

Prosthodontic Rehabilitation using Cu-Sil like Denture and Prefabricated Extracoronal Attachments: A Case Report

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ABSTRACT

Present day dentistry is all about being conservative, preservation of teeth, thereby preserving the integrity of the residual alveolar ridge and the proprioceptive ability of the periodontium. Cu-Sil dentures, a relatively newer type of transitional dentures serves all the above-mentioned purposes. It is essentially a complete denture with holes joined with a rubber gasket, allowing the remaining natural teeth to protrude through. On the other hand, achieving patient satisfaction can be challenging when a case presents with bilaterally posterior segments of missing teeth. Successful restoration can be done using attachment retained cast partial dentures. This clinical report discusses the rehabilitation of a patient with Cu-Sil like denture for the maxillary arch and a FPD supported removable dental prosthesis using a prefabricated, extracoronal attachment for the bilaterally edentulous mandibular arch.

KEYWORDS: Cu-Sil denture. Cu-Sil like dentures, Extracoronal precision attachment, Removable partial dental prosthesis

INTRODUCTION

M M DeVan has rightly said that "Perpetual preservation of what is remaining is more important than the meticulous reconstruction of what is lost." Complete edentulism, when rehabilitated with removable prosthesis follows sequelae of psychological trauma, lack of stability and retention, compromised aesthetics, residual ridge resorption and masticatory dysfunction. Crum and Rooney¹ and Van Wass et al² says that there is relatively lower alveolar bone resorption in partially edentulous ridges than in cases of complete edentulism. Other advantages of preserving natural teeth include maintenance of proprioceptive ability of the periodontium and increased stability of the removable prosthesis. Overdentures or transitional dentures or immediate dentures following complete extractions are the treatment options available for edentulous patients having very few remaining natural teeth. But for patients who are apprehensive for complete extractions, Cu-Sil dentures are the simplest mode of partially edentulous treatment available in the transitional phase. A Cu-Sil denture is essentially a complete denture featuring a soft elastomeric gasket which clasps the neck of all the remaining natural tooth/teeth, thereby allowing to seal out food and fluids, and facilitates cushioning and splinting of all the natural tooth/teeth from the hard acrylic denture base. On the other hand, preservation of teeth to support an abutment retained fixed or removable prosthesis is another stable alternative to complete dentures. So, the combination of fixed and removable prosthesis designs including

precision or semi-precision attachments can allow us to achieve a correct balance between retention, stability, aesthetics and masticatory function, thus increasing patient compliance. This clinical report discusses the rehabilitation of a patient with a Cu-Sil like denture for the maxillary partially edentulous arch and a combination of fixed and removable prosthodontic therapy using prefabricated extracoronal attachments for the mandibular arch.

CASE REPORT

A 74 year old male patient in good general health, but compromised aesthetics and masticatory function reported to our Department of Prosthodontics, Crown, and Bridge including Implantology at M R Ambedkar Dental College and Hospital, Bengaluru, Karnataka, India. Preliminary clinical examinations revealed maxillary and mandibular Kennedy's Class I arches. In Maxillary arch, only three teeth were present, that were 11, 12 and 21 (Figure 1). All were apparently periodontally and endodontically sound. Mandibular arch presented with periodontally compromised anterior teeth, 31, 32, 33, 41, 42 and 43 and a decayed right first premolar tooth (44). Oral hygiene was fair, Extra-oral examinations showed no significant findings.

Radiographic examinations revealed deep Dental Caries involving pulp in 44; reasonable alveolar bone support for maxillary and mandibular anterior teeth; loss of vertical dimension at occlusion and alteration in the occlusal plane.

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Root Canal Treatment was done in 44, followed by Restoration with a full veneer crown (Porcelain fused to metal crown).



Figure 1. Patient presented with maxillary (Kennedy's Class 1) and mandibular (Kennedy's Class 1) partially edentulous arches.

After non-surgical periodontal therapy, diagnostic casts were mounted on a mean value articulator for estimating the tentative vertical dimension.

Treatment planning included fabrication of a Cu-Sil like denture for the maxillary arch and fabrication of a FPD (bridge) with respect to 31,32,33,41,42,43 and 44, including prefabricated extracoronal attachments for rehabilitating the mandibular bilateral distal extension arches using a cast partial denture.

The chief aim of providing a fixed bridge for lower anterior teeth was to splint them and thereby achieve better long-term stability and prognosis

Clinical steps:

1. Diagnostic impressions were made with irreversible hydrocolloid (Alginate-Algitex, DPI) for both the arches.
2. Diagnostic wax-up and mounting was done in a mean value articulator to evaluate the inter-arch space.
3. Maxillary pick-up impression was made using zinc oxide eugenol impression paste (DPI Impression Paste) and alginate (Algitex, DPI). The mandibular impression was made using additional silicone elastomeric impression material (Putty-Affinis, Coltene, Light body- Affinis, Coltene) using the two step-two phase technique. Master casts were poured with Type III Gypsum product (Kalstone, Kalabhai).
4. Temporary denture bases and occlusal rims were fabricated for both the arches.

