



Prosthetic management of edentulous patients with mandibulectomy : case report

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Abstract :

interruptive mandibular defects lead to numerous aesthetic and functional impairments, making prosthetic rehabilitation particularly challenging. This article presents the prosthetic rehabilitation of two patients who underwent segmental mandibulectomy. The patient was satisfied with the improvement in esthetics and mastication.

Keyword : mandibulectomy, prosthesis,

Introduction :Whether due to trauma or tumor removal, mandibulectomy has significant and frequently serious aftereffects :

- an unsightly appearance brought on by mandibular displacement toward the operative site
- difficulty swallowing and chewing
- modification of the phonation function
- a decline in the patient's self-confidence and psychological well-being.

Mandibular deviation may be lessened or corrected with prosthetic rehabilitation, although this is one of the biggest obstacles in maxillofacial prosthodontics.(3)

CASE REPORT

A 57- year old male presented to the departement of prosthodontics with the chief complaint of deformety facial due to deviation of lower jaw and difficulty in mastication . The previous history revealed a left-sided mandibulectomy due to oral carcinoma followed by a skin graft. Three years later , he received splint placement.

Extraoral examination revealed a marked deviation of the mandibule toward the resected side (figure1).

The maxillary arch is completely edentulous. The mandibular arch presents a class I Kennedy edentulous area(figure2) .

the panoramic radiograph shows the absence of the right mandibular ramus and angle,the resected area was reconstructed with plates (figure3).

For this case,resin-based removable prostheses weree selected for both the maxillary and mandibular arches.

To lessen the pronounced inclination of the mandibul occlusal plane, selective ameloplasty of the remaining teeth was carried out.

Alginate was used to create the primary impression, and polyether (Impregum Regular) was used to create the secondary impression(figure4).

The patient needed multiple occlusal equilibration sessions after the dentures were inserted in order to achieve functional equilibrium.



For greater accuracy, the intermaxillary record was registred in two stages. In the first stage, occlusion rims were used, and in the second stage , the intermaxillary record was taken with the maxillary teeth



arrangement (figure 5,6)

After therapy was finished, the patient showed that they could limit deviation and achieve mandibular recentring on their own without the assistance of a practitioner (figure7).

Figure 2 : intraoral views

Figure 1 :facial view



Figure 3 :panoramic radiograph



Figure 4 :maxillary and mandibular impressions

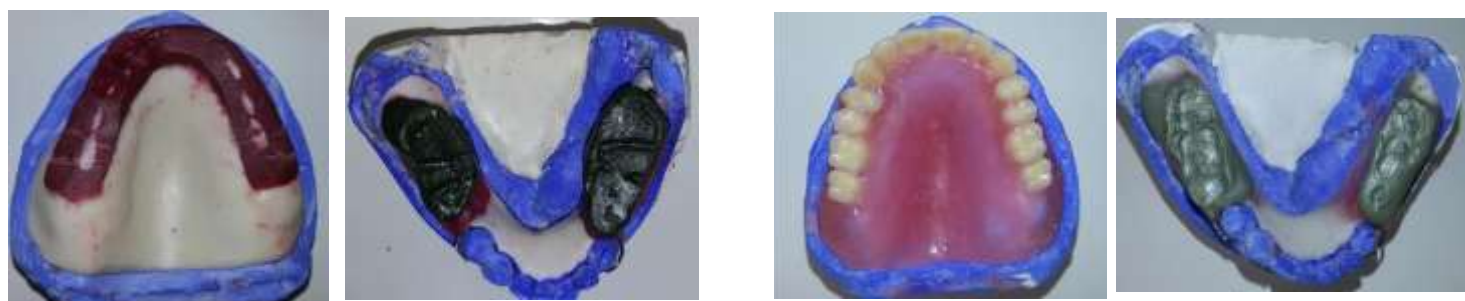


Figure 6 : second intermaxillary record using the Figure 5 : first intermaxillary record maxillary teeth arrangement for greater accuracy



Figure 7 : smile before and after prosthetic treatment

Second case :

In the second case, the 58-year old patient RA was referred to the department for prosthetic rehabilitation (figure 1). Medical history revealed that he had received radiotherapy for nasopharyngeal carcinoma, and subsequently developed mandibular osteoradionecrosis six years later, which necessitated a right mandibulectomy (figure 3).

The deviation of the mandible toward the right side is highly pronounced.

The patient presents a complete bimaxillary edentulism (figure 2). The residual ridges show good height and healthy mucosa. Salivary quantity appears adequate.

The therapeutic decision was a conventional complete denture, the preliminary impressions were taken with alginate using stock impression trays (figure 4). The mandibular tray was trimmed up to the limit of the tissue loss.

The secondary impressions were made using individual impression trays and polyether material (figure 5).

The most challenging step was the recording of the intermaxillary relationship. Initially, we guided the patient to reposition the mandible toward the healthy side, and then the patient participated in the registration of the intermaxillary relationship without practitioner guidance (figure 6). The final result was satisfactory after insertion and mandibular recentration (figure 7,8).



