



Prosthetic Management of Hemimandibulectomy Patient with Guiding Plane and Twin Occlusion Prosthesis

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Abstract

The prosthodontic rehabilitation of patients with mandibular defects is very challenging due to the muscle attachments that are present on the mandible. Any loss of mandibular continuity that occurs due to reasons like, surgery or trauma most of the times, results in mandibular deviation towards the defected side subsequently causing lack of occlusion. The basic objective of rehabilitation is re-training the mandibular musculature in order to stabilize the mandibular prosthesis by providing an acceptable maxillo-mandibular relationship with an occlusal approximation that restores the function. Emphasis on an early consultation with a maxillo-facial prosthodontist for rehabilitation of mandibulectomy patient should be made. A multidisciplinary approach before, during and after surgery is necessary for better rehabilitation treatment outcome.

Keywords: Mandible; Deviation; Hemimandibulectomy; Resection; Prosthetic

Introduction

The mandible is a vital structure that which, along with the muscles of mastication, constitutes the lower third of the face. The peripheral boundaries of the oral cavity and the floor of the mouth are constituted by the mandible. The bilaterally attached muscles of mastication, play an important role in various functions

like speech, mastication, swallowing and respiration along with the mandibular bone [1].

The prosthodontic rehabilitation of patients with mandibular defects is very challenging due to the muscle attachments that are present on the mandible. Any loss of mandibular continuity that occurs due to reasons like, surgery or trauma most of the times,

results in mandibular deviation towards the defected side subsequently causing lack of occlusion. Unlike the dentulous patients, edentulous patients are difficult to restrain mandibular movement and many times may never achieve proper maxillomandibular relationships for optimum mastication and appearance [2].

We present a case of a partially edentulous hemimandibulectomy patient who reported for replacement of his missing teeth after 2 years of cancer therapy. Initially when the patient was evaluated from a prosthetic point of view indicated poor prognosis. This article describes fabrication of twin occlusion prosthesis for the maxillary arch in hemi-mandibulectomy patient in order to attain occlusion for maximal masticatory efficiency.

Case Report

A 55-year-old male patient with maxillary and mandibular partial edentulousness reported to the Department of Prosthodontics, Dental Care Clinic, Dharam Marg, Delhi, India with a chief complaint of difficulty in eating and speaking due to loss of multiple teeth. The patient gave a history of pain along with swelling on the lower left side of the jaw 2 years back, which was later diagnosed as squamous cell carcinoma of the left mandibular alveolus region which also involved the left ramus of the mandible, this may have been caused due to the patient being a chronic tobacco chewer since 40 years.

When the medical history of the patient was recorded, it was revealed that resection of the tumor with left hemimandibulectomy without disarticulation was surgically done 2 years back. On extraoral examination, facial asymmetry with deviation of mandible to the left side was seen. On intraoral examination, 22 to 26 and 32 to 37 were found to be missing, causing it to be classified under Kennedy's Class II division of partially edentulous arches. The patient had reduced mouth opening to 11 mm which made impression making difficult for prosthetic rehabilitation. On clinical examination of the surgical wound, substantial amount of cicatricial tissue (Figure 1), the natural teeth that were present in both the arches had compromised periodontal support with generalized gingival recession and attrition of the tooth surface.

Treatment options that were available for the particular case were surgical reconstruction or rehabilitation by prosthesis, or a combination of both. Since the patient had undergone radiation therapy, the option of surgical reconstruction was not feasible.

Also, on observation it was found that guiding the mandible towards the normal side in order to attain occlusion was difficult due to the large amount of fibrosis. Hence, the treatment plan thus formulated was to improve mastication with the help of twin occlusion prosthesis.

Implant reconstruction of the defect was also one of the treatment options; however, the patient's low financial status and refusal to undergo any surgical treatment rendered this option futile. Hence, the patient's mandible was manually guided into centric occlusion gradually without any excessive force being applied. A maxillary guided inclined plane with twin occlusion was fabricated to meet the needs of the patient's opposing mandibular acrylic partial denture.

Procedure

The preliminary impressions of the maxillary and mandibular arches were made with the use of irreversible hydrocolloid and polyvinyl siloxane of putty viscosity respectively. Primary casts were poured and were utilized for construction of acrylic custom trays. Secondary rubber based impressions were made after border molding with Type II compound in order to obtain the master casts. For jaw relation wax occlusal rims were fabricated on top of self-cure acrylic resin denture base with the help of the master casts so obtained. The articulation on a semi adjustable articulator was done. This was followed by acrylic teeth arrangement of mandibular and maxillary semi anatomic acrylic teeth (Figure 2). Try in was carried out with a completed set of double rows of posterior teeth which was placed on the left palatal surface of the maxilla, that guided the deviated mandible into occlusion (Figure 3). Following dewaxing, using lost wax technique, the maxillary and mandibular prosthesis is acrylised (Figure 4). After processing, the maxillary guided inclined plane prosthesis with twin occlusion and mandibular acrylic prosthesis were inserted (Figure 5). Post insertion, the patient was first trained with the guided prosthesis in order for him to get use to the prosthesis and was advised not to carry out mastication on the defected side. Follow-up evaluation after 3 months revealed that the patient was both functionally and psychologically satisfied.

