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Twin Occlusion Prosthesis: An Alternative to Conventional Guide Ramp - A Case Report

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Abstract*: Segmental resection of the mandible commonly results in the deviation of mandible toward the defective side. Such patients present with many debilitating problems because of the deviation of mandible. The amount of deviation depends on the amount of hard and soft tissue involvement, method of surgical site closure, degree of impaired tongue function, number of remaining teeth and the extent of loss of sensory and motor innervations. It is essential to restore the oral function like mastication in such patients to ensure for an ability to have healthy diet and overall general health. The treatment options for such patients are surgical restoration of resected part, physiotherapy and/or prosthodontic intervention. Numerous prosthetic methods are employed to minimize deviation and improve masticatory efficiency which includes implant supported prosthesis, mandibular guide flange prosthesis, and palatal based guidance restoration.This article presents a technique of restoring oral function for a hemimandibulectomy patient by twin occlusion prosthesis on the unresected side in the maxillary edentulous arch for whom implant supported prosthesis, mandibular guide flange prosthesis or palatal based guide flange prosthesis cannot be fabricated.*

Keywords*: Twin Occlusion, hemimandibulectomy, palatal based guidance*

I. Introduction

Hemimandibulectomy has an adverse effect on the physiological functions as well as esthetics which may result in a psychological trauma. It is reported in the literature that the hemimandibulectomy patients have managed with their disability by using their proprioceptive feedback to balance for deviation towards the resected side.[1]There are multifactorial causes for the deviation including the extent of osseous and soft tissue involvement, the loss of sensory and motor innervations, the type of wound closure and certain additional forms of treatment that the patient might have received.[2] The greater the loss of tissues, greater will be the deviation of the mandible to the resected side, thus compromising the prognosis of the prosthetic rehabilitation to a greater extent. Apart from deviation, other dysfunctions such as difficulty in swallowing, speech, mandibular movements, mastication, 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. There are several unfavorable, physical limitations when rehabilitating completely edentulous patients with resected mandibles. This include resected skin grafts, scar tissue and deviation of the resected mandibles, limited coordinative ability, resorbed ridges and limited posterior throat form due to obliteration by the grafts. One of the basic objectives in rehabilitation is to retrain the muscles for mandibular denture control and repeated occlusal approximation.[4]

Cantor & Curtis[5] provided a hemimandibulectomy classification for edentulous patient that can also be applied in partially edentulous arches as follows:

Class I: Mandibular resection involving alveolar defect with preservation of mandibular continuity.

Class II: Resection defects involve loss of mandibular continuity distal to the canine area.

Class III: Resection defect involves loss up to the mandibular midline region.

Class IV: Resection defect involves the lateral aspect of the mandible, but are augmented to maintain pseudoarticulation of bone and soft tissues in the region of the ascending ramus.

Class V: Resection defect involves the symphysis and parasymphysis region only, augmented to preserve bilateral temporomandibular articulations.

Class VI: Similar to class V, except that the mandibular continuity is not restored.
In cases with class II, III, IV, and V guide flange prosthesis would be a treatment modality. For guide flange prosthesis to be effective sufficient number of posterior teeth that are periodontally sound should be present in the opposite arch. In patients where reconstruction is not done after resection of the mandible, scar tissue formation occurs over a period of time that stiffens the tissues and worsens prosthetic rehabilitation leading to compromised treatment planning.[5]

The treatment option for such patients should be directed towards dealing with dysfunctions like difficulty in swallowing, speech, mandibular movements, mastication and impaired esthetics.[3]Various prosthetic treatments are available and depending upon the clinical situation appropriate option should be selected. Swoop[3] proposed the use of a palatal ramp, Rosenthal suggested the use of two rows of maxillary posterior teeth on unresected side.[6,7] Mathew A and Thomas S delivered a guiding flange prosthesis to a hemimandibulectomy patient.[8] This article presents a case report of a hemimandibulectomy patient wherein a twin occlusion prosthesis was fabricated for maxillary arch to guide the mandible for achieving occlusal contact on unresected side.

II. Case Report

A 50 year old male patient reported to the department of prosthodontics of our institution with a chief complaint of difficulty in mastication since 2 years. His medical history revealed that he was diagnosed for squamous cell carcinoma on the left side of the mandible, for which he had undergone extensive resection of the entire mandible on left side with part of the anterior mandible on right side 4 years back. The patient's habit revealed that he was a tobacco chewer, 10–15 packets per day for 40 years. An extra oral examination showed facial asymmetry, and a convex profile. There was deviation of the mandible to the left side that is towards the resected side (fig 1).

