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CASE REPORT

Modified Maxillary Palatal Ramp Prosthesis to Guide Mandibular Deviation Following Segmental Mandibulectomy for Squamous Cell Carcinoma

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ABSTRACT

Benign or malignant tumor is one of the frequent causes of resection of the mandible. The extent and location of the tumor decides the mode of treatment of the neoplastic lesion. Surgical removal of oral neoplasm leads to an extensive resection of the mandible along with the associated structures. **Objective:** This case report describes the use of palatal ramp prosthesis to guide the mandible during movements and restore a stable occlusal relationship with an additional acrylic buccal pad to achieve partial esthetics. **Case Report:** A 30-years-old female patient reported with the inability to chew food following the mandibular resection of the left side. History of the patient revealed left side segmental mandibulectomy following surgery for squamous cell carcinoma of mandible. This case report describes the use of palatal ramp prosthesis to guide the mandibular deviation. **Conclusion:** The clinician must keep in mind the prosthetic intervention until and unless the reconstruction of the defect is planned. The rehabilitation of the defect should be done as soon as possible to prevent the mandibular deviation.

Key words: mandibular deviation, mandibular guidance, maxillary palatal ramp prosthesis, segmental mandibulectomy

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INTRODUCTION

Surgical resection of a neoplastic lesion depends on the extent and location of the tumor. Neoplasms associated with the jaw often require removal of the neoplastic lesion along with extensive resection of the mandible to reduce the possibility of recurrence of the lesion.^{1,2} Surgical resection of the mandible along with the muscles involved in the lesion can lead to various complications, including facial disfigurement, difficulty in swallowing, malocclusion, altered mandibular movements, impaired speech and articulation, and deviation of the mandible toward the defect site. Mandibular deviation follows as a result of the loss of continuity of the mandible.^{3,4}

Resection of the mandible leads to loss of the proprioception impulses of the affected region, which, in turn, results in abnormal mandibular movements. The main objective of rehabilitation of the hemimandibulectomy defect is to retrain the muscles to create a stable occlusal relationship. Various treatment

modalities have been devised for obtaining an optimum maxillo-mandibular relationship for re-establishing the path of closure of the deviated mandible in the clinical situation of hemimandibulectomy. These modalities include a widened maxillary occlusal table, vacuum formed PVC splints, intermaxillary fixation, and mandibular-guiding prosthesis. Palatal ramp prosthesis is a mandibular-guiding prosthesis that has been shown to maintain the functional position of the jaws and improve speech and deglutition following surgery or injury to the mandible.^{4,5}

CASE REPORT

A 30-year-old female reported to the Department of Prosthodontics with the chief complaint of inability to chew food and disfigurement of the face following the mandibular resection of the left side of face. Medical history revealed segmental mandibulectomy



Figure 1. Intraoral view showing the deviation of the mandible towards the left side.



Figure 4. Wax-up for the heat cure acrylic resin polymerising material.



Figure 2. Primary impression of the maxillary arch.



Figure 5. Final prosthesis with markings indicating indentations of the opposing cusps of the mandibular teeth.



Figure 3. Adaptation of the clasps on the maxillary cast.



Figure 6. Intraoral view showing intercuspation of teeth on right side following insertion of the prosthesis.

of the left side following surgery for squamous cell carcinoma of the mandible one month previously. Extraoral examination revealed deviation of the mandible toward the left side along with a sunken cheek appearance. Intraoral examination revealed a healed lesion with resection involving the loss of mandibular continuity distal to the canine region along with missing maxillary molars and mandibular posteriors (FDI#26,27,34,35,36,37). The buccal sulcus was almost obliterated by the graft placement following the resection (Figure 1). Assisted closure of the mandible achieved a stable occlusal relationship, so a palatal ramp prosthesis was a better treatment modality. The patient was in great psychological distress due to the disfigurement of her face. So, a cheek plumper retained with a palatal ramp prosthesis for the sunken cheeks was planned for this patient; however, the cheek plumper that was planned was not possible due to the muscle pull and scar contracture, so a thick layer of acrylic was added buccally within the functional limits of the musculature.

