

Rehabilitation of Long Span Marginal Mandibulectomy Case Using Extracoronary Attachment

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Abstract

Oral cyst and tumors are increasingly at an alarming rate especially in Indian subcontinent and marginal mandibulectomy is one of the treatment modality for such cases. Post-operatively patient is left with large bony defect covered with unusual soft tissue. To restore such defect various surgical and implant procedures have been suggested but these complex procedures are not possible in all cases due to limiting factors presented by patient or lack of adequate clinical experience of the operator. Such cases are big challenge for Prosthodontist during rehabilitation especially when conventional removable partial dentures are the only option. This case report describes use of extracoronary attachment in enhancing stability and retention in conventional cast partial dentures for such a case.

Keywords: Denture Stability; Mandibulectomy; Precision Attachment; Removable Cast Partial Denture

Introduction

Marginal mandibulectomy is indicated in the cases of jaw cysts/malignancies/infection/trauma [1]. Apart from compromised orofacial functions like mastication/speech/poor aesthetics, it also results in psychological trauma to the patient [2]. Although various surgical techniques have been suggested for restoring such defects like Microvascular Flap [3]/Bone Graft [3]/Distraction Osteogenesis [2]/Inferior Alveolar Nerve Transposition etc. yet these complex surgical procedures are not possible in all cases due to limiting factors presented by patient or lack of adequate clinical experience in operator. Prosthetic rehabilitation is only treatment of choice in majority of cases. Implants have limited role due to poor bone quantity and quality. Conventional fixed prosthesis cannot be given in such cases because of presence of large defect. So, conventional removable prosthesis may be treatment of choice but achieving maximum stability in partial dentures with such defects is big challenge. Extracoronary attachments if designed and used correctly can enhance stability and retention tremendously in such cases. Unfortunately these are not much used in clinical practice.

Case Report

A 34-years-old young male patient reported with chief complaint of difficulty in chewing food since last six months. As per his records, he had undergone a "marginal mandibulectomy" six months back for "enucleation of odontogenic keratocyst". Dento-alveolar defect was extending from 31 to 37 edentulous region antero-posteriorly and upto basal bone occluso-cervically and was lined with healthy mucosa. 41 and 42 were tender on percussion; also showing periapical changes radiographically; so were treated endodontically. Implants were ruled out due to poor bone in the defect area and conventional cast partial denture was planned for the case.

Clinical procedure

Diagnostic impressions were made in irreversible hydrocolloids and poured in dental plaster. Retrieved casts were surveyed for all favorable/unfavorable undercuts and cast partial denture was designed. Special emphasis given on prosthesis design are:

- 38 was tilted mesially and lingually so it was decided to modify anatomy by restoring it with full metal crown. Wax pattern was incorporated with mesial occlusal rest seat, mesial guiding plane and buccal and lingual height of contour for circumferential clasp. Lingual plate was chosen as major connector. Embrasure clasp was designed between 46 and 47 for achieving cross arch stabilization and retention.
- As 41 and 42 were endodontically treated, so PFM crown were planned with lingual rest seat for indirect retention. PFM crowns on 41 and 42 were splinted together (during fabrication to increase root surface area). Selected castable precision (Figure 1b) (Extracoronar castable ball attachments- Vario Stud Snap 60°-Trailerhitch ball attachment) [4] was incorporated during waxing procedure for metal copings of PFM crowns. PFM crowns-precision attachment assembly on 41/42 and full metal crown on 38 were checked for fit but not cemented at that stage (Figure 1a and 2a). Mouth preparation was done for cast partial denture and a pick-up impression was made in elastomeric impression material (PFM crowns-precision attachment assembly on 41/42 and full metal crown on 38 came out in impression). Master cast was poured with above components in place. Master cast was surveyed, blocked out and duplicated in refractory material. Wax pattern was made and casting done. Metal framework fit was first checked on master cast with PFM crowns-precision attachment assembly and full metal crown in place. Now PFM crowns-precision attachment assembly and full metal crown are placed back in mouth and framework fit is checked intraorally. Wax rim was made on framework and soft tissue conditioner was added on both buccal and lingual aspect to record neutral zone. Jaw relation was recorded and teeth were arranged within recorded neutral zone to minimize lateral forces. Wax trial was done and final prosthesis was processed in heat cure polymethyl methacrylate. Finished prosthesis was seated intra-orally by giving relief over ball attachment (Figure 2b). All necessary occlusal adjustments were done to achieve unilateral group function occlusion on defect side. Final cementation was done for PFM crowns-precision attachment assembly on 41/42 and full metal crown on 38 (keeping prosthesis in place).
- Attachment of Nylon Cap (Vario Matrix-Yellow) [4] was done by direct method intra-orally. Rubber ring was first adapted over ball neck then nylon cap is engaged snugly over it. (Rubber rings are provided by manufacture along with precision attachment to put between ball and nylon cap while attaching cap in the prosthesis. It prevents inflow of self cure polymethyl methacrylate between nylon cap and ball interface. If these are not used then self cure can inflow at interface between nylon cap and ball; which if sets there, will not allow prosthesis to come out. If manufacturer has not provided, then rubber stopper of Endo H-files can also be used). Now space was created in prosthesis till its complete seating. An escape hole was drilled from this housing space to lingual flange of prosthesis. A small quantity of self cure polymethyl methacrylate was added in thin consistency and prosthesis was put back in mouth. After complete seating of prosthesis, ask patient was to occlude. Once self cure was polymerised, prosthesis was removed from mouth and examined for deficiency. More increments can be added carefully to cover deficiency without overflowing. Final finishing was done for the prosthesis (Figure 3a and 3b).
- Final prosthesis was checked intra-orally for fit and occlusion (Figure 4a and 4b). Patient was given with post insertion instructions and recalled for follow-up visits.