Discussion

The reasons for segmented resected mandible is dependent on several factors [2,3], with many associated problems altering the prosthetic prognosis [3,4]. However, the four significant factors



Figure 1: Intra oral view showing residual tissue.

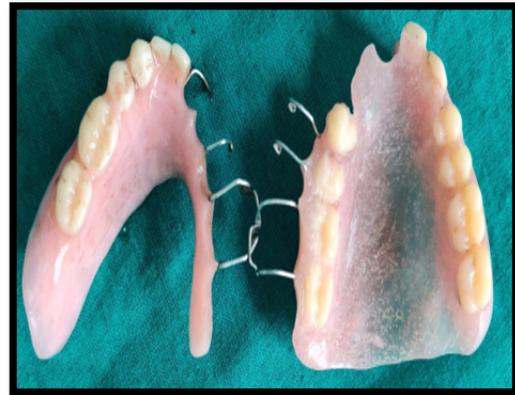


Figure 4: Acrylised maxillary and mandibular prosthesis.



Figure 2: Acrylic teeth arranged on the wax rims and try in.



Figure 5: Insertion of the prosthesis.



Figure 3: Deviated mandible is guided into occlusion with the help of the teeth.

that affect the amount of prosthetic rehabilitation include the site of surgery and its extent, the effects of radiation therapy, number and condition of teeth that are present and the psychological impact on the patient post surgery [5]. The basic objective of rehabilitation is re-training the mandibular musculature in order to stabilize the mandibular prosthesis by providing an acceptable maxillo-mandibular relationship with an occlusal approximation that restores the function.

When surgical reconstruction following mandibulectomy is not a feasible option, reduction or elimination of mandibular deviation can be done with the help of various prosthesis [7-9]. In the present case, a maxillary acrylic inclined guiding plane prosthesis was fabricated in order to assist the muscles to retrain, acrylic was chosen

as a material of choice as it provides a leeway for various adjustments. These adjustments are done over a period of time as and when the relationship of the mandible improves.

In order to attain an acceptable occlusal contact amongst the remaining natural teeth, a flat and wide twin occlusal table on the resected side was fabricated. This occlusal table aided in compensating for the deviation of the mandible. The twin occlusal prosthesis also provided for a surface against which the artificial teeth of the residual mandibular segment may occlude. This surface is inclined for a better occlusal relationship. By providing freedom in lateral movements, the lateral force was minimized, which in turn enhanced the stability of the mandibular prosthesis. The mandibular segment was oriented by deflecting the mandibular segment outwards. In order to achieve a functional occlusion position, the teeth slide over each other up till the incline that is formed by the second row of teeth in the prosthesis. The inner row helped in restoring the function whereas the outer row supported the cheek thus enhancing the esthetics [3,9,10].

After the mandible has been resected, the residual hard tissue structure i.e., the bony mandible and teeth has to articulate with the normal structures of the maxillary arch. Due to the deviation towards the resected side, the functional movements of the mandible and its occlusal proprioception are different from that of a normal non deviated and non surgically treated mandible. During mastication, the envelope of motion occurs on the surgically defected side [11]. There is a plane rotation that occurs as a result of loss of proprioception during occlusion, leads to uncoordinated movements of the mandible. When the force of closure increases, the residual mandible rotates through the frontal plane [12]. The primary cause for abnormal position of the mandible is due to the action of suprahyoid muscle and influence of contra lateral internal pterygoid muscle [11,13].

In the above case, in order to improve the symmetrical arc of closure physiotherapy was suggested to the patient which also assisted him in finding the centric occlusion position without manual guidance of the mandible.

The position might be subjected to change at a later date if the ability of the mandible to control its position improves or differs [14]. The management of a mandibulectomy patient is tough because achieving a reasonable occlusal scheme is an arduous task

even by a skilled prosthodontist. However, a definitive and periodic clinical examination along with psychological support of the prosthodontist is required by these patients [14].

There should be contact between the patient and a maxillofacial prosthodontist that occurs before the surgery has been performed in order to properly examine, plan and fabricate training prosthesis which can be inserted either at the time of or shortly after the surgery so as to prevent muscle imbalance which leads to deviation of the mandible to an eccentric position and also reduce the pull of the contraction of the cicatricial tissue [15].

Conclusion

Emphasis on an early consultation with a maxillofacial prosthodontist for rehabilitation of mandibulectomy patient should be made. A multidisciplinary approach before, during and after surgery is necessary for better rehabilitation treatment outcome. An individualized physiotherapy along with the patient's cooperation is vital in achieving a good prosthetic rehabilitation. The present article describes the fabrication of a maxillary guided plane prosthesis with twin occlusion so as to guide the segmented mandible into a position that is most acceptable functionally. The positive mental attitude aided by physiotherapy helped the patient to overcome the limitations of prosthetic rehabilitation and gave us satisfactory results.

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