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Guide the mandible back home, Mandibular guide flange: A case report

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Abstract

Introduction: Guide flanges are essential in prosthodontics, particularly for patients with significant maxillofacial defects resulting from surgery, trauma, or congenital conditions. This case report presents the rehabilitation of a patient with a mandibular resection defect using a guide flange prosthesis. The patient, a 42-year-old male, underwent a partial mandibulectomy due to squamous cell carcinoma, resulting in a deviation of the mandible and significant functional impairments in mastication and speech. A comprehensive treatment plan was devised, focusing on the fabrication of a guide flange prosthesis to re-establish mandibular guidance and improve occlusal function. The process involved meticulous planning, impression-taking, and the fabrication of a custom acrylic flange prosthesis. The patient underwent several fitting and adjustment sessions to ensure optimal fit and function. Post-treatment evaluation revealed substantial improvements in the patient's mandibular movement, masticatory efficiency, and overall quality of life. The guide flange prosthesis effectively minimized the deviation of the mandible,

enabling better alignment during occlusion. This case underscores the importance of personalized prosthetic solutions in managing complex maxillofacial defects and highlights the significant role of guide flange prostheses in restoring functionality and enhancing patient outcomes.

Keywords: guide flange prosthesis, mandibular resection, maxillofacial defects, occlusal function, mandibular deviation.

Introduction

Oral cancer is the eighth most prevalent carcinoma globally, damaging tissue and necessitating resection of the mandible, maxilla, mouth floor, and tongue, which can negatively impact a person's mental health.[1] Surgical excision of a segment or loss of mandible continuity can damage the majority of the masticatory structures. Reconstruction of mandibular continuity using a bone graft or metal plates at the time of surgery can resolve most of the patient's problems. If left unsolved, however, the deviation will cause loss of occlusion on the non-resected side and an anterior open bite that can affect the patient's speech, swallowing, control of salivary secretions, and esthetic.[2]

Patients lose their proprioceptive feeling of occlusion and the mastication muscles on the surgical site, resulting in significant rotation of the mandible upon closure. The jaw deviates towards the surgical site after the infected site is resected.[1]As a result, employing palatal or mandibular-based guidance, such patients can get prosthetic rehabilitation to attain adequate occlusal function. This case report describes prosthodontic management of a patient who has undergone a hemimandibulectomy and hemimaxillectomy and was rehabilitated using guide flange prosthesis to fulfill the patient's needs and requirements.

Case History Presentation-

A 42-year-old male patient was referred to the department of prosthodontics for rehabilitation following hemimandibulectomy of the right side. A detailed case history revealed that the patient was diagnosed with oral squamous cell carcinoma and underwent surgery 4months back followed by chemotherapy and radiotherapy. Extraoral examination showed facial asymmetry with severe mandibular deviation to the right side and a lack of proper occlusal contact between maxillary and mandibular teeth.[Fig 1]

A plastic sectional stock dentulous tray and elastomeric impression material (Zhermack; Zetaplus Putty Impression Material) were used to record the preliminary impression of the maxillary and mandibular arch [Fig2]. The impressions were poured with Type III gypsum material (Kalstone; Kalabhai Karson, Mumbai, India) and casts were retrieved.

A 21 gauge hard, round, stainless steel orthodontic wire was manipulated (as shown in [Fig 3] to fabricate a substructure. The vestibular (buccal and lingual) flanges and the mandibular guide flange were waxed-up with modeling wax (Modeling wax; Deepti Dental Products, Ratnagiri, India) around the wire substructure.[Fig 4]

Followed by acrylization into heat-polymerized clear acrylic resin (DPI Heat cure clear; Dental products of India) to make the guide flange prosthesis. [Fig 5]

