

Class 4 Definitive Obturator Prosthesis for Hemimaxillectomy Patient to Improve the Quality Of Life: A Case Report

Dr.Kumari Sindhu Pravin¹, Dr.Bibhuti Prasanna², Dr.Neeta Sinha³, Dr.Shaivy Ambuj⁴

¹(MDS Final Year, Department of Prosthodontics, Buddha Institute of Dental Sciences & Hospital Patna Bihar /Magadh University, India)

²(Dental Surgeon, PHC Kuchaikote, Gopalganj, Bihar. Department Of Health/Government of Bihar, India)

³(Professor, Department of Prosthodontics, Buddha Institute of Dental Sciences & Hospital Patna Bihar/Magadh University, India)

⁴(Senior Lecturer, Department of Prosthodontics, Buddha Institute of Dental Sciences & Hospital Patna Bihar /Magadh University, India)

Abstract

Aim: This article mainly describes the fundamental designing technique in improving the retention, stability and support of the definitive obturator prosthesis, and to improve the psychological status and normal social habits of patient.

Background: Maxilla is one of the most important midface structures which separate the oral, antral and orbital cavities. The defect created as a consequence of hemimaxillectomy leads to difficulties with speech, swallowing, mastication, and aesthetic which eventually affect the quality of life.

Case description: This case report describes the restoring of maxillary defect with obturator prosthesis helps to replace missing hard and soft tissues and also enable swallowing, mastication, and a speech by closing the oronasal or oroantral communication.

Conclusion: Post-surgical maxillary defects predispose the patient to hyper nasal speech, fluid leakage into the nasal cavity, and impaired masticatory function and the total rehabilitation of the maxillectomy patient, the maxillofacial-prosthodontist has two primary objectives: [A]. To restore the functions of mastication, deglutition, and speech and [B]. To achieve normal oro-facial appearance. Rehabilitation with obturator prosthesis appears to be a functional and effective treatment modality. It also improves the quality of life of patients.

Keywords: Hemimaxillectomy, maxillary defect, obturator, prosthetic rehabilitation, quality of life

Date of Submission: 28-10-2021

Date of Acceptance: 11-11-2021

I. Introduction

Maxilla is one of the most important midface structures which separates the oral, antral and orbital cavities and provide support to the eyeball lower eyelid, cheek, lip and nose and its play important role in speech, swallowing, mastication and aesthetic.

Acquired palatal defects occur due to hemimaxillectomy causes major difficulties with speech, swallowing and mastication as well as facial disfigurement which create psychological problems rather it creates great difficulties in facing and accepting the social consequences may leads to emotional stress and depression finally affect the quality of life of the patient [1].

A maxillectomy prosthesis or obturator restores the surgical defect and aids in the function of speaking chewing or swallowing after the surgery by recreating the functional separation of the oral cavity sinus and nasal cavity. This prosthodontics rehabilitation also involve: -

[A] Patient counselling and instructions.

[B] Physical therapy (oral- physical)

[C] Dietary counselling.

[D] Hygiene maintenance.

Fabrication of obturator is usually accomplished in three phases: -

[A] Immediate /surgical obturator: -prosthesis may be replaced at the time of surgery.

[B] Transitional /Interim obturator: -This phase is started 10 to 15 days after surgery when surgical dressings or immediate prosthesis are removed the transitional prosthesis is placed and modified until healing is complete. It may extend from 2 to 24 months.

[C] Definitive obturator: -This phase begins when healing is complete it may take 4 to 6 month and involves fabrication of prosthesis intended for long term uses.

Any phase of treatment may be altered dependent on the nature of the disease and its staging, radiation, chemotherapy, surgical complications and the morbidity of the disease.

Aramany has classified the maxillary defects into 6 classes based on the relationship of the defect area to the remaining abutment teeth. In present case report we discuss class 4 definitive obturator prosthesis. In this “defect cross the midline and involve both side of maxilla” and the remaining teeth will be few in number and may create a unique design problem similar to the unilateral design of conventional removable partial denture. The design of the obturator is linear. Support is located on the center of the all-remaining teeth; retention is located mesially on the premolars, and palatally on the molars. Stabilizing components are palatal on the premolars and buccal on the molars [2].

II. Case Report

A male patient aged 50 years reported to the department of prosthodontics 27 years after surgery. The chief complaint was an inability to masticate food properly and difficulty in speech because of loss of teeth and oronasal communication in relation to right side posterior region of palate. The patient gave a history of surgery hemi-maxillectomy 27 years back. The patient was operated for ameloblastoma after being diagnosed by biopsy. The right maxillectomy was done. Anterior teeth were also removed on other side. Intraoral examination revealed complete healing of the operated site, oronasal communication on right is 2cm x 1cm in size, no any discharge, no any swelling, no any pain and discomfort [Figure 1A]. Oral hygiene was very poor. The missing teeth were 11, 12,13,14,15, 16, 17, 18, 21, and 22. The right half of the face was disfigured [Figure 1B]. Thereby stretching the right labial and the nasal regions. It was clearly evident that the oral tissues and the remaining palatal bone were incapable of supporting the prosthesis. Owing to such unfavourable conditions, it was necessary to plan a prosthesis that would be light and easy to wear. After taking a thorough patient’s social history, the patient was educated but after a long time he will be prepared psychologically to undergo the procedure of definitive obturator rehabilitation.



