

## Precision attachments for partial edentulous rehabilitation

<sup>1</sup>Nur Inriany, <sup>1</sup>Herawati Hasan, <sup>2</sup>Irfan Dammar

<sup>1</sup>Postgraduate Student of Prosthodontist Specialist Program

<sup>2</sup>Department of Prosthodontics

Faculty of Dentistry, Hasanuddin University

Makassar, Indonesia

Corresponding author: Nur Inriany, e-mail: indahjailan@gmail.com

### ABSTRACT

A 48-year-old female patient was referred to the Department of Prosthodontic, Hasanuddin University Dental Hospital, Makassar with complaints of difficulty chewing food due to partial tooth loss. The patient had used a denture on the lower jaw but it was loose so she wanted to make a denture on both jaws without using wires so as not to disturb the aesthetics. Intra-oral examination, the upper jaw was left with nine teeth with gingival recession and the lower jaw was totally edentulous. A hybrid denture that could support the patient's aesthetics and a conventional complete denture in the lower jaw were fabricated. Initially, a preliminary mold and study model were made, then temporary vertical dimensions were determined followed by recording the relationship of the maxilla and mandible using the two dots method, and mounted on an articulator. Preprosthetic treatment included scaling, endodontic treatment. Preparation of teeth 13, 14, 24, and 25 for porcelain-fused to metal. It is concluded that precision attachment in dentistry is the functional mechanical part of a removable partial denture. The use of precision-attached dentures has simplified and strengthened the retention, function and aesthetic aspects when compared to conventional removable partial dentures.

**Keywords:** maxillary partial denture, extracoronal precision attachment, patient comfort

### INTRODUCTION

Free-end removable partial denture is a common case. Rehabilitation of such cases is a challenge because they are contraindicated for fixed dentures. The fabrication of a RPD requires a retainer, which is a clasp for immediate retention. The presence of a clasp may not meet aesthetic requirements, especially if it is located in the anterior region.<sup>1,2</sup>

Precision attachments are sometimes referred to as the link between fixed and RPD because they combine features that are common to both types of construction. Attachments are defined as *mechanical devices for fixation, retention, and stabilization of prostheses*. Precision attachments are two pre-fabricated metal components made to form an articulated joint. The first component or matrix is a metal rest-sit or keyway, which is positioned within the normal clinical contour of the cast restoration placed on the attachment or the second component the matrix, which is attached to the RPD.<sup>3</sup>

Due to their versatility, precision attachments have many advantages. Despite this, these attachments were generally neglected in the past, due to their high cost and lack of understanding of their application. As society has become more aware over the past decade, a dental surgeon who is familiar with precision attachments will be able to expand his or her treatment options.<sup>4</sup>

A precision attachment appliance in a hybrid denture has a similar basis to a clasp, with the components of occlusal rest, bracing arm, and retentive arm, which are small interlocking devices to con-

nect the denture to the abutment teeth providing retention, stability, comfort, and improved aesthetics, as well as the biomechanical benefit of having the ability to distribute load on the abutment teeth to maintain healthy periodontal tissue.<sup>5</sup>

Hybrid prostheses may be indicated when the denture is still unable to replace all damaged tissue so as to restore the patient's aesthetics. A hybrid prosthesis is a denture that has fixed parts and some removable parts using precision hook retention. The advantages of using a hybrid prosthesis can be made limited to the space of the denture, there is no need for a hook arm on the labial or buccal part of the tooth, it can last a long time with good oral hygiene.<sup>6</sup>

Indications for hybrid prostheses with precision hooks, including aesthetics, pressure redistribution, minimization of trauma to soft tissues, control of chewing load and rotational forces, misaligned abutment teeth, future treatment efforts, retention.<sup>6</sup> Contraindications for hybrid prostheses with precision hooks are clinical short crowns. Teeth have high enough crowns because precision hooked components can effectively compensate for the leverage exerted on the crown.<sup>7</sup>

This article discusses the fabrication of a precision hooked metal framework or hybrid denture.

### CASE

A 48-year-old female patient was referred to the Department of Prosthodontics, Hasanuddin University Dental Hospital, Makassar with complaints of having difficulty chewing food due to partial loss of

teeth in the upper jaw and all teeth in the lower jaw. The patient had used a denture on the lower jaw but the denture felt loose. The patient wanted to have dentures made on both jaws without using wires so as not to disturb the aesthetics (Fig.1).

Extraoral examination showed no loss of facial height. Temporomandibular joint movement was normal. Intra-oral examination showed a partially edentulous upper jaw where there were nine remaining teeth with gingival recession and a totally edentulous lower jaw (Fig.2).

The treatment plan was a partial denture with an attached metal framework or hybrid denture that could support the patient's aesthetic and a conventional complete denture on the mandible.



Figure 1. Patient's profil



Figure 2 Intra oral photography

## MANAGEMENT

After the examination, a preliminary cast of the maxilla and mandible was made with irreversible hydrocolloid; then cast with dental stone to obtain a plaster model. Determination of the tentative vertical dimension followed by a record of the maxillo-mandibular relationship was then mounted on an articulator.