Figure 1: Extra Oral view

Intra oral palpation showed that the mandibular ridge was present till first premolar region on right side. Ortho-pantomogram revealed absence of the mandible mesial to the right first premolar involving the entire mandible of the left side. This particular case fails to represent any of the Cantor & Curtis classification. Dental examination showed that maxillary arch had all teeth present except 21, while only mandibular teeth present were 45, 46, 47, and 48. Occlusal caries were present with 46 and 47. Patient had a tendency to deviate the mandible on left side. Even on manually guiding the mandible it was not possible to achieve the occlusal contact of maxillary and mandibular teeth on unresected side. So, it was decided to provide an extra row of teeth in maxillary prosthesis to provide occlusal contacts on unresected side. Hence, maxillary twin occlusion prosthesis was fabricated.

III. Clinical Procedure

Impressions were made with irreversible hydrocolloid in perforated stock trays (fig 2 and 3) and poured in type III dental stone.

Figure 2 : Maxillary Irreversible hydrocolloid impressiopn

Figure 3 : Mandibular Irreversible hydrocolloid impressiopn

Master casts were obtained (fig. 4 and 5) and maxillary base plate was fabricated for recording functional maxillomandibular relationship.

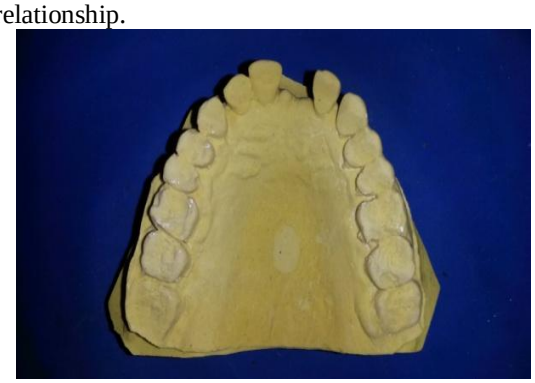

Figure 4 : Maxillary Cast

Figure 5 : mandibular cast

Maxillary baseplate was incorporated with Adams clasp's to be fitted on 16, 26 while ball end clasp's between 13, 14 and 23, 24. Maxillary master cast was articulated using a face bow (Hanau USA) on a semi adjustable articulator (Hanau Wide view, USA) (fig. 6). Occlusal caries with 46 and 47 were restored using esthetic posterior composite restorations.

Figure 7: Casts mounted on semi-adjustable articulator

Maxillomandibular relations were recorded with wax interocclusal records.[9]The patient's tactile sense and sense of comfort was used to assess the vertical dimension of occlusion. The patient was advised to move his mandible as far as possible to the untreated side and then gently close his mandibular jaw into position to record a functional maxillomandibular relationship (fig. 7).

Figure 7 : Maxillomandibular relation recorded

Then, an extra row of non-anatomic teeth was arranged at the recorded position on unaffected side. Try-in was done and the prosthesis was evaluated for phonetics and occlusion (figure 8). The prosthesis was fabricated, finished and polished (fig 9).

Figure 8 : Try-in Done

Figure 9 : Final Prosthesis.

The prosthesis insertion was done and patient was trained to close mandible in such a way that appropriate occlusal contact can be obtained between the second row of teeth in maxillary prosthesis and mandibular natural teeth on right side. Oral hygiene instructions were given to the patient to ensure longevity of

remaining natural teeth and the prosthesis. Patient had difficulty in chewing since 2 years. With the prosthesis he was able to chew the food and had an improvement in type of food which he had. He could now have solid diet as compared to only liquid and semisolid diet which he had without the prosthesis. The facial aesthetics was also improved to some extent due to limitation of deviation by the prosthesis.

IV. Discussion

This article highlights functional rehabilitation of hemimandibulectomy patient who has undergone resection without reconstruction. Literature review advocates fabrication of guide flange or palatal ramp prosthesis for such patients to prevent deviation of the mandible and to improve masticatory function and aesthetics. Since a considerable period of time had elapsed after the surgical procedure, scar tissue formation had occurred and guidance prosthesis was not possible.[10, 11]Apart from this, guide flange therapy is most successful in patients where resection involves only bony structures with minimal sacrifice of tongue, floor of the mouth, and adjacent soft tissue.[12, 13]Twin occlusion was provided because the patient could not occlude on the natural teeth. The palatal row of teeth occluded with the remaining natural mandibular teeth and the buccal row of natural teeth supported the cheeks. This technique enabled the patient to masticate appropriately, to lead a healthy, good quality of life. It also helped patient to deal with the physical and psychological disabilities. However, Olson ML et al [14] and Curtis DA et al [15] recommended that immediate reconstruction of resected part of mandible should be done to recover both facial symmetry and masticatory function. It is reported that even the recent developments in reconstructive surgery and prosthodontic rehabilitation have not been able to restore impaired masticatory function in 50% of head and neck cancer patients. Osseointegrated dental implants provide a treatment modality that may adequately rehabilitate oral functions of these patients so that they can lead a healthy life.[7]However this is an expensive modality which may be not be acceptable to all strata of patients.

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