

Prosthodontic Management of Marginal

Hemimandibulectomy With Surgically Induced Lip Drop

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ABSTRACT

Loss of continuity of the mandible destroys the balance and symmetry of mandibular function, leading to altered mandibular movements and deviation of the residual fragment towards the resected side. The rehabilitation of these cases must be carefully planned and the treatment requires a denture construction in such a way to get maximum retention, support, stability, esthetics and function. This case report describes the treatment of a patient with partially resected edentulous mandible, combining functional and esthetic requirements. A removable prosthetic appliance was fabricated to maintain the lip in its normal position, thereby helping the patient to perform normal functions. All basic principles of rehabilitation are applied and interpretation was based on altered anatomic and functional situation. An esthetic configuration with ideal function was achieved and the occlusion showed a satisfactory stability.

KEYWORDS: Hemimandibulectomy, maxillofacial rehabilitation, esthetics

INTRODUCTION:

One of the most challenging and demanding maxillofacial endeavours is the construction of functional, complete dentures for the edentulous patient who has undergone a mandibular resection. Loss of continuity of the mandible destroys the balance of the mandibular movement and function, leading to altered mandibular movement and deviation of the residual fragment towards the surgical side. The greater the loss of tissues, greater will be the deviation of the mandible to the resected side, thus compromising the prognosis of the prosthetic rehabilitation to a greater extent.

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Apart from deviation, other dysfunctions in such patients are observed in swallowing, speech, control of saliva, mandibular movements, mastication, respiration and psychic functioning¹.

Based on the nature of resection, Cantor and Curtis (1971) devised a prosthetic classification that is as follows².

Class I: Radical alveolectomy with preservation of mandibular continuity.

Class II: Lateral resection of the mandible distal to the cuspid

Class III: Lateral resection of the mandible and maxilla.

Class IV: Lateral bone graft surgical reconstruction

Class V: Anterior bone graft surgical reconstruction

Class VI: Resection of the anterior portion of the mandible without reconstructive surgery to unite the lateral fragments.

In cases with class II, III, IV, V guide flange prosthesis would be a treatment modality. One of the basic objectives in rehabilitation is to retrain the muscles for mandibular denture control and repeated occlusal approximation.

This article highlights prosthetic rehabilitation of a class I hemimandibulectomy patient for whom a mandibular prosthesis is fabricated with loop on corner of mouth for lip support.

CASE REPORT:

A 74 year-old, completely edentulous, female patient was referred to the Department of Prosthodontics after extraction of remaining natural teeth which were periodontally compromised for maxillofacial rehabilitation with a chief complaint of difficulty in eating and speaking. Her medical history revealed that she was diagnosed for squamous cell carcinoma on the right side of the mandible, for which she had undergone marginal resection of mandible on right side 3 years back. The patient's history indicated that she had a tobacco-chewing habit since 40 years. An extra oral examination revealed asymmetrical face, and a convex profile. There was a deviation of the mouth to the right side that is toward resected side.

On intraoral examination it was found that the maxillary and mandibular arches were completely edentulous. On palpation the mandibular ridge was present till first premolar region. On evaluation of pre extraction diagnostic ortho-pantomogram, segmental absence of the mandible distal to the first premolar to the last molar on the same side was noted. This particular case represents to class I Cantor and Curtis classification.

CLINICAL PROCEDURE:

Preliminary impressions were made with irreversible hydrocolloid material (Zelgan Plus, Dentsply, Gurgaon, India) using stock trays. Casts were prepared (Fig. 1) and self-cure clear acrylic resin (RR, Dentsply, India) custom trays were constructed. The tray was border-molded with modeling plastic (DPI Tracing stick, Dental products of India, Mumbai, India), taking care to avoid overextension. Final impressions were made with light-body vinyl polysiloxane (Aquasil, Dentsply/Caulk, Milford, DE). While in case of mandibular final impression tray handle was extended with autopolymerizing resin and a cylindrical mandibular rest is fabricated in the posterior region with an increased vertical height. Then softened impression compound was placed on the top of the mandibular rests and inserted in the patient's mouth. Patient was advised to close her mouth, so that the mandibular rest fit against the maxillary alveolar ridge.

