Case Report

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FABRICATION OF MODIFIED PALATAL AUGMENTATION PROSTHESIS TO IMPROVE FUNCTIONAL DEFICITS IN POST GLOSSECTOMY AND MANDIBULECTOMY PATIENT : A CASE REPORT

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ABSTRACT:

Squamous cell carcinoma of tongue is commonly associated with infiltration of disease into the floor of mouth and the mandible, requiring extensive ablative surgery of the tongue and the mandibular bone. This gives rise to severe facial disfigurement along with various functional deficits, such as, difficulty in swallowing, mastication and speech, uncontrolled salivary secretions, altered mandibular movements and occlusion. This paper describes the prosthetic rehabilitation of a patient who has undergone partial glossectomy with segmental mandibulectomy. It involves the fabrication of hollow palatal augmentation prosthesis with a widened occlusal table on the non-resected side and a palatal-based guidance ramp for the mandible on the resected side. This case report presents an alternative method to rehabilitate such partially edentulous patients with compromised anatomical situation.

Keywords: Palatal augmentation prosthesis, Glossectomy, Segmental mandibulectomy

INTRODUCTION:

Treatment optionsfor oral squamous cell carcinoma (OSCC) of tongue include ablative surgery, radiotherapyor combination. Advanced cases require wide excision of the tumor, resulting in extensive loss of tongue structure.Infiltration of malignancy into the mandible results in segmental mandibulectomy.[1,2]

Variousprostheses are suggested to alleviate these deficiencies, such as, palatal augmentation prosthesis,artificial tongue, mandibular guidance flange, guidance ramps, and implant-supported prosthesis.[3-8]

This paper describes the prosthetic rehabilitation of apatient with partial glossectomy and mandibulectomy, involving the fabrication of modified hollow palatal augmentation prosthesis, due to unfavourable anatomical situation in the resected mandible.

CASE DETAIL:

A 43-year-old female patient presented to the Department of Prosthodontics, with the chief complaint of difficulty in performing oral functions due to broken denture. The patient revealed history of partial glossectomy with segmental mandibulectomy 3 years back.

According to patient's medical records, an ill-defined lesion was seen on the left side of the tongue in 2015. The patient

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was diagnosed with stage III oral squamous cell carcinoma of tongue (T3N0M0).[9] Sheunderwent anterior glossectomy with segmental left mandibulectomy followed by reconstruction using free anterolateral thigh (ALT) flap. Patient also underwent left modified and right supraomohyoid neck dissection. Histopathological investigation revealed well differentiated squamous cell carcinoma of tongue. Patient was administered radiotherapy of 60 Gy.In 2016,amaxillaryprosthesis with widened occlusal table was fabricated. However, lack of adequate linguopalatal contact resulted in unintelligible speech and inefficient swallowing. Moreover, the weight of the prosthesis resulted in early fracture of the retentive clasp within a period of 6 months.

Extra-oral examination revealed facial asymmetrywith surgical scarsin the midline (Figure 1) and on the lateral aspect of the neck.Reduced lower lip mobility due to scarring and non-harmonious negative space due to edentulous areaswas noted. Restricted mouth opening (2.4cm) and, deviation and retrusion of mandibletowards the resected side atvertical dimension of restwas noted.

Intra-oral examination revealed generalized mucosal inflammation. Immobile tongue fused to the floor of the mouth and obliteration of the lingual sulci was seen (Figure 2). Generalized attrition,abrasion, recession and restorationof multiple teethwas noted. Grade I mobility in 14, 15 and 17 was seen. Unfavourable inclination of teeth was seen in 17, 31, 32, 33, 41, 42 and 43.An anterior open bite was noted with unilateral cross bite in 13 and 43. An altered mandibular path of closure was recorded with eccentric occlusion. The maxillary arch was Class II Kennedy classification with one modification and the mandibular arch was Class II Kennedy classification. Severe bone loss was notedin the resected area of the mandibular arch.Patient presented with mild xerostomia due to radiotherapy.

Radiologic examination revealed generalized bone loss in the maxillary teeth. Orthopantomogram revealed segmental mandibulectomywith unrestored mandibular continuity (Figure 3).

Following diagnosis, a removable maxillary prosthesis incorporating features of palatal augmentation prosthesis and mandibular guide plane prosthesis was planned.

Maxillary and mandibular impressions were made using standard techniques. Recording of maxillo-mandibular relationship and teeth setting was done at the patient's centric occlusion. The polished surface of the auto-polymerising PMMA record base (DPI-RR Cold Cure, Bombay Burmah Trading Corporation Ltd., India) was augmented with tissue conditioner(Visco-gel, Dentsply Ltd., U.K.) to record the palatogram (Figure 4). The material was molded by asking the patient to swallow and to read stimulus sentences containing consonant

sounds.[10]This allowed a functional impression of the dorsal surface of tongue on the moldable material.

