



## Prosthodontics

## A SINGLE PROSTHESIS TO REHABILITATE A PATIENT WITH MAXILLARY AND MANDIBULAR DEFECT: A CLINICAL REPORT

<b>Dr. Ankita Agrawal</b>	Senior Resident, Department Of Prosthodontics and Crown & Bridge, S. C. B. Dental College and Hospital, Cuttack, Odisha
<b>Dr. Tapan Kumar Patro*</b>	Head of Department, Department Of Prosthodontics and Crown & Bridge, S. C. B. Dental College and Hospital, Cuttack, Odisha *Corresponding Author
<b>Dr. Angurbala Dhal</b>	Associate Professor, Department Of Prosthodontics and Crown & Bridge, S. C. B. Dental College and Hospital, Cuttack, Odisha
<b>Dr. Lokanath Garhnayak</b>	Associate Professor, Department Of Prosthodontics and Crown & Bridge, S. C. B. Dental College and Hospital, Cuttack, Odisha

**ABSTRACT** Patients with head and neck cancers should be managed in a multidisciplinary team approach for an overall treatment success. The quality of life of these patients is affected both functionally and cosmetically after surgery. Role of maxillofacial prosthodontist is to rehabilitate such patients with a fixed or removable prosthesis which will assist them in mastication, swallowing, speech and will also restore the aesthetics. This clinical report describes the fabrication of a single removable maxillary prosthesis with an obturator plate and a palatal guide flange for a patient with both maxillary and mandibular defect.

**Summary:** A single palatal flange prosthesis will assist the patient in speech, mastication and will also improve his social appearance.

**KEYWORDS :** Maxillary defects, mandibular defects, prosthodontic rehabilitation, obturator, guide flange prosthesis

### Introduction

Oral cancer is the eighth most common carcinoma worldwide and it ranks among the top three types of cancer in India. At times they are diagnosed at later stages which result in low treatment outcomes and considerable costs to the patients.<sup>1,2</sup> Surgical resection of tumor often includes a partial maxillary or mandibular resection, a partial glossectomy, a partial resection of the floor of the mouth, and a radical neck dissection. The extent of surgery and the effects of radiation therapy and chemotherapy determine the range of rehabilitation needed for a given patient.<sup>3</sup>

Patients with maxillary defect except with small oro-antral and oronasal defects, which may be amenable to surgical closure, are rehabilitated by prosthodontic means.<sup>4,5</sup> The treatment options are a surgical obturator just after surgery followed by an interim obturator during healing and finally a definitive obturator after total healing.<sup>6</sup> The obturator must seal the defect so that there is no escape of air, fluid and food through oral nasal and orbital cavities.

In patients who have undergone mandibular resection, the remaining mandibular segment will retrude and deviate towards the surgical side, at the vertical dimension of rest. Upon opening the mouth, this deviation increases, leading to angular opening and closing pathway.<sup>7</sup> This is due to the resection of the muscles of mastication on the surgical side. There is also loss of occlusal harmony.<sup>2</sup> Different authors have suggested different techniques for reducing mandibular deviation such as inter maxillary fixation at time of surgery, intense physiotherapy to minimize deviation or by giving a Mandibular Guidance Prosthesis.<sup>2,7,8,9,10</sup>

The literature shows varying designs of obturator prostheses and mandibular guidance appliance for management of maxillary and mandibular defects respectively. But very less number of cases have been reported who are restored with a single prosthesis for a dual cause, restoring both the defects.

### Case Report

A 45 year old male patient with the chief complains of difficulty in eating and swallowing was referred by Acharya Harihar Regional Cancer Institute, Cuttack, Odisha to the Department of Prosthodontics and Crown & Bridge, SCB Dental College and Hospital. He had a unilateral discontinuity mandibular defect on the left side due to surgery for a moderately differentiated SCC of left alveolus for last 1 year. No intermaxillary fixation was applied at the time of surgery. The defect was restored with Pectoralis Major Myocutaneous Flap (PMMF) later. The patient also underwent a surgery for SCC of maxillary left alveolus a month before reporting. The surgery left a

large oval shaped maxillary defect. Radiotherapy was planned for the patient following surgery.

Extra oral examination showed facial asymmetry with mandibular deviation to the left side. The mouth opening of the patient was 15 mm (Figure 1). The patient had competent lips. Intraoral examination revealed a left side maxillary defect (Aramany's class II defect)<sup>11</sup> measuring 3 cm anteroposteriorly and 4 cm mediolaterally crossing the midline posteriorly (Figure 2). There was also non coinciding maxillary and mandibular dental midline due to mandibular deviation (Figure 3). The defect area was not completely healed, and anticipating the decrease in size of the defect following radiotherapy due to contracture of the tissues, an interim prosthesis was planned for the patient.

The mandibular defect was classified as Cantor and Curtis class II defect.<sup>12</sup> The vestibular depth was obliterated on the left side. The patient was evaluated for the fabrication of a guide flange prosthesis. It was noted that the patient's mandible could be manually placed into centric occlusion without excessive force. Owing to the restricted mouth opening, a decision was made to fabricate a single palatal prosthesis serving the functions of an obturator and also of a mandibular guidance prosthesis.

