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A novel technique to rehabilitate a completely edentulous patient with hemimaxillectomy and restricted mouth opening with a two piece maxillary denture: a case report.

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Abstract

Prosthetic and surgical procedure can be applied to rehabilitate acquired palatal defects. The obturator prosthesis as a part of prosthetic management used for separation of oral and nasal cavities to allow adequate deglutition and speech. This case report describes prosthetic approach for completely edentulous patient who had undergone hemimaxillectomy with limited mouth opening. As the mouth opening was limited, two piece maxillary denture was fabricated with monoplane teeth. Patient reported with improved speech and deglutition.

Keywords: Hemimaxillectomy, hollow bulb obturator, complete denture

Introduction

The mortality rate of the people in oral malignances is higher than those people with the other types of tumors as in cervical or breast. The most frequently seen oral malignancy includes the squamous cell carcinoma followed by the basal cell carcinoma. Apart from the chemo and radio therapy, the surgical approach of these tumors includes the surgical removal of the affected region based on the size, extent and the origin of the tumor.

The surgical removal of the entire or the partial portion of the maxilla is known as the maxillectomy or the hemi maxillectomy based on the extent of the correction [(1)].On terms of the aesthetic concerns, maxillary bone have great significance in maintaining the profile, contour of the face as well as balances the equilibrium in the phonetics and functions like mastication. Complete or the partial maxillectomy leaves the patient with a wide, hollow void in the oral cavity, with a great disturbance in the oroantral and oronasal communications and severe affect on the physiological and the psychological concerns of the patient [(2)]

The construction of the prosthesis varies from that of the conventional complete dentures. However, the prognosis is based on the factors such as the number of the natural teeth retained in the oral cavity. The hollow bulb obturator seals the oro nasal communication along with the restoration of form, function and phonetics. The stomathognatic prosthesis can be taken to consideration in case of the poor prognosis condition.

This case report presents rehabilitation of edentulous hemi maxillectomy patient with restricted mouth opening, with a two piece maxillary obturator made in a novel method.

Case Report

A 56 year old female patient reported to the Department of Maxillofacial Prosthodontics, GITAM dental college, Visakhapatnam with the chief complaints of missing teeth and unable to take food. The past medical history of the patient, showed patient suffered with squamous cell carcinoma on the right side, and undergone surgical excision with hemi maxillectomy and later she had radiotherapy, and she had edentulous maxilla. For the last 7 months patient is using ryles tube for feeding. A previous attempt had already been made by specialist for rehabilitation but attempt was not successful owing to the restricted mouth opening. Hence the patient was referred to postgraduate teaching institute for rehabilitation in a better way.

On intraoral examination, according to Armany classification, this case is classified in to class I defect extending anteriorly from the incisive papilla to posteriorly on right side upto the posterior palatal seal area involving the half of the maxillary segment (fig 1) [(3)].

Fig 1: Intra oral defect

There was restricted mouth opening of 1.5 cm and no deviation of mouth on opening (fig 2). The primary impression was made with a stock tray, in which the right side of stock tray is trimmed with the metal disc later smoothened. Impression compound was used to record the preliminary impressions for both maxilla as well as the mandible(fig.3A, 3B). The impression extended up to the defect area. After the preliminary impression was made, the preliminary cast was generated. A spacer was adapted over the preliminary cast and the special tray is fabricated over it.

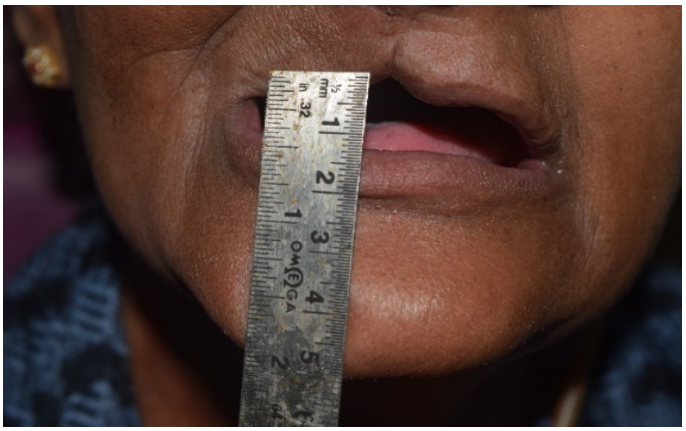

Fig 2: Restricted Mouth Opening.

Fig 3A: Mandibular preliminary impression

Fig 3B: Maxillary preliminary impression

Later, the border molding was done with green stick compound to record the soft tissues and tissues around the patient by using the functional movements. The path of insertion of the special tray was done in rotational path, as the mouth opening is restricted, and conventional procedure isn't possible here. Then the patient, was asked to move her head down and back and laterally and asked her to swallow. After the check of the proper adaptation and the orientation, the final impression was recorded with light body. Mandibular border moulding was done with low fusing compound & final impression made with light body. (fig 4A, 4B)

Fig 4A: Mandibular final impression

Fig 4B: Maxillary final impression

The final impression was poured, and the master cast was obtained. The master cast was duplicated with agar to obtain an additional cast for the fabrication of hollow bulb obturator with the lost salt technique (figure 5). The unfavourable under cuts were blocked out with pumice and plaster on the duplicated master cast. The waxup for the obturator was done, including the defect and denture base on the edentulous side, and beading was done in the labial, buccal and the palatal surfaces of the maxilla corresponding to the areas of the teeth.