Fig 1: Intraoral view

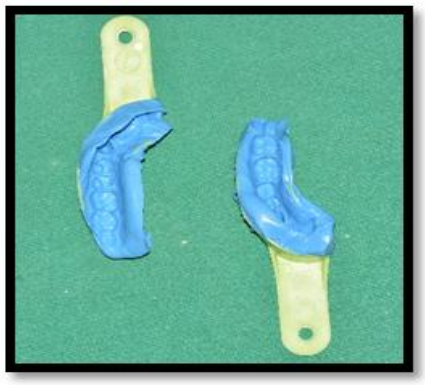

Fig 2: Maxillary & Mandibular preliminary impression

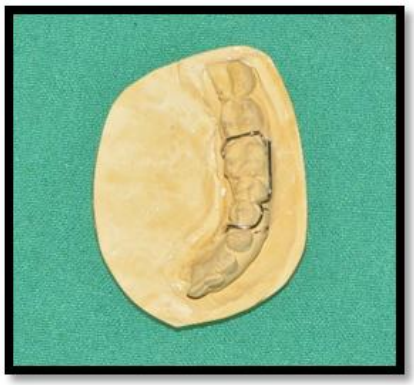

Fig 3: Wire substructure

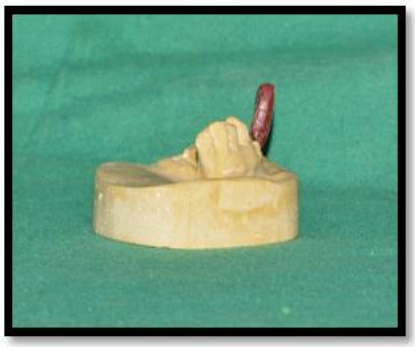

Fig 4: Wax up model

Fig 5: Heat cured GFP

Fig 6: GFP in place

The GFP was tried in patient's mouth and the initial stability and retention was checked. The inclination of the guide-flange was adjusted by selectively trimming the teeth-contacting surface.

Thus the smooth gliding flange surface was developed intraorally to guide the mandible to a definite closing point (rather than the area) in occlusion. Care should be taken to preserve the buccal-surface indentations of the opposing maxillary teeth which were guiding the mandible in a final definite closing point during mastication. The flange height was adjusted in such a way that it guided the mandible from a large opening position (in practical limits of the height of the buccal vestibule) to the maximum intercuspation in a smooth and unhindered path. The prosthesis was delivered and post-insertioninstructions were given. [Fig 6]

Discussion

Loss of mandibular continuity results in deviation of the remaining mandibular segment towards the resected side primarily because of the loss of tissue involved in the surgical resection.[3]It primarily depends on the location and extent of the tumor in the mandible, various surgical treatment modalities like marginal, segmental, hemi, subtotal, or total mandibulectomy can be performed.[4] When a segment of the mandible is removed, immediate reconstruction is usually recommended to improve both facial symmetry and masticatory function. Although

techniques for reconstructive surgery and prosthodontic rehabilitation have advanced, more than 50% of reconstructed head and neck cancer patients still report impaired masticatory function. Recent advancements in facial reconstructive surgery and osseointegrated dental implants provide a treatment modality that may adequately rehabilitate oral cancer patients so that they can return to a healthy, productive life. Though osseointegrated dental implants are the final solution for replacing the missing teeth for reconstructed mandibulectomy patients, the clinicians must wait for extensive period of time (more than a year) for completion of healing and acceptance of the osseous graft. During this initial healing period early prosthodontic intervention by mandibular guide flange and maxillary stabilization prosthesis serve the purpose of reducing the mandibular deviation, preventing extrusion of the maxillary teeth, and improving the masticatory efficiency.[4]

The patient presented in this article was a male who was very concern with the masticatory efficiency conscious. Our principal aim was to guide the mandible back to restore the masticatory efficiency during mandibular movements. The flange of GFP was localized to three teeth (two premolars and a first molar) to avoid possible dislodging forces in the anterior lingual sulcus area and to minimize the display. Though the lingual flange of the GFP was short in length, it was sufficient to stabilize the GFP (in this particular patient) as the deviation force was lesser than the stability of the GFP. Support for the GFP is no different from that of any other removable prosthesis, the natural teeth and the residual alveolar ridge being the primary sources. In the presented case retentive components were modified and incorporated into the prosthesis as a wire substructure.

The GFP can be regarded as a training type of prosthesis. If the patient can successfully repeat the mediolateral position, the GFP can often be discontinued. Some patient, however, may continue indefinitely with a guide flange, and the stress generated to the remaining teeth must then be carefully monitored.

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