1(a)

1(b)

Figure 1a: PFM crowns-extracoronal attachment assembly on 41/42.

Figure 1b: Extracoronal attachment (Vario Stud Snap 60°-Trailerhitch ball attachment and Vario Matrix -Yellow).



2(a)

2(b)

Figure 2a: PFM crowns-extracoronal attachment assembly on 41/42 and full metal crown on 38.

Figure 2b: Prosthesis in situ (occlusal view).



3(a)

3(b)

Figure 3a: Finished Prosthesis (polished surface).

Figure 3b: Finished Prosthesis (intaglio surface).



4(a)

4(b)

Figure 4a: Final prosthesis intraorally (frontal view).
Figure 4b: Final prosthesis intraorally (left lateral view).

Discussion

Odontogenic Keratocyst, also called Keratocystic Odontogenic Tumor is a potentially aggressive lesion [5]. They are treated by enucleation and always submitted for histo-pathological examination in order to rule out any of the aforementioned lesions [6]. Marginal mandibulectomy is conservative surgical technique to remove oral cysts and tumors invaded in jaw. Based on extent of lesion dento-alveolar portion is excised. Prosthodontic rehabilitation include options of implants/fixed partial dentures/acrylic or cast partial removable dentures. Implant retained restoration can significantly improve patients quality of life³ but sometimes not possible due to insufficient amount of bone or economic reasons; also fixed partial dentures cannot be fabricated due to long span and large vertical dento-alveolar defect. So, only left option is acrylic or cast partial removable dentures. Achieving maximum stability with conventional removable partial dentures in such large defect situations is big challenge.

Precision Attachment retained RPD is an excellent treatment modality as they restore both esthetic and a function of missing teeth and oral structures. However, Precision attachments are not so commonly used due to lack of proper knowledge, overwhelming number of attachments available in the market, multiple adjustments and repairs that makes dentist reluctant to offer and provide attachment-retained cast RPD to their 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 [7,8].

Thorough knowledge of various designs/types of precision attachment, their mechanics, indications/contra-indications, their selection criteria and their effect on bio-mechanics of RPD is must before selecting a precision attachment and to give esthetically pleasing and comfortable restoration [9,10].

In this case report, extra-coronar castable attachment (Vario Stud Snap 60°-Trailerhitch ball attachments) with nylon cap (Vario Matrix -Yellow) was used⁴. It has Stud Snap 60°, which is bar kind of extension with height of around 7mm to prevent bucco-lingual tilt in prosthesis (provide stability). A Trailerhitch ball attachment was to provide retention. Nylon cap (Vario Matrix -Yellow) was incorporated in denture as female part of Trailerhitch ball attachment (Figure 1b).

Summary and Conclusion

Cases where anatomical defects are large and lateral forces are more; fixed prosthesis and implants are not possible. With careful selection of precision attachments in indicated cases can improve biomechanics of removable partial dentures and they can be used successfully to restore oral functions/aesthetics for the patient.

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