Preprosthetic treatment was performed including periodontal treatment namely scaling in upper jaw, endodontic treatment of teeth 13, 14, 24, and 25. Then, preparation of those teeth for the manufacture of PFM split crowns. Impression of abutments was performed using a two-step technique with polyvinyl siloxane (PVS) and the mold is poured with dental stone and processed in the laboratory. Next, try on metal and female coping, molding and tooth color selection (Fig.3). Try-in split crown and metal frame (Fig.4).

Individual tray was made for the lower jaw, border molding was performed, and secondary molding was performed using polyvinyl siloxane.



Figure 3 Try-in coping metal and the female



Figure 4 Try-in split crown and metal frame

Beading and boxing were performed to make casts that had been secondary molded and processed in the laboratory. The two-point method was used to determine the maxillomandibular relation and vertical dimension measurements. Arrangement of artificial teeth and try-in in the mouth, followed by acrylic packing and finishing, followed by denture insertion (Fig.5).

The first control was carried out on 24 hours post insertion. The second control was carried out three days after the first control (Fig.6).



Figure 5 Insertion the denture



Figure 14 Follow up stage

## DISCUSSION

Tooth loss is a serious problem often cause problems with mastication, phonetics and aesthetic. Use of RPD to replace missing teeth is often lacking satisfy the patient from the functional and aesthetics.<sup>1,2,5</sup> In the case of free-ended dentures, which the manufacture of fixed dentures is contraindications, another option is to combine types of RPD in combine with precision attachment.<sup>8</sup>

In general, a precision link can be classified as intracoronal or extracoronal attachment. The intracoronal attachment is hooks that lie within the contour of the crown of the tooth, while the extracoro-

nal type can be all or part of the hook that is outside the crown. The reason for using extracoronal type is good dental crown too small to accommodate all attachment parts or tooth pulp is too large so that it can be disturbed by the connection that all lies in the crown.<sup>9</sup>

According to Preiskel, precision relationships are classified into four main groups, namely 1) relation intracoronal. This type of link is usually used to connect the units of the denture fixed, holding restoration with removable denture free-tipped with distal extension; 2) hook extracoronal. This attachment provides stability and retention for RPD with extension distal.<sup>5</sup> Different types of extracoronal hooks (extracoronal attachments), including Conex attachment, Scott attachment, Dalbo extra coronal attachments, and the checka attachment system.<sup>10</sup>

Differences in extracoronal precision attachment only lies in the material and size and the position of

the arm for retention; 3) stud hook. This type of hook is usually in the forms of a ball and socket, mainly used to provide overdenture stabilization and denture retention. One advantage of the stud hook is that it makes it easy oral cleansing and maintaining crown root ratio; and 4) hookbar. Originally used for splinting a group of teeth, but when it is often used for retention and stabilization overdenture.<sup>10</sup>

It is concluded that precision attachments are difficult to master in terms of technical ability. In order to treat a case of precision attachment, a complete understanding of the biomechanics of maxillomandibular function, different attachments, and material science expertise is required. Precision attachments successfully serve the functions of retention, stress distribution, and esthetics if the case is planned on strong biological and technical grounds, and the dentist and patient provide sufficient care during the maintenance phase.

## REFERENCES

1. Makkar S, Chhabra A, Khare A. Attachment retained removable partial denture: a case report. *Int J Clin Dent Sci* 2011;2.
2. Awang R, Hassan AE. Spring loaded plunger attachment for retention of removable partial denture: a case report. *Arch Orofac Sci [Internet]* 2008;3:32–5. Available from: <http://www.microtecnor.com/pagine/asc52default1.htm> \n [http://dental.usm.my/ver2/images/stories/AOS/Vol\\_3/Issue1/3235\\_rjazman.pdf](http://dental.usm.my/ver2/images/stories/AOS/Vol_3/Issue1/3235_rjazman.pdf)
3. Jain R, Aggarwal S. Precision attachments-An overview. *Ann Prosthodont Restor Dent* 2017;1:6-9
4. Nigam A, Singh A, Shekhar A, Gupta H. Precision attachments—an overview. *www.journalofdentofacialsciences.com*, 2013; 2(4): 41-4
5. McGivney GP, Carr AB, Brown DT. McCracken's removable partial prosthodontics. 11<sup>th</sup> ed. St.Louis: Mosby; 2005: 19-23, 177, 371
6. Parnaadji R. Perawatan hybrid prosthesis dengan precision attachment pada kasus fraktur gigi tiruan tetap. *Stomatognatic (Jurnal Kedokteran Gigi Universitas Jember)* 2012;9(2):58-64
7. Jain AR, Philip JM, Ariga P. Attachment-retained unilateral distal extension (Kennedy's clas II modification I) cast partial denture: A case report. *Int J Prosthodont Restor Dent* 2012;2(3):101-7.
8. Jayasree K, Bharathi M, Nag VD, Vinod B. Precision attachment: Retained overdenture. *J Indian Prosthodont Soc* 2012; 12:59–62
9. Miller E, Grasso J. Removable partial prosthodontics. 2<sup>nd</sup> Ed. Baltimore: William & Walkins; 1981
10. Preiskel H. Precision attachment in prosthodontics. London: Quintessence; 1995.