The palatogram was then duplicated in modelling wax (Modelling wax, Deepti Dental Products of India Pvt. Ltd., India) using condensation silicone(CSP) (Zetaplus putty, Zhermack, Italy) and polyvinyl siloxane (PVSP)(Aquasilputty, Dentsply De Trey, Germany) impression material. CSP was adapted on the buccal surface of the stone and acrylic resin teeth to prevent escape of wax. PVSP was adapted on palatogram to form a putty index. A hole in the posterior border of the index was made to allow pouring of molten wax. Tissue conditioner was removed and putty index was repositioned. Molten wax was poured into the impression obtained after removing the tissue conditioner. This modified trial denture was placed in the mouth and patient was asked to carry out a chewing cycle to transfer the deviated occlusal contacts on the wax, thus, establishing a widenedocclusal table. Also, the occlusal contact of the left mandibular canine with wax was marked and adjusted to create the mandibular guidance ramp.

The modified trial denture was then invested in a flask in the conventional manner. After wax elimination stage, CSP was adapted in the cope to form an outline of the lid. The lid extended 3mm away from the free gingival margin anteriorly and terminated at the posterior border of the denture base. Auto-polymerising PMMA was adapted on the palatal aspect of the cope using the sprinkle-on method(Figure 5). The lid was secured to the cast with cyanoacrylate glue. Wax spacer (2mm-thickness) was adapted to the tissue surface of the cast and on the base of the acrylic resin teeth to provide space for the heat-polymerising denture base resin (DPI Heat Cure, Bombay Burmah Trading Corporation Ltd., India). PVSP was then packed in the two parts of flask to create silicone putty filler. Following retrieval of the putty filler, borders of the lid (2mm in width) were covered with silver foil to permit easy separation after denture processing. The lid and filler were then secured to the cope using cyanoacrylate glue (Figure 6). Heat-polymerising acrylic resin was packed in the flask and cured in the standard manner. Following retrieval of the processed denture, the prefabricated lid was separated. Putty filler and tin foil were removed from the denture (Figure 7). The lid was then secured back on the denture using auto-polymerizing acrylic resin. Patient has been successfully using the acrylic resin prosthesis for over 2 years with perceived improvement in oral function (Figure 8).

DISCUSSION:

This case report presents an alternative method to rehabilitate partially edentulous patients with glossectomy and mandibulectomy and offering compromised anatomical situation for prosthetic rehabilitation.

Malignancy of tongue can result in resection of tongue and the

mandible.This can significantly affect mastication, swallowing, speech, saliva control, mandibular function, occlusion, function of mandibular prosthesis and aesthetics. The aforementioned are consequences of loss of tongue volume and mobility, tactile sensitivity, altered maxillo-mandibular relationship, loss of mandibular structure, uncoordinated mandibular movements and soft tissue deficits. This compromises the ability of the patient to manipulate, grind and consolidate the bolus; to propel the bolus posteriorly towards the pharynx during swallowing; to form appropriate interaction with adjacent structures to produce vowel sounds and lingual consonants; and to allow proper channelling of salivary secretions. Mandibular discontinuity can result in lateral deviation, frontal plane rotation and posterior retrusion of the mandible. This can further result in loss of occlusion on the non-resected side, an anterior open bite, angular pathway of opening and closing and restricted excursive movements on the non-defect side.[2]

This case presented with numerous rehabilitative challenges. Fusion of residual tongue to the floor of the mouth, loss of bone height on the resected side, unfavourable inclination of mandibular anterior teeth and radiation caries restricted the fabrication of a mandibular prosthesis. Furthermore, patient was unable to undergo tongue release with vestibuloplasty due to financial restraints. Also, large space between the palate and the residual tongue resulted in a heavy prosthesis, thus, compromising its retention and causing excessive stress on retentive denture components leading to fracture.

Thus, modified hollow palatal augmentation prosthesis was fabricated to permit proper linguopalatal contact during speech and adequate lingual propulsion during swallowing by reshaping the palatal contour. Also, palatal-based mandibular guidance ramp was incorporated in the prosthesis on the resected side to help control mandibular deviation and a widened occlusal platform was created on the non-resected side for deviated chewing movements. The prosthesis also replaced missing maxillary teeth to improve aesthetics.

Advantages of this method lie in the fabrication of a single prosthesis with multiple functions, especially in a patient with trismus and xerostomia. Furthermore, positive water-float test revealed that the prosthesis was successfully hollowed out, reducing the overall weight and improving its retention and stability. Heat-polymerizing acrylic resin material allowed easy adjustments as needed. Unilateral occlusal scheme was followed with limitations in dietary intake, since mandibular edentulous space was unrestorable.[2] Moreover, the clinical stages are routine requiring little additional chair-side time. Although, this procedure involves easy laboratory steps with economically available materials, the laboratory stages can be time-consuming and cumbersome.

