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Rehabilitation of Total Maxillectomy with Magnet Retained Obturator- A Case Report

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Introduction- Prosthetic rehabilitation of patients who have undergone total maxillectomy has always been a challenging task for the Prosthodontist. Such a patient presents with unique combination of multiple problems.[1] In addition to the debilitation associated with surgery the patient has to continue nasogastric feeding till the maxillary defect is obturated prosthetically or by surgical reconstruction.[2] It is challenging for the treating prosthodontist to combine and achieve all the characteristics a maxillofacial prosthesis such as, light weight, retention, stability, and esthetics and being functionally adequate, in a compromised clinical situation as that of a total maxillectomy.[3] In the clinical situation described, clinician has used his ingenuinity in fabricating a light weight, 2-piece obturator with magnetic attachments. The final prosthesis was considerably retentive, stable and proved to be functionally efficient for the patient.

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Rehabilitation of Total Maxillectomy with Magnet Retained Obturator- A Case Report

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Keywords: total maxillectomy, 2-piece obturator, magnets.

I. Introduction

Prosthetic rehabilitation of patients who have undergone total maxillectomy has always been a challenging task for the Prosthodontist. Such a patient presents with unique combination of multiple problems.[1] In addition to the debilitation associated with surgery the patient has to continue nasogastric feeding till the maxillary defect is obturated prosthetically or by surgical reconstruction.[2] It is challenging for the treating prosthodontist to combine and achieve all the characteristics a maxillofacial prosthesis such as, light weight, retention, stability, and esthetics and being functionally adequate, in a compromised clinical situation as that of a total maxillectomy.[3] In the clinical situation described, clinician has used his ingenuinity in fabricating a light weight, 2-piece obturator with magnetic attachments. The final prosthesis was considerably retentive, stable and proved to be functionally efficient for the patient.

II. Case Report

A 72 yrs old female patient reported to dental center complaining of a loose obturator. History revealed that she had undergone partial maxillectomy of right side 04 years back for Adenoid cystic carcinoma following which she was provided with an obturator.

A thorough intraoral examination revealed another diffuse swelling of palate on the left side. Biopsy confirmed the recurrence of the lesion on left side of palate. The total maxillectomy was planned by oncosurgeons. Pre-surgical impressions were made to fabricate a surgical obturator and the extent of resection was outlined by oncosurgeon on the maxillary cast. The surgical obturator was fabricated and secured intra orally using ligature wires and screws inserted bilaterally in the zygomatic arch (Fig 1). In the defect area, considerable portion of the nasal septum, part of the inferior nasal conchae, and the superior wall of maxillary sinuses on either side could be appreciated clinically (Fig 2). Treatment plan narrowed down to fabrication of an interim obturator followed by a 2 piece magnet retained hollow bulb definitive obturator to restore patient's oral functions, speech and to improve esthetics.

Surgical obturator was retrieved after 20 days and the clinical procedures for an interim obturator were initiated. Elastomeric impressions were made using a custom tray with medium body (Aquasil Monophase; Dentsply; Caulk, Germany). Jaw relations were recorded. Initially only anterior teeth were set in the interim obturator Fig 3). The improvement in esthetics and phonetics considerably motivated the patient to develop a more positive outlook towards her clinical condition. The interim obturator was relined intraorally with monomer free silicone soft liner (GC reline, GC Japan). The patient was kept on a strict and regular follow up and post insertion hygiene maintenance protocol. The patient was recalled after 03 months for the fabrication of definitive obturator.

Fabrication of Definitive Two Piece Magnet Retained Hollow Bulb Obturator. The definitive obturator comprised of an 'Antral' and an 'Oral' section. Both were fabricated in different phases as outlined below.

a) Antral section of obturator (hollow bulb)

The patient's interim obturator was customized to be used as an impression tray. Border molding was done with green stick compound and the final impression was made with medium body elastomeric impression material. Master cast was fabricated and duplicated. The undesirable tissue undercuts were blocked by equal mixture of plaster and pumice. A 2-mm thick baseplate wax was then adapted over the antral portion of the obturator and a flat wax lid was fabricated over it. The obturator was polymerized using heat cure polymerizing acrylic material (DPI, Mumbai, India), as per manufacturer's instructions. The acrylized antral part was separated from the cast and the plaster/pumice mix blocking the undercuts was removed. The superior surface of the antral part of the obturator, which was to come in contact with the tissues, was roughened with acrylic bur. Permanent silicone soft liner material (Permaflex, Kohler, Germany) was then mixed and placed into the mold space and the antral obturator placed over it. Curing was carried out as per manufacturer's recommendations.

