



CASE STUDY

PROSTHETIC REHABILITATION OF A PATIENT AFTER TRAUMA USING EXTRA-CORONAL ATTACHMENTS FOR RETENTION OF AN OVERDENTURE

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ABSTRACT

Rehabilitation of a patient who has suffered from trauma is a challenging task for the oral surgeon and the Prosthodontist. A multidisciplinary approach is required to rehabilitate the patient so as to enable function and esthetics. Use of a fixed removable option for long span edentulous spaces using precision attachments is a viable prosthetic option for patients who have suffered trauma due to road traffic accidents. This case report describes the rehabilitation of a young patient who lost his front teeth in a road traffic accident and replacement of the missing teeth was done using extra-coronal Rhein 83 attachments.

INTRODUCTION

The preservation of what remains is a fundamental basic of any form of rehabilitation. A fixed - removable combination prosthesis is an appropriate choice for replacement of long span edentulous spaces or distal extension spaces. Precision / semi-precision attachments are cost-efficient and viable option. Due to the numerous number of attachment systems available in the market and the lack of knowledge among practitioners, dentists are reluctant to use these attachment retained removable partial dentures for patients routinely. Precision attachments have prefabricated, machined components with precisely manufactured metal-to-metal parts which contain the male and female parts. The fabrication methods for semi-precision attachments yield a less precise tolerance. Tooth-supported overdentures can be retained with the help of precision attachments and can improve both retention and stability while simultaneously reducing alveolar bone resorption. (Burns and Ward, 1990; Vaidya *et al.*, 2015)

Case Report

A 26 year old male patient reported to the Department of Prosthodontics on referral from the Department of Oral Surgery

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for rehabilitation of his missing front teeth. On further examination it was noted that the patient had suffered a from a road traffic accident 8 months ago due to which he had facial injuries which included loss on the right eye combined with maxillary and mandibular bone fractures. Further diagnostic OPG and CBCT (Figure 1, Figure 2) were made. The fractured segments were splinted using mini-plates as observed on the OPG. On intra-oral examination his 14,13,12,11,21,22 (Figure 3) were missing and loss of vertical height and width of the remaining alveolar bone (Siberts ClassIII). 15 was present which was fractured transversely on further radiographic and surgical exploration wrt 15 it was noted that the fracture line was below the alveolar crest thus the tooth was extracted due to poor prognosis. 6 weeks after healing diagnostic impressions were made using alginate (Neocolloid) in perforated metallic stock trays. After examination of the study models it was noted that a large horizontal and vertical discrepancy (15mm) existed between the upper alveolar ridge and lower teeth. Three different treatment options were considered for the patient i.e implant supported prosthesis, conventional FPD and a fixed removable treatment option. It was then decided to rehabilitate the patient with the help of extracoronal attachments which gained support from 17,16,23,24 and 25 respectively. All the teeth were prepared for metal with ceramic facings except for 17 which was prepared for a complete coverage metal crown (Figure 4). Impression was made using a two stage putty relined technique involving the entire maxillary arch (Figure 5).

