Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Spl Issue [2] 2022 : 208-212

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD

ORIGINAL ARTICLE **OPEN ACCESS**

Treatment Options in Distal Extension Case With Case Report Of Fixed Removable Prosthesis Using Rhein 83 Attachments ;A Case Report

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ABSTRACT
Several treatment options are available for replacement of posterior missing teeth for both Kennedy's Class I & II. Each treatment option has its pros and cons, like removable prostheses in unilateral edentulous cases are challenging due to lack of cross arch stabilization and are unesthetic due to the metal clasp. Implant supported rehabilitation will require sufficient bone, attached gingival, cost and time. Thus, fixed removable prosthesis is a cost-effective, esthetic and time-saving option. This article is a case report of the unilateral edentulous mandibular arch which was successfully restored with fixed removable prosthesis using Rhein 83 semi-precision attachment.
Keywords*: Distal Extension, Removable Prosthesis, Implants, Fixed Removable Prosthesis, Rhein83 attachment.*

Received 12.07.2022 Revised 20.08.2022 Accepted 29.10.2022

INTRODUCTION

Posterior teeth are significant in biting and squashing the food, additionally they give a vertical stop and secure TMJ. Mandibular first molar is the first permanent tooth to erupt in the oral cavity. It endures bacterial insult for the maximum number of years and needs to be extracted in a large number of people. Loss of posterior teeth reduces chewing efficiency and deteriorates a person's health. So, their replacement is of utmost importance. Several treatment options are available for replacement of posterior missing teeth for both Kennedy's Class I and Class II. These are removable partial dentures of either acrylic or cast metal, implant supported prosthesis and fixed removal prosthesis using a precision attachment. The removable prosthesis is less expensive as compared to implants but lacks cross arch stabilization and aesthetics also if not properly designed it can deteriorate abutment teeth leading to further tooth loss. Sometimes an accurate prosthesis may not satisfy the patient psychologically because it is a removable prosthesis. Treatment with implants may require hard and soft tissue grafting. These procedures are time-consuming and expensive. A treatment option of fixed removable prosthesis attached with a precision attachment seems like a cost-effective, retentive and viable option [1].Precision attachment is a non-rigid connection between two parts. One part is attached to the tooth, root or implant and the second part is attached to the prosthesis (Fig.1).

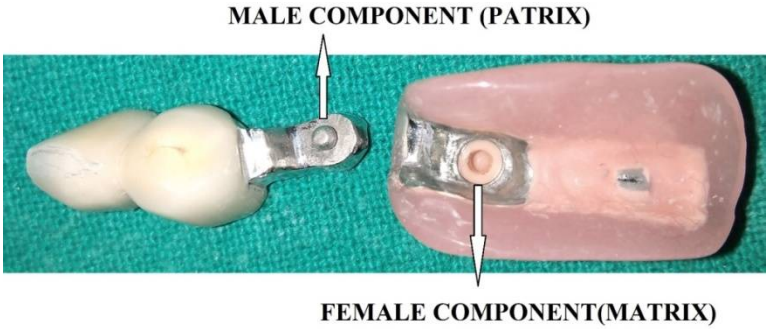

Figure 1 Parts of Attachment within Prosthesis

This whole unit provides a mechanical connection between two parts which gives the advantage of the fixed and removable prosthesis. The precision attachment was first discovered in the 20th century by Dr Herman Chayes. He gave a T shape attachment which was further modified in 1906 by Dr Chayes into an H shape attachment. Precision attachments can be used with a removable prosthesis, fixed prosthesis and also with implant prosthesis [2]

PRECISION ATTACHMENTS ARE CLASSIFIED INTO FOLLOWING:

A. According to their relationship with the abutment teeth

1. Extra-Coronal,
    - Rigid attachment
    - Hinged attachment
    - Resilient attachment
2. Intra-Coronal,
3. Stud Type
4. Bar Type.