Primary impressions of the maxillary and mandibular arch (Figure 2) were made using irreversible hydrocolloid material (Prime Chrome, India), and then the diagnostic casts were obtained. The casts were mounted on the articulator, and a deviation of 6mm was noted. The buccal aspect of the mandibular molars was almost 6mm lingual to the palatal aspect of the maxillary molars. A circumferential clasp and a pinhead clasp were provided for retention, whereas a circumferential clasp with extension was adapted on the buccal surface of the left premolar to reinforce the thick layer of acrylic (Figure 3). A wax pattern was fabricated (Figure 4), and conventional curing using clear heat cure acrylic resin (DPI Heat Cure, India) was performed. The prosthesis was inserted and verified for retention and stability. Then, to act as a guide plane, autopolymerising acrylic resin (DPI RR Cold Cure, India) was added palatally to the maxillary teeth opposing the non-resected site of the mandible (Figure 5). The ramp or guide plane directs the mandibular teeth into the maximum intercuspal position possible upon closure, thus ensuring that the patient can consistently achieve closure in their intercuspal position (Figure 6). The polished prosthesis was then inserted, and instructions regarding the maintenance of the prosthesis were given to the patient. With the thick layer of acrylic added with the palatal ramp prosthesis, partial cheek support was possible. To provide continuous motivation and counselling, regular follow-ups were carried out. A 6-week follow-up revealed satisfactory occlusion without the guiding prosthesis. The patient felt uplifted and was satisfied with the outcome of the treatment.

DISCUSSION

The location and extent of the resection, the quantity of soft tissue and innervations involved, and the presence of remaining natural teeth are a few factors that determine the extent of the deviation of the mandible. Loss of continuity of the mandible results in downward rotation of the mandibular occlusal plane and deflection of the unaffected segment toward the defect site. The masticatory function is impaired due to the uncompensated influence of contralateral musculature, the pull of the contraction of cicatricial tissue on the resected side, the altered maxillomandibular relationship, and fewer tooth-to-tooth interactions.⁵⁻⁷ This therapy is most successful in patients for whom the resection involves only bony structures, with minimal sacrifice of the tongue, floor of the mouth, and adjacent soft tissues. In the present case, as the resected site had already healed, unassisted closure of the mandible was not possible. Guidance therapy is recommended in such clinical situations. Both the guiding flange prosthesis and maxillary ramp prosthesis are used for guidance therapy in hemimandibulectomy patients. However, when the deviation of mandible is higher, the palatal ramp prosthesis is preferred over the guiding flange prosthesis.²

The deviation of the mandible is corrected by the angulation of the ramp, which provides the path of guidance during closure. During closure of the prosthesis, the remaining natural teeth of the resected mandible make their initial contact with the palatal ramp prosthesis at its highest point (usually the canines). Further, the mandibular teeth continue to glide down the slope of the ramp to establish a stable occlusion with the maxillary teeth on the unaffected side.⁸⁻¹⁰

Cheek plumper is an excellent modality for accommodating sunken cheek appearance; however, due to the functional constraints and the scar contracture, this modality was not possible and so an additional thick layer of acrylic was used to provide partial esthetics to the patient. Although only partial esthetics were achieved, this had a huge positive impact on the psychological status of the patient. In such patients, obliteration of the sulcus depth makes it difficult to employ a prosthesis to meet both the patient's functional and esthetic needs.^{3,11,12} Sulcus deepening with an immediate prosthesis is highly recommended in these situations to provide better functional and cosmetic results. It is highly advised to immediately reconstruct the mandible following resection in order to enhance the mastication and symmetry of the face.^{13,14}

CONCLUSION

Palatal ramp prosthesis described here is an effective and economic treatment modality to treat the mandibular deviation in such patients. Both the functional and esthetic needs of the patient should be considered to provide the best possible outcome.

CONFLICT OF INTEREST

None declared.

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