This was done to stabilize the tray in position by preventing anterioposterior and mediolateral displacement of the tray during final impression, and which was made using the light body material and the patient was asked to close the mouth such that cylindrical rest will fit over maxillary ridge. For recording the functional state, patient was instructed to run his tongue along her lips, suck in her cheeks, pull in her lips, and swallow by keeping her mouth closed till the impression material hardened

Master casts were poured with Type III dental stone (DPI, Mumbai, India). Stabilized record bases were made with self-cure acrylic (DPI, Mumbai, India) using the sprinkle-on technique. Wax rims were adjusted until a tentative occlusal vertical dimension was established. Face bow transfer was made to orient the maxillary cast to the semi-adjustable articulator (Artexsemiadjustable articulator, rotofix face bow). Maxillomandibular relations were recorded with wax interocclusal records. The patient tactile sense and sense of comfort was used to assess the vertical dimension of occlusion. The patient was asked to move her mandible as far possible to the untreated side and then, gently close her jaw into position to record a functional maxillomandibular relationship.

The teeth were arranged in the usual manner, semi-anatomic posterior teeth (Acryrock, Pyrax polymers, Roorkee, India) were used. Maxillary and mandibular teeth were arranged to achieve balanced occlusion. Occlusal table on resected side was up to the second premolar, just to establish the cross arch stability and balance in the right lateral excursive movements. A wax set-up was tried in the mouth and was checked for esthetics, phonetics, occlusal vertical dimension and balanced occlusion. The basic objective is to achieve an occlusal scheme which will have a multiplicity of occlusal contacts in centric position. Long centric concept and to a slightly decreased vertical dimension of occlusion in an attempt to decrease occlusal force is given. The level of the occlusal plane, especially in edentulous patients, should be acceptable to the remaining portion of the tongue to permit easier distribution and control of food on the occlusal table and control of complete denture prosthesis³. A posterior palatal seal was recorded and the dentures were waxed, processed (DPI RR

heat cure, DPI, India) and remounted and the occlusion was refined. Freedom of movement and lack of cuspalintercusation was checked before denture insertion. The dentures were evaluated intraorally and the mandible was manipulated to the static centric position area⁴. Any interference in normal movements was corrected. During insertion to improve the tissue contact situation, resilient liner (Ufigel;VOCO, gmbh) was used to reline the mandibular denture by keeping the mandible into the maximum intercusation position. The sealer was applied once over the polymerized surface of the resilient liner, which prevents water sorption by the liner and helps in maintaining the softness for a longer period of time. The dentures were removed, repolished and then reinserted.

The prosthesis design is composed of snapfit buttons (Fig. 2) which includes male and female component in which male component is attached to lower mandibular denture in premolar region and female component in removable segment (Fig. 3) to which stainless steel wire is attached, curving out at the anterior end to form a loop supporting the lip extraorally. The removable component of prosthesis was fabricated with self-cure acrylic resin and it was designed such that patient can easily remove the removal component during mastication.

Addition of a 21-gauge stainless steel wire in the form of a J-shaped buccal loop to engage the corner of the mouth of the unaffected side in order to pull the corner of the mouth and achieve an esthetically pleasing appearance. The wire loop was embedded in the acrylic of the buccal flange of the removal segment of the denture⁵ (Fig. 4). It was adjusted to ensure that its position provided circumoral symmetry and esthetics without compromising comfort and simulated functional jaw movements. The extraoral wire components were relined with permanent tissue conditioner to reduce the shine so as to blend with the skin. Follow-up appointments were carried out routinely to ensure patient comfort and satisfaction. No discomfort or any problems in mouth opening or mastication were noted resulting from the J-shaped loop, and the patient was quite happy with the prosthesis.