Fig 5: Fabrication of obturator in lost salt technique

Later flasking and dewaxing steps were followed. The packing of the mold was done along with a pouch of salt, and curing procedures were performed. The hollow obturator bulb was checked for accuracy on the master cast.

The hollow bulb denture base was fabricated extending within the physiological limits of the defects and remaining edentulous ridge. Prior to the jaw relations, the hollow bulb denture base is inserted into the defect and patient is asked to have water and checked for any evidences of the leakage of water from nose. As the patient had the limited mouth opening, the denture base is initially placed in the mouth excluding the occlusal rim segment. After the patient is comfortable with the denture base, the occlusal rims fabrication and the jaw relations are later recorded.

The maxillary horse shoe shaped occlusal rim was fabricated with the base plate wax (Bego) and the corresponding mandibular occlusal rim is fabricated. The Beading is done which fits and corresponds to the labial, buccal and the palatal surfaces in the maxilla of the denture base corresponding to the areas of the teeth. This beading helps in the orientation of teeth to be placed over denture base.

Recording the jaw relations, in this case isn't same as in the conventional jaw relations. Initially the hollow bulb denture base segment is placed followed by the mandibular occlusal rim, and then the horse shoe shaped maxillary rim is placed, as the patient had limited mouth opening. Jaw relations recorded ensuring vertical dimension and freeway space established as per requirements.

Monoplane teeth were used as patient had poor neuromuscular coordination. Try- in of the waxed up dentures was done, with hollow bulb denture base placed first later mandibular denture base finally horse shoe shaped maxillary segment placed (fig 6A, 6B).

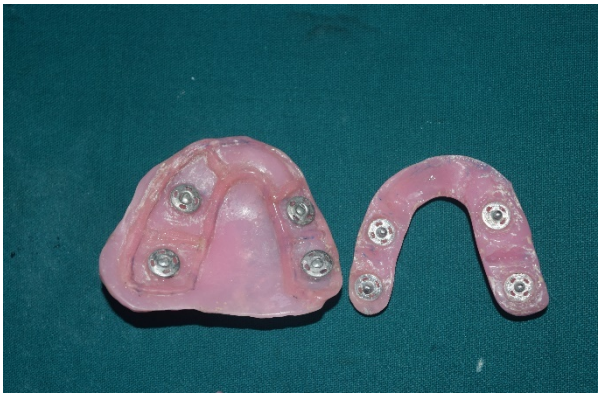

Fig 6A: Maxillary denture with horse shoe shaped segment

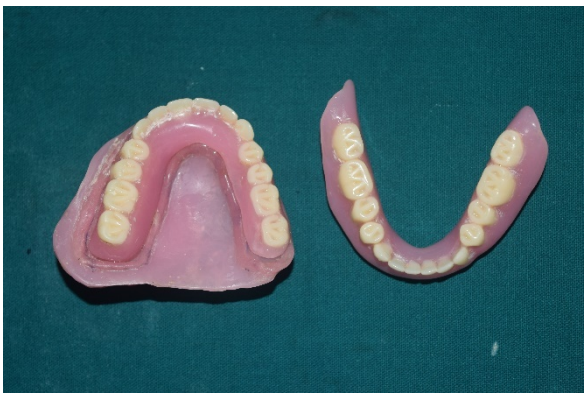

Fig. 6B: Maxillary & mandibular dentures

After try in flasking and dewaxing were done. During packing, maxillary teeth segment was packed in heat- cured acrylic resin and cured. Press buttons were incorporated in the regions of premolar & molar teeth on

both sides. The keyways of the press buttons were incorporated in the hollow bul denture base and counterparts in the horse shoe shaped rim with teeth. The final prosthesis was finished and polished and inserted into the patient oral cavity and checked for speech, comfort, and retention (figure 7).

Fig 7: Denture insertion

Post insertion instructions were given to the patient and called for recall checkup. Patient was taught about the use of and diet counseling was given. After one week patient had reported with improved speech and deglutition. Ryles tube was removed after 2 weeks of patients successful use of the prosthesis. Weight of the patient was checked before and after 6 months of the usage of dentures and it was found that there was an increase in the nutrional intake by the patient. (fig 8)

Fig 8. Follow up

Discussion

Oral malignancies are never suspected in the beginning, but always get ruled out in the later stages, which involves the compromised treatment planning. Squamous cell carcinoma, which is likely to spread its tumour extent involving the palate, nasal floor and the entire or the partial maxilla. A maxillary oral squamous cell carcinoma (SCC) is generally treated with conventional surgical excision. The resultant surgical defect often includes part of the hard and soft palates, which results in an oro-antral communication [(1).]

