

Case Report

Simple Innovative Techniques for Semi Precision Attachments: A Case Series

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ABSTRACT

The desire to balance between functional stability and cosmetic appeal in dental prosthesis gave rise to the development of Precision Attachments in dental field. Since then, Precision Attachments have always been surrounded by an aura of mystery. The use of Precision Attachments for partial denture retention is a practice builder for the better class of dentistry and helps to elevate the general standards of partial prosthodontics. Even though this is the best possible retention aid available, it comes at a fairly high cost. In this article, our aim is to present, same quality of precision with desirable mechanical properties using day to day items like plastic buttons, coffee straws in replacement to conventional matrix and patrix system. This case series give us an insight of how simple attachment systems can be inspirational to the young dentist.

Introduction

Prosthodontic rehabilitation of a patient with few teeth remaining is challenging. Any conservative treatment that can delay or eliminate future prosthodontic problems should be considered¹. Complete denture patients are generally not fully satisfied due to the movement of the mandibular denture which may be related to resiliency of the supporting tissues or inherent instability of dentures during functional and parafunctional movements². Many studies have shown that, 20-30% of denture wearers are dissatisfied with the functioning of their dentures^{3,7}.

Overdenture increases the retention, stability and support, so it improves the masticatory efficiency, preserves the alveolar bone and muscular patterns¹. Also it preserves sensory receptors within the periodontal ligament which increases manipulative skills in handling the denture⁸. Overdentures have various advantages like they decrease the pressure on soft-tissue and transmit it to the underlying bone, which increases the ridge integrity, stability and patient comfort. Overdentures have better retention and stability compared with the conventional complete dentures, which greatly improve the masticatory efficiency⁹. Disadvantages of the overdenture require

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Fig. 1 – Prepared abutment teeth



Fig. 3 - Cementation of coping

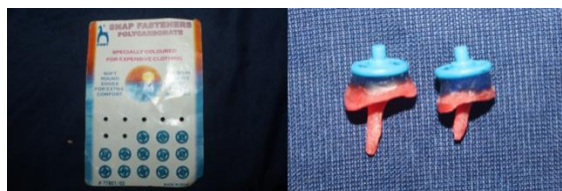


Fig. 2 – Plastic buttons and wax - up done with Pattern resin impression



Fig. 4 - Picked-up of female component using auto polymerizing acrylic resin

additional unavoidable treatment that includes preparation of abutment with coping and without coping, with or without root canal treatment that add on to additional time and increases cost¹⁰. Retention and stability of overdentures can be improved by attachments or magnets. Attachments for overdenture are classified as studs or bars which can be rigid or resilient.

The precision attachment is sometimes said to be a connecting link between the fixed and the removable type of partial denture because it incorporates features common to both of construction. The primary objective of this case series was to provide a cost effective attachment with the optimum functional efficacy. The present article describes a procedure where the attachments are fabricated in the institutional laboratory using different simplified techniques and methods, which could provide us a way to avoid the costlier prefabricated sophisticated precision attachment and still provide sufficient retention.

CASE REPORT 1

A 55 year old male patient reported to the Department of Prosthodontics, Terna dental college, Nerul, Navi Mumbai, with a chief complaint of multiple missing teeth and wanted replacement of the same. On oral examination, it was observed that patient had generalized periodontitis. On clinical and radiographic inspection, detailed treatment planning and several treatment options were offered and patient understood various treatment plans. Prosthesis was planned according to patients comfort, choice and economical constrains, i.e. Conventional mandibular denture and maxillary Overdenture (tooth supported). Diagnostic impression made with irreversible hydrocolloids impression material followed by tentative jaw relation was recorded which showed sufficient interocclusal space to accommodate the stud attachments. The bone height, periodontal support of the remaining roots and interocclusal space determined which attachments could be used¹². After going through the detailed examination and patient economic status, it was decided to use matrix and patrix like system that are easily available in our day today life i.e snap fit shirt button.



Fig. 5 - Denture Insertion



Fig. 6 - Prepared abutment

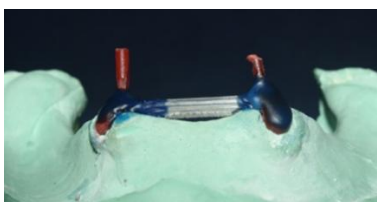


Fig. 7 - Wax - up of coffee straw

Treatment plan includes extraction of teeth with poor prognosis, endodontic procedure for the retained teeth followed by preparation of 13 and 23 as abutments. The teeth were reduced to 0.5 to 1.0 mm above the gingival level and the roots were rounded to a dome-shaped contour (Fig. 1). After preparing the post space with peso reamer, picked up impression was made with addition Silicone (Aquasil LV, Dentsply, Caulk, Germany) using indirect technique. Prefabricated snap fit plastic shirt button was used as a substitute for semi-precision attachment. Initially post space impression was made with pattern resin over which male component of snap fit shirt button was waxed up using parallelometer and it was casted (Fig. 2). Copings were checked for the fit intraorally. After recording maxillomandibular relation, try-in was done and overdenture was fabricated. An abutment tooth was treated with topical fluoride gel (Fluorovil Gel, Vishal Dentocare Pvt Ltd, Gujrat, India). Final cementation of the coping (male