The patient was instructed to chew only on the non-resected side, to avoid denture instability. It may be necessary to accept an occlusion that is not bilaterally balanced in eccentric occluding positions for an edentulous resected maxilla or mandible. The patient was given routine post insertion instructions and was motivated to make efforts to learn to adapt to the new dentures. Simple exercises were suggested to the patient such as repeated opening and closing of mandible. This helped the patient learn to manipulate the lower prosthesis into the proper position. Initially, retention of the dentures, especially of the lower one was a problem but this improved with constant use. Within a week, the patient expressed satisfaction in mastication, phonetics and esthetics and drastic improvement is seen from initial stages of prosthesis planning (Fig. 5) and after the fit and insertion of the final prosthesis (Fig. 6).

DISCUSSION:

The prosthetic rehabilitation of a hemimandibulectomy subject is a difficult task for a prosthodontist as the normal physiological functions like swallowing, speech, mandibular movements, mastication, control of saliva and respiration are adversely affected by radical mandibular surgery. These dysfunctions radically alter the prosthetic prognosis. Surgical reconstruction by implants and grafts of various types is the ideal treatment when feasible.

In the present case the OPG (Fig.7) and intra oral pictures (Fig.8) revealed the absence of mandibular segment. As the surgical reconstruction is not always feasible in every patient, prosthodontic approach has to be considered to restore the esthetic and function in such subject. Because of the loss of the normal anatomy and physiology of the oral cavity many principles of complete denture prosthesis must be compromised. Since the mandibulectomy patients have reduced masticatory strength and little soft and hard tissue support, it is important to record and utilize as broad denture base as possible within the physiological limits.

Closed-mouth impression techniques have been suggested but these were designed for making accurate static impressions⁶. The column trays described in this article are similar in form, but they are used to record the muscular dynamics of the postsurgical lower denture space. The reasons for increasing the height of the lateral columns of the custom trays are as follows:-

1. To reduce the amount of force exerted by the remaining muscles of mastication.
2. To make swallowing more difficult.

This type of "stress swallowing" will cause extreme muscular activity of the residual tongue and floor of the mouth. An impression of this functional activity should help prevent future denture displacement. In the final denture form, the tissue conditioner placed on the dentures when they are first inserted provides comfort during the adjustment period, corrects any tissue surface discrepancies resulting from the impression material, and refines the final denture form during function.

Lott and Levin stated that retention will increase in proportion to an increase in the area covered by the denture. Boucher states that the amount of biting force tolerated by a denture is proportional to the size of the tissue-bearing area. Since hemimandibulectomy patients have markedly reduced masticatory strength and little soft and hard-tissue support, it is important to record and utilize as broad denture base as is possible. The use of a tissue-conditioning agent facilitates the extension of a functional denture form to the maximum size tolerated by the oral tissues. This form should enhance the patient's ability to manipulate the prosthesis and to realize maximal masticatory potential².

Facial symmetry could be improved with the use of removable prostheses. Esthetics has to be compromised, however, because labial commissural sag is necessary if a functional seal is to be

maintained between the lips. Without this seal, drinking and speaking appear to be much more difficult⁷. In this particular case, an effort was made to restore the patient's appearance and comfort by repositioning and supporting the lip in a natural position with the described prosthesis. Since the J-hook was lined with permanent tissue conditioner which does not cause any irritation and it has to be changed every 6 month, patient has to wear for full time except during mastication of hard food.

CONCLUSION:

The described technique offers an inexpensive, simple, and expedient approach to manage the hemimandibulectomy patient. The availability of well-formed edentulous ridges and an excellent peripheral seal permitted excellent retention and stability of the dentures, and the presence of the loop to support oral commissure. The philosophical approach to the treatment and rehabilitation of edentulous patients with resected mandibles is not in concentrating on what has been sacrificed in the eradication of the disease, but rather in taking full advantage of the remaining structures.

FIGURES:



Figure 1: Maxillary and mandibular diagnostic cast



Figure 2: Snapfit button include male and female component



Figure 3: Male component in the mandibular denture and female component in the removable segment



Figure 4: Prosthetic design with extroral loop



Figure 5: Preoperative photograph



Figure 6: Postoperative photograph



Figure 7: Pre extraction diagnostic OPG



Figure 8: Intra oral view

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