

### TOOTH SUPPORTED OVERDENTURE – A CASE REPORT

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Article Received on 02/01/2020

Article Revised on 23/01/2020

Article Accepted on 13/02/2020

#### ABSTRACT

The preservation of supporting teeth for overdenture abutments provides an acceptable and a very efficient prosthetic treatment. However, preservation of tooth requires that proper diagnosis and treatment planning be ensured for a long-term denture performance. The implants or modified natural teeth provides additional support, stability; and retention of the overdenture than the edentulous ridges alone can provide. This is particularly of great advantage in the mandibular arch, where edentulous ridges may resorb at a rate four times greater than that of the maxillary arch. Retaining natural teeth as abutments for overdentures can considerably reduce the progress of residual ridge resorption. The stress concentration is also shared between the denture bearing areas and the abutment teeth present.

**KEYWORDS:** Overdenture, metal copings, resorbed ridges.

#### INTRODUCTION

Taking into account the number of partially or completely edentulous patients, various types of treatment procedures may be indicated, including conventional complete dentures and tooth-supported or implant-supported overdentures. Tooth-supported overdentures can be retained in oral cavity with attachments and can help improve both retention and stability of the denture while simultaneously reducing alveolar bone resorption chances. It delays the process of resorption, improves denture foundation area and increases masticatory efficiency.<sup>[1]</sup> They can also be cost-effective and can help maintain more dental proprioception through the periodontal ligament area than implant supported overdentures. However, patient needs to maintain good oral health care with professional assistance to prevent failures of the overdenture. Rissin *et al.* in 1978 in their study compared masticatory performance in patients with natural dentition, complete denture and over denture and found that the over denture patients had a chewing efficiency that was one-third higher than the complete denture patients.

DeVan statement states that "Perpetual preservation of what remains is of more importance than the meticulous replacement of what is lost".<sup>[1]</sup> The preservation of supporting teeth for overdenture abutments provides an acceptable and efficient prosthetic treatment. However, preservation of tooth requires proper diagnosis and

treatment planning to ensure a long term performance of the denture. The remaining roots in the oral cavity are used to maintain adequate bone height for support and periodontal support with proprioception.

A number of designs of overdenture attachments are available nowadays in markets including bar and clip, ball and O-ring, ERA and magnetic attachments. The selection of the most appropriate system for use in such overdenture cases depends on the number of remaining root or teeth, distance from each root or teeth, and location of the remaining natural teeth.<sup>[2]</sup>

#### Heartwell' has classified overdenture is as follow Based on the method of abutment preparation

1. Coping.
2. Non-coping - with simple tooth modification.
3. Attachments.
4. Submerged vital roots: Effective in preserving alveolar bone.

#### Coping types

- Short coping - 2-3 mm long and normally require endodontic therapy.
- Long coping - 5-8 mm long, an attempt is made to avoid endodontic therapy by conservative reduction of the remaining tooth structure.

Other treatment options like a telescopic crown, short-coping, or long-coping, covering the remaining roots with metal are also used.<sup>[3,4]</sup> Attachment selection should be determined after the analyzing the vertical occlusal dimension and each tooth's vertical bone height.

### Case Report 1

A 82 year old male patient came to the department of Prosthodontics and crown and bridge sullivan with chief complaint of loose fitting tooth supported mandibular overdenture and maxillary conventional complete denture. On intraoral examination it was seen that no teeth were present in the maxillary arch and in mandibular arch only teeth present were first premolar in left quadrant and canine in right quadrant. No attachments or metal copings were given for the overdenture.

Mandibular ridge was more resorbed posteriorly. No mobility or clinical pathology was noticed on radiograph. Treatment planning was to fabricate cast metal short coping for 34 and 43 on which the overdenture would be fabricated. Post space was prepared using Peeso reamers leaving about 3-4mm gutta percha at the apex. Abutment teeth were prepared with a dome-shaped contour in all dimensions. The height of the abutment teeth was 3-4 mm with the finish line placed equigingivally. Pattern resin material was used to record the post space area using orthodontic wire and the adequate dome shape was produced using the pattern resin material for the short copings. These were then checked for proper fit and were cast in base metal alloy. After fabrication of the copings were checked for fit and cemented using glass ionomer cement type 1 cement. Primary impression was made using alginate impression material (Jeltrate). Casts were

poured and special trays were fabricated with self-cure acrylic resin. Border molding was done for both the arches with low fusing compound Secondary impression was made using light body elastomeric material for mandibular arch. For maxillary arch wash impression was made using Z.O.E. impression paste. Jaw relation was recorded, teeth arrangement and trial insertion was done and final denture was fabricated.

