IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 16, Issue 7 Ver. X (July. 2017), PP 63-67
www.iosrjournals.org

Rehabilitation of Acquired Maxillary Defect with Precision Attachment Retained Hollow Bulb Obturator prosthesis: A Case Report

*Santosh Dixit[1],Viddesh Patil[2],Swati Tiwadi[3],Sumit Deshpande[4], Yogesh Jadhav[5]

[1](Prof. and HOD, Department of Prosthodontics Crown & Bridge, PDU Dental College, Solapur, India)
[2](Post Graduate student, Department of Prosthodontics Crown & Bridge, PDU Dental College, Solapur, India)
[3](Post Graduate student, Department of Prosthodontics Crown & Bridge, PDU Dental College, Solapur, India)
[4](Prof. and PG guide,Department of Prosthodontics Crown & Bridge, PDU Dental College, Solapur, India)
[5](Post Graduate student, Department of Conservative & Endodontics, PDU Dental College, Solapur, India)

*Corresponding author: *Swati Tiwadi[3]*

Abstract: *Rehabilitation of post maxillectomy is the challenge to clinician. The size of these defects can vary from small to large, and they may include portions of the hard and soft palate, alveolar ridges, and floor of the nasal cavity. The size and location of the defect usually influences the extent of impairment and difficulty in prosthetic rehabilitation. The increased weight of the prosthesis when closing large defects is often a concern to its retention. Lightweight obturators are thus warranted in such clinical situations. Conventional clasp design may not provide adequate retention, stability and support in cases of large defects. The present clinical report describes use of the resilient attachments post maxillectomy This will help to improve aesthetics and improve retention in comparison to conventional clasping on incisors as terminal abutments adjacent to a large defect.*

Keywords:*maxillectomy, defect, rehabilitation, obturator, extracoronal resilient attachment, esthetics, retention*

I. Introduction

The term *maxillectomy*is used by head and neck surgeons and prosthodontists to describe the partial or total removal of the maxillae in patients suffering from benign or malignant neoplasms. Maxillectomy defects can be categorized as limited, partial, medial, subtotal, total, radical, or extended. Defects in the maxilla can result in hypernasal speech, fluid leakage into the nasal cavity, and impaired masticatory function. Obturatoris a maxillofacial prosthesis used to close a congenital or acquired tissue opening, primarily of the hard palate and/or contiguous alveolar/soft tissue structures. The primary goal of obturator is closure of the maxillectomy defect and separation of the oral cavity from the sino-nasal cavities in order to prevent hyper-nasal speech and liquid leakage into the nasal cavity.[1-3] The prosthesis should also improve mastication, swallowing, articulation and speech intelligibility, restore facial contours and reduce drooling of saliva.[4-8]Successful obturation depends on the volume of the defect, and the positioning of remaining hard and soft tissues to be used to retain, stabilize, and support the prosthesis. Obturator designs for partial and total maxillectomy defects have included open and closed hollow obturators, [10-17] inflatable obturators,[18] and 2-piece hollow obturator prostheses. [19]The majority of maxillary defects can be rehabilitated with a conventional simple obturator prosthesis that uses various clasps as retention components.[19-21]In many cases, however, a conventional obturator prosthesis is unable to provide adequate retention, stability and support. In such cases, precision attachments may be very useful. The use of multiple attachments has been described as providing increased stability and retention of the prosthesis, as well as improved water and air tightness.[22]

The present clinical report describes the prosthetic rehabilitation of maxillary defects using an obturator with extracoronal resilient attachments over root canal treated teeth. The use of attachments as an adjunct to maxillary obturators is indicated for improved aesthetics and retention in comparison to conventional clasping on incisors as terminal abutments adjacent to a large defect.

