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BRIDGING NATURAL DENTITION WITH PRECISION ATTACHED PARTIAL DENTURES

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ABSTRACT

Increasing age and loss of teeth need not necessarily go hand in hand, but the loss of teeth has detracted patients from living a quality life. This case series aims to emphasize effective mastication that relies upon the feedback of mechanoreceptors associated with the periodontal ligament, this can be achieved by recuperating and rehabilitating the remaining structures. Extra coronal Rhein attachments have been used to act as retainers along FPD, and RPD and adjacent teeth are used for support.

Keywords: OT strategy attachments, Equator attachments, Precision attachments, Tooth supported overdentures

INTRODUCTION

The four most common causes of tooth loss are periodontal diseases, caries, injury or trauma, and underlying systemic diseases and risk factors (diabetes, hypertension, tumors, and cysts being iatrogenic factors, smoking, poor nutrition, etc)

Precision and semi-precision attachments help in restoring, retaining, and attaching a removable bridge or partial denture on natural teeth, vital and non-vital teeth. There are restorations of choice in unusual conditions that might include non-parallel abutments, long edentulous spans, distal extension bases, or residual ridges of peculiar shapes.[1] They are used in sections of fixed prosthesis connected with attachment, as a stress breaker in free-end saddles, as an intra-coronal attachment which are effective retainers for RPD, to lock a connector joining a saddle on the opposite side of the arch, and, to retain hybrid dentures.[2] Re-instating esthetics and function using existing periodontium assisted with attachments has been the grail here.

CASE REPORT 1

A 24-year-old patient reported to the Department of Prosthodontics and Crown and Bridge, Bharati Vidyapeeth (Deemed to be University) Dental College and Hospital, Pune, with a chief complaint of difficulty in chewing and compromised esthetics. The patient had been

diagnosed with a mandibular benign tumor on the left side, which was treated by a partial mandibulectomy. On radiographic examination 1.5 mm of basal bone was available.

Extraoral examination revealed a sunken region over the left cheek and unilateral facial and lip asymmetry due to partial resection of the left mandible. Reduced lip fullness and reduced overall muscle tone were noted

Intraoral examination presented a resection of alveolar bone, teeth, and soft tissue exceeding the midline (Fig. 1). The defect was classified according to Cantor and Curtis as a class I defect.[3] The remaining teeth on the contralateral side were sound. No abnormalities in the temporomandibular joint were noted. 11,14, 15, 23, 24, 25 33, 34, and 35 were present.

Line of treatment Diagnostic study models was made after making diagnostic impressions in alginate (chromalgin, Dentsply, Gurgaon, India) for maxillary and mandibular arch. Tooth preparation was done. The final impression was made using the addition silicone (Fig. 2), and poured-in die stone. The wax pattern was fabricated on the model cast.(Fig. 3) Three castable equator attachments (Rhein 83, USA) were placed on the bar fabricated on the residual ridge to aid in the retention of the removable partial denture fabricated for the resected region. The bar along with the attachments was cast.(Fig.4) Jaw relation was established and the try-in of the teeth arrangement was done intraorally. The retentive caps were picked in the final denture base, chairside. The patient occlusion was checked for high points and corrections were made post-op. (Fig. 5).

CASE REPORT 2

A 42 -year-old patient reported a complaint of missing teeth in the upper and lower jaw and fractured removable prostheses. On taking detailed history and examination

1. The patient exhibited soft, smooth, thin, dry skin with no sweating.
2. Hair on the scalp was lost in growing years.
3. The bridge of the nose was depressed.

Intraoral examination showed that the patient had partial anodontia. The patient gave a family history of her son having similar dental findings. From previous treatment, copings on the11, 15, 23,24,25, 37, and 44. (Fig. 1) The permanent teeth that erupted in the upper arch were the 11, 14,15,23,24,25,33,34,35,37,44 and 45. (Fig. 6)

Extraction of the 33,34 and, 45 was indicated since it was non-restorable. Diagnostic impressions for the patient were made using alginate (Fig. 7), custom trays were fabricated using 2mm of a spacer, and the final impression was made in polyether (3M, ESPE)
Primary copings were removed. Endodontic treatment with new cast copings which had intra radicular extension was cemented on 11, 14, 15, 23, 24, 25, 35, 44,47. The Interarch distance was noted to be 15 mm anteriorly and 11 mm posteriorly. Hence, equator attachments (Rhein 83, USA),were selected to be placed. Attachments were cast and cemented on upper right 14, 23, 35, and 44. (Fig 3). Jaw relation was recorded and transferred on the Hanau articulator. (Fig. 8) The teeth arrangement of acrylic teeth was done as per a shortened dental arch due to

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reduced space availability in the dental arches.[4] A denture was fabricated in heat cure acrylic material (DPI, The Bombay Burmah Trading Corporation, Mumbai, India), in which chairside pick up of the retentive component of attachment was done in cold cure acrylic material. (DPI, The Bombay Burmah Trading Corporation, Mumbai, India) (Fig. 9). Post-op photograph was taken. (Fig. 10)

CASE REPORT 3

A 63-year-old female complaint of a loose fitted maxillary denture and missing teeth in the lower arch.

Extraoral Examination showed elasticity of musculature around the mouth, drooping corners of the mouth, deep nasolabial fold. TMJ examination showed no abnormality.

