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Asian Journal of Oral Health and Allied Sciences

Case Report

Management of hemimandibulectomy using guide flange

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Received: 04 December 2023
Accepted: 25 December 2023
Published: 05 February 2024

DOI
10.25259/AJOHAS_18_2023

Quick Response Code:

ABSTRACT

Patients with mandibular deviation following surgical hemi/segmental/subtotal mandibulectomy for a variety of reasons (squamous cell carcinoma being the most common cause) are administered a guide flange. The physician must wait for the lesion to heal, the graft to heal, or the radiotherapy effects to subside before proceeding with planned procedures like secondary osseous grafting. A definitive prosthesis cannot be planned until the graft has healed. The patient has to receive a prosthesis during this period of time in order to correct mandibular deviation caused by a unilateral muscle pull. Furthermore, if bone grafting fails or the patient refuses a second operation, there are situations in which a definitive prosthesis must be postponed. This report describes the fabrication of such a mandibular guide flange prosthesis.

Keywords: Guiding flange, Mandibulectomy, Squamous cell carcinoma, Mandibular prosthesis, Maxillofacial prosthesis

INTRODUCTION

The twelfth most common cancer in the world is mouth cancer. It is one of the top three cancerous lesions that arise in India.[1,2] One type of cancer called oral squamous cell carcinoma primarily affects the tongue's lateral borders and floor of the mouth. It is among the tumors that invade the mandible most frequently. This means it needs to be removed along with the floor of the mouth, the local lymphatics, and a significant portion of the tongue. Thus for the radiation oncologist, prosthodontist, and surgeon, managing the underlying disease and the healing process following treatment presents challenges. In addition to severe cosmetic deformity, loss of mandibular continuity can cause salivary drooling, rotation of the occlusal plane inferiorly, and distortion of the jaw toward the affected side during functional motions, and difficulties such as swallowing, speech, and mastication.[3]

Immediate mandibular restoration is recommended to restore stable occlusion, facial symmetry, and arch alignment.[4,5] Alternative treatment options, such as removable prostheses, and traditional guide flange prosthesis (GFP) prostheses are offered to restore the patient's quality of life and oral functions. These are often the options available to a surgeon who chooses primary reconstruction to eliminate the chance of a lesion recurrence.

Patients who are unable to hold their jaw in a suitable, guided mediolateral position long enough to masticate properly are often candidates for GFP.[6] This describes the occlusion deviation brought on by condyle resection, unilateral muscle pull, and surgical site fibrosis in the interim until a more comprehensive treatment strategy can be put in place. The patient whose marginal mandibulectomy and unsuccessful attempt at free fibula grafting are described in this case study.

CASE REPORT

A 40-year-old man who had undergone a marginal mandibulectomy and had attempted, but failed, reconstruction with a free vascular fibula graft four months prior was referred to the prosthodontics department for prosthetic rehabilitation. The patient's medical history indicated that he had chewed tobacco for 18 years and had been diagnosed with squamous cell carcinoma of the left mandible five months prior. Extraoral examination revealed a diffuse swelling of the right side of the face that extended from the corner of the mouth to the superior border of the neck, and from the mandibular midline to the right ear [Figure 1]. The teeth missing in relation to #17 and 45–47 were found during the intraoral examination. In the right half of the mandibular region intraorally, it also showed thick, freely movable soft tissues with scar formation, loss of alveolar ridge, and obliteration of buccal and lingual sulci. The mandible was observed to deviate to the right, approximately 15 mm from the midline on 30 mm of mouth opening. This was attributed to the normal action of the left mandibular muscles in the absence of the right contralateral muscles. When the patient attempted to close his mouth to the maximum intercuspation, frontal plane rotation was observed. One mm after guided closure, the patient's scissor bite revealed that the mandible could not be brought into proper mediolateral alignment. Moreover, the patient could not hold this position for mastication again.

Fabrication of the prosthesis

Irreversible hydrocolloid impressions of the maxillary and mandibular arches were recorded using stock trays and sectional stock edentulous trays, respectively. Casts were obtained from Type III gypsum material (Kalstone; Kalabhai Karson) which was poured into the impressions. To create a framework for the GFP, a 19-gauge round stainless steel orthodontic wire was worked on the tooth-bearing portion of the remaining mandible. Moreover, on the mandibular cast, C clasps were created on the molars and first premolars. The mandibular guide-flange to the level 3 mm over the free gingival margin of the opposing maxillary teeth in order to keep the maxillary cast in occlusion was done on the maxillary cast. The clear heat-polymerized acrylic resin (dental product of India (DPI) Heat cure clear) was then created by acrylizing them [Figure 2]. GFP was polished and completed.