Case report

A 80-year-old man reported to the Department of Prosthodontics, PanditDeendayalUpadhyay Dental college and hospital with the chief complaint of inability to chew, loose denture, impaired speech, difficulty in mastication and liquid leakage into the oral cavity. 10 years earlier, the patient had been diagnosed with epidermoid carcinoma of the maxillary sinus that was treated by a unilateral maxillectomy followed by post-surgical radiation therapy. As a result of surgery and radiotherapy, the patient had experienced fibrosis and scar

contraction . 3 years later he was treated and a conventional obturator with claps design was fabricated that was no longer retentive. Extra-oral examination revealed unilateral facial and lip asymmetry due to partial resection of right maxilla. Intraoral examination revealed resection of the hard palate, alveolar bone, teeth and soft tissue that did not exceed the midline. The defect was classified according to Aramany as a Class II Curved Arch Form.[19] (Fig. 1). Remaining teeth on the contralateral posterior side were carious and fractured because of food and plaque accumulation at previous clasp site.

Treatment plan-

A maxillary hollow bulb obturator was planned following extractions of carious and fractured teeth. Remaining anterior teeth i.e 11,21,22,23,24 were subjected to root canal treatment. Post space preparation was done with 21, 22, 23 followed by tooth preparations for all remaining teeth. Impressions of post space were made using orthodontic wire and low fusing compound. Full arch impression was made using putty and light body (Fig.2). Impression was poured in die stone . Post, core and dome copings were fabricated for 21, 22 and 23. For 11 and 24, simple dome shaped copings were fabricated. To improve the stability and retention, 11-12 and 23-24 were splinted. All the copings were fabricated with Co-Cr alloy. Rhein 83 resilient attachments were casted on the top surface of 21 and 23 copings (Fig. 3 & 4).

Impression procedures-

1. Undercuts in the defect were blocked out using wet gauze. A dental floss was tied to gauze avoid accidental swallowing of the gauze while making the impression .
2. A preliminary impression was made using metal stock tray no.3 and irreversible hydrocolloid. (Fig. 5)
3. Primary impression was poured using dental stone (type III gypsum product)
4. Undercuts of the primary cast were blocked out using baseplate wax and spacer was designed followed by fabrication of custom tray using autopolymerising acrylic resin with tissue stops in the region of 26,24 and 12
5. Borders were molded using low fusing compound and defect was molded using putty by asking the patient to turn head side by side to simulate soft palate movements. (Fig. 6)
6. Final impression was made using light body ensuring complete seal of the defect after border molding. (fig. 7)
7. Final cast of dental stone (type III gypsum product) was used to fabricate denture base using autopolymerising acrylic resin and hard base plate wax was used to fabricate the occlusal rims
8. Jaw relation records were made and transferred to semi-adjustible articulator using a facebow
9. Teeth arrangement and trial insertion was done ensuring occlusion on both sides. (Fig. 8)

Fabrication of hollow bulb obturator-

1. Maxillary denture was processed through conventional manner. (Fig.9 & 10)
2. Make a putty index of the bulb before making it hollow.
3. Pry off the bulb at centre after outlining the margins at the point of separation on the bulb to ensure that there is no alteration when the bulb is made hollow.
4. Make the bulb hollow by removing acrylic resin with a bur. Leave adequate thickness of acrylic resin to allow for adjustments at the placement and post insertion visits. (Fig. 11)
5. Finalize the thickness of the bulb walls when the obturator is deemed comfortable to the patient. Seal the lid using autopolymerizing acrylic resin and putty index to confirm exact placement and an air-tight seal, place the obturator prosthesis into a bowl of water and verify that it remains afloat. Return the polished prosthesis to the patient.

Insertion of the prosthesis-

1. Space was created on the tissue surface of the denture for attachments.
2. Pickup impression of the retentive clips was made with the help of the hard reliner. (Fig. 12)
3. Occlusion on both sides was ensured, selective grinding procedures were followed.
4. Post insertion care and instructions were given. (Fig.13 & 14)