B. Based on the stiffness of resulting joint

1. Rigid attachment
2. Resilient attachment

Selection of Precision Attachment for a particular case depends on many factors, such as type of prosthesis, space available for attachment, crown to root ratio, oral hygiene status, amount of tooth structure left, the status of the vitality of the tooth etc.

OT-CAP Rhein 83Inc. USA attachment is a resilient passive castable plastic attachment. This attachment has male and female components. Male component is attached to the distal surface of the prepared tooth and female attachment has a nylon rubber which provides retention and attached to the other half of the prosthesis This can be used in unilateral edentulous cases successfully. Force is distributed over a large area of the ridge instead of abutment tooth, is esthetic and requires less time as compared to the implant as treatment option. Above all, this is cost-effective [3]. The only limitation is that it cannot be used with short clinical crowns.

CLINICAL REPORT

A female of age 62 reported our Department (Prosthodontics) with main problem of not able to masticate food from left-back teeth area since 3 years and desired fixed treatment for it.

On extra-oral examination: no gross abnormality was detected; all mandibular movements were within the range. No deviation or abnormal clicking was detected.

On intra-oral examination: no gross soft tissue abnormality was detected. Missing teeth reported were 36, 37, 47,15,16,17, and 25. Mesially tilted third molar with a Class 1 amalgam restoration was present in the fourth quadrant. Also the patient was a wearing a removable prosthesis with respect to maxillary arch and wanted no change in that (Fig. 2-3). Radiographic assessment was done by means of an Orthopantomogram(Fig 4).

Figure 2 Pre-Operative Intra Oral View Figure 3 Maxillary Occlusal view

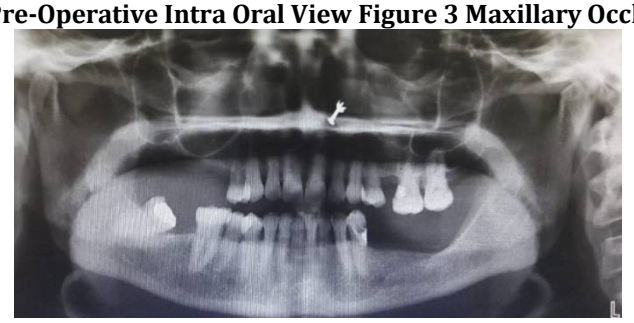

Figure 4 Pre-Operative Radiographic view

Procedure:
After complete intra-oral examination, alginate impressions (Septodont) were made for the maxillary and mandibular arch. Casts were poured in dental stone and mounted on a semi-adjustable articulator in maximum intercuspationwith the help of inter-occlusal records. The mandibular cast was examined for different treatment options. The axial wall of 35 was measured and was found to be 8 mm in length (4mm connector height required for precision attachment). All treatment choices were given to the patient and she opted for a fixed removable prosthesis with precision attachment as she didn't want to go for implants because of long duration and surgical procedures. Informed consent was obtained from patient. Tooth preparation for full coverage restorations (PFM) was done with respect to 34, 35 (Fig.5). After achieving complete retraction, impressions were made with addition silicone (Affinins) Fig.6) for both the arches.


Figure 5 Mandibular Occlusal Preparation Figure 6 Impression Made with Addition Silicone

Impressions were disinfected with 2% glutaraldehyde solution and the casts were poured in dental stone (Gypstone, type 3- super hard dental stone). Separating medium and die hardener was applied on the prepared teeth and wax copings with guiding plane were fabricated. The male component (Patrice) of Rhein 83 attachment was attached on the axial surface of 35 using dental surveyor. Casting and finishing was done for the anterior segment. The trial was done in the patient's mouth to evaluate the fitting of the prosthesis **(Fig 7, 8).**

