Guiding Flange Prosthesis for a patient with mandibular deviation following Hemimandibulectomy defect: A Case Report

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Abstract: Mandibular deviation occurs due to loss of mandibular bone continuity in consequence of surgical resection treatment and related altered muscle function. It results in facial asymmetry and malocclusion. A Patient who had undergone hemimandibulectomy of right side leading to mandibular deviation, was given a Guiding flange prosthesis for correction of deviated mandible.

Result obtained have been encouraging.

The prosthodontic management of acquired mandibular defects following the surgical treatment of malignant tumors associated with the tongue, mandible, floor of the mouth, oral vestibule etc. is a challenging and difficult task for the prosthodontist and it might lead to disabilities such as impairment of speech, difficulty in swallowing, mandibular deviation, lack of control of salivary secretions and severe cosmetic disfigurement.[1]

Surgical treatment of neoplastic lesion of the oral cavity many times requires resection involving the mandible.[2] Success of the prosthesis is related directly to the amount of remaining bone, soft tissue and also on the number of teeth present.[3]

Mandibular deviation occurs due to loss of mandibular bone continuity in consequence of surgical treatment and related altered muscle function which will result in facial asymmetry and malocclusion. The residual mandible deviates medially and superiorly. The degree of deviation would depend on the location and extension of the resection, and the amount of soft tissue involvement.[4]

Case report

A fifty one year old male reported to Modern Dental College and Research Centre, Indore with chief complaint of loosening of teeth in lower right



Fig.1. Intra oral view showing deviation of mandible.

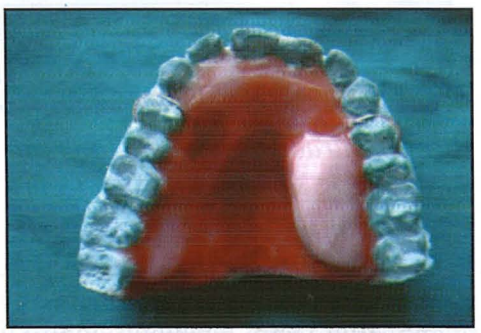


Fig.2. Waxed up prosthesis with palatal ramp.

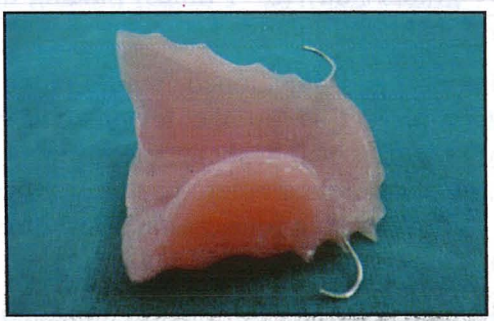


Fig.3. Finished prosthesis with Palatal ramp and retainer.

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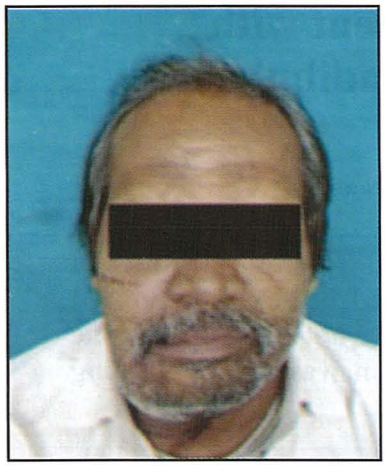


Fig. 4. Extraoral view ithout prosthesis.

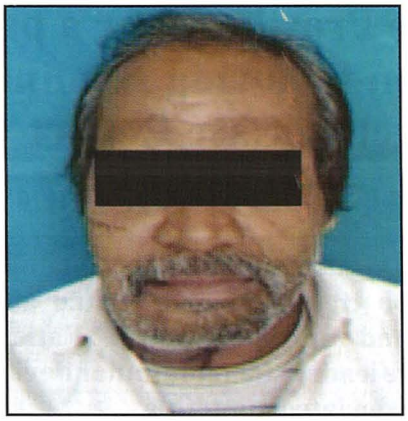


Fig. 5. Extraoral view with prosthesis Mandible is deviated towards defective side.



Fig. 6. Intraoral view of prosthesis.

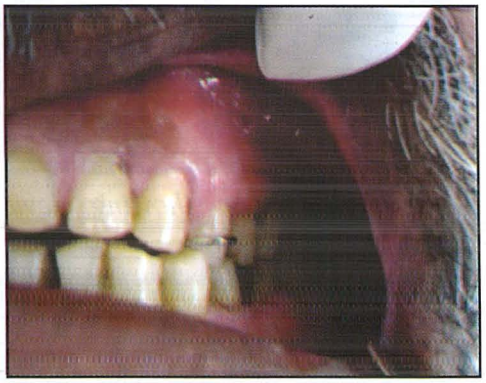


Fig. 7. Intraoral view of palatal ramp Prosthesis with remaining teeth in occlusion.



Fig. 8. Intraoral view of teeth in occlusion with out prosthesis.

posterior region with a history of tobacco chewing since twenty five years, chewing approximately twenty grams / day (3- 4 times) placing quid in lower right buccal sulcus.

Patient had developed white patch with papillary projection on the lower right buccal mucosa roughly oval in shape, measuring 4/ 3 cm in diameter extending antero posteriorly from the right commisure and four cm superiorly from the depth of the lower buccal vestibular gingiva.