II. Discussion

The conventional removable obturator framework design uses various clasps as retention components.[19,20,23] Clasps have disadvantages like low capacity for retention and plastic deformation caused by cycles of insertion/removal. Due to plastic deformation there will be rapid loss in retention that results in air and liquid leakages as well as discomfort. [24] Also, food and plaque accumulation at clasp site are common problems seen with conventional obturators. In such situations precision attachments (Rhein 83) are useful. Although, there are additional lab procedures but the nylon retentive caps are economical, replaceable and has less tendency to

wear. They also provide advantages like reduce torquing forces, reduce rotational movement of the abutment, reduce stress to abutment and prosthesis stabilization .[25,26] The position and periodontal status of abutment teeth are critical factors that contribute to the absorption of stress generated by functional movement of the obturator prosthesis play an essential role in retaining and stabilizing the prosthesis. Attachments need to be resilient to accommodate obturator movement and reduce the stress on abutment teeth. The literature defines many techniques for fabrication of closed hollow bulb using viz. putty, cotton, salt, double flask. The technique described here doesn't require double flask and additional materials. Splitting the hollow bulb and scraping the excess heat cure acrylic resin is easiler but time consuming . Putty index was used to reorient the bulb after hollowing.

A comprehensive assessment of speech intelligibility, vocal quality, and oropharyngeal swallowing provides important information for prosthetic modification to prevent nasal emission while speaking and regurgitation of food while eating. An appropriate prosthetic fit and functional success ensures that the patient ultimately uses the device during daily routines. It is important that clinicians do not overlook the importance of referral to the speech pathologist, particularly in patients for whom the success of a prosthetic obturator after partial maxillectomy depends on the ability to adequately speak and swallow.

III. Conclusion

One of the primary objectives of the rehabilitation of maxillary defect by using the obturator is the recreation of the partition between the oral and nasal cavities. Successful replacement of such a partition improves deglutition and enhances speech intelligibility. Restoration of aesthetics is achieved by the replacement of the missing teeth. We presented a case of rehabilitation of partial maxillectomy by using a definitive hollow bulb obturator with resilient attachments (Rhein 83) for achieving considerable reduction in the total weight of the prosthesis. This definitive obturator helped improve the quality of the life of the patient.

References

[1]. Okay DJ, Genden E, Buchbinder D, Urken M. Prosthodontic guidelines for surgical reconstruction of the maxilla: A classification system of defects. J Prosthet Dent2001;86:352-363.
[2]. Etienne OM, Taddei CA. Use of bar-clip attachments to enhance the retention of a maxillofacial prosthetic obturator: a clinical report. J Oral Rehabil2004;31:618-622.
[3]. Nekora- Azak A, Evlıoglu G, Ozdemir-Karatas M , Keskin H. Use of biofunctional prosthetic system following partial maxillary resection: a clinical report. J Oral Rehabil2005;32:693-695.
[4]. Curtis TA, Beumer J. Restoration of acquired hard palate defects: etiology, disability, and rehabilitation. In: Beumer J, Curtis TA, Marunick MT, editors. Maxillofacial rehabilitation:prosthodontic and surgical considerations. 1st ed. St Louis: Ishiyaku Euro-America; 1996. p. 225-284.
[5]. Devlin H, Barker GR. Prosthetic rehabilitation of the edentulous patient requiring a partial maxillectomy. J ProsthetDent 1992;67:223-227.
[6]. Keyf F. Obturator prostheses for hemimaxillectomy patients. J Oral Rehab 2001;28:821-829.
[7]. Ortegon SM, Martin JW, Lewin JS. A hollow delayed surgical obturator for a bilateral subtotal maxillectomy patient: a clinical report. J Prosthet Dent 2008;99:14-18.
[8]. Gurbuz A, Hasanreisoğlu U. Clinical comparison of different types of obturators constructed after maxillary resections. Ankara UnivHekimFakDerg1990;17:103-108. (Turkish)
[9]. Brown KE. Fabrication of a hollow-bulb obturator. J Prosthet Dent 1969:97-103.
[10]. Shaker KT. A simplified technique for construction of an interim obturator for a bilateral total maxillectomy defect. Int J Prosthodont 2000;13:166-8.
[11]. Nidiffer TJ, Shipmon TH. The hollow bulb obturator for acquired palatal openings. J Prosthet Dent 1957;7:126-34.
[12]. elMahdy AS. Processing a hollow obturator. J Prosthet Dent 1969;22:682-6.
[13]. Palmer B, Coffey KW. Fabrication of the hollow bulb obturator. J Prosthet Dentn1985;53:595-6.
[14]. Matalon V, LaFuente H. A simplified method for making a hollow obturator. J Prosthet Dent 1976;36:580-2.
[15]. Parel SM, LaFuente H. Single-visit hollow obturators for edentulous patients. J Prosthet Dent 1978;40:426-9.
[16]. Chalian VA, Barnett MO. A new technique for constructing a one-piece hollow obturator after partial maxillectomy. J ProsthetDent 1972;28:448-53.
[17]. Payne AG, Welton WG. An inflatable obturator for use following maxillectomy. J Prosthet Dent 1965:759-63.
[18]. Cheng AC, Somerville DA, Wee AG. Altered prosthodontic treatment approach for bilateral complete maxillectomy: a clinical report. J Prosthet Dent 2004;92:120-4.
[19]. Aramany MA. Basic principles of obturator design for partially edentulous patients. Part I: Classification. J ProsthetDent. 1978;40:554–557.
[20]. Aramany MA. Basic principles of obturator design for partially edentulous patients. Part II: design principles. J ProsthetDent 2001;86:562-568.
[21]. King GE, Martin JW. Cast circumferential and wire clasps for obturator retention. J Prosthet Dent 1983;49:799-802.
[22]. Brudvik JS, Taylor TD. Resin bonding for maxillofacial patient. In: Taylor TD, editor. Clinical maxillofacial prosthetics. Chicago: Quintessence; 2000.p.53-62.
[23]. Parr GR, Tharp GE, Pahn AO. Prosthetic principle of the framework design of maxillary obturator prostheses. J Prosthet Dent 1989;62:205-212.
[24]. Vallittu PK, Kokkonen M. Deflection fatique of cobalt-chromium, titanium, and gold alloy cast denture clasp. J Prosthet Dent 1995;74:412-419.
[25]. Williamson RT. Removable partial denture fabrication using extracoronal resilient attachments: A clinical report. JProsthet Dent 1993;70:285-287.
[26]. Sigurgeirsdottir E, Minsely GE, Rothenberger SL. Incorporation of an ERA attachment for obturator framework design: a clinical report. J Prosthet Dent 2002;87:477-480.