REFERENCES:

1. Selvamani M, Yamunadevi A, Basandi PS, Madhushankari GS. Prevalence of oral squamous cell carcinoma of tongue in and around Davangere, Karnataka, India: A retrospective study over 13 years. J Pharm BioalliedSci 2015;7:S491–S494.
2. Beumer J, Marunick MT, Silverman J et al. Rehabilitation of tongue and mandibular defects. In: Beumer J, Marunick MT and Esposito SJ (eds) Maxillofacial rehabilitation: prosthodontic and surgical management of cancer-related, acquired, and congenital defects of the head and neck. Quintessence Publishing Co, Inc:IL,2011,pp. 61-154.
3. Balasubramaniam MK, Chidambaranathan AS, Shanmugam G, Tah R. Rehabilitation of Glossectomy Cases with Tongue Prosthesis: A Literature Review. J ClinDiagn Res 2016;10:ZE01-4.
4. Ohno T, Fujishima I. Palatal and lingual augmentation prosthesis for patients with dysphagia and functional problems: A clinical report. J Prosthet Dent 2017;117:811-813.
5. Prencipe MA, Durval E, De Salvador A, Tatini C, Roberto B. Removable Partial Prosthesis (RPP) with acrylic resin flange for the mandibular guidance therapy. J Maxillofac Oral Surg 2009;8:19-21.
6. Shimodaira K, Yoshida H, Yusa H, Kanazawa T. Palatal augmentation prosthesis with alternative palatal vaults for speech and swallowing: a clinical report. J Prosthet Dent 1998;80:1-3.
7. Pandey S, Kar S, Sharma NK, Tripathi A. An innovative approach to the prosthodontic management of Class III mandibular defect.Natl J MaxillofacSurg 2018;9:90-95.
8. Gupta S, Bhargava A, Mehra P. A bar and ball attachment prosthesis over osseointegrated implants post mandibular resection. J Indian ProsthodontSoc 2016;16:395-399.
9. Crescenzi D, Laus M, Radici M, Croce A. TNM classification of the oral cavity carcinomas: some suggested modifications. Otolaryngol Pol 2015;69:18-27.
10. Kong HJ, Hansen CA. Customizing palatal contours of a denture to improve speech intelligibility. J Prosthet Dent 2008;99:243-8.

FIGURES:

Figure 1, Pre-operative extra-oral view

Figure 2, Pre-operative intra-oral view

Figure 3, Orthopantomogram revealing segmental mandibulectomy with unrestored mandibular continuity

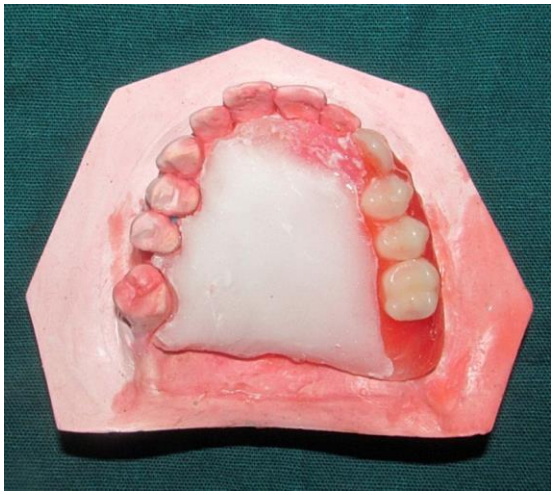

Figure 4, Palatogram recorded using tissue conditioner material

Figure 5, Fabrication of Poly methylmethacrylate lid

Figure 6, Putty filler with lid secured to cope for packing stage

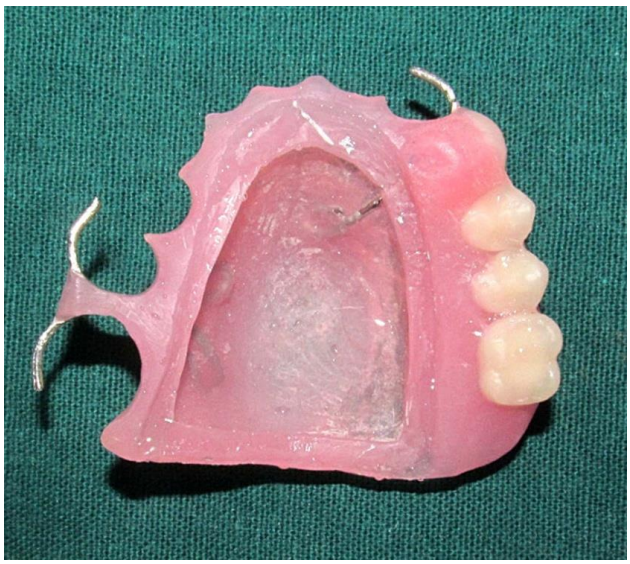

Figure 7, Hollowed processed denture

Figure 8, Post-operative intra-oral view with modified palatal augmentation prosthesis