Abstract

Segmental resection of the mandible and commandos procedures involve extensive loss of hard and soft tissues, resulting in deviation of the mandible to the defective side and impairment in swallowing, speech, mastication and saliva control due to loss of sensory and motor innervations. Prosthodontic rehabilitation mainly aims the mandibular deviation and improve the masticatory efficiency. This clinical report describes the use of maxillary occlusal ramps which provide support for the mandibular fragment in the acquired position and help to stabilize the dentures thus improving the masticatory efficiency in edentulous mandibulectomy patients.

Keywords:
Maxillary occlusal ramps, hemimandibulectomy, Prosthetic rehabilitation.

Introduction:

The construction of complete dentures for the hemimandibulectomy patient is one of the most challenging and demanding maxillofacial endeavors. Segmental resection of the mandible mainly results in physiological, psychological and esthetic problems. The difficulty encountered is mandibular deviation towards the defective side (1, 2). The extent of the deviation depends on amount of soft & hard tissue loss and associated function, loss of sensory and motor innervations, type of wound closure and additional forms of treatment that the patient might have received. The greater the loss of tissues, greater will be the deviation of the mandible on the defective side. Apart from this patients will have defective speech, swallow pattern, mastication, saliva control, respiration and psychic functioning (3). This type of dysfunction radically alters the prosthetic prognosis. The degree of impairment depends not only on the extent and type of surgery but also on specific vulnerability of each function.

Based on the amount of the mandible that has been resected or restored Cantor and Curtis (1971) devised a prosthetic classification that is as follows (2):

Class I - Radical alveolectomy with preservation of mandibular continuity.
Class II - Lateral resection of the mandible distal to the cuspid.
Class III - Lateral resection of the mandible to the midline.
Class IV - Lateral bone graft surgical reconstruction.
Class V - Anterior bone graft surgical reconstruction.
Class VI - Resection of the anterior portion of the mandible without reconstructive surgery to unite the lateral fragments.

There are several unfavorable physical limitations when rehabilitating completely edentulous patients with resected mandible. This include restricted tongue movements, scarring of the orbicularis oris, the absence of labial, buccal & lingual sulcus, incision notching of the lower lip, loss of sensory (1, 2), deviation of the resected mandible, resorbed ridges and limited posterior throat form due to obliteration by the grafts. The main objectives in rehabilitation are to retain the muscles for mandibular denture control and repeated occlusal approximation.
A treatment option available for the treatment of edentulous patient to achieve optimal function is by using palatal ramp on maxillary posterior teeth on the unresected side as described by Swoope (7,8). Cases have been reported in literature where 2 rows of teeth were used to rehabilitate the edentulous hemi-mandibulectomy patient.

In the past, artificial temporo-mandibular joints have been used to rehabilitate the edentulous patients but they are not in use anymore. Another technique uses two positional records: one in deviated position and the other in the functional position. The occlusion is cleared between these positions to provide a range of possible occlusal contacts. This article describes the use of maxillary palatal occlusal ramps on the unresected side in a patient who had undergone partial mandibulectomy.

Case Report:

A 54 year old, completely edentulous, male patient was referred to the Department of Prosthodontics in Shree Dharmasthala Manjunatheshwara College of Dental Sciences, Dharwad. He complained of difficulty in eating and speaking. The patient's history indicated that he had a tobacco chewing habit since 25 years and was a chronic alcoholic since 15 years. He was diagnosed with Squamous cell carcinoma of the right buccal mucosa (T4, No & Mo) about 2 years back.

His medical history revealed that he had undergone an extensive resection of the mandible distal to the right lower canine region, together with radical neck dissection and commando operation about 24 months ago. The reconstruction had been done with a pectoralis major myocutaneous flap and he had postoperative radiotherapy for five months. An extraoral examination showed an asymmetrical face [fig 1, 2]. There was deviation of the mandible on right side. Right side facial paralysis was noted because of resection of the facial nerve during commando operation. On palpation, the ridge on the right lower side was found to be insufficient. The flap extended and filled the space posterior to this region [fig 3]. This represented class II type of resection according to the cantor and Curtis classification.

