stop using maxillary RPD altogether and was given the antifungal tablet Fluconazole 100 mg once a day (OD) for three days, as well as a multivitamin tablet and topical Clotrimazole. After complete healing of the lesion, the use of a maxillary conventional RPD and a mandibular

overdenture using ball attachments in 35 and 45 with metal coping on 44 was planned for this patient.

Clinical Procedure

The intentional root canal treatment of 35, 44, and 45 was performed (Fig. 2a). The tooth preparation of 35, 44, and 45 was done with a tapered round-end diamond point, and 2 to 3mm of the coronal height of teeth was maintained with a chamfer finish line subgingivally (Fig. 2b). The post space for the essential dental system (EDS) (Fig. 2c) was prepared in 35 and 45, leaving 4 mm of gutta percha apically. After that, the ball attachments were sealed with dual-cure resin cement (Fylla Connect, Mother's Dental). Excess cement was removed and cured, and a final radiograph was taken.

Custom post-and dome-shaped coping were prepared on 44 with the help of an endodontic file with pattern resin (Pattern resin, GC Corp) (Fig. 3a,b). It was then sprued and finally cast in a base metal alloy (Fig. 3c). The coping was further evaluated for fit in the patients' mouth and finally cemented with the help of GIC cement (GC Gold label; GC Corporation, Japan). A final radiograph was taken (Fig. 3d, e).

An irreversible hydrocolloid (Zelgan, Dentsply) was used to make primary impressions of the maxillary and mandibular arches (Fig. 4a, b). The impressions were poured, and custom trays were fabricated with an autopolymerizing acrylic resin. The border molding of the mandibular arch was done using green stick compound to mold the mandibular arch's border, and a polyvinyl siloxane light body impression material (addition silicone, GC Flexceed) was used to make the final impression (Fig. 4c, d). Plaster beading was performed, and the final cast was poured using type-3 dental stone (Fig. 4e, f).

A maxillomandibular relation was recorded (Fig 5a). The established records were transferred to a semi-adjustable articulator, and a teeth arrangement followed by try-in was performed (Fig 5b). The denture was then processed in heat-cure acrylic resin (DPI Heat cure, Mumbai) and followed by finishing and polishing.

During the mandibular denture insertion, the premolar area was marked using polyvinyl siloxane light body impression material (Addition silicone, GC Flexceed) and relieved using carbide burs to incorporate the female component of the ball attachment (the nylon cap). A pick-up impression was made using an autopolymerizing acrylic resin (Trevalon; Dentsply International) (Fig. 5). The excess resin was trimmed, finished, and polished. Following this, denture insertion was performed (Fig. 6).



Figure 1. (a) Intraoral maxillary view with erythematous mucosa, (b) Intraoral mandibular view.

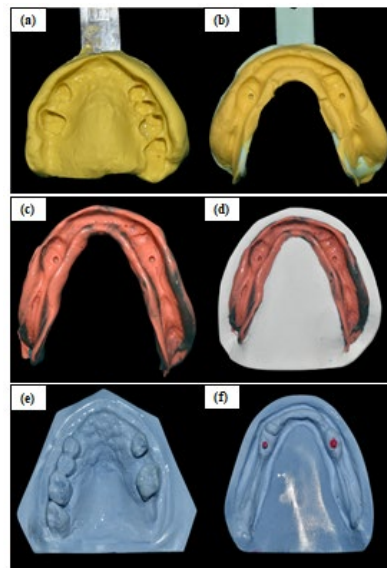


Figure 4. (a, b) Primary impression (c) Secondary impression (d) Plaster boxing (e, f) Master cast

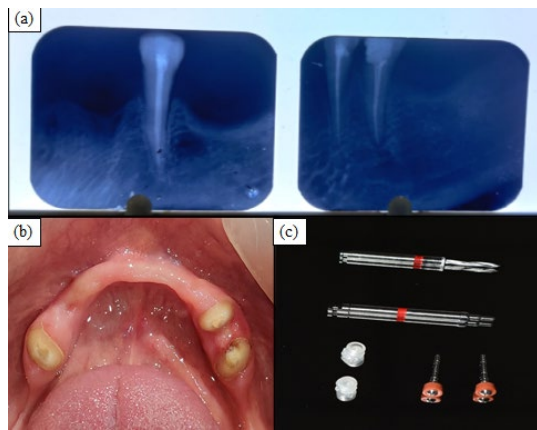


Figure 2. (a) RCT-treated 35, 44, and 45, (b) Decoronation done until 1 mm supragingival.

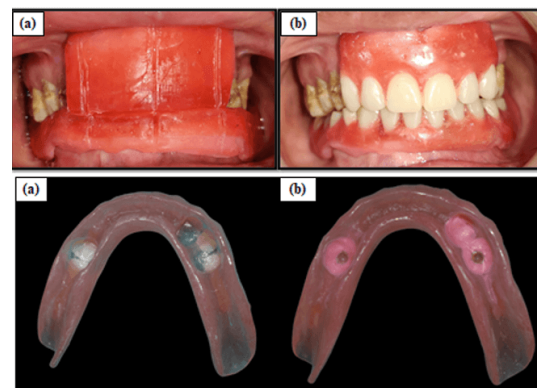


Figure 5. (a, b) Maxillo-mandibular jaw relation. (c, d) Try-in and attachment of nylon cap

