

GUIDE FLANGE PROSTHESIS – A SIMPLE YET EFFICIENT AID FOR SEGMENTAL MANDIBULECTOMY PATIENTS

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ABSTRACT

Purpose: To fabricate a simple yet efficient aid, to improve condylar position, to reduce mandibular deviation and to enhance the masticatory efficiency, for a segmental mandibulectomy patient. **Method:** A guide flange prosthesis was fabricated without additional retentive aids to enable the patient comfort and an occlusal acrylic extension for stabilizing unopposed dentition on resected side. Heat cure PMMA (Poly methyl methacrylate) was employed for fabrication. **Results:** Mandibular guidance was achieved using a guide flange prosthesis fabricated on maxillary arch. Mandibular deviation was corrected to almost 4-5 cm where patient couldn't move the mandible atleast by 2 mm. On a follow-up visit after 1 week patient reported with improved masticatory efficiency, reduced TMJ discomfort and facial profile. After 1 month follow-up, the patient could guide her non-resected side of mandible to normal occlusal relation and she was able to guide her mandible half-way to normal occlusion without the prosthesis. **Conclusion:** Mandibular guidance therapy in segmental mandibulectomy patients would help to establish an acceptable occlusion by re-educating the muscles and thus normal occlusion and mastication can be achieved.

KEYWORDS: Hemimandibulectomy, Guide Flange Prosthesis, Mandibular Deviation.

INTRODUCTION

Squamous cell carcinoma (SCC) is the most frequent malignant tumour of the oral cavity. It develops in all parts of the oral cavity; the high-risk areas being the floor of the mouth, posterolateral margin and base of the tongue.^[1] In case of oral SCC attached to the mandible, a unilateral, elective, modified supraomohyoid neck dissection is recommended.^[2] But too extensive surgery, involving the resection of the mandible, negatively influences the patient's quality of life,^[3] the most crucial pitfalls of hemimandibular resection patients being facial disfigurement and deviation of mandible towards resected side due to unilateral muscle mass removal, altered maxillomandibular relationship, difficulty in mastication, swallowing and speech.

Early interventions in management of hemimandibulectomy patients include various exercise regimens, inter-maxillary fixation and guide flange prosthesis to improve the range of mandibular movements. Surgical reconstructive procedures can restore the bony defect and function of resection patients. A wide range of approaches from grafts to

distant bone flaps have been used for correcting bony defects but masticatory function remains compromised. However, patient's general health and economic status are the prime determinants in undergoing massive reconstructive procedures. A longitudinal prospective study was conducted by Garrett et al,^[4] to determine whether conventional prostheses or implant-supported prostheses and current surgical reconstructive procedures restore patient's oral functions and quality of life to their status prior to segmental mandibulectomy with immediate fibula free-flap reconstruction; and the authors concluded that 72% (33/46) of the subjects enrolled were able and willing to complete treatment with conventional prosthesis and only 35% (16/46), with completed implant-supported prostheses treatment.

The present case report describes, early prosthetic management of a hemimandibulectomy patient with an acrylic guide flange prosthesis on maxillary arch to improve the form and function of existing masticatory apparatus, without any additional retentive measures owing to the ease and comfort of the patient in wearing the prosthesis.

CASE REPORT

A 45 year old female patient status post SCC of left mandibular gingiva buccal sulcus operated with wide excision of lesion and segmental mandibulectomy (lateral resection of mandible distal to cuspid) reported to the department of prosthodontics with chief complaint of impaired speech and mastication. Patient gave history of tobacco usage for 18-20 years. Clinical examination of the patient revealed thick non-resilient buccal mucosa due to scar formation and obliterated buccal and lingual vestibule as a result of absence of alveolar ridge on left side. Mouth opening was limited to 20 mm and severe mandibular deviation of about 4-5 cm to left side was noticed (*Fig. 1&2*). Patient was unable to position her mandible to right side due to unopposed muscle pull and complained about TMJ pain on right side due to abnormal condyle to fossa relation.

Intermaxillary fixation was done when the patient first reported to the department, for 7 days, to overcome the resistance in moving mandible which was stabilized in an abnormal condyle to fossa relation on right side. A mandibular guide flange prosthesis was planned to achieve proper occlusion and TMJ relation on the non-resected side of mandible. The guide flange was planned on maxillary arch since the patient herself could not move her mandible to right side and this guide flange itself has an ability of guiding the patient to normal occlusion without tiresome effort.

The impression of maxillary arch was made with irreversible hydrocolloid impression material (Algitex, DPI, India) using maxillary dentulous perforated metal stock tray and mandibular impression was made with autoclavable plastic sectional impression tray using putty consistency condensation silicone (Speedex, Coltene-waldent, Switzerland). While making sectional impression of mandible extra material was added without tray support to record the obliterated buccal and lingual sulci of resected side. Additional putty material, not merely helped in recording the resected side, but, along with the sectional tray helped in removing the impression in single piece within the limit of available mouth opening and without causing discomfort to the patient.

Impressions were poured with Type III dental stone (Gem stone, Shruti products, India) according to manufacturer's instruction and allowed to set. Casts were retrieved after 1 hour and analysed for any inaccuracies (*Fig. 3*). Guide flange prosthesis was planned on maxillary arch. Self cure polymethyl methacrylate acrylic resin was used to make the denture base for maxillary arch. Hardwax (Plastiwax, Ruthinium group, India) was used to make the guide flange on maxillary denture base. Hardwax was built in an angulation such that it guided patients mandible to normal occlusal position. During try-in stage additional wax was added to the inner side of flange to increase the precision of the mandibular movement.

once the desired result was achieved, wax-up was completed. Also, a single layer of wax was added to the occlusal surface of the un-opposed maxillary posterior teeth on left side, as a precaution to prevent supraeruption of the existing teeth. No supplementary retentive aids were used since the interdental extension of acrylic itself was enough for retaining the prosthesis.

