

## Case Report

### Intra radicular retained (coping) tooth supported overdenture for alveolar bone preservation

Souman Chawla<sup>1</sup>, John Jacob KH<sup>2</sup>, Sandeep Chawla<sup>3</sup>

<sup>1</sup> Senior lecturer, Department of Maxillofacial Prosthodontics, CIIDSRC, KUHS, Kerala;

<sup>2</sup> Reader, Department of Maxillofacial Prosthodontics, CIIDSRC, KUHS, Kerala;

<sup>3</sup> Associate professor, Department of Periodontics, Government Dental College, KUHS, Kerala

#### ABSTRACT:

The presence of a natural tooth within the residual alveolar bone preserves its integrity and is a major mean of preventing a future Prosthodontic situation. Remaining natural teeth need to be prepared in such cases in order to be able to support and/or retain the overlying denture. An elderly male patient in his early fifties, reported with chief complaint of extremely poor mastication since he had lost all of his natural teeth except two maxillary canines. Both canines were supraerupted to the extent that the roots were denuded of its surrounding bony support. A tooth supported overdenture with a single coping (with endodontic treatment) was designed to influence masticatory efficiency. The complete denture occlusion was balanced in terms of occlusion. The patient was highly satisfied with the outcome of the prosthesis.

**Key words:** residual ridge, balanced occlusion, overdenture, coping, base metal alloys, implant overdenture.

Received: March 12, 2021

Accepted: April 13, 2021

**Corresponding Author:** Dr. Souman Chawla, Senior lecturer, Department of Maxillofacial Prosthodontics, CIIDSRC, KUHS, Kerala, India

**This article may be cited as:** Chawla S, KHJ John, Chawla S. Intra radicular retained (coping) tooth supported overdenture for alveolar bone preservation. J Adv Med Dent Sci Res 2021;9(4):110-113.

#### INTRODUCTION

The significance of retaining natural teeth as a means to aid in retaining the denture dates back to 1856,<sup>1</sup> when the concept of overdentures was brought into the science and art of prosthetic dentistry. Since then various prototypes of overdenture in the form of immediate overdenture and implant supported overdenture have also basically been inspired from early tooth supported overdenture. Overdenture treatment is basically an old concept in which dental practitioners have successfully engaged existing natural tooth/implants/retained roots to retain or support an overlying complete denture.<sup>2</sup>

The present era of implant supported overdentures differs only in terms of the supporting structure while the principles of designing are not far different from earlier overdentures. One out of available prosthetic implant options is an implant supported overdenture.<sup>3</sup> While implants have revolutionized prosthetic dentistry in many developed nations, the tooth support overdentures are still a treatment option of choice for poor patients in both developed and developing countries.<sup>4</sup> In a comparative study of three treatment modalities, the use of tooth or

implants as support to complete denture has been found to be positively associated with preservation of bone.<sup>5</sup> The presence of the tooth or root within a bone present many distinct advantages that includes proprioception and directional sensitivity besides other advantages of having a natural tooth within the oral cavity.<sup>6,7</sup> Other ominous clinical advantages include a decrease in the amount of bone resorption (less than 0.1 mm/year), increased masticatory forces, thus promoting masticatory efficiency and psychological well being.<sup>8</sup> Preventing bone loss has been reported to be proportionate to the number of teeth present. Overdentures are extremely flexible in terms of designing and can be made either with or without endodontic treatment, and/or with or without attachment (coping).<sup>9</sup>

While many authors have reported the use of tooth supported overdentures using an amalgam plug, we present a case of a tooth supported overdenture using an intraradicular customized base metal alloy coping with two long overerupted maxillary canines.