Figure 1 :facial view



Figure 2 : intraoral view



Figure 3 :panoramic view



Figure 4 : Primary impressions with alginate Impregum



Figure 5 : secondary impressions with



Figure 6 : intermaxillary registrations



Figure 7 :try-in of the teeth arrangement with mandibular centring



:facial views before and after prosthetic treatment Figure 8

Discussion

In pseudotherapeutic RC ,Cantor and Curtis classified edentulous mandibulectomy patients according to the extension of resection and prosthodontic concerns. Mandibulectomy patients were categorized into six classes (2) :

Class	Description of Resection	Prosthodontic Concerns
Class I	Resection involving the alveolar bone only, with preservation of mandibular continuity.	Minimal prosthetic difficulty; conventional dentures usually possible.
Class II	Resection involving the alveolar bone and continuity defect posterior to the cuspid region.	Moderate difficulty; requires stabilization and support for prosthesis.
Class III	Resection involving the alveolar bone and continuity defect anterior to the cuspid region.	Severe difficulty; loss of anterior guidance and symmetry complicates prosthetic design.
Class IV	Resection crossing the midline, involving the alveolar bone and continuity defect.	Major challenge; midline defect affects stability, retention, and esthetics.
Class V	Resection involving the alveolar bone and continuity defect posterior to the second premolar region.	Moderate-to-severe difficulty; occlusal balance and support compromised.

Class VI	Resection involving the alveolar bone and continuity defect anterior to the second premolar region.	Severe difficulty; extensive loss of support and guidance, requiring advanced prosthetic solutions.
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Cantor, R., & Curtis, T. A. (1971). Prosthetic management of edentulous mandibulectomy patients. I. Anatomic, physiologic, and psychologic considerations. Journal of Prosthetic Dentistry, 25(4), 446–457.

Swallowing, speaking, mandibular motions, mastication, saliva management, respiration, and psychic functioning are all negatively impacted by mandibulectomy. Functional lip seal and salivary regulation are compromised by extensive lip resections. Restricted tongue mobility and the resulting loss of linguopalatal contact negatively impact speech. • Functional deficiencies are made worse by radiation-induced xerostomia, which results in delayed food processing, poor bolus formation, difficulties swallowing, and inadequate laryngeal protection. (3)

Mandibular discontinuity defects result in more disability and disfigurement than continuity defects. (4)

The most significant sequelae of acquired mandibular discontinuity are retrusion and deviation of the residual mandibular segment toward the surgical side.(4)

Mandibular hemi-section results in deviation of the remaining segment of the mandible towards the resected side due to the unbalanced influence of the internal pterygoid muscle. It also leads to the rotation of the residual mandible in an inferior direction, caused by the pull of the suprahyoid musculature and gravity due to the loss of anchorage of elevator muscles. The amount of deviation and rotation depends on the extent of tissue loss.(3)

During mandibular opening, , deviation increases, resulting in an angular trajectory of mandibular movements. The normal hinge movement , which is typically parallel to the sagittal plane, is consequently lost. During mastication, entire envelope of motion occurs on the surgical defect side . The extent of mandibular deviation is influenced by several factors, including the quantity of soft and hard tissues surgically resected, the method of surgical site closure, the degree of impairment of tongue function, and the condition of the remaining teeth, loss of proprioceptive sense of occlusion which also depends on the teeth remaining and the time at which prosthodontic therapy was initiated.(1)

Reconstruction of the mandible is essential for maintenance of normal spatial relationships of the tissues and to ensure optimal prosthetic rehabilitation.Immediate reconstruction of the mandible is generally preferred to optimize treatment outcome.the surgeons and maxillofacial prosthodontists must coordinate closely to ensure optimal results for patients requiring mandibular resection and reconstruction.(4)

Acquired mandibular defects present many changes to the extra and intra-oral environment, which often lead to great difficulties in providing prostheses with adequate retention, support, and stability. Due to deviation of the resected mandible, it is also not uncommon to observe that the coronoid process of the contralateral side obliterates the buccal sulcus of the maxilla posteriorly. This

commonly results in difficulties in the development of buccal flange in the maxillary prosthesis - Radiation therapy causes tissue changes make fabrication and tolerance of prostheses more difficult and may increase risk of tissue abrasion and possible tissue necrosis.

Xerostomia is a common side effect, if the salivary glands are in the field of radiation treatment. Following administration of 60 Gy of radiation therapy, up to 80% reduction in serous salivary flow can be expected. Saliva is an effective lubricant at the denture–mucosal interface. Decreased output and increased viscosity of saliva have an important bearing on patients' tolerance of removable prostheses. With reduced salivary flow, more friction at the denture–mucosal interface is produced during function. In addition, peripheral seal in complete dentures may be difficult to obtain, further compromising retention of prostheses. (4)

the extent of mandibular deviation commonly causes the mandibular dentition to be palatal to the maxillary dentition. Mandibular denture teeth are usually positioned near the top of the edentulous ridge in normal unresected mandibles. In discontinuity defects, mandibular posterior teeth are placed in a more buccal manner than usual. It may be necessary to establish a palatal occlusal ramp on the maxillary denture prosthesis over the unresected side.

Simple guidance prostheses help to restore acceptable occlusal function by retraining, enabling the patient to achieve and maintain a functional occlusal relationship during the post-operative healing phase of the mandible after partial mandibulectomy. (3,5)

It is only an interim treatment to correct the deviation as much as possible, and occlusion is the primary determinant. Several prostheses have been used to reduce or eliminate mandibular deviation like intermaxillary fixation, cast metal mandibular resection restoration, acrylic guidance flange, cast metal guidance flange prosthesis, guidance ramp in the maxillary, crowns with a maxillary prosthesis to guide hemi mandible, functionally moulded palatal ramp, twin occlusal table in the maxillary arch.

However, these methods should be used with a well-planned mandibular exercise plan.(5)

The use of osseointegrated implants to enhance oral function and improve the quality of life for patients has been well established. Favourable tumour prognosis, good health of local tissues, and a patient's positive attitude with realistic expectations are important factors for successful treatment with implant supported restorations ;

It has been proposed that 10mm of vertical bone height and 6mm of horizontal bone width should be available for predictable results. The fibula and iliac crest bone flaps consistently have bone volume that is adequate for implant placement. In general, the radial forearm free flap offers inadequate bone for implant placement(3,4)

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