Clinical Procedure:

Preliminary impressions were made with irreversible hydrocolloid using stock tray. Casts were prepared and acrylic resin impression trays were constructed. The trays were border-molded with modeling plastic (DPI Tracing Stick, Dental Products of India, Mumbai, India), taking care to avoid over extension. Final impressions were made with medium body vinyl siloxane (Reprosil, Dentsply /caulk, Milford, DE). This impression material was chosen to produce minimal tissue displacement. Master casts were poured with Type III dental stone (DPI, Mumbai, India). Stabilized record bases were made with self cured acrylic (DPI, Mumbai, India) using the sprinkle on technique and wax occlusion rims are made with the usual prosthetic techniques (9). The upper wax occlusion is modified to provide proper facial support and to establish the occlusal plane. The lower rim is adjusted until a tentative vertical dimension has been established. The mandibular fragment should be gently guided back to unstrained position as far as possible to the untreated side and gently lower his jaw into position to record a functional Maxillomandibular relationship (4,10). The lower rim was mounted using standard horizontal and lateral condylar inclination values (30°40° respectively) (11).

After all the mandibular teeth and the maxillary anterior semi anatomic teeth have been arranged, occlusal ramps are developed for the maxillary prosthesis in baseplate wax. These ramps are 6-8mm wide and provide 3-4mm of horizontal overlap with the mandibular posterior teeth.
After tooth arrangements had been finalized, the occlusal contact of the mandibular teeth was checked with the maxillary ramps (fig 4), the patient was able to establish contact with the ramps without guidance. The wax setup was checked for esthetics, phonetics, occlusal vertical dimension and occlusion. A posterior palatal seal was recorded in usual manner and the occlusion was refined. Freedom of movement and lack of cuspal intercuspation was checked before denture insertion. The dentures were evaluated intraorally and the mandible was manipulated to the centric position area (fig 5). Any interference in normal movements was corrected. The lingual extension of the palatal ramp should be checked in order not to interfere without normal palatal valving. Pressure indicating paste and disclosing wax were used in identifying areas of excessive tissue displacement. Buccal acrylic resin facing were added to the maxillary posterior ramps to improve the esthetics. The dentures were removed, repolished and then reinserted.

The patient was given routine post insertion instructions and was motivated to make efforts to learn to adapt to the new dentures. Simple exercises were suggested to the patient such as repeated opening and closing of mandible. This helped the patient learn to manipulate the lower denture into the proper position. Initially, retention of the lower denture was a problem but this improved with constant use. Within a week, the patient expressed satisfaction in mastication and phonetics (fig 6, 7).

Discussion:
Successful rehabilitation of edentulous mandibulectomy patients is more difficult than that of an dentulous patient. Sharry (12) described the difficulties encountered as Limited coverage and retention, Grossly impaired relation of the mandible to the maxilla, Limited movement of the mandible.

Loss of facial structures and sensory and motor innervation complicates the control factor and together with the reduced denture base, contributes to a difficult complete denture situation. The maxillomandibular relation cannot be recorded with any degree of accuracy in a deviated position so a satisfactory occlusion is difficult to achieve. The occlusion is usually developed in the static centric position area (4, 12, 13). This position is achieved by the patient comfortably though it is not truly repeatable as a centric relation.

The maxillary occlusal ramps provide support for the mandibular fragment in the acquired position and help to stabilize the dentures (2, 6). The occlusal ramp provides mandibular support consistent with the functional pathway resulting from unilateral disarticulation, scar tissue and gravity. Esthetics can be enhanced by using semi anatomic teeth and by selective contouring of the polished surfaces of the maxillary denture and facial distortion can be decreased by creative placement of the anterior teeth shifting the midline slightly towards the defect side or tipping the
occlusal plane to correspond to an asymmetrical facial droop can provide an optical illusion that makes the disfigurement less conspicuous\(^{(2,6)}\).

As described in this report, the maxillary occlusal rim on the unresected side definitely improved patient mastication and reduces the deviation of the mandible to a certain extent. The vertical dimension of the occlusion was re-established and proper lip contour, fullness and support was restored. Simple exercises with the prosthetic treatment helped the patient to achieve stabilizing occlusal contact and hence, an increased masticatory efficiency. He has expressed satisfaction with the mastication and esthetic outcome.

**SUMMARY:**

Certain basic principles of construction of conventional dentures should be modified for mandibular resection patients because of many restrictive physical factors. In edentulous patients, a maxillary occlusal ramp on the unaffected side will help to position the residual fragment into the correct sagittal relationship, enhance the stability of the dentures and thus, improve masticatory ability. The philosophical approach to the treatment and rehabilitation of edentulous patients with respected mandibles is not in concentrating on what has been sacrificed in the eradication of the disease, but rather in taking full advantage of the remaining structures.

**REFERENCES:**