### CASE REPORT

An elderly male patient aged 53 years, reported to the department of Prosthodontics with a chief complaint of poor masticatory ability due to loss of natural teeth. Patients medical, social, drug and other related histories were non contributory to ongoing treatment plan. Extra oral examination revealed normal clinical features while intra oral examination presented with the presence of mandibular completely edentulous residual alveolar ridge while maxillary arch presented with a Kennedy class 1 modification 1, partial edentulous situation with bilateral maxillary canines only present (Fig 1). Both canines had supraerupted, had worn out incisal surface and denuded roots. Presence of plaque over the undercut area of both canines was present. Treatment options for mandibular arch included implant supported overdenture or a conventional complete denture while the prosthetic option for maxillary was tooth supported overdenture with coping (endodontic treatment) or extraction of canines followed by conventional complete denture prosthesis. The patient gave consent for conventional mandibular complete denture opposing a maxillary tooth supported (with coping) overdenture. Treatment started with an oral prophylaxis of the remaining natural tooth along with aggressive polishing of the denuded roots. This was followed by endodontic treatment of both maxillary canines. Prosthetic treatment was initiated by preparing the teeth (slicing) till the level of alveolar bone and preparing a wax pattern with an indirect-direct method using pattern resin (Duralay, USA). For preparing and verifying the patterns a putty reline elastomeric impression (Affinis; Coltene AG, Altstätten; Switzerland) was made after preparing each tooth to the level of the bone. Two patterns were fabricated on the cast procured from the impressions using pattern resin (LS; GC America). They were then further refined and tried directly on the prepared root canals (Fig 2). Both canine copings were then cast in base metal alloys (Wiron 99; Bego, Bremen, Germany) using the lost wax technique. The two metal copings were tried and then later cemented with zinc phosphate cement (Harvard, Germany) (Fig 3). Routine clinical and laboratory procedures for fabrication of a complete denture were then undertaken to fabricate the overdenture. Since less space was present, the second coping within the denture was not fabricated (Fig 4).



**Figure 1: Intra oral view of maxillary canines**



**Figure 2: Direct patterns tried in patient's mouth**



**Figure 3: Metal coping cemented in place**



**Figure 4: Maxillary complete denture showing tissue surface**



**Figure 5: Maxillary and mandibular denture in place**

The occlusal scheme for the completed overdenture was balanced occlusion. Processed overdenture was corrected clinically for occlusal errors and delivered to the patient with standing written instructions regarding its maintenance (Fig 5). The patient was extremely satisfied with the outcome of the denture prosthesis.

## DISCUSSION

A completely edentulous patient presenting with supraerupted maxillary bilateral canines with all remaining natural teeth absent was successfully rehabilitated without extracting the natural teeth. While there are different forms of overdentures (tooth supported, implant supported, immediate and conventional), they have almost similar advantages in term of preservation of residual alveolar bone. Immediate overdenture being a hybrid of an immediate denture and an overdenture,<sup>10</sup> has added psychological advantages and is indicated for those who cannot be seen edentulous.<sup>11</sup> The main feature of this rehabilitation being the use of an indirect – direct method of fabricating the coping rather than using either the direct or the indirect alone. The procedure was done to minimize the chances of hypersensitivity/allergy reaction to the monomer content of the self cure resin. The liquid monomer is considered to be responsible for most of the allergic reactions.<sup>12</sup>

Without underlying systemic condition, the resorption of the alveolar bone after tooth loss has been considered to be as pathologic in terms of the rapidity of the loss.<sup>13</sup> Although the two canines presented in this case had supraeruption with denuded roots, their clinical evaluation was done by periodontist rather than prosthodontist as recommended in recent literature, since periodontist can judge the periodontal prognosis of a tooth that supports a denture better.<sup>14</sup> Reducing the crown also decreases the leverage effect of the erupted tooth, thereby improving its chances of survival. After endodontic treatment of the remaining natural tooth, one has the option of going for a prefabricated precision attachment or a customized coping. Various designs of overdenture prefabricated precision attachments include bar/clip, bar/ring, Ball/ring.<sup>15,16</sup> The only factor in such cases is the cost which is the reason why they were not preferred in this case. With custom copings in either tooth supported or implant supported removable overdentures there is less burden on dentist for patients can easily maintain oral hygiene in such cases.<sup>17,18</sup> Custom cast copings are cemented easily, even if the retention is obtained from within the root of the abutment tooth (low film thickness).<sup>19</sup> Besides maintenance of oral hygiene both tooth supported and implant supported overdentures provide patients with added control over their denture (proprioception) and increased masticatory efficiency. Masticatory efficiency is directly related to denture stability, which was enhanced in this case using functional chew in technique for establishing balanced occlusion.<sup>20</sup> Using a coping under a denture may increase the possibility of fracturing the denture, which is why a properly balanced occlusion is also mandatory in such cases. The recording of accurate centric relation is the starting point of obtaining occlusal balance in static and dynamic relations. The use of custom attachment that is retained intra radically has been shown to have adequate retention as compared to prefabricated attachments.<sup>21</sup> If and when, the remaining natural teeth are supraerupted as in this case, the chief problem encountered is establishing vertical dimensions that provide a balance between function and Neuro muscular physiology. Although

multiple landmarks have been used to enhance determination of vertical dimension of occlusion,<sup>22</sup> we used a combination of mechanical (modified niswongers method) and physiological methods.