### Case Report 2

A male patient aged 66 years reported to the department with chief complaint of broken mandibular removable partial denture and loose maxillary removable partial denture. On intraoral examination teeth present were 11, 21, 22, 23, 34, 33, 43 (FDI). Grade 1 mobility was present with 23, 34 and 43(FDI). Available interarch space was found to be adequate. A final treatment plan was made and explained to the patient with the fabrication of a mandibular and maxillary overdenture. Intentional endodontics was carried out with the teeth. Post space was prepared using peeso reamers leaving about 3-4 mm gutta percha at the apex. Post space area was recorded using light body impression material and putty impression material using the indirect technique with the help of orthodontic wire to record post area. Upon fabrication, posts were cemented to the teeth using zinc phosphate cement. Primary impression was made using alginate impression material and poured with stone. Custom trays fabricated and border molding and secondary impressions were made using low fusing compound and light body elastomeric material. Casts were poured and jaw relation was recorded. Mounting was followed by teeth arrangement and trial insertion. After patient's approval final processing of denture was done.

### CASE 1

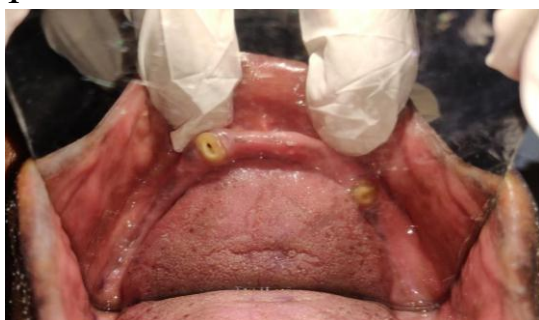


Figure 1: Pre treatment.



Figure 2: Post space preparation.



Figure 3: Copings fabricated with pattern resin.

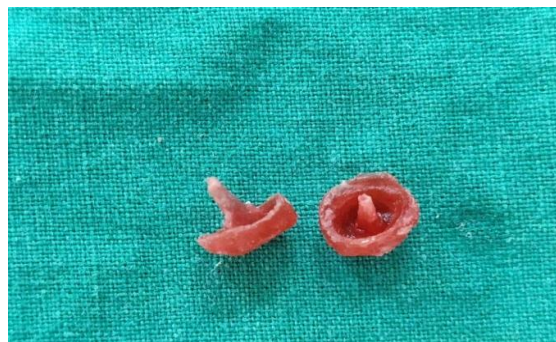


Figure 4: Copings.



Figure 5: Pre operative.



Figure 6: Post operative

CASE 2

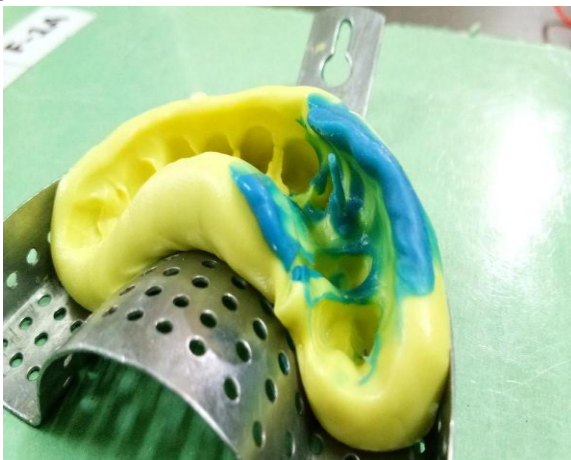


Figure 1: Indirect technique for recording post space.



