

Use of a Semi-Precision Attachment to Fabricate A Removable Partial Denture: A Case Report

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Abstract

Use of attachment in providing retention to removable prosthesis is an old treatment modality with better success. It highly improves the comfort, aesthetic, function, and patient satisfaction, especially in the patients with long span edentulism where implants and fixed partial denture (FPD) are not indicated and cast partial dentures are barely satisfactory. Proper diagnosis and treatment planning is necessary for selection of appropriate attachment type. A comprehensive evaluation, multi-disciplinary approach and sequential treatment planning is needed for long-term successful outcome. This case report describes the use of an extracoronar semi-precision attachment to enhance retention of removable prosthesis.

Key words: Attachments; Cast partial denture; Over denture; Preci-Sagix; Semi-precision attachment.

Introduction

Precision attachment is an interlocking device, one component of which is fixed to an abutment and the other is integrated into a removable partial denture to stabilize and/or to retain it.¹ A precision attachment is fabricated from milled alloys and are generally intracoronar and non-resilient, and have standard, interchangeable parts.² A Semi-Precision attachment is fabricated by the direct casting of plastic, wax, or refractory patterns. They are considered “semi-precision” since in their fabrication they are subjected to inconsistent water/powder ratios, burn out temperatures and other variables. The resulting components therefore vary to a small degree. They are less costly, easy to fabricate and may

be cast in alloy. They are generally extra coronar and resilient.

Rigid attachments can be considered for Kennedy’s Class III and Class IV tooth-supported prosthesis while for tissue supported large Class IV and distal extension class I or II cases, resilient attachments are preferred. Rehabilitation of distal extension situations can be done by several conventional methods. One treatment modality is implant retained prosthesis but due to insufficient bone or for economic reasons patients are unable to accept that option. Another treatment modality for such clinical situations is combination of fixed and removable partial dentures using semi-precision attachment.

This clinical report demonstrates the rehabilitation of a partially edentulous mandibular arch with removable partial dentures using extra coronar attachment, precisagix. Crown was made with the projecting attachment and a corresponding fitting or housing was incorporated in the removable

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prosthesis, which permitted a certain amount of movement between the two sections of the prosthesis that acts as a non-rigid stress breaker and helped in distributing the occlusal load.

A Case report

A 67-year old female presented to the department of prosthodontics for the rehabilitation of partially edentulous maxillary and mandibular arch. On examination 13, 11 were present on maxilla and 35,34,33,32,31,44,45,46 were present on mandible (Fig 1). After radiographic evaluation, tooth 46 was advised for extraction. The mandibular arch was classified as Kennedy's Class I modification 1 partially edentulous arch (Fig 3).

After oral prophylaxis impressions were made and the diagnostic casts were mounted on the articulator using a face-bow (fig 4).

Treatment was planned as:

1. Overdenture in maxillary arch
2. Semi-precision retained cast partial denture in lower arch

Reduced interocclusal space was found on left side due to dentoalveolar extrusion of mandibular teeth (Fig 5). Endodontic treatment was done on 13,11,35,34,33,32,31. After occlusal reduction of 33, 34, 35 proper occlusal plane was established on the left side. Crown height was insufficient, so crown lengthening was performed and temporization was done (Fig 6).

Tooth preparation was done in 13 and 11 for overdenture abutments. Primary impression was made and custom tray was fabricated. Final impression was made with light body elastomeric impression material (Reprosil, Dentsply, India). Master cast of upper arch was mounted on the articulator using face-bow transfer.

Tooth preparation was done in lower arch. Putty wash impression was made. Two casts

were poured. One cast was used for fabrication of framework for CPD. On other cast die sectioning was done and working cast with removable dies were made using die lock tray. Denture base and wax rim was made on lower cast. Bite registration record was made and lower cast was mounted on articulator (Fig 7).

Teeth arrangement was done on maxillary arch. Wax pattern was fabricated for metal ceramic bridge from 33 to 44 and splinted crowns 34 and 35. With the help of dental surveyor and paralleling mandrel, a castable plastic male component of Preci-sagix was attached to the pattern, on the distal aspect of each distal abutment. Using a milling bur, shoulder for lingual bracing arm was prepared on the lingual aspect of the wax patterns of distal abutments (Fig 8). Wax pattern was then invested, casted and finished.

Metal framework for FPD and splinted crowns were tried in the patient's mouth for accuracy of fit. Framework was veneered with ceramic and metal ceramic try-in was done and necessary adjustment and contouring were done, after which the FPD was polished and glazed. Preci-sagix processing female was assembled into male component. It was covered with pattern resin (GC, Tokyo, Japan) and wax was added to make pattern of premolar teeth. Lingual bracing arm was waxed up directly to the female component housing (Fig. 9). Cut back was done on wax pattern for ceramic veneering. Housings were sprued and then removed from the male components. Preci-sagix processing female were removed using pointed instrument and then housing were invested, cast and finished. The inside of the housings were sandblasted. After confirming the fit of male and female components, the housings were veneered with ceramic.