Fig. 8 - Bar Cementation and picked-up clip in autopolymerizing acrylic resin



Fig. 9 - Denture Insertion

component) was done with zinc phosphate cement (Fig. 3). After that female component of snap fit shirt button were incorporated in the maxillary denture (Fig. 4). Denture was inserted after necessary occlusal corrections. Post denture insertion and proper oral hygiene maintenance instructions were given. Patient was recalled after 1 week, 1, 3, 6 and 12 months interval to evaluate the abutments and periodontal status (Fig. 5).

CASE REPORT 2

A 50 year old female patient came to the Department of Prosthodontics, with a chief complaint of multiple missing teeth and wanted replacement of missing tooth. Clinical and radiographic examination revealed that patient had a combination syndrome with maxillary complete edentulism and supraerupted periodontally compromised mandibular anterior teeth. Abutment condition was evaluated and extraction of compromised teeth was carried out. Treatment planned for the patient was conventional maxillary denture and mandibular tooth supported Overdenture. Abutments selected for Overdenture were mandibular right and left canine.

Bar attachments are most commonly used for enhancing the retention and support of a dental or

maxillofacial prosthesis. A bar attachment assembly connects retained roots, teeth, or osseointegrated implants. Interocclusal space was evaluated and was sufficient for accommodation of bar retained overdenture. The disadvantage of these bar systems is that they are expensive and so economical replacement for the bar systems was considered and is described in this article. In this case, plastic coffee straw was used as a substitute to hader bar. The plastic coffee straw (stirrer) can be cast as a bar for splinting retained roots, copings on abutment teeth, or castable abutments for implants. Any straw which adapts well to the prefabricated metal housing and clip can be used.

PROCEDURE:

Abutment teeth were prepared (Fig. 6). Wax pattern on the prepared abutments were made and the plastic coffee straw (stirrer) was used as the bar connecting the abutment teeth (Fig 7).The framework was casted by using cobalt chromium alloy. (Wironium Extra-Hard Co-Cr alloy; BEGO, Bremen, Germany) Casting was retrieved followed by Finishing and polishing of the bar framework using tungsten carbide burs (Gebr Brasseler GmbH, Lemgo, Germany) and rubber polishers (green and brown polishers for Co-Cr alloys; Dentaurum, Ispringen, Germany). Final cementation of the coping (male component) was done with zinc phosphate cement. The prefabricated bar clips (Bremen, Germany) fit well to the cast bar and it was picked up in the mandibular denture (Fig. 8).Post denture insertion and proper oral hygiene maintenance instructions were given (Fig. 9).

DISCUSSION

The Intraradicular precision attachments and the bar attachments are the two commonly used attachment

systems for overdentures. These readily available semi-precision attachments give additional retention, stability, proprioception and patient acceptance, but they come with a cost factor which is higher. Component selection depends on periodontal health and sound bone support, root length and diameter of prepared abutment, inter occlusal space, material availability and cost factor.

Langer and Langer (1991) used stud attachments in the abutments to improve the retention and recommended incorporation of cast metal frameworks to prevent base fractures¹³. Nemcovsky et al. (1990) described a simple technique for fabricating stud overdenture retainers in the form of custom attachment castings with teflon retention discs¹⁴. Berkson (1989) used a laboratory made semi-precision attachment in overdentures and he fabricated the spherical shaped stud attachment with a female part made of clasp wire¹⁵. Guttal et al (2009) fabricated the bar attachment by using coffee straw for tooth supported overdenture¹⁶.Dable et al (2013) fabricated the semi-precision attachment by using plastic beads and orthodontic modules fulfilling the criteria¹⁷.

In this case report, custom made semi precision attachments i.e. plastic snap fit shirt button (male and female component) as a replacement for ball attachment and coffee straw for hader bar attachment were used. Pattern resin was used for preparing the post space impression to fabricate the pattern. Recently, a study described novel method of fabricating a bar for overdenture that can be used both with prefabricated metal clips and custom cast clips¹⁸. This shows that there is need for implementing innovative techniques, which can provide better choice of treatment. Though the custom made attachments lack in the precision, which is possible with the sophisticated prefabricated attachment, it is important

to serve the purpose to achieve the satisfactory function. The acceptance level of the patient receiving final prosthesis with custom made semi precision is similar to the prefabricated precision attachments.

CONCLUSION

Customized ball attachment using plastic shirt button and bar and clip attachment using coffee straw (stirrer) are the simple and cost effective alternative treatments to the use of prefabricated attachment's for enhancing the retention of tooth supported overdentures.

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