

## CASE REPORT

# Attachment Retained Cast Partial Denture: Conventional and Contemporary Treatment Perspectives

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## ABSTRACT

Multiple missing teeth situation always claims careful attention and meticulous treatment planning. It becomes more challenging when unilateral or bilateral distal extension situation exists. Successful treatment can be done with some contemporary and conventional treatment planning. Implant-assisted prosthodontics has become contemporary choice of the replacement of the natural teeth, although conventional methods of fabrication of the removable partial denture continue to be an essential prosthetic consideration in many oral reconstructions, especially when implant therapy may not be used to replace missing natural teeth for some patients. Attachment retained partial denture has paved the way for such cases in prosthodontics. Attachment retained partial dentures last longer, wear less, need less adjustments, look better, work better, less destructive, protect abutment teeth, and are easier to clean. In this case report patient's esthetic and functional requirements were fulfilled with attachment retained cast partial denture using semi-precision attachments.

**Keywords:** Cast partial, Distal extension, Implant therapy, Semi-precision attachment.

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## INTRODUCTION

Dentistry is not limited to prevention and treatment of dental diseases but it extends its use to meet the esthetic demands of patient. It has evolved to curative to creative dentistry.<sup>1</sup> Various treatment modalities are available for the patients with unilateral or bilateral distal extension

situations and few missing teeth in either upper arch or lower arch. In such partial edentulous situations, implant prosthodontics has paved the way for contemporary dentistry, although conventional removable prosthodontics has been a treatment consideration where implant therapy is not possible due to local or systemic factors or economic reasons.<sup>2</sup>

While replacing missing teeth, our primary goal should be to restore function and preservation of oral tissues and esthetics. Numerous removable partial dentures (RPDs) are made where negligence to above-mentioned factors occurs while attention is paid in mere replacement of missing teeth. This results in detrimental effect on remaining natural dentition.<sup>3</sup>

Prosthodontic rehabilitation of distal extension partially edentulous situations remains challenging. The support of distal extension RPD is derived from edentulous ridge and terminal abutment teeth. The terminal abutments act as fulcrum while functional movements of RPD as well as retentive clasps exert force on abutment teeth which may jeopardize the periodontium of these teeth.<sup>4</sup>

The advent and success of semi-precision and precision attachments in dentistry have improved the field of dentistry tremendously. Attachment retained RPD is the treatment therapy that can facilitate both functional and esthetic requirements of patients. The few retrospective studies available show a survival rate of 83.3% for 5 years, of 67.3% up to 15 years, and of 50% when extrapolated to 20 years.<sup>5,6</sup>

Staubli<sup>7</sup> has classified attachments as:

*Class 1a:* Solid, rigid, nonresilient

*Class 1b:* Solid, rigid, lockable with U-pin

*Class 2:* Vertical resilient

*Class 3:* Hinge resilient

*Class 4:* Vertical and hinge resilient

*Class 5:* Rotational and vertical resilient

*Class 6:* Universal, omniplanar.

Selection of precision attachment should be based on physiologic, functional, and esthetic need of prosthesis. Primary indication of attachment retained partial denture is esthetics. When partial denture is essential for distal extension situations, the precision attachment is most equitable and definite means of distributing stresses.

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Precision attachment partial dentures are not retained by clasps, hence, removes wedging effect of clasp and also favorable distribution of horizontal forces. Precision attachment virtually tie abutment teeth together, which limits excessive movement of abutment teeth. Precision attachments have commonly been fabricated with rigid lingual and palatal bars while circumferential clasp are retained by flexible arms. Too flexible and poorly planned clasps have little value in distributing bilateral stresses. Contraindication to precision attachment includes short clinical crowns, inadequate interarch space. The tooth must have adequate crown height space to house the attachment components. Similarly RPD framework must have adequate height to house corresponding components of attachment.<sup>8</sup>

This study describes the clinical case report of unilateral distal extension situation restored with attachment retained cast partial denture.