Figure 1A: Complete healing of operated sight



Figure 1B: Facial disfigurement

1) Primary impressions were made in irreversible hydrocolloid impression material and poured with die-stone (type-4) and primary cast was retrieved. [figure 2A,2B]



Figure 2A: primary impression



Figure 2B: Primary cast

2) Proper border moulding was done on the defect side of the denture, by following the conventional methods of denture fabrication. A final impression of the defect area was made up with impression compound and green stick, and then whole maxillary impression was recorded with alginate. [figure 3]



Figure 3: final impression with defect area

3) It was poured with die-stone (type-4) and master cast was retrieved and undercuts on the side of defect were blocked with modelling wax. [Figure 4A, 4B].



Figure 4A: Final master cast

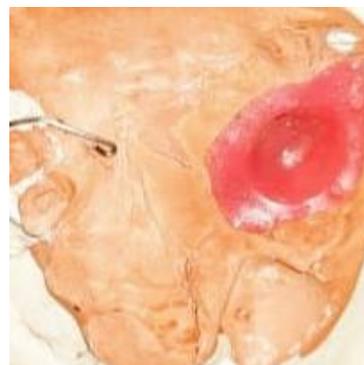


Figure 4B: defect was blocked with modelling wax

4) Now centric jaw relation was recorded by conventional method and cast was mounted on semi-adjustable Hanau articulator. [figure 5]



Figure 5: cast were mounted on semi- adjustable Hanau articulator

5) Acrylic denture teeth were arranged. The rules of aesthetics were born in mind during the selection and the setting of the teeth.

6) Waxed up dentures were tried and checked for retention, stability and comfort in the mouth. Phonetics was a cause of concern and so, the denture movements were re-checked during phonation, and corrections were made accordingly. [figure 6]



Figure 6: Trying waxed up denture

7) The template was fabricated on the defect portion; a hole was made during packing. First heat-cure acrylic was placed on the defect then template was placed and some salt is placed in the template hole. Then final packing was done with heat cure acrylic resin. [figure 7A,7B]

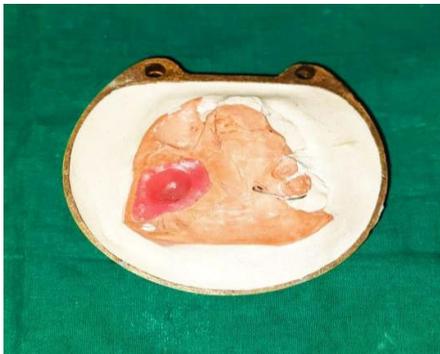


Figure 7A: template was fabricated on the defect portion **Figure 7B:** Final packing with acrylic resin

8) The prosthesis was cured with heat cured acrylic resin and inserted salt during packing was removed to make prosthesis light weight and then finishing and polishing was done. [figure 8A, 8B]



Figure 8A: finished and polished prosthesis **Figure 8B:** Permanent soft liners used around defect margin

9) Permanent soft liners were used to reduce the pressure on the defect area [Figure 9B], as they provide the cushioning effect between the defect margins and the prosthesis. Then the prosthesis was finally inserted and

the patient was educated regarding oral hygiene and future maintenance of the prosthesis. And frequent visit after 2 months [figure 9].



Figure 9: final insertion of denture

III. Discussion

Prosthetic rehabilitation is a quick and simple therapy which almost always leads to predictable results. Prosthetic rehabilitation of maxillary surgical defect is so effective that reconstructive surgery is not indicated in most instances. Post-surgical maxillary defects incline the patients to hyper nasal speech, leakage of food bolus, and liquids into nasal cavity diminished mastication and in some cases aesthetic deformity. The oral disability is diminished immediately with prosthetic operation it also reduces cosmetic deformity by fabricating missing teeth and supporting the upper lip and cheek. Many studies stated that patient's satisfaction with obturator functioning increased their social adjustment improved and their psychological distress decreased as they previously feel negative impact of their affections on employment and incomes. [3]

The memorial Sloan Kettering Cancer center developed an obturator functioning scale (OFS) for self-assessing the function of an obturator the scale consists of 15 questionnaires that measures a patient ability to eat and speak with the obturator and their satisfaction with cosmetics effect improved by the obturator [4].

Patient with acquired surgical defects of the maxilla prosthodontics therapy divided into three phases of treatment with their different objectives:

(A) Initial phase is called surgical obturation, the primary objective of immediate surgical obturation is to restore and maintain oral function during the initial postoperative period.

(B) Second phase is called interim obturation i.e., second phase of post-surgical processes the main objective is to provide the patient with a comfortable and functional process until healing is complete.

(C) Third phase of prosthodontics therapy is called definitive obturation. Generally, it completed after four to six months of surgery when complete healing done.