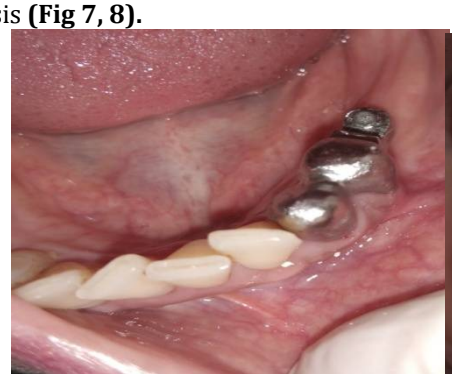


Figure 7 Mandibular Occlusal ViewFigure 8 Mandibular Left Lateral withExtra-coronal

Laboratory rubber was attached to the rounded head of the attachment and a plastic frame was attached with that rubber on red modelling wax and this was adapted on the residual ridge distal to 35. The casting of the posterior segment was done. Complete wax-up and teeth setting was done on the casting and the whole unit was cured with heat cure acrylic resin. Ceramic layering was done with respect to 34, 35 (Fig 9) The trial was done with complete anterior and posterior segments in mouth and occlusion was verified (unilateral balanced occlusion). Luting was done with respect to 34, 35 with light cure resin cement (Rely-X U200) (Fig 10, 11). Instructions were given to the patient for oral hygiene maintenance, removal and insertion of the prosthesis. Follow up was done at 1 week, 1 month, 3 months and 6 months duration postoperatively.

Figure 9 Final Prosthesis after Ceramic Layering Figure 10- Final Prosthesis on Cast

Figure 11 Post Operative Intra Oral Left Lateral View

DISCUSSION

Removable partial denture although a cost-effective option for partially edentulous ridges, has deleterious effects on remaining teeth. It increases the chances of caries on both coronal and root surface areas of teeth, gingivitis and periodontitis. Poorly designed cast partial denture reduces the life span of the abutment teeth. Also they are not aesthetic due to presence of metal clasps [4-8]. Fixed removable prosthesis or stress breaking appliances using precision attachment is the way by which we can reduce the undue stresses acting on the abutment teeth mainly in those cases where the distal abutments are periodontally compromised. This helps in broad stress distribution of masticatory stresses on the sound residual ridge rather than concentrating them on abutment tooth alone [9] Rhein 83 attachment is a resilient extra-coronal attachment in which the flexible rubber provides retention as well as a resiliency effect. This gives a slight degree of freedom for movement of anterior and posterior units of the prosthesis which reduces the stresses on the abutment teeth and increases its life with physiological stimulation[10]. Rhein 83 semi-precision attachment can be used in unilateral as well as for bilateral edentulous cases successfully[11].The need for overnight removal of the prosthesis is not required. It physiologically stimulates residual bone. So, the prosthesis can be worn 24 hrs and requires removal only for cleaning purpose. Fabrication of this prosthesis is skill-specific and requires either a parallelogram or a dental surveyor for the attachment of Patrix (Male component) also the wear and tear of the components can reduce its life. Case selection is the pre-requisite for precision attachment as it cannot be used with short clinical crowns (less than 4mm of connector height at the distal side of abutment teeth[12] According to the available literature, the survival rate of these fixed removable prosthesis 83.3% up to 5 years and 50% up to 20 years [13].Additionally, sufficient height must be provided to accommodate the relevant attachment components within the RPD framework or supporting acrylic resin while enabling the best possible prosthetic tooth replacement [14-17].

CONCLUSION

This case report emphasises the advantage of using precision attachment in the distal extension cases. It improves phonetics, aesthetics and mastication with the preservation and physiologic stimulation of abutment teeth and residual ridge.

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CITATION OF THIS ARTICLE

P Rani, S S Phukela, R Sanan, B Raina, Nisha, J Yadav. Treatment Options In Distal Extension Case With Case Report Of Fixed Removable Prosthesis Using Rhein 83 Attachments ;A Case Report. Bull. Env.Pharmacol. Life Sci., Spl Issue [2]: 2022: 208-212