

Oral Rehabilitation of Segmental Mandibulectomy with Extensive Fibrosis- A Daunting Obstacle for the Maxillofacial Prosthodontist

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ABSTRACT

The fifth most frequent malignancy worldwide is head and neck cancer. Following surgical removal of lesions of the oral cavity, mandibular resection can result in undesirable effects, such as altered mandibular movements, disfigurement, dysphagia, impaired speech, and deviation of the mandible in the direction of the resected site. After a marginal or segmental mandibulectomy, prompt rehabilitation is preferred since aesthetic and functional deficiencies impair a patient's quality of life. The contribution of maxillofacial prosthodontists safeguards the prosthetic viability, driven by a prosthetic proposed plan. Maxillofacial prosthodontists should be included from the start, and they play a crucial and directing role in this procedure. The present case report specifies the treatment of a 52-year-old male patient with extensive fibrosis who had a reduced mouth opening as a result of right-side segmental mandibulectomy. The mandible was difficult to manipulate into occlusion due to considerable fibrosis that had formed over time, thus a guiding flange prosthesis was not employed in the present case. To address the patient's inability to chew food, a double occlusion table was designed using the remaining maxillary teeth. A 3-month follow-up was performed, as well as the Oral Health Impact Profile-14 (OHIP-14) was done prior to and following the treatment.

Keywords: Dental prosthesis design, Head and neck oncology, Mandibular defects, Maxillofacial prosthesis, Oral health-related quality of life

CASE REPORT

A 52-year-old male patient reported to the Department of Prosthodontics, Crown and Bridges with the chief complaint of inability to chew food since four years. The patient's prior interventional history reveals that mandibulectomy was done following squamous cell carcinoma of the right buccal mucosa and alveolus five years ago. Following surgical intervention, the patient did not receive any prosthodontic rehabilitative care. Patient gave history of radiotherapy three and half years ago.

A clinical examination revealed the right mandibular portion missing and extraoral facial asymmetry. Deviation of the mandible was towards the right side [Table/Fig-1a-c]. Orthopantomography was used for diagnostic imaging, this illustrated that the right mandibular body was absent, and teeth present were 21-28, 33-37, 42-43 [Table/Fig-2]. Due to the sharp pain of varying intensity, the patient endured extraction of 21,22,42,43,44 by a nearby dentist. On intraoral examination, drooling of saliva and a restricted mouth opening of 3.5 cm was observed [Table/Fig-3a-c].

Postsurgical rehabilitation was not received by the patient, this resulted in the ramus segment migrating superiorly and medially and fibrosing, with limited mouth opening, making impressions a



[Table/Fig-1]: a-c) Preprosthetic treatment extraoral photographs.



[Table/Fig-2]: Preoperative orthopantomogram.



[Table/Fig-3]: (a-c) Intraoral photographs of the patient showing drooling of saliva and restricted mouth opening.

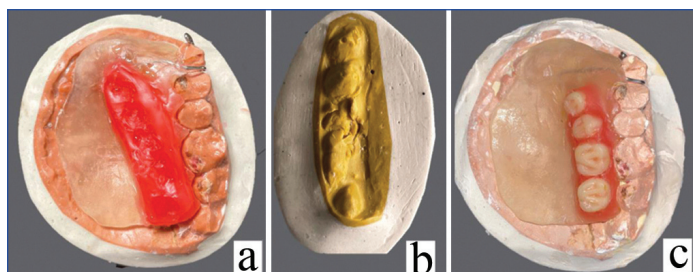
difficult process, and hampered the treatment prognosis. No details of the surgical procedure were available with the patient.

A guide flange prosthesis was not used in this particular case because the mandible was difficult to manipulate into occlusion due to extensive fibrosis that had developed over time. To resolve the patient's inability to chew food, a double occlusion table was designed with the help of the remaining maxillary teeth.