A. Mandibular Arch:

1. Mandibular anterior teeth (31, 32, 33, 41, 42, 43) and mandibular right first premolar (44) was prepared to receive a Porcelain fused to metal bridge following the conventional principles of tooth preparation.
2. The impression of the prepared teeth was made using Putty Reline technique (Putty-Affinis, Coltene, Light body- Affinis, Coltene).

3. Conventional lab steps were followed for preparing the wax pattern for the metal copings.
4. An arbitrary line was traced approximately on the crest of the alveolar ridge in the bilaterally edentulous areas.

Attaching the Prefabricated Extracoronal attachment (Rhein 83 OT Cap, Italy):

1. The attachments were positioned parallel in the center of the residual alveolar ridge using specialized paralleling instruments. They were attached and stabilized to the wax pattern of 44 and 33 on the distal aspect using inlay wax (Figure 2).



Figure 2. Positioning of the Attachments using paralleling instruments

2. The casting was done following conventional protocols using cobalt-chromium alloy.
3. The attachments were then covered with a black cap, and the casting was sandblasted. After checking the casting on the model, refining and polishing of the copings and attachments were done. The metal copings were tried in the patient (Figure 3).



Figure 3. Try-in for metal copings and the attachment assembly

4. The Metal surface was veneered using ceramic following the conventional laboratory steps.
5. Final cementation of the bridge along with the Attachment assemblies was done using Glass Ionomer cement (GC Gold Label 1- Lining and Luting Cement) (Figure 4).
6. Jaw Relation was recorded following the



Figure 4. Final cementation of FPD in mandibular arch.

Conventional clinical steps.

7. Teeth arrangement was completed followed by try-in of the waxed up dentures (Figure 5).
8. Acrylation of the mandibular denture was done using heat cure resin (Heraeus Meliodent) by compression moulding technique.
9. The female component of the attachment was placed over the male component of the assembly. An arbitrary depression was created in the intaglio surface mandibular prosthesis, and self cure acrylic resin was filled in the depression for picking up the female component (Figure 6).
10. Finishing and polishing were done (Figure 7).



Figure 5. Try-in for the dentures.



Figure 6. Female component picked up in the mandibular denture using self-cure acrylic resin.

B. Maxillary arch:

1. The maxillary trial denture was processed by conventional methods .
2. After Finishing and polishing, Space in the denture for the remaining natural teeth was widened to give a clearance of 4-5 mm.
3. Silicone adhesive was applied to the denture. Silicone soft liner base and catalyst (Mollosil, Detax, Germany) were mixed and applied in the spaces created in the denture around the natural teeth. The denture was inserted and held in position till the material sets.
4. The denture was then removed, and excess material was trimmed and finished using silicone polishing agents (Figure 7).
5. Polishing of the denture was done by applying silicone glaze and the denture was placed in patient's mouth (Figure 8).



Figure 7. Finished and Polished dentures



Figure 8. Dentures placed in patient's mouth.

Post-placement Instructions: Conventional instructions similar to removable prosthesis should be followed. Special care should be taken regarding maintenance of oral and denture hygiene to prevent fungal growth on soft liner material. Denture cleansers and antimicrobial agents were prescribed. The patient was informed about the need for frequent replacement of female component of the attachment assembly, every 3-4 months.

DISCUSSION

Fabrication of Cu-Sil like dentures does not involve invasive procedures, tooth preparations, and extra patient visits. The chairside procedure described in this report increase the retention and stability of the removable prosthesis as well as at the same time, vertical occlusal

dimension and proprioception are maintained by remaining natural tooth.

However, the functional duration of soft liners are short and frequent corrections in the denture margins are required. Lastly, proper oral hygiene has to be maintained as plaque accumulation takes place on the entirely covered gingival margins of the natural teeth.

Despite the growing trend to use fixed dental prosthesis to maintain more teeth in older age groups and an increasing use of dental implants, removal dental prosthesis is still prevalent.³ All RPD with attachments, especially of the extracoronal type, are considered more efficient in providing retention and restoring function and aesthetics.^{4,5}

Extracoronal attachments helps in overcoming the drawbacks of intracoronal attachments like excessive tooth reduction, compromised embrasures, and poor aesthetics.

CONCLUSION

Cu-Sil/ Cu-Sil like dentures provides a snug fit over existing healthy tooth structures. An elastic gasket seals itself around the cervical part of each tooth, thereby providing a stable and healthy fit. Considering the advantages and disadvantages of the technique, Cu-Sil like dentures have evolved to be a suitable treatment option for edentulous patients with very few remaining teeth.

On the other hand, incorporation of pre-fabricated attachments in fixed dental prostheses to support a

removable prosthesis is a conservative treatment option, offering excellent patient acceptance. Due to its versatility in clinical applications, it one of the most successful designs available today. It does not limit the patient's choice to have an implant-supported prosthesis, whenever they are psychologically and financially prepared.⁶

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