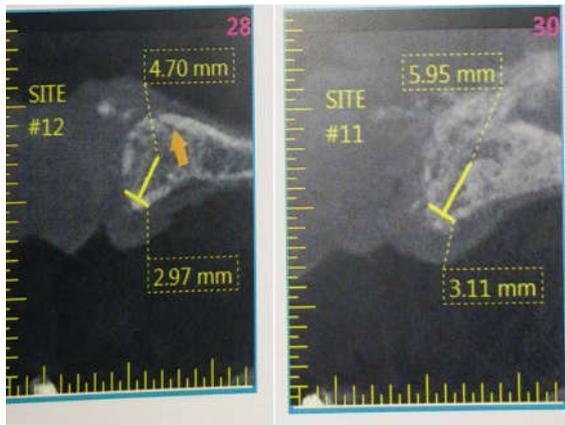


Figure 1. CBCT

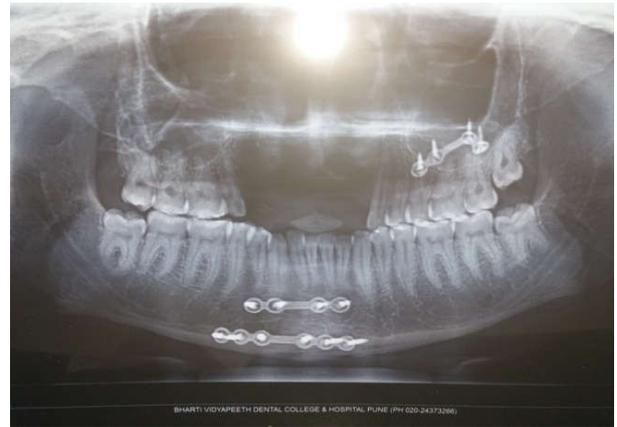


Figure 2. Pre-operative OPG



Figure 3. Pre-operative view frontal



Figure 4. Intra-oral view of crown preparation



Figure 5. Putty wash impression



Figure 6. Attachments with metal struts



Figure 7. Metal Struts with ceramic facing



Figure 8. Intra-oral metal trial



Figure 9. Pick-up impression in Putty



Figure 10. Cast poured in resin



Figure 11. Overdenture Trial



Figure 12. Final Prosthesis

A wax pattern for the metal crowns along with wax pattern for the metal struts and the rein attachments was fabricated (Figure 6). Two ball type attachments were added on each side due to the long span of the defect. The wax pattern with the cut back for porcelain was cast in Cobalt- chrome alloy and adjusted to the master cast (Figure 7). The metal copings and struts were checked for fit and occlusion (Baush articulating paper) intra-orally (Figure 8). The copings were then picked up in a putty (3M ESPE) impression (Figure 9). The prepared teeth were poured using pattern resin with die pins and the remainder of the cast was poured in die stone (Figure 10). Ceramic layering was done on 16, 23, 24 and 25 and a trial denture was made which included all the missing teeth. Wax trial of the removable segment and bake trial of the splinted crowns and attachments was done (Figure 11). After processing in heat cure acrylic final cementation of the crown was done using resin cement (3M ESPE RELYX U200) (Figure 12). Occlusion was verified in lateral excursions. The patient was given oral hygiene instructions and was informed regarding the limitations of the prosthesis particularly related to initial phases of adaptation. He was motivated regarding the essentiality of a regular follow-up. The patient was reviewed after 1 week and 1 month and 6 months. The Patient was satisfied with the esthetics and function of the prosthesis.

DISCUSSION

The choice of using an attachment retained over-denture is a viable option for young patients who demand fixed prosthesis. It is a more cost-effective option and maintains more dental

proprioception than implant supported overdentures. (Burns and Ward, 1990) In the above case report inadequate bone was found in the CBCT for implant placement and the age of the patient warranted him a fixed prosthesis. Due to the large span of the edentulous space and horizontal discrepancy conventional FPD was not an advisable treatment option. The acrylic RPD which was retained using the attachments gave the patient the required lip fullness in addition to the replacement of missing teeth. Due to a short clinical crown 17 was prepared for a full coverage metal crown. Although the other crowns had adequate clinical height a ceramic facing was preferred due to lack of monetary funds. Indications of using an attachment retained overdenture include esthetics, redistribution of forces, minimal trauma to the soft tissues, retention etc. (Ashish Jain *et al.*, 2012; Preiskel, 1995) The ball attachments used were 1.8mm diameter and 1.7mm height manufactured by RHEIN 83. (Attachments and Pre-fabricated Castable Components CATALOG / TECHNICAL MANUAL for Dentists and Dental Technicians) Extra-coronal attachments are placed outside the clinical crown of the tooth. They are the more favoured attachment type as the normal tooth contour can be maintained, minimal tooth reduction is required and the possibility loss of vitality during tooth preparation is reduced. Also, the path of insertion is easier for patients with limited dexterity as semi-precision attachments allow a little movement and also act as stress breakers Preiskel first reported the use of precision attachments in the 20th century these attachments are now also being used in conjunction with implants. (Preiskel, 1995; Preiskel, 1985) Although it is more difficult to maintain hygiene with extra-coronal attachments and patients need to be

instructed on the use of hygiene accessories. Keeping the underside of the attachment area clean using dental floss improves tissue response. In this case the patient was told to use floss from the medial end of the struts to the distal end. Cross-arch splinting of the anterior teeth that includes 2 strategic attachments and it best distributes the load of the partial denture. The preferred arrangement is splinting the anterior segment from canine to canine, since the canines are the cornerstones and have the longest roots. (Edward Feinberg, 2011; Brewer and Morrow, 2nd edition; Feinberg, 1982) Since 13,14 and 15 were also missing support was obtained from 16 and 17 to derive the cross-arch splinting effect and to distribute the forces over larger number of abutment teeth.

Conclusion

This case presented a challenge of esthetics and function. The use off of an attachment retained over-denture for the patient who suffered from a road traffic accident elevated the confidence of the patient post traumatic injuries. Thus this treatment modality is a cost-effective and esthetic option wherein redistribution of forces also takes place thus reducing the stresses on the abutment teeth.

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