A stock tray was used to make an impression using irreversible hydrocolloid impression material (Tropicalgin Zhermack alginate powder) which was then followed by the fabrication of a custom tray using tray compound, a wash impression using vinyl poly siloxane impression material light body (Express 3M ESPE) was

made. A palatal plate made of chemically-cured polymethyl methacrylate (DPI, Mumbai) was used to record the Functionally Generated Pathway (FGP) [1]. The patient was instructed to close into centric occlusion. Modelling wax (Prevest Denpro) was used to record indentations made by the patient's mandibular teeth [Table/Fig-4a]. The patient was then instructed to open the jaws and try to move it laterally as much as possible, due to the restricted movement of jaw only about 2-3 mm of lateral movement were recorded. Before going in for definitive records, this was repeated. Cast was poured using dental stone (Kalabhai, Mumbai) by the indentations produced in wax [Table/Fig-4b]. Casts were mounted on 3-point mean value articulator and a row of semi-anatomic maxillary posterior teeth on the untreated side of the maxillary denture was arranged [Table/Fig-4c]. After trial, it was processed using chemically-cured polymethylmethacrylate and insertion was done. No treatment was done on untreated side due to restriction in mouth opening [Table/Fig-5a].

At the follow-up after three months the patient reported improvement in chewing efficiency and overall satisfactory experience [Table/Fig-5b,c]. The pre and post-treatment responses to OHIP-14 [2] were recorded [Table/Fig-6].



[Table/Fig-4]: a) Functionally Generated Pathway (FGP) registration using modelling wax; b) model fabricated in dental stone using the FGP; c) semi-anatomical teeth arrangement done on the palatal aspect.



[Table/Fig-5]: a) Postprosthetic rehabilitation shows the achieved intercuspation; b,c) Postoperative extraoral photographs at three months follow-up.

DISCUSSION

Mandibular continuity defects may result from the removal of benign or malignant tumours infections, or trauma [3]. The fifth most frequent malignancy worldwide is head and neck cancer [4]. Following surgical removal of lesions of the oral cavity, mandibular resection can result in undesirable effects, such as altered mandibular movements, disfigurement, dysphagia, impaired speech and articulation, and deviation of the mandible in the direction of the resected site [5]. Loss of continuity results in rotation of the mandibular occlusal plane downward and deflection of the remaining segment(s) toward the defect. Because of the muscular imbalance caused by the unilateral muscle removal, the maxillomandibular relation is changed, resulting in fewer tooth-to-tooth contacts after a segmental mandibulectomy procedure [5,6]. After a marginal or segmental mandibulectomy, prompt rehabilitation is preferred since aesthetic and functional deficiencies might impair a patient's quality of life [7].

For mandibular reconstruction, free bone grafts, vascularised flaps, alloplastic implants can all be used in conjunction with soft-tissue-free flaps [5]. This report describes the fabrication of a maxillary occlusal table prosthesis for the management of postsurgical malocclusion in the case of limited mouth opening in a mandibulectomy patient without reconstruction.

Dimensions	Question	Pretreatment response	Post-treatment response
Domain 1: Functional Limitation	Have you had trouble pronouncing any words because of problems with your teeth, mouth, or dentures?	4	2
	Have you felt that your sense of taste has worsened because of problems with your teeth, mouth, or dentures?	4	1
Domain 2: Physical pain	Have you had painful aching in your mouth?	3	0
	Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth, or dentures?	4	1
Domain 3: Psychological discomfort	Have you been self-conscious because of your teeth, mouth, or dentures?	3	1
	Have you felt tense because of problems with your teeth, mouth, or dentures?	4	2
Domain 4: Physical disability	Has your diet been unsatisfactory because of problems with your teeth, mouth, or dentures?	4	2
	Have you had to interrupt meals because of problems with your teeth, mouth, or dentures?	4	1
Domain 5: Psychological disability	Have you found it difficult to relax because of problems with your teeth, mouth, or dentures?	4	2
	Have you been a bit embarrassed because of problems with your teeth, mouth, or dentures?	4	1
Domain 6: Social disability	Have you been a bit irritable with other people because of problems with your teeth, mouth, or dentures?	3	1
	Have you had difficulty doing your usual jobs because of problems with your teeth, mouth, denture?	3	1
Domain 7: Handicap	Have you felt that life in general was less satisfying because of problems with your teeth, mouth, dentures?	4	1
	Have you been totally unable to function because of problems with your teeth, mouth, dentures?	4	2