## CONCLUSION

Natural tooth or root should not be removed unless a far sighted vision has not been exhausted to preserve the residual alveolar ridge. Coping allows better retention and support to the complete overdenture and is easy to maintain for the patient.

## ACKNOWLEDGEMENT

The authors would like to acknowledge the department head and the principal of providing immediate multidisciplinary access to complete the case. The authors are also grateful to dental technicians of the department of Prosthodontics for their immaculate laboratory work.

## REFERENCES

1. Crum RJ, Rooney GE. Alveolar bone loss in overdentures: a 5 year study. *J Prosthet Dent* 1978;40:610-3.
2. Budtz-Jorgensen E. Effect of controlled oral hygiene in overdenture wearers: a 3-year study. *Int J Prosthodont* 1991;4:226-31
3. Mattoo K, Singh SP, Brar A. A simple technique to align attachment components in implant supported mandibular overdenture. *International Journal Of Research In Medical Sciences And Technology* 2014;1(1):6-8.
4. Mattoo K, Kapoor A, Jain S. Immediate overdenture – an alternative option in preventive prosthodontics. *Medico Research Chronicles* 2015;2(1):26-29
5. Kalk W, Van Rossum GM, Van Waas Ti. Edentulism and preventive goals in the treatment of mutilated dentition. *Int Dent J* 1990;40:267- 74.
6. Morrow RM, Feldmann EE, Rudd KD, Trovillion HM. Tooth-supported complete dentures: an approach to preventive prosthodontics. *J Prosthet Dent* 1969;21:513-22
7. Mattoo KA, Garg R. Incorporating basic principles of support and balanced occlusion to improve longevity of overdenture. *Dentistry NX*, Dec 2011
8. Ledger E. On preparing the mouth for the reception of a full set of artificial teeth. *Br J Dent Sci* 1856;1:90.
9. Mattoo KA, Deep A. Determining the need of a coping and/or its number/type in a tooth supported overdenture. *J Adv Med Dent Scie Res* 2020;8(10):46-49.
10. Ratnadeep P, Van Brakel R, Kavita I, Huddleston Slater J, De Putter C, Cune M. A comparative study to evaluate the effect of two different abutment designs on soft tissue healing and stability of mucosal margins. *Clin Oral Impl Res.* 2013;24:336–341.
11. Fenton AH. The decade of overdentures: 1970–1980. *J Prosthet Dent.* 1998;79:31–36.
12. Mattoo KA, Garg R, Gupta A, Jain N. Toxicology and biocompatibility of dental materials: A review. *Res J Pharm Biol Chem Sci*, Oct 2012;3(4):1091-99
13. Fenton AH, Hahn N. Tissue response to overdenture therapy. *J Prosthet Dent* 1978;40:492-8.
14. Rahman SU, Mattoo K. Role of Periodontal Evaluation in Tooth Supported overdenture. *Journal of Health Science Research* 2020; 5(1): 21-23.
15. Burns DR, Ward JE. A review of attachments for removable partial denture design: part 1 classification and selection. *Int J Prosthodont* 1990; 3:98–102

16. Burns DR, Ward JE. A review of attachments for removable partial denture design: part 2. Treatment planning and attachment selection. *Int J Prosthodont* 1990;3:169–174
17. Mattoo KA, Yadav L, Rahman SU. Immediate overdenture - a treatment option for bone preservation. *Journal of Medical Science and Clinical Research* 2015;3(1):3879-82.
18. Minocha T, Mattoo K, Rathi N. An 2/2 Implant Overdenture. *Journal of Clinical Research in Dentistry* 2020;3(1):1-3.
19. Mattoo KA, Kapoor A, Sivach A. Selecting the right cement for cast post core crowns – a dental students quandary. *Journal of Medical Science and Clinical Research* 2014 ; 2(9):2323-27
20. Brewer A.A. and Morrow R.M. *Overdentures made easy*, 2nd Ed, The C. V. Mosby Co, St. Louis,1980
21. Preiskel. *Overdentures Made Easy*. Chapter 2 Chapter 3, pp. 21-43, , pp.45-65.
22. Brar A, Mattoo KA, Singh Y, Singh M, Khurana PRS. Singh M. Clinical Reliability of Different Facial Measurements in Determining Vertical Dimension of Occlusion in Dentulous and Edentulous Subjects. *Int J Prosthodont Restor Dent* 2014; 4 (3):68-77.