

Two Piece Closed Hollow Bulb Magnet Retained Obturator: A Viable Modality Option of Rehabilitation in Maxillofacial Prosthodontics- A Case Report

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ABSTRACT:

Maxillofacial prosthodontics has been subjected to use of various new techniques and materials over centuries to bring about promising results and reforms in rehabilitation and reconstruction with optimum and at times with much better appearance and function. This has lead to a much satisfied clientele. This clinical report falls no short in presenting a modality to rehabilitate a maxillary resection with two piece hollow bulb obturator with an aid of magnets.

Keywords: Obturator, Magnets, Denture

INTRODUCTION

Tumours in areas of hard palate, maxillary sinus and nasal cavity require maxillary resection or maxillectomy since there is lack of anatomic boundaries with one confluent chamber creates disabilities in speech and deglutition[1]. Basic prosthodontic principles should be followed and extreme care of the more resilient and unsupported tissues should be taken during the fabrication of an obturator prosthesis [2]. These prostheses vary in size and shape depending on the extent of the defect and should be easily fabricated, light weight, and provide retention, stability, and patient comfort [3].

It has been well documented in the literature that in fabrication of a hollow maxillary obturator, the weight of the prosthesis gets reduced by up to 33% [4, 5]. As per Aramany, the partially edentulous palatal defect patients are classified as per Kennedy's classification and are treated successfully by taking support from the remaining natural teeth [6]. However, in fully edentulous patients, since the support is taken only from the remaining bone, it is always mandatory to take care of what is remaining and what is lost.

Prosthodontist management during surgery can improve the overall prosthetic outcome and patient acceptance. It is mandatory to understand the normal anatomy and an appreciation of physical, physiological and psychological barriers for any treatment procedure.

This clinical report depicts a simple technique of fabrication of two piece closed hollow bulb obturator retained with magnets to rehabilitate speech, deglutition, mastication and facial profile of a

completely edentulous patient, who has undergone maxillectomy.

CASE REPORT

History

A 70 years old retired personnel of the Indian Air Force referred from general OPD to the Division of prosthodontics at our Lucknow centre with chief complaint of missing upper and lower teeth along with associated parts on the right upper side and difficult in chewing.

Examination

Clinical examination revealed that the patient had got all his teeth extracted 12 years back owing to periodontal disease. He was diagnosed with CA maxilla on the right side, three years back in 2012 and had undergone total maxillectomy for the same. He also revealed that post surgery, prosthesis were fabricated twice, which were loose and with no success.

Diagnostic OPG was done for the initial bone assessment [Fig 1]. Medical history was obtained and was clinically correlated with the routine blood and urine investigations. The patient had NIDDM Type II, which was under control owing to the regular intake of oral hypoglycaemic drugs. None other medical findings were significant. A pre operative diagnostic OPG was made for the initial assessment. The maxillo-mandibular alveolar ridges were deficient owing to the systemic condition and provision of implant retained prosthesis was ruled out. Therefore, a treatment plan of the more viable

option of fabricating a magnet retained two piece hollow bulb obturator with mandibular conventional complete denture was considered.

Treatment protocol

Preliminary impressions were made with irreversible hydrocolloid impression [Marieflex-Septodont] material in the stock edentulous trays and palatal fistulas were blocked with piece of gauze tied with floss extending out of the mouth. Primary casts were poured after block out of the undercuts with pumice within the maxillary defect. Relief was provided using spacer wax [Marc] and special tray were fabricated with autopolymerising resin for both the arches. The details of the defect were recorded with high fusing impression compound [Functional compound-DPI] and final impression with light body consistency addition silicone [Aquisil-Dentsply]. All the necessary functional movements of the adjacent tissues were carried out during the recording. Mandibular impression was recorded using Winkler's technique for impression of resorbed ridges. The first two applications being with the tissue conditioner [Viscogel-Dentsply] for 8-10 minutes each followed by the final third application of light body consistency addition silicone material. Beading and boxing of the impression was done and master casts were poured with type III dental stone [Kalstone-Kalabhai].

Hollow bulb fabrication

The maxillary secondary cast was duplicated using silicone duplicating rubber [Doublident-DMG]. A wax pattern was fabricated lining the hollow part of the defect and carved. A wax lid flattened at the top was also fabricated approximating and covering the defect well, post block out of the cast. Both were heat acrylised separately using compression moulding technique and later secured together with self cure resin to form the closed hollow bulb. A chair side try in was done.