The guide flange prosthesis was processed with heat cure PMMA resin (DPI, Mumbai), finished, polished and delivered to the patient (*Fig. 4*). The patient was able to get her mandible to desired position with adequate occlusal tooth contact of non-resected side without any external guidance (*Fig. 5&6*)

Also, extraction of root stump irt mandibular left lateral incisor was carried out. Patient was given proper instructions regarding maintenance of the prosthesis and mouth exercises to do concurrently while using the prosthesis. Patient was reviewed after 1 week and reported to have better compliance with the prosthesis. Patient also claimed to have improved masticatory efficiency. Further follow-up visits were planned for a better treatment outcome.

INVESTIGATIONS

Orthopantomograph (*Fig. 7*) was taken. It showed abnormal condyle to fossa relation on right side (non-resected side) due to unopposed muscle pull and a root stump was found irt left mandibular lateral incisor which was later extracted.

FOLLOW-UP

On a follow-up visit after 1 week patient reported with improved masticatory efficiency reduced TMJ discomfort and facial profile.

After 1 month follow-up, the patient could guide her non-resected side of mandible to normal occlusal relation and she was able to guide her mandible half-way to normal occlusion without the prosthesis which was earlier unattainable. Patient also reported with further improvement in masticatory efficiency.



Figure 1 and 2: Pre-Operative Intraoral and Extraoral Pictures.



Figure 3: Master Cast



Figure 4: Guide Flange Prosthesis



Figure 5 and 6: Post-Operative Intraoral and Extraoral Pictures.



Figure 7: OPG.

DISCUSSION

Loss of mandibular continuity causes deviation of remaining mandibular segment toward the defect and rotation of the mandibular occlusal plane inferiorly.^[5-7] The usual result of the mandibular resection with disarticulation is a shift of the residual fragment to the resected side. This mandibular shift is due to the uncompensated influence of the contra-lateral musculature, particularly the internal pterygoid muscle.^[8] If this influence is left uncompensated, the contraction of the cicatricial tissue on the operated side will fix the residual fragment in its deviated position. This situation leads to facial deformity and functional loss.^[5] Immediate post surgical management of hemimandibulectomy patients includes inter-maxillary fixation and exercise of jaws to loosen contracture caused by scars, to achieve better temporomandibular joint position thereby reducing trismus and to improve maxillomandibular relation. During the initial healing period early prosthodontic management with guidance therapy can be done using mandibular guide flange prosthesis and maxillary stabilization appliance which aid in reducing mandibular deviation, preventing extrusion of unopposed tooth and improving the masticatory efficiency.

The factors that have to be considered while giving a guidance therapy are (1) timing of rehabilitation – the results are better if the guidance therapy is initiated at an early stage, (2) whether the guidance therapy should be given for the maxilla or mandible – accordingly a guidance ramp or flange is to be given respectively, (3) it is only an interim treatment to correct the deviation as much as possible, and occlusion is the primary determinant.^[9]

In the present case mandibular guidance was achieved using a guide flange prosthesis fabricated on maxillary arch. Mandibular deviation was corrected to almost 4-5 cm. The guiding flange was planned on maxillary arch because patient was unable to shift her lower jaw atleast for 2mm by herself which was required to plan for a mandibular prosthesis. Whereas guidance flange on maxillary arch guides the patient to proper occlusion on non-resected side. We were unable to rehabilitate the resected mandibular segment due to already formed scar tissue which caused severe contracture of musculature on buccal mucosa of same side.

Physiotherapy and exercise modules were advised for the patient to improve the resiliency of the tissue to plan for a definitive treatment later. As a precaution to prevent the supraeruption of opposing teeth on resected side of mandible, an acrylic plate of 1 mm was included with the prosthesis. The most alluring feature of this prosthesis is that no extra retentive aids were used, this prevented any possible patient discomfort, also, removal and placement of the prosthesis was made easy.

Mandibular guidance therapy in hemimandibulectomy patients would help to establish an acceptable occlusion by re-educating the muscles and thus normal occlusion and mastication can be achieved. Frequent follow-up visits are mandatory in this case to monitor the improvement in normal function and occlusion. This should continue till the patient attains proper occlusion without guidance. Once it is accomplished a definitive removable or fixed treatment could be planned.

SUMMARY

Rehabilitation of patient with acquired mandibular defects are integral part of treatment planning because the potential psychologic and physiologic outcome can be more annoying. The rehabilitation should be planned before any resection so that both the patient and prosthodontist will be well aware of the cosmetic and functional aspects of treatment outcome. If planning for fixed rehabilitation, mandibular reconstruction with osseointegrated implants should be done at the same time of surgical resection of mandible and if removable rehabilitation is considered, mandibular guidance prosthesis should be fabricated as early as one week post-surgery, to reduce deviation and can be used upto one year depending upon its severity. Guide flange on maxillary arch is indicated when extent of derangement prevents the residual mandibular segment to be manipulated into acceptable occlusal contact.

CONFLICT OF INTEREST: None declared.

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