Maxillary and mandibular arch impressions were made by using irreversible hydrocolloid (Plastalgin, Septodont Healthcare India Pvt. Ltd Raigad, India). Definitive casts were poured with Type III dental stone (BNSTONE, B N Chemicals, Kolkata, India). A maxillomandibular jaw relation record was made by manually assisting the mandible into the centric occlusion position. Maxillary and mandibular cast was mounted on a semadjustable articulator (Figures 4). Retentive wire components (Labial bow, C-clasp on 1<sup>st</sup> premolar and adams clasp on 1<sup>st</sup> molar) were fabricated over the cast. Wire components were secured in place with sticky wax and separating medium was applied over the cast.

The obturator part or the maxillary plate was fabricated with autopolymerizing clear acrylic resin (DPI-RR Cold Cure, Dental Products of India, The Bombay Burmah Trading Corporation Ltd, Mumbai, India). The design included palatal guidance flange on the nondefect side. This was made with pink acrylic resin. The flange should extend downward and slight lateral towards the defect side forming a gradual inclined plane. The length of this flange is guided by the amount of mouth opening and the functional vestibular depth (Figures 5a,5b).

The prosthesis was finished, polished, evaluated and inserted intraorally. The inclination of the guide-flange was adjusted by selectively trimming the teeth-contacting surface or adding the auto-polymerizing clear acrylic resin. After the modification of flange inclination intraorally, occlusal prematurities were corrected by selective grinding (Figure 6).



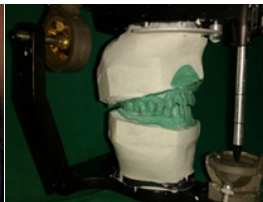
**Figure 1** Frontal view showing limited mouth opening



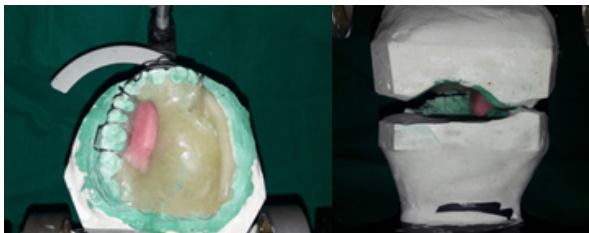
**Figure 2** Intraoral Defect



**Figure 3** Midline shift



**Figure 4** Mounted casts



**Figure 5(a, b)** Prosthesis fabrication over the cast



**Figure 6** Intra oral view after prosthesis insertion

#### Discussion

Surgery, radiation, and chemotherapy are frequent modes of treatment for the management of head and neck tumors. All three modalities of treatment have severe undesired adverse effects causing changes in the oral cavity. Rehabilitation of these patients is an essential phase of cancer care and should be considered from the time of diagnosis for a comprehensive treatment plan.<sup>7</sup>

Resection of any part of the maxilla usually affects speech, mastication, and swallowing because the anatomical defect that is created allows the oral cavity, maxillary sinus nasal cavity, nasopharynx to be one confluent chamber.<sup>3</sup> In addition, if the anterior maxilla is involved, the loss of the supporting structures of the lip and nose may adversely affect the patient's appearance. Functional difficulties after maxillectomy are directly related to the size and the location of the defect.<sup>4</sup>

Contrary to maxilla, which remains stable even if it is partially resected, the mandible is a dynamic structure and this has to be considered when planning for prosthetic treatment.<sup>4</sup> Discontinuity defects of the mandible causes deviation of remaining mandibular segments towards the defect side and rotation of the mandibular occlusal plane inferiorly. Mandibular deviation toward the defect side occurs primarily because of the loss of tissue involved in the surgical resection.<sup>3</sup> During the initial healing period early prosthodontic intervention by mandibular guide flange prosthesis serve the purpose of reducing mandibular deviation and facial disfigurement post

surgery. It also helps in restoring the occlusion and improving the masticatory efficiency.<sup>8</sup> The objective of these exercise programs is to reprogram the remaining musculature and improve the maxillo-mandibular jaw relationship, reduce the scar contracture and decrease trismus.<sup>11</sup>

As the prosthesis was to be used for short interval of time for reasons of esthetics, mastication, occlusal support, or to condition the patient for a more definitive prosthesis an interim prosthesis was selected for this patient.<sup>11</sup>

Obliteration of the buccal vestibule on the mandibular left side following surgery made impression making difficult. Recording the functional vestibular depth is important for fabricating a stable prosthesis. So decision was made to fabricate a single maxillary prosthesis with obturator plate and palatal flange prosthesis to seal the defect and guide the mandible into centric occlusion.

The technique is proposed only when the remaining teeth are periodontally sound enough to bear the angular pull of muscles and masticatory forces. After the placement of the prosthesis the patient must be evaluated for any strain or pain in the temporomandibular joints and muscles, hypernasalness of voice and esthetics. The patient is recalled after 6, 12, and 28 days to evaluate the efficacy of the guide flange appliance.<sup>3</sup> On follow up visits, mandibular deviation was significantly reduced and patient expressed his satisfaction in mastication, speech, swallowing and esthetics. Instructions on oral hygiene maintenance should be reinforced in each follow up visits.

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