By either adding autopolymerizing clear acrylic resin intraorally (DPI Cold cure clear) or carefully trimming the GFP surfaces that come into contact with the occlusal surfaces of maxillary teeth, the guide-flange's inclination could be changed. In order to direct the mandible toward occlusion, an intraoral smooth gliding flange surface was created. In order to guide the mandible to a final, definitive closing point during mastication, care was taken to preserve the buccal-surface indentations of the opposing maxillary teeth. From the opening position to the maximum intercuspation, the flange height was adjusted in a smooth, unhindered path [Figure 3]. Together with post-insertion instructions, the prosthesis was delivered. For the following year, the patient underwent follow-up at the customary three3 month interval. The patient had little trouble using the prosthesis and was able to successfully masticate and speak.

DISCUSSION

Cancer affects the vast majority of people.[7] India has the highest incidence of oral cancer, with oral premalignant lesions estimated to affect 20% of the global population.[8] Depending on the tumor in the mandible, several surgical treatment options, including subtotal, hemi, segmental, marginal, and total mandibulectomy, are used.[9] If mandibular continuity is lost without reconstruction, the mandibular segment or segments

Figure 1: Pre-prosthetic treatment view.

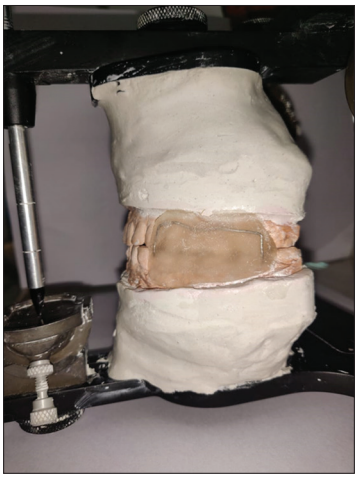

Figure 2: Acrylized guide flange on articulator.

Figure 3: Guide flange (in function).

that remain will deviate toward the defect. A vertical acrylic protrusion extends to the buccal surfaces of the corresponding maxillary teeth from the non-resected side of the mandibular teeth's buccal aspect. By doing this, the mandible is kept in its ideal mediolateral position. With limited lateral movement, this primarily permits vertical strokes. Although it used to be preferred, intermaxillary fixation is no longer used to lessen the deviation brought on by mandibular resection. Arch bars and elastics were used for this for 5–7 weeks after surgery. It is only feasible for individuals whose mandibular resections result in little loss of soft tissue. Consequently, there is minimal scarring, and the mandibular deviation is primarily caused by muscle imbalance and impaired proprioception, because there is plenty of soft-tissue available for closure. When the intermaxillary fixation is removed, most patients are able to quickly assume the proper intercuspal positions, preserving their proprioceptive sense of occlusion. However, it is not appropriate if the patient required radiation therapy and composite resection along with a traditional radical neck dissection, if the oral wound was primarily closed, if the mandibular deviation worsened, and if the resulting scar contracture was more profound and unyielding. More important causes of deviation in these patients than muscle imbalance and loss of proprioceptive sense of occlusion are scar contracture and tight wound closure.[10]

Ideally, surgical removal of a mandibular segment should be planned with immediate reconstruction. Patients can now expect a significant improvement in their quality of life for developments in reconstructive surgery and dental implant procedures.[11]

This case involved a middle-aged man who had undergone reconstructive surgery before. The main objectives of this patient's treatment were to partially correct the patient's facial appearance, which was brought on by the remaining mandible's excessive deviation, and to realign the remaining mandible to its natural position so that the patient could perform the basic function. To some extent, the prosthesis's esthetics can be enhanced by moving the wire components as far posteriorly as permitted. The prosthesis can be made of clear acrylic. To be stable, retentive, and to distribute stresses over the greatest practical area, the prosthesis should nevertheless have as many teeth as is practical, and the flange should have sufficient extension.

Until a permanent prosthesis is created, the GFP is frequently used as a training prosthesis. The prosthesis can be removed if the patient is able to successfully repeat the mediolateral position. However, patients may occasionally decide to wear the GFP indefinitely for a variety of reasons, including guarded prognoses for the intended definitive treatment and financial or scheduling constraints.

CONCLUSION

A temporary prosthesis called a GFP is given to the patient after post-surgical reconstruction of the defect. This allows the patient to carry out functions like eating and partially preserves esthetics by keeping the jaw from deviating to the affected side. Some circumstances, such as a poor prognosis after bone grafting or inability to pay for the expensive treatment, may require the patient to use the prosthesis indefinitely.

Ethical approval

The Institutional Review Board approval is not required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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How to cite this article: Khandualo AK, Nagar S, Gupta A, Chopra D, Misra SK. Management of hemimandibulectomy using guide flange. Asian J Oral Health Allied Sci. 2024;14:2. doi: 10.25259/AJOHAS_18_2023