A definite obturator is not fabricated until the surgical site is healed and dimensionally stable. It may take normally 4 to 6 months after surgery, depends upon many factors e.g., Prognosis of the tumor's, size of the defect healing progress and presence or absence of teeth and the patient is prepared physically and emotionally for restorative care. After four to six month of surgery the mental outlook of the patient will improve, they realised that speech, mastication and deglutition will not be compromised anymore. Patient is prepared physically and emotionally for the extensive restorative procedures that may be required prior to the construction of the definitive obturator.

For this case a linear design was selected. The basic principle of the design of removable partial denture should be reviewed when designing the framework of the obturator. Major connector should be rigid. Occlusal rest should direct, occlusion force along the long axis of the tooth. Guide planes should be designed for facilitate stability and bracing. Retention was gained from the remaining teeth by incorporating wrought wire clasps in the form C-clasps. Acrylic denture teeth were added and a light contact with the opposing teeth was ensured retention should be within the psychological limit of the periodontal ligament and maximum support should be designed from the residual soft tissue [5].

Moment of prosthesis: -The class 4 definitive obturator processes may be displaced superiorly with the force of mastication and will tend to drop without occlusal contact. In this case the moment will vary with the number and position of teeth, the remaining area of the palatal shelf as well as the size of the defect. The tissue changes may occur due to movement of obturator during function. Due to which removable partial prosthesis is

indicated the obturator portion should be constructed with acrylic resin so that the prosthesis may be relined or revised to compensate for their changes.

Oral - nasal portion: -The obturator forms a barrier between nasal and oral cavity. In class 4 obturator prosthesis extended into the defect to improve the retention stability and support. The control of the defect is relatively static during function but sometime due to movement of the coronoid process and the anterior border of ramus of mandible and slight movement of oral musculature like lip and cheek. The contour of the defect is displaced with soft-tissue movement.

Extension into the defect: -In class 4 of obturator prosthesis the defect is used to improve the retention, stability and support by extension of obturator into the defect. It depends on the nature of lining tissue and configuration of the defect.

Teeth: -In this case the presence of teeth enhances the retention, stability and support for the prosthesis. In case of the poor periodontal status, teeth adjacent to the defect are splinted together to enhance their load bearing capacity.

Weight and design: -In this type of obturator weight reduction is important due to lack of bone and posterior teeth support on the defect side. Bulky area of the obturator should be hollowed to reduce the weight to relief the supporting tissue from unnecessary stress. Wu and Schaaf studied that hollow maxillary obturator prosthesis reduced the weight of prosthesis by 7% to 35% depending on the size of the defect [6].

Quality of life of patient with maxillary defects is improved with properly designed obturator to restore mastication, swallowing, aesthetics, resonance and speech. This can be achieved with skill knowledge and experience of the specialists. The patient after prosthodontics rehabilitation can improve their psychological status and normal social habits [7, 8].

IV. Conclusion

We all know that it is difficult to obtain retention and stabilization of a class 4 obturator prosthesis but proper diagnosis and a well diagnosis treatment plans with patients positive effort and attitude will result good outcome. Quality of life of patients with maxillary defects could obviously be improved with a properly designed obturator. The prosthetic obturator can restore and improve patient's chief complaint mastication, swallowing, aesthetic particularly the mid face and pronunciation. They can resume their social habits in their normal way with satisfactory condition.

Acknowledgement

I am very thankful to my seniors, my guides, and the whole team for highly appreciable contribution and efforts.

References

- [1]. Alhaji MN et al. Maxillary obturator prosthesis for a hemimaxillectomy patient: A clinical case report, The Saudi Journal for Dental Research (2016), <http://dx.doi.org/10.1016/j.sjdr.2016.03.001>
- [2]. Aramany M. Basic principles of obturator design for partially edentulous patients. Part I: Classification. J ProsthetDent 2001; 86:559-61.
- [3]. maxillary obturator:-the relationship between patient satisfaction and speech outcome ; Janna M Rigger ;John F.Wolfaardt ;Naresh jha 2003 Wiley interscience:895-doi:10.1002/hed10299.
- [4]. Ali et al.Head and Face Medicine (2018) 14:2 DOI 10.1186/s13005-017-0160-2.
- [5]. Filiz Keyf (2001).Obturator prostheses for hemimaxillectomy patients. , 28(9), 821–829. doi:10.1111/j.1365-2842.2001.00754.x
- [6]. WU, Y. & SCHAAF, N.G. (1989) Comparison of weight reduction in different designs of solid and hollow obturator prostheses. Journal of Prosthetic Dentistry, 62, 214.
- [7]. Bailey LW, Edwards D. Psychological considerations in maxillofacial prosthetics. J Prodthet Dent 1975; 34:533–8.
- [8]. Elhag SA. Level of dry mouth and its effect on the quality of life in patient wearing maxillary obturator prosthesis [Master's thesis]. Faculty of Dentistry: University of Khartoum; 2014. p. 1–70.

Dr.Kumari Sindhu Pravin, et. al. "Class 4 Definitive Obturator Prosthesis for Hemimaxillectomy Patient to Improve the Quality Of Life: A Case Report." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(11), 2021, pp. 25-30.