Right side overlying mucosa appeared to be rough and raised; surrounding mucosa appeared atrophied. The biopsy of the lesion revealed moderately differentiated squamous cell carcinoma of right gingival buccal sulcus infiltrating in to the right side mandible, gingiva, alveolus and lymph node on right side of neck. Patient underwent commandos operation which include modified radical neck dissection followed by reconstruction with pectoralis major myocutaneous flap.

Patient reported to the department of prosthodontics after three weeks of surgery. Extraoral examination revealed deviation of mandible towards surgical side due to its discontinuity. As a result of mandibular deviation and the pectoralis major myocuteneous flap graft, the patient was unable to occlude with the remaining teeth in proper intercuspation. (Fig.1)

Impressions of maxillary and mandibular arch were made with Irreversible Hydrocolloid and casts were obtained. The twenty one gauge orthodontic wire was used to make a circumferential clasp on first

premolar bilaterally on maxillary cast as a retainer. The autopolymerized resin prosthesis was prepared which was positively engaging all the teeth in maxillary cast. The mandible was manipulated laterally towards the desired position and the occlusal contact with the palatal prosthesis were noted. The prosthesis was removed, a mix of autopolymerizing acrylic resin was prepared, and the resin was added to the prosthesis along the lateral border on the non defect side. The prosthesis was replaced in the mouth and the mandible was manipulated to the desired position, thus establishing an index in the palate. This was repeated several times until the resin begins to polymerize. The prosthesis was then removed to allow for completion of polymerization of acrylic resin. After adjustment and smoothening, prosthesis was reinserted and it was made sure that the patient is able to close into the index, using appropriate manual manipulation of the mandible. Thereafter the prosthesis was removed from patient's mouth followed by waxing (Fig. 2.), flasking, dewaxing and packing with heat cure acrylic resin. The prosthesis was finished and polished (Fig.3) and delivered to the patient. (Fig. 4 & Fig. 5)

Follow up was done in every 15 days. The patient was able to close mouth in proper position after twenty weeks. The guide flange prosthesis is designed to restrict the patient to vertical opening and closing movements into maximum occlusal contacts. This guided function over period of time should promote scar relaxation, allowing the patient to make unassisted masticatory contact. The patient had worn the guiding flange prosthesis for six months and there after he was able to close the teeth in maximum intercuspation without the guiding flange prosthesis.

Discussion

Mandibular resection usually result in disarticulation with shift of residual fragment to the resected side[5]. This is due to the uncompensated influence of the contra lateral musculature. Such a situation results in facial deformity and functional loss. Use of a guide plane provides necessary influence to obtain a normal midline relationship of the residual fragment of the mandible to the maxilla. Once the normal maxillo-mandibular relationship is obtained, a more definitive prosthesis can be constructed. In a discontinuity defect, the movement of the residual mandibular segment is an uncoordinated action dictated by two features unique to the specific defect and the patient.

(1) The remaining unilateral muscular activity that will be specific to the surgical resection and will have a characteristic resting posture to the defect side with a diagonal movement on closure;

(2) The surgical environment will change as healing progresses, and patient's efforts to train movement during this healing period will help to maintain both position and movement range. To facilitate training of the mandibular segment to maintain a more midline closure pattern. In this case the guide flange prosthesis has been used.

Mandibular guide flange prosthesis is used primarily as an interim training device. When no teeth are missing in both jaws than it may be considered a training appliance rather than prosthesis. This appliance is used in dentulous patients with non reconstructed lateral discontinuity defects who have severe deviation of the mandible toward the surgical site and are unable to achieve unassisted intercuspation on the non surgical side. Patients who have had significant amount of soft tissue removed along with the resected mandibular segment and have had surgical closure by suturing the lateral surface of the tongue to the buccal mucosa, causes deviation toward the defect side.

Guidance Flange prosthesis is indicated for patients whose severe deviations prevent manipulations of the mandible into any form of acceptable occlusal contact as maxillary guiding ramps are more adjustable. These maxillary prosthesis are usually constructed in acrylic resin with either cast or wrought wire retainers. Acrylic ramp are advantageous because periodic revisions and adjustments of the ramp are possible, and the final position does not have to be achieved with the initial application of acrylic resin, while cast metal guidance flange allows for only mini-

mal adjustment as compared to guidance ramp of acrylic resin which can be periodically adjusted.

Conclusion

Prosthodontic modifications can be accomplished to compensate for defects that are not correctable with surgical reconstruction. Hemimandibulectomy patients suffer numerous problems with mastication, speech, and deglutition due to anatomical compromise resulting from tumor resection. Rehabilitation of rudimentary function of speech and swallowing should be of paramount importance for all Prosthodontist. Prosthodontist should strive to maintain existing mandibular dentition as they will help to retain prosthesis and support the lips and stabilize the mandible for swallowing. Anterior dentition is important to assist in air flow during speech, especially when tongue movements are compromised. While prosthesis can replace dentition to aid in mastication, the effect on mastication is a secondary to prosthetic benefit compared with rehabilitation of the rudimentary function of speech and swallowing that the prosthesis offer.

Success of prosthesis for resected edentulous mandible is directly related to the amount of remaining bone, the number and integrity of remaining teeth and continuity and discontinuity of the bone defect.

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Continued from Page 165

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