The antral part of the obturator was then removed and cleaned (Fig 4). The flat lid was secured onto the antral portion with the help of self cure acrylic polymer resin. On the inferior surface of the antral section three triangular elevations, one in central and

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two in posterior areas were carved out with autopolymerizing resin. This would help to orient the oral part with the antral part of the obturator during all further clinical procedures. The antral part was tried in and corrected for any overextensions and sharp margins (Fig 5). The anatomical undercuts present in the maxillary tuberosity, sinus areas and the perioral musculature provided acceptable retention for the prosthesis.

b) Oral section of obturator

The antral section was re-positioned on the earlier duplicated master cast and wax occlusal rim was fabricated over it using hard modelling wax (Cavex, Netherland). Jaw relations were recorded. Anterior and posterior try in of teeth was done and patient's esthetics and phonetics were evaluated (Fig 6). To give the patient a feel of normal palatal contours and to improve the pronunciation of linguopalatal sounds, a thin layer of wax was adapted in the palatal region of the prosthesis (Fig 7). The prosthesis was then polymerized in heat cure acrylic resin. Trimming, finishing, and polishing procedures were completed, and the prosthesis was tried in the patient's mouth. Occlusal errors were checked and corrected, and an almost non functional occlusion with passive intercuspal contacts of the teeth was incorporated. Five pairs of commercially available magnets (cobalt-samarium, Ambica Corporation, New Delhi, India) were positioned in the prosthesis with the help of autopolymerizing acrylic resin (Fig 8) with the keeper in antral part and magnet in oral part. The completed prosthesis was inserted in the patient's mouth (Fig 9).

c) Insertion and Review

The prosthesis was evaluated for retention, stability, phonetics, esthetics and comfort. Patient was instructed to wear the antral portion first and once this was comfortably seated, the oral part was to be inserted. During removal, the patient was instructed to stabilize the posterior part of the antral part of the prosthesis with her left index finger and remove the oral part of the obturator with her right hand to avoid displacement of the antral part along with the oral part of the obturator. Patient was recalled after 24 hours for a review checkup. She was instructed to start consuming semisolid food. Periodical review follow-up was done upto 06 weeks during which the patient had no complaints. After a period of 3 months, the patient was found to be completely comfortable in handling and using the prosthesis to continue to use. She was also satisfied with her speech, esthetics and function.

III. Discussion

Obturator prosthesis is the treatment of choice for patients who have undergone maxillectomy.[1] It recreates a partition between the oral and nasal cavities, restores facial contour, improves mastication, articulation and speech intelligibility. Patients with a bilateral maxillary resection present a tough clinical situation for the prosthodontist. Support and retention of the prosthesis is often compromised due to the absence of palate and teeth, lack of favorable tissue undercuts, and presence of non keratinized nasal mucosa. The retention of the antral part of the obturator in such cases can be achieved from the available anatomy using resilient liners. The use of a resilient liner is a simplified treatment modality because it is modifiable and comparatively economical.[4,5] Magnets, on the other hand, are useful due to their small size and provide strong attractive forces. They can be placed within the prostheses without being obtrusive in the mouth.[6] Cobalt samarium magnets are rare earth magnets and have been used since 1960s for dental applications.[6] In the 1980s neodymium iron-boron magnets were introduced. Though these were efficient for dental applications, they presented a few limitations, such as brittle nature and low corrosion resistance. Long term use of this type of magnet is not indicated. To rectify these limitations, samarium-iron-nitride magnets are presently being researched for intraoral use.[6] Dental implants are generally ruled out in such cases due to non availability of adequate bone. Furthermore, due to inadequate zygomatic bone and the morbidity associated with the surgical procedures, the modality of implant anchorage from the zygomatic arch was totally ruled out for this patient.

IV. Summary

This technique offers a practical means of rehabilitating a patient who has undergone total maxillectomy. The majority of maxillary defects can be ideally reconstructed with a simple obturator. However, the insertion and removal of a large prosthesis used for the rehabilitation of midfacial defects requires adequate neuromotor coordination. A 2 piece sectional obturator with antral and oral sections retained with magnets provides a suitable, economical and functional means of rehabilitation for total maxillectomy patient. The outcome was very rewarding and motivating for the patient.

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