[Table/Fig-6]: Oral Health Impact Profile-14 (OHIP-14). Pretreatment and three months post-treatment patient.

*The responses were recorded on a 5-point Likert scale (0-never; 1-hardly ever, 2- occasionally, 3- fairly often, and 4- very often)

Different surgical treatment approaches, such as a marginal, segmental, hemi, subtotal, or total mandibulectomy, are used, depending on the location and size of the tumour in the mandible [8]. Immediate reconstruction is generally advised following the removal of a mandibular segment in order to enhance facial symmetry and masticatory function. More than 50% of patients with reconstructed head and neck cancer still reported experiencing impaired mastication, despite recent advances in reconstructive surgery and prosthodontic rehabilitation procedures [8]. Re-educating muscles to establish a desirable occlusal relationship is the fundamental goal of rehabilitation. Depending on the type and extent of the mandibular deficiencies, a number of different, such as implant-supported prostheses or guide flange prostheses have been recommended for the correction of mandibular deviation. Korlakunte PR et al., corrected the mandibular deviation, and restored the maxillomandibular relationship by a functional training device called a maxillary guided hollow inclined plane with twin occlusion acrylic prosthesis was designed [9]. Agarwal S et al., fabricated a maxillary removable partial prosthesis with two rows of teeth-twinning occlusion on the unresected side in the maxillary edentulous arch [10].

In the present case, the patient reported at a quite later stage and due to extensive fibrosis, the mediolateral movement of the mandible was not possible. Due to this, the occlusal relationship

of the teeth was not maintained and hence the inability to chew was encountered. The addition of teeth on the palatal aspect of the unaffected maxillary arch gave a broad occlusal table by means of which the remaining mandibular natural teeth could occlude and improve masticatory ability and with the help of FGP harmonisation of occlusion with minimal interferences was seen. Because of the patients limited mouth opening and movement of the mandible, the present prosthesis relied on the FGP technique using patients own functional jaw movements to create an antagonistic cast. It should be brought to notice that correct surgical techniques and early prosthetic intervention would help the maxillofacial prosthodontist enhance the quality of life through effective rehabilitation [11].

The maxillofacial prosthodontist is involved in pretreatment dental and oral rehabilitation screenings, as well as preradiation dental screenings which, includes oral hygiene, location of the suspected or confirmed tumour, the extent of acquired resection for clean margins, potential reconstruction types, the requirement for chemo or radiation therapy, and potential dental and/or prosthetic options, should all be taken into consideration while creating this plan.

The contribution of maxillofacial prosthodontists safeguards the prosthetic viability, driven by a prosthetic proposed plan, and covers the potential requirement for implant insertion or the required denture-bearing area [12]. With the advent of 3D printing, computer-aided design has become a valuable tool for the surgical team and supports collaboration in choosing the best alternative for reconstruction following oncology therapy.

Maxillofacial prosthodontists should be included from the start, and they play a crucial and directing role in this procedure. Timing and success of prosthetic intraoral rehabilitation depend on multidisciplinary presurgical planning and postsurgical prosthesis planning and successfully restoring the patient's well-being.

CONCLUSION(S)

The involvement of the maxillofacial prosthodontist in treatment planning is crucial for the timing and success of prosthetic

intraoral rehabilitation. Maximising dental rehabilitation dramatically enhances oral health-related quality of life, oral diet success, and oral functioning.

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