## CASE REPORT

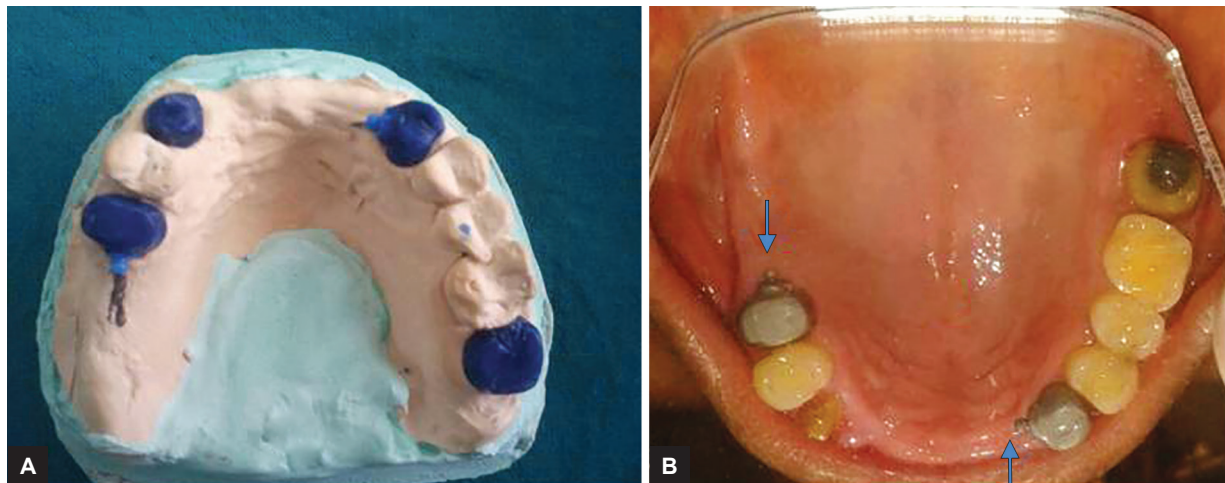
A 42-year-old female reported to the Department of Prosthodontics with the chief complaint of multiple missing teeth in maxillary and mandibular arch and inability to chew food properly. Medical history was not significant. On oral examination, teeth missing in maxillary arch were 11, 12, 21, 22 and 16, 17 and in mandibular arch missing teeth were 31, 32, 33, 36, 41, 42, 46 and there was generalized attrition of remaining

teeth (Figs 1A and B). In maxillary arch 13, 15, 23, 27 and in mandibular arch 34 was endodontically treated. After radiographic examination and diagnostic model study, interocclusal distance was found to be adequate (Fig. 1C). Treatment was carefully planned by taking into consideration patient's esthetic need and economical condition. Treatment plan included fixed prosthesis on 13, 15, 23, 27, and 34, followed by attachment retained (Preci-Sagix, CEKA Attachments, Swiss) cast partial denture in maxillary arch and conventional cast partial denture in mandibular arch.

Diagnostic impression was made and mounted on a semi-adjustable articulator using facebow, following which diagnostic wax-up was done within the mounted cast. A putty matrix (Express STD Putty; 3M ESPE, St. Paul, Minn.) was made over the completed diagnostic wax-up for evaluation of the existing space for the extracoronal resilient attachments. Maxillary canines and 1st premolar were prepared to receive porcelain fused to metal crowns, while maxillary molar was prepared for all metal restoration. Mandibular left 1st premolar was prepared to receive buccal porcelain facing fixed dental prostheses. Mouth preparation for mandibular cast partial denture was completed. Impressions of maxillary and mandibular arches were made in polyvinyl siloxane impression material (Affinis, Coltene/Whaledent, Altstätten, Switzerland) and the cast was poured in die stone (Kalrock, Kalabhai Karson, Mumbai). Crowns were waxed to full contour



**Figs 1A to C:** Preoperative occlusal view of maxillary and mandibular arch, adequate inter occlusal distance for attachment retained prosthesis



**Figs 2A and B:** Plastic male components attachment on wax patterns and casting of male components

and milled in wax for maximum guiding plane surface. Rest seat was prepared on wax patterns of maxillary right 2nd molar, right 1st premolar, and mandibular left 2nd premolar. Burnout plastic male components (Preci-Sagix standard attachment, CEKA, Swiss) were attached to the mesial surface of maxillary left canine and distal surface of maxillary right 2nd premolar of the waxed abutment using a dental surveyor, lingual to the center of proximal contour to avoid interference with esthetics (Fig. 2A). Fixed partial denture along with a male part of Preci-Sagix attachment was cast in Ni-Cr alloy (MeAlloy, Dentsply, UK) (Fig. 2B). Porcelain buildup of fixed partial denture was completed and tried in patient's mouth.

After cementation of fixed prosthesis, impression was made in polyvinyl siloxane impression material (Affinis, Coltene/Whaledent, Altstätten, Switzerland) and poured in die stone. Wax-up of the cast partial framework was completed on the master cast (Fig. 3A), and the entire cast partial framework was cast in Co-Cr alloy (Bego, Dentaureum, Germany) (Figs 3B and C).