However, after effects of these surgical treatments compromises the efficiency of the prognosis. It certainly leaves with a void in the disturbed physiological and psychological health of patient. Maxillary bone helps to maintain the contour of the face and seperates the nasal cavity from the oral cavity.

Although microvascular reconstructive techniques for maxilla defects have improved, limitations caused by irradiation fields without optimal recipient vessels prolong hospitalization, incur post-operative complications, cause donor-site morbidity, lead to a risk of flap failure (including through bone resorption), prolong treatment time, cause blood loss, and create financial difficulties, ultimately resulting in patient refusal. The above considerations have led to the use of maxillary prostheses as an alternative [(4).]

Despite the controversial opinions, it was unanimously accepted, that prosthetic rehabilitation is the optimal treatment method for patients with maxillary resection [(5)]

The most common issues in prosthesis treatment of patients who have undergone maxillectomy are: lack of support, retention and stability. The palatal obturator restores: mastication, swallowing, articulation and intelligibility of speech and the contour of the midface [(6)]

Success of the rehabilitation of defect cases can be influenced by two key factors, one is the patient aspect and other is the clinical point of view. From the patient aspect several factors work such as size of the defect, number of remaining teeth, soft palate involvement & oral hygiene status [5]

On radiographical examination patients bone density was D3/D4, for which success rate of implant ossification is low. Rogers et al. reported that patients with larger defects had lower scores for activity, recreation, physical function. Okay et al concluded that stability of prosthesis was compromised as the defect size increased, resulting in poor obturator function[7]

Prosthetic construction of the denture in these patients who underwent maxillectomy or the hemi maxillectomy isn't the same like in conventional complete dentures. It is the real challenge to a prosthodontist, as the patients who underwent the maxillectomy have the restricted mouth opening and needed support effects the retention and stability. The Prosthodontist should construct a denture that includes the obturation of the void in the palate, which in terms is called as a hollow bulb obturator [8].

Definitive obturator is strictly indicated unless the surgical site is completely healed and the dimensionally stable along with the total consent of the patient.

While few patients, are partially or completely edentulous, presence of fewer teeth with dentulous mandible could result in the fracture of the denture as there will be unequal distribution of the forces amongst the natural and artificial teeth.

Usually, to make sure the accuracy of the prosthesis, mouth opening should be more, as the entire defect portion can be recorded properly. In this case, due to the restricted mouth opening, fabrication of two piece obturator is beneficial for the patient than a conventional obturator, as it is not possible for the patient to wide open the mouth due to surgically acquired scar and insert the one piece obturator [9].

Prior to the definitive prosthesis, initially the obturator bulb is fabricated with the self cure acrylic resin, and placed into the void, and the asked the patient to have some water, to check for the fit as well as the leakage though the nasal communication or any evidences of the nasal regurgitations. On intraoral placement of the preliminary prosthesis, and once fit was checked, the definitive prosthesis is made.

The path of placement of the special tray is rotational, as the patient had the restricted mouth opening, which couldn't offer for the conventional procedures. The functional movements were helpful for recording the sulcus depth and the extensions with the green stick compound as the mouth opening was limited. The method used in this case report, includes the fabrication of the hollow bulb obturator along with the denture base as the single unit and the second piece with horse shoe shaped denture, with teeth rim, was fabricated and later assembled as the single unit with retentive mechanism by means of press buttons and beading for orientation.

The monoplane teeth were used instead of the cuspal teeth, as this patient's neuromuscular coordination was in state of imbalance and this cuspal teeth can damage the soft tissues and results in the lacerations and may results in the ulcerations.

The hemi maxillectomy procedure, in this case extended the involvement of the posterior palatal seal and the retention here is completely relayed on the necessary undercuts with the blockage of the unnecessary undercuts.

After the insertion of the definitive prosthesis, the patient was recalled to come back for review. On the recall visit, its is found that there was an improved speech, and deglutition of the patient.

The successful prosthetic rehabilitation retrieved patient's self-esteem and her social activity, which according to many types of research has the main role for life quality improvement [5].

Conclusion

Prosthetic rehabilitation to the patients after the irradiational therapy and the surgical procedures, not only maintains the functional stability but also stirs up the self esteem, who already gone through this psychological trauma after all these procedures. The prosthodontist, should take up such cases as real challenge as the prosthetic rehabilitation of patients with maxillary resection is a very complicated multi-stage process, correlated with many difficulties and problems. This requires the research and modification of different methods and techniques, which have to provide optimum restoration of the damaged functions and to improve patients' life quality. A proper diagnosis and a well-designed treatment plan will result in pleasant outcomes. Rehabilitation with obturator prosthesis appears to be a functional and effective treatment modality.

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