In the meantime, framework of mandibular cast partial denture was waxed up and cast. Closed mouth impression was made with light

body impression material on a border moulded (DPI pinnacle tracing stick) acrylic custom tray (Zelgan, Dentsply, India). (Fig. 10). Pickup impression was made with alginate along with FPD (Fig. 11), which was poured to fabricate the cast.

Now, there were altogether three components to be assembled: FPD with male components, Female housings with yellow riders in it and Cast partial denture framework. The housings with yellow females were fitted to the male components. CPD framework was then seated in the cast. With the help of pattern resin, the

extension of the housing was attached to the CPD framework³ (Fig. 12). The joined CPD and female housing were transferred to articulator. Acrylic teeth were set up in the articulator and then try in was done (Fig. 13). The denture was cured, finished and polished.

FPD was cemented to the abutment teeth with the help of luting Glass Ionomer Cement (GC, GC Corporation, Tokyo, Japan). The denture with housing and white female component with reduced retention was delivered (Fig. 14). Post insertion instructions were given and patient was kept on regular follow up appointments.

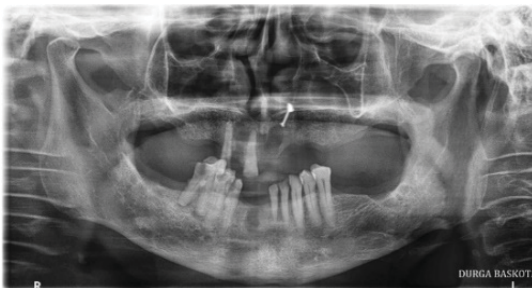


Figure 1: OPG X-ray



Figure 2: Upper arch



Figure 3: Lower arch



Figure 4: Diagnostic mounting



Figure 5: Diagnostic mounting shows reduced interocclusal space



Figure 6: Crown lengthening



Figure 7: Cast Mounted in CR

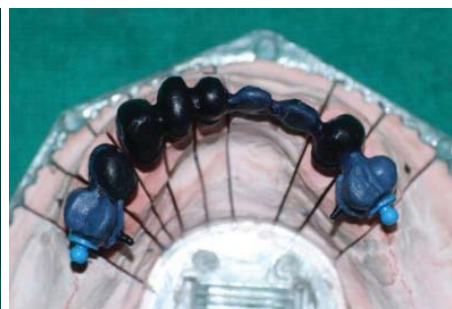


Figure 8: Waxup



Figure 9: Female housing



Figure 10: Closed mouth impression



Figure 11: Pick up impression



Figure 12: Three components joined in cast



Figure 13: Try in



Figure 14: Post insertion

Discussion

Semi-precision attachment is fabricated by direct casting of plastic wax or refractory pattern. It provides the exceptional feature of improved retention, improved comfort, esthetics and less postoperative adjustments to the cast partial denture. Usually indicated for long span edentulous arches, distal extension bases, and nonparallel abutments. The desire to balance between functional stability and cosmetic appeal in partial dentures gave rise to the development of precision attachments. The decision to use an intracoronal or extracoronal attachment should be based on the size and shape of the abutment teeth. Intracoronal attachments require more tooth preparation and tooth reduction than extracoronal attachments.

The preci-sagix, in this case, consisted of extracoronal male and female components. Sagix consist of castable plastic male which is incorporated with paralleling mandrel into the wax-up. 2.2 mm diameter sagix was used. Female components are available in 3 retention

levels: yellow:normal retention, white:reduced retention, red:increased retention.⁴ The semi-precision attachments overcome the disadvantages associated with the use of the intracoronal attachments, which are (1) excessive tooth reduction (2) compromised embrasures and (3) poor esthetics. The other advantages are handling-ease, and wide-choice of alloys. Every attachment with the resilient counterpart has a shelf life, given by the manufacturers. The plastic resilient cap undergoes wear from usage and has to be replaced when its retentive capacity is lost.⁵

Supra-eruption of the teeth into edentulous areas is a common occurrence, which starts once the opposing tooth is lost and continues until a point of time and space that the tooth can no longer erupt. Supra-erupted teeth alter the occlusal plane as well as reduce the interocclusal space. Teeth that have undergone endodontic therapy followed by crown lengthening procedure with osseous resection and final restorations with equi-gingival margins survive for over long

duration of time with stable bone and soft tissue levels. These procedures can be predictably used to correct supra-erupted teeth and gaining the necessary interocclusal space for restorative purposes resulting in favourable long-term restorative outcome.⁶

Conclusion

When esthetics is of prime concern and economic condition does not permit the use of dental implants, semi-precision attachment retained cast partial dentures would be an excellent option for such cases. The stress control on abutment is an essential factor for the success of distal extension cast partial denture which is achieved through accurate impression technique, broad coverage, stable denture base, splinting of abutments and proper selection of attachment. With proper case selection and treatment planning, semi-precision attachments are the viable option and can improve retention, esthetics and function.

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