Treatment obturator fabrication

With the hollow bulb in situ obturating the defect well [Fig 3], peripheral tracing was done with low fusing compound and impression made with light body addition silicone [Fig 4]. Cast was retrieved and occlusal rims were fabricated for both the arches. Maxillo-mandibular relation was made in centric and transferred onto a mean value articulator. Prior to this, vertical dimension of occlusion and interocclusal space were verified. Tooth arrangement was done using semi anatomic teeth in centric relation and try in was done. Mandibular conventional complete denture and oral part of the obturator were heat acrylized, finished and polished [Fig 5]. Close intimate contact of the pharyngeal and oral part of the prosthesis was verified. Two magnets were placed on

the intaglio surface of the oral part of the obturator at a distance of 10 mm. The counter alloy was picked up in self cure resin onto the cameo surface of the closed hollow bulb [Fig 6]. The patient was guided and could remove the pharyngeal bulb himself without any aids. A lab remount was done to eliminate lateral deflective occlusal contacts. Post insertion speech was intelligible and esthetics was optimal [Fig 7]. Verbal and written instructions were given. Patient was followed up and periodic recall was done at regular intervals as per the protocols.



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 7



Fig. 5



Fig. 6

DISCUSSION

The problems in speech, retention and mastication are more serious edentulous obturator patient as compared to completely edentulous patients. Speech deficits improve usually with modification of the prosthesis, adaptation and persistence by the patient, and constant support and encouragement by the prosthodontist.

With sizable palatal perforation, retention in the complete denture prosthesis is impossible. Adhesion, cohesion and peripheral seal are compromised due to air leakage, poor stability and reduced bearing surface. Thus, the contours of the defect must be used to maximise the retention, stability and support.

In this case, retention was gained mainly from the appropriate obturator tissue contact superio-laterally. Prosthesis was extended along the nasal surface of the soft palate and anteriorly onto the nasal aperture to gain additional retention. Stability was achieved by superio-lateral portion of the defect and the medial margin [7].

The patient had well healed lesion and had fabricated permanent prosthesis twice in the past but with no success. Despite several adjustments, the prosthesis was loose and unable to serve him for chewing and mastication. The prosthodontist considers to all facets of patient care from diagnosis and treatment to rehabilitation [7]. The patient was reassured and motivated for the rehabilitation procedure. The aim was to provide a prosthesis, which should be simple to handle, easy to maintain, light in weight and convenient for future adjustments [8].

To avoid nasal secretions, the obturator was chosen to be a closed type, which emit odour and make the prosthesis bulky. The other disadvantages of an open type of obturator are difficult to clean and polish the internal surface from saliva, mucous secretions, remnants of food and inability to extract

any support from the superior portion of the defect area were also avoided.

The selection of hollow design was primarily based on several advantages [9]

- More comfortable and efficient due to reduced weight
- Lightness improves retention and physiological function so that teeth and supporting tissues are not stressed unnecessarily
- Reduced self consciousness of wearing a prosthesis
- Reduced pressure on the surrounding tissues, aids in deglutition.
- Does not cause excessive atrophy and physiological changes in muscle balance

In the current situation, silicone liner was not used as a cushioning agent for the tissues. However, soft silicone liners can be used successfully to provide the cushioning effect, which depends on their resiliency i.e. the chemical composition of the material and its thickness. Despite resiliency being an asset, soft liners have several problems like loss of softness, colonization with *Candida Albicans*, poor staining, porosity, poor tear strength, lack of colour stability and varying degree of softness [10].

The fact remains that the placement of dental implants in such cases is fruitful and restores form, function and confidence of the patient to a greater extent. Cost which is primary factor in such rehabilitation, was not at all an inhibition being a govt borne clientele treatment modality. However, patient being suffering from NIDDM Type II, lack of sound bone both in quality and quantity at the surgical site alongwith poor compliance of the patient negated their use.

The magnets employed were the Neodymium Iron Boron (Nd-Fe-B) magnets [Magfit-DX, Japan], sealed in stainless steel casing and welded with microlaser to make them corrosion and wear resistant. Each magnet had a magnetic force of 600 gm with 0.7 mm height and 4 mm diameter. The magnets were adapted with cold cure resin as their magnetic field destroyed above the temperature of 120⁰ C. The counter alloy used was EFM i.e. Electro ferro-magnetic alloy with a chromium coating to protect its surface from oxidation. The alloy had an outer ellipsoidal outer lip to prevent rotation and enhance retention.

CONCLUSION

We have to extend our horizon and update our knowledge on the current methodologies of treatment options to satisfy the patient's need. A rewarding area of prosthodontics is the rehabilitation of patients with acquired maxillary defects. Keeping this view in mind, prosthodontic principles of utilising both hard and soft tissue undercuts, adequate

tissue coverage without overextension were taken into consideration.

The treatment was purely based on triad of clinical efficiency, functional harmony and esthetic outcome. The two piece sectional obturator design was ought to ease insertion and removal due to the limited mouth opening. Moreover, hollowness of the pharyngeal portion reduced the weight of the prosthesis, increasing the compliance and success rate of the prosthesis. The prosthetic rehabilitation was aimed at retrieving the form, function and esthetics of the patient, enable him lead a normal life span.

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