Maxillomandibular relation was recorded and mounted on semi-adjustable articulator. Teeth arrangement was done and wax try in done. Occlusion and esthetics was verified in patient's mouth. Cast partial denture for maxillary and mandibular arch was fabricated in heat cure denture base resin (Leucitone 199 Denture

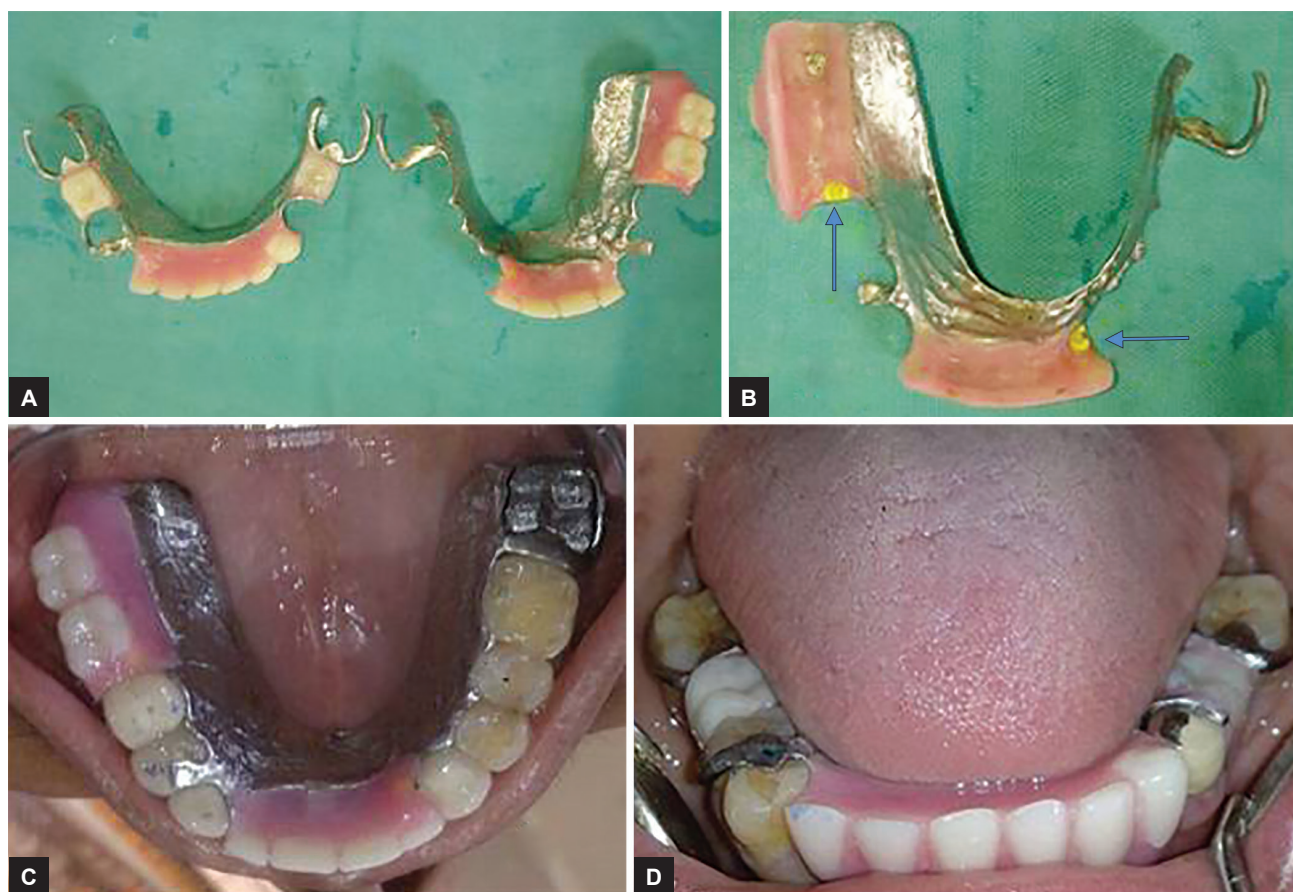


**Figs 3A to C:** Wax pattern fabrication of cast partial denture and casting of framework of maxillary and mandibular cast partial

Resin; Dentsply, Trubyte) (Fig. 4A). Female components of attachments were attached to cast partial denture by relining method (Fig. 4B). Retention was found to be satisfactory after insertion of cast partial in patient's mouth (Figs 4C and D). Balanced occlusion was achieved and home care instructions regarding insertion and cleaning of the prosthesis were given to the patient. Patient's esthetics showed a remarkable positive change and the patient was very satisfied with the results (Figs 5A and B).