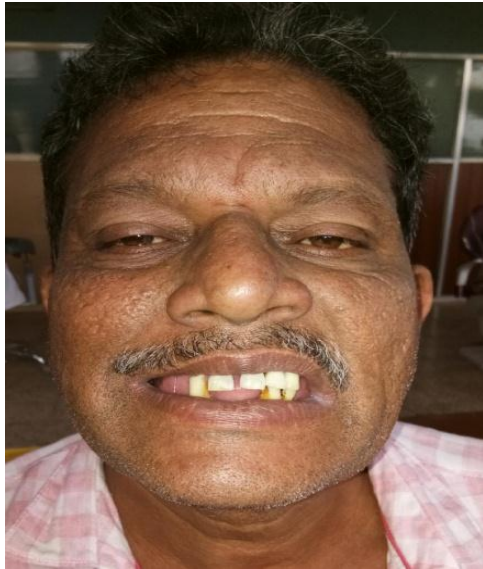
Figure 2: Intraoral view.



Figure 3: Cemented copings.



Figure 4: Master casts.



**Figure 5: Pre operative view.**



**Figure 6: Post operative view**

## DISCUSSION

In a study 5 years study by Crum and Rooney, they graphically demonstrated an average loss of 0.6 mm of vertical bone in the anterior part of the mandible of overdenture patients through cephalometric radiographs as opposed to 5.2 mm loss in complete denture patients.<sup>[5]</sup> Overdentures have a number of advantages over the conventional denture. Overdentures help in reducing loss of surrounding bone and reduces pressure on the alveolar ridge. Studies have also showed that in overdenture cases, mobility of tooth also decreases due to the fact that leverage on bone is reduced as the crown to root ratio is reduced. They also help maintain proprioception as the tooth is not extracted. The average threshold of sensitivity to a load was found to be 10 times as great in denture wearers as in dentulous patients.<sup>[6,7]</sup>

### Location of abutment teeth

Two teeth in each quadrant presents an ideal situation. Cuspids, second premolars or second molars in each quadrant. Mandibular cuspids are most often utilized since they are usually the last teeth to be lost. Mandibular incisors can be used as over denture abutments if mandibular arch is intact.

### Clinical procedure: (For tooth supported over denture)

1. Surgical removal of teeth with poor prognosis should be done.
2. Periodontal treatment if and when needed should be carried out.
3. Endodontic treatment of abutment teeth if and when needed.
4. Crown reduction of abutments for receiving copings should be done.
5. Fluoride application over prepared teeth in cases of high caries chances should be done.
6. Impressions and subsequent procedures are similar to that of conventional complete dentures.

In the case reports described above, customized short coping with the intra-radicular post was selected for a case with limited inter-arch space and also taking into consideration patients economical status. Retaining natural teeth as abutments for dentures can considerably reduce the progress of residual ridge resorption. Multiple abutments can be used for this purpose. Even abutments which are coronally modified or restored can be used. Endodontic treatment is usually done for most cases.

Advantages of Overdentures are it maintains the integrity of the residual ridge, improves the retention and stability of the denture, improved proprioception leading to better neuromuscular control and also reduces tooth mobility. They help in regulating the biting force over the denture. Provides psychological effect on the patient as extraction of abutment teeth can be avoided. In case of abutment failure, the abutments can be extracted and the overdenture can be relined and used as a conventional complete denture. Disadvantage is that oral hygiene measures and fluoride application should be carried out periodically, which if not followed can cause high incidence of caries and periodontal disease around the overdenture abutments. Frequent recalls are needed to verify the health of the supporting tissues of the overdenture abutments. They can be more expensive than conventional dentures due to endodontic therapy and coronal restorations which may be needed for certain overdenture abutments.

Periodontally-compromised teeth with horizontal bone loss have a much better prognosis than the ones with vertical bone loss. Favourable crown-root ratio should be present in cases with slight tooth mobility. A sufficient band of attached gingiva around the abutment is an absolute necessity for an overdenture abutment. Usually anterior teeth like canines and premolars are preferred as overdenture abutments as they are easier to prepare and quite economical.

## CONCLUSION

The overdentures have innumerable advantages and applications as compared to that of conventional complete dentures. Their success depends upon proper case selection and careful evaluation of various steps in the procedure.

Prosthetic rehabilitation of cases like partial anodontia not only improves function and esthetics dramatically, but also psychologically boosts the morale of the patients more so when the individual is of younger age.

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