Intraoral Examination showed cast metal copings on 11 and 13. Root pieces of 33, 34,35, and 43 were seen to be present. (Fig. 11)

Line of Treatment Primary impression was made in impression compound (DPI Pinnacle, The Bombay Burmah Trading Corporation, Mumbai, India) (Fig. 7), custom tray was fabricated, and border molding procedure using low-fusing impression compound (DPI Pinnacle Tracing Sticks, The Bombay Burmah Trading Corporation, Mumbai, India), and the final impression of the upper arch was made in polyether (ESPE). (Fig. 12) Impressions were poured in die stone. Occlusal rims for recording jaw relation were established. Endodontic treatment of 33, 35, and 37 was indicated and hence, performed. Intra radicular preparation of the root canal of 33 and 43 was done to receive casted equator attachment (Rhein 83). 35 and 37 received strategy attachment cast along with PFM crown copings on the same teeth. They were cemented with glass ionomer cement (FUJI GC I, Japan). A cast partial framework was fabricated on the master cast and checked in the patient's mouth. (Fig. 13) The occlusal rim was made to establish jaw relation in a regular manner. Try-in of upper and lower denture was done with sleeves placed on all three attachments. The fabrication of the upper and lower dentures was done in heat cure acrylic. (DPI Pinnacle, The Bombay Burmah Trading Corporation, Mumbai, India). Post-operative photograph was taken. (Fig. 14)

DISCUSSION

Attachments provide the retentive and stabilizing elements necessary to retain the partial denture in the mouth at rest and in masticatory function. Attachments are also used in segmented fixed partial dentures and overdenture prosthetics on natural roots and implants.[5] Prostheses that do not share a common path of insertion can be connected rigidly in the mouth. It is preferred to limit the length of individual castings while making a large-span fixed prosthesis. The prognosis of distal abutments can be dubious as seen in the first case report. Connecting the posterior segment with an attachment allows subsequent removal without damage to the main restoration.[6] The complexity of design, complex principles, and procedures for fabrication and clinical treatment requires high technical expertise for successful fabrication Experience and knowledge on the part of dentist and laboratory

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technician are essential and increased demand on oral hygiene performance from the patients ' side. The attachment is subjected to wear as a result of friction between metal parts; as wear occurs, the male portion fits more loosely, thus permitting excessive movement and leading to injury to the abutment teeth. [7] In the other two case reports, extra coronal stud attachments allows a certain degree of play attributing to the axial rotation joint that allows vertical and predetermined hinge movements (Locator attachment), and the rotation joint that allows slight rotational and lateral movements (OT STRATEGY attachment). Reduced dimension of OT strategy permits it to be applied in very small areas. Attributing to the parallel support under the spherical head, it automatically aligns the retentive cap, which prevents the risk of wear to the spheres. In the last two case reports, preserving the remaining teeth has been given importance as it is a favored treatment modality for the elderly, also the roots provide sensory feedback and preserve the alveolar teeth and improve the stability of partial dentures. In the above cases, the mechanism of action of attachments was using active retention. Positive lock of retentive units maintained the border seal while providing additional stability, retention, and support.

CLINICAL SIGNIFICANCE

Stability and support are the objectives that are to be achieved by the clinician by preserving natural dentition, utilising the residual alveolar ridge, and designing a prosthesis to give acceptable aesthetics. Rehabilitating large edentulous regions with compromised systemic health of patient using remainder support, and better retention is a possibility using precision attachments.

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(a) (b)
Fig 1: (a) Defect site in the mandibular arch (b) Orthopantomogram

Fig. 2 : Final Impression of the partially edentulous arch

Fig. 3 : Wax pattern fabrication with castable equator attachments

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(a) (b)

(c)

Fig. 4 : a, b, c: Try-in of bar prostheses with equators and teeth arrangement intra-orally

Fig. 5: (a) Pre- operative Photograph. (b) Post- operative Photograph

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Fig. 6: (A) Pre-op intraoral photograph (B) Pre-op Orthopantamogram

Fig. 7: Primary impressions were made of upper and lower arch

Fig. 8: Pattern resin impression of intraradicular preparation, Casted equator attachments and metal copings.

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Fig. 9 : Jaw relation recorded, mounted on semi-adjustable articulator and teeth arrangement done

Fig 10 : (a) Female component picked up in the denture. (b) Intra oral post-op photograph.

Fig. 10 (c) Pre-op photograph (d) Post-op photograph

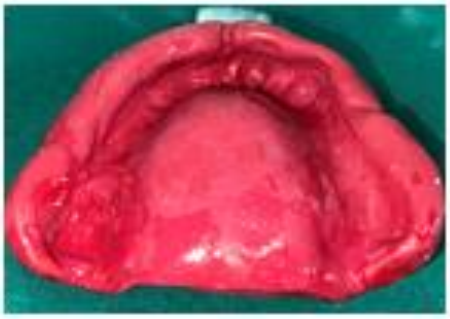

Fig. 11: (a) Primary Impression of upper arch (b) Final Impression of lower arch

Fig. 12 Casted equator and OT Strategy attachments on patient cast

Fig. 13 : Try in of cast partial framework fabricated on the attachments

Fig. 14 : (a) Pre-op photograph (b) Post-op photograph