## DISCUSSION

Attachments have always been surrounded by mystery as lack of experience and familiarity. According to Glossary of Prosthodontic terms, attachment is defined as a mechanical device for the fixation, retention, and stabilization of a prosthesis or as a retainer consisting of a metal receptacle and a closely fitting part; the former [the female (matrix) component] is usually contained within the normal or expanded contours of the crown of the



**Figs 4A to D:** Postoperative occlusal view of maxillary and mandibular cast partial denture and attachment of female component in mandibular denture



**Figs 5A and B:** Preoperative and postoperative frontal profile showing increased esthetics with prosthesis

abutment tooth, and the latter [the male (patrix) component] is attached to a pontic or the denture framework. Semi-precision attachments yield a less precise tolerance and were preferred in reduced tooth support.<sup>6</sup>

Attachment retained cast partial prosthesis was fabricated for patient as primary advantage of attachment is esthetics as compared with clasp retained cast partial and also it was economical for the patient. Patient does not want surgical procedure for implant therapy. Attachments may also allow better cross-arch force transmission and stabilization than clasps, but this is determined by the type of attachment used, the number of guiding surfaces, and the design and adaptation of the framework and the attachment.<sup>7</sup>

The majority of extracoronal attachments available have resilient attributes. Attachment alignment is not as critical in highly resilient extracoronal attachments due to the omniplanar motion possible. This creates the advantage of multiple paths of placement for the prosthesis.<sup>9</sup>

The attachment selected for presented case report included Preci-Sagix attachment as these attachments are extracoronal resilient and economical. These attachments are based on broken stress philosophy, permit vertical movement, and reduce stress transfer to abutments. According to Feinberg,<sup>10</sup> these attachments are passive and free moving that dissipate destructive lateral forces. Segmented female component is provided in this system which contacts a greater surface area for increased retention and stability. The female plastic insert (made up of polypropylene) used in this case provided standard retention to the prosthesis.

The abutment selection also plays a vital role in attachment retained prosthesis. Canines were chosen as abutments because of its proprioceptive organs, the shape and strategic position, and the larger periodontal attachment area.<sup>11</sup> Cast partial denture fabricated over it is less subject to breakage and effective transmission of thermal changes.<sup>12,13</sup>

## CONCLUSION

Success of the prosthodontic treatment relies on the proper selection of precision attachment to provide

adequate retention, stability, and esthetics. Challenging situations like unilateral or bilateral distal extension can be dealt successfully with contemporary treatment plan (attachment retained prosthesis). Attachment retained partial dentures hence, provide long-term stability and more contentment to the patient as compared with clasp retained dentures.

## REFERENCES

1. Patil R. Esthetic dentistry – an artist's science. 1st ed. Mumbai: PR Publications; 2005.
2. Lil W, Solar P. Indications, diagnosis, and recall. In: Watzek G, editor. Endosseous implants: scientific and clinical aspects. Chicago (IL): Quintessence; 1996. p. 153-182.
3. Master M, Shetty O, Charushila SS. Full mouth rehabilitation of a patient using cast partial dentures with precision attachments. *Heal Talk* 2013;5(5):26-28.
4. Ku YC, Shen YF, Chan CP. Extracoronal resilient attachments in distal-extension removable partial dentures. *Quintessence Int* 2000 May;31(5):311-317.
5. Burns DR, Ward JE. A review of attachments for removable partial denture design: part 1. Classification and selection. *Int J Prosthodont* 1990 Jan-Feb;3(1):98-102.
6. Burns DR, Ward JE. A review of attachments for removable partial denture design: part 2. Treatment planning and attachment selection. *Int J Prosthodont* 1990 Mar-Apr;3(2):169-174.
7. Schuyler CH. An analysis of use and relative value of the precision attachment and the clasp in partial denture planning. *J Prosthet Dent* 1953;3:711-714.
8. Staubli PE. Attachments and implants: reference manual. 6th ed. San Mateo (CA): Attachments International; 1996.
9. Extracoronal Attachments. Belgium. [Last cited 2014 Jul 21]. Available from: <http://www.ceka-preciline.com>.
10. Feinberg E. Precision attachment case restoration with implant abutments: a review with case reports. *J Oral Implantol* 2011 Aug;37(4):489-498.
11. Feinberg E. Diagnosing and prescribing therapeutic attachment-retained partial dentures. *NY State Dent J* 1982 Jan;48(1):27-29.
12. Owall B. Precision attachment-retained removable partial dentures: Part 2. Long-term study of ball attachments. *Int J Prosthodont* 1995 Jan-Feb;8(1):21-28.
13. Shetty NB, Shetty S, Nagaraj E, Shetty O, D'souza R. Precision attachments for aesthetics and function: a case report. *J Clin Diagn Res* 2014 Jan;8(1):268-270.