Fig.1

Fig.2

Fig.3

Fig.4

Fig.5

Fig.6

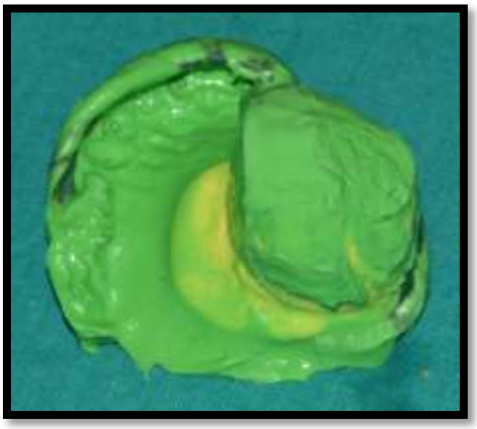

Fig.7

Fig.8

Fig.9

Fig.10

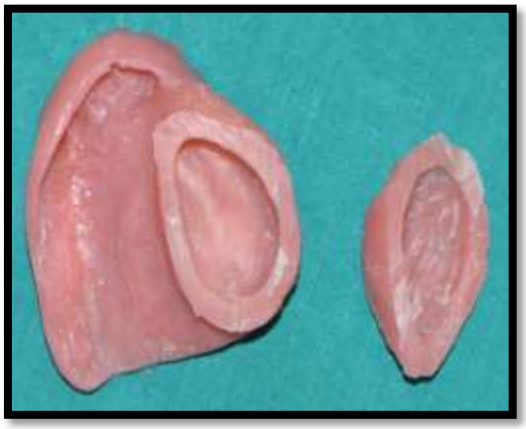

Fig.11

Fig.12

Fig.13 (Pre-op)Fig.14 (Post-op)

Swati Tiwadi. "Rehabilitation of Acquired Maxillary Defect with Precision Attachment Retained Hollow Bulb Obturatorprosthesis: A Case Report." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) 16.7 (2017): 63-67.