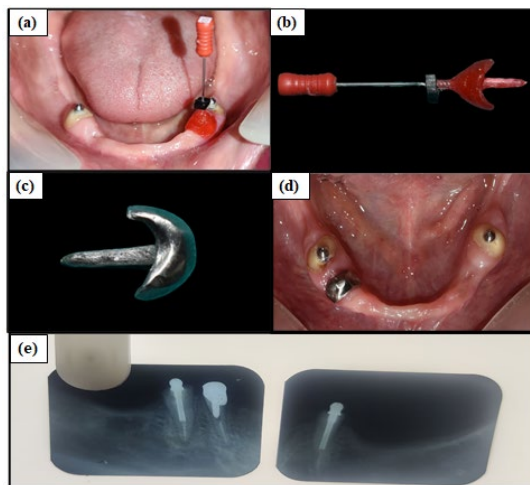


Figure 3. (a, b) Cementation of ball attachments and resin pattern preparation for coping on 44. (c) Processed coping (d) Cementation of coping and (e) Radiographic view after the cementation of attachments.



Figure 6. (a) Post-rehabilitative view, (b) Pre-rehabilitative smile, (c) Post-rehabilitative smile.

Post-operative instructions regarding denture maintenance and oral hygiene were given to the patient, and follow-up was arranged every three months.

DISCUSSION

For a patient, the prospect of losing all their teeth might be terrifying. It also lowers patient morale by serving as an indirect reminder of one's dependence on others. In such cases, overdentures are an option as a preventive prosthodontic measure that offers countless advantages. Root retention with natural teeth aids in preservation of the residual ridge, retention, support, and stabilization for the denture base, resulting proprioceptive feedback and psychological benefits to the patient. The masticatory performance in patients with overdentures is also higher than in complete denture patients. Overdenture therapy is thus the ideal option for patients with prominent Edentulism and/or severe wear, as it provides a relatively quick, straightforward, and cost-effective solution to functional and aesthetic oral rehabilitation.^{4,5}

Overdenture therapy has disadvantages when it comes to maintaining good dental hygiene and avoiding caries and periodontal disease. Overdentures are bulkier and over-contoured when compared to regular dentures. Another drawback is the encroachment of the interocclusal gap. Finally, this treatment option is more expensive and requires more frequent patient recall checks than a traditional removable and complete denture.⁶

Overdentures necessitate sufficient vertical space. There must be enough space for attachments, for artificial teeth, and for the proper thickness of denture base material, all without compromising the denture's strength. The locator attachment takes up the least amount of vertical space.

In the present case report, a ball attachment and custom-made coping were used to increase denture retention, as there was appropriate bone support and a sufficient crown/root ratio. The Essential dental system (EDS) consists of access post overdenture, primary reamer, countersink drills, and nylon cap, while the access post overdenture system consists of a thick-walled hollow tube design and a ball and socket attachment, which allows rotation of the denture, stabilizing flange, second tier and a shank. The nylon cap is a female component that is picked in dentures.⁷ Ball attachments can be used if there is appropriate bone support, a 1:2 crown/root ratio, and at least 5 mm of bone surrounding the root. The access post's ball and socket attachment allow the denture attachment to rotate. Because the ball attachment's small head reduces the quantity of material

that must be removed from the denture, the denture's strength is not jeopardized. The technical work can be simply completed at Chairside.^{8,9}

CONCLUSION

An overdenture is a practical and feasible treatment alternative to a conventional complete denture. For edentulous patients with few remaining teeth, a mandibular tooth-supported overdenture is one of the best and most comfortable treatment alternatives. A multidisciplinary team approach and patient education determine the treatment results and the patients' post-prosthetic quality of life.

DECLARATION OF THE PATIENT CONSENT

Written informed consent was obtained from the patient for the treatment and publication of this study.

CONFLICT OF INTEREST

There is no conflict of interest.

REFERENCES

1. The Glossary of Prosthodontic Terms. 9th ed. J Prosthet Dent. 2017;117(5S):e1-e105.
2. Drashti G, Rajeah S. Tooth supported overdenture: Imperative treatment modality: Root to basics. Int J Appl Dent Sci. 2019;5(4):16-21.
3. Brewer AA, Morrow RM. Overdentures made easy. 2nd ed. St.Louis: Elsevier Mosby; 2015.
4. Samra RK, Rupan & Bhide SV, Goyal C, Chhavi & Kaur T. Tooth supported overdenture: A concept overshadowed but not yet forgotten!. J Oral Res Rev. 2015;7:16-21.
5. Okataria I, Shen R. The prosthodontics care for geriatric patients nowadays. J Indones Dent Assoc.2019;2(1):43-48.
6. Rodrigues RC, Faria AC, Macedo AP, Sartori IA, de Mattos Mda G, Ribeiro RF. An in vitro study of non-axial forces upon the retention of an O-ring attachment. Clin Oral Implants Res. 2019;20:1314-9.
7. Scotti R, Melilli D, Pizzo G. Overdenture su denti naturali. Analisi dei vantaggi clinici (Overdenture supported by natural teeth: analysis of clinical advantages). Minerva Stomatol. 2003;52(5):201-10.
8. Schwartz IS, Morrow RM. Overdentures. Principles and procedures. Dent Clin North Am. 2016;40:169-94.
9. Bansal S, Aras MA, Chitre V. Tooth supported overdenture retained with custom attachments: a case report. J Indian Prosthodont Soc. 2014;14(Suppl 1):283-6.