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A Hollow Bulb Obturator to Rehabilitate Hemi-Maxillectomy Defect.

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Abstract:
Maxillectomy defect can lead to oroantral communication, difficulty in mastication, phonetics and other occlusal problems. Patients who have had procedures like partial or full maxillectomy or mandibulectomy lead a very poor quality of life, to rehabilitate and to improve their quality of life to some extent interim or definitive prosthesis is recommended. In this case report, we fabricated interim obturator for a patient who went through hemi-maxillectomy due to development of central giant cell granuloma in second quadrant of maxillary arch. The obturator was supported by teeth present in the first quadrant. This interim prosthesis rehabilitated the patient, improving masticatory efficiency, enhancing speech clarity, and improving quality of life.
Categories: *dentistry, oral rehabilitation, oral surgery*
Keywords: *CGCRG, prosthodontic rehabilitation, obturator, denture, hemi-maxillectomy*

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I. Introduction

Maxillectomy, the surgical removal of the maxilla or part of it, is often necessary to manage malignancies of the maxillary sinus, palate, or adjacent structures. This extensive surgical intervention, while life-saving, results in significant anatomical and functional deficits, including difficulties in speech, mastication, and deglutition, as well as aesthetic concerns due to facial disfigurement.[1] The subsequent maxillary defect can be classified according to the extent of resection, with hemi-maxillectomy indicating the removal of one half of the maxilla.[1]

Prosthetic rehabilitation of these defects is essential to restore form, function, and aesthetics. The hollow bulb obturator is a well-documented prosthetic solution designed to address these challenges.[1] It serves to obturate the defect, separate the oral and nasal cavities, and support speech and deglutition. Its hollow design reduces the weight of the prosthesis, improving comfort and patient compliance while also enhancing resonance and speech intelligibility.[1]

This case report details the clinical management and prosthetic rehabilitation of a patient with a hemi-maxillectomy defect using a hollow bulb obturator. It highlights the step-by-step fabrication process, the considerations for optimizing fit and function, and the impact of the prosthesis on the patient's quality of life. Through this case, we aim to illustrate the efficacy of the hollow bulb obturator in the complex rehabilitation of maxillary defects and to contribute to the body of knowledge guiding prosthetic interventions for similar clinical scenarios.[1]

II. Case Report

A 45 years old female patient reported to the department of prosthodontics and crown & bridge with the chief complaint of inability to do mastication, compromised phonetics and unesthetic appearance as she underwent hemi-maxillectomy due to the developing central giant cell granuloma.

Figure 1: Pre-treatment extra-oral profile of the patient

Extra oral examination revealed asymmetrical facial profile (figure 1). On intra oral examination it was observed that the defect was present on the left side of maxillary arch (figure 2). According to Armany's classification the defect comes under class I midline resection. Plaque and calculus accumulation was seen on the opposite quadrant of the maxillary arch.[1,2] The gingiva on the affected side appeared red and in the process of healing when the patient reported. The occlusal examination revealed class I occlusion (figure 3,4).

The primary goal of the treatment was to close the communication between oral and nasal cavities that would eventually block the unrestricted transfer of speech sounds, foods and liquids.[1] Additionally the goal was to improve esthetics and function of the patient's oral cavity.

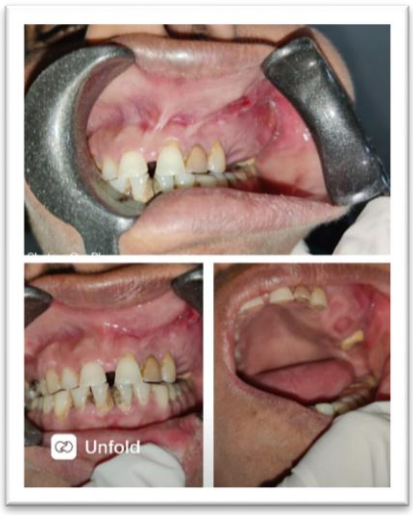

Figure 2: Pre-treatment intra-oral view showing swelling present on the left side of the maxilla (A,B,C)

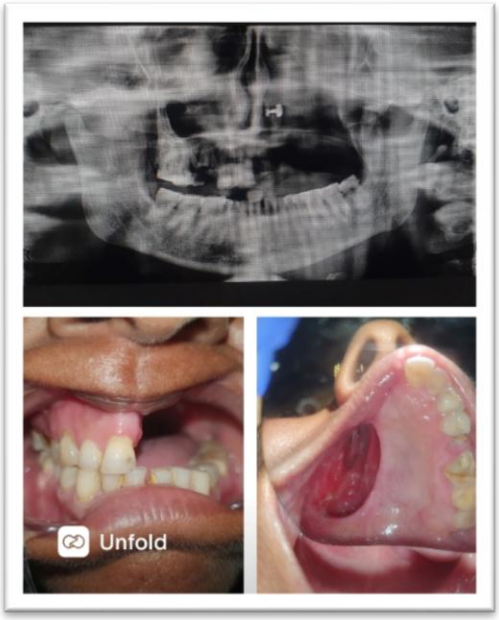

Figure 3: A shows OPG showing the resected area by radioluscency, B: shows the occlusion and unpleasant appearance of the patients intra-oral view, C: shows the resected maxilla and the oro-nasal communication in the palate.

Figure 4: A: shows oro-nasal defect, B: extra oral post-treatment view, C: side profile view of the patient.

Maxillary and mandibular impressions were obtained using irreversible hydrocolloids. The upper stock tray was modified for a better fit, and undercuts were blocked out with petrolatum-laden gauze. These impressions were then poured with Type IV dental stone to create study casts (figure 5).

Figure 5: A: shows a feeding plate adjusted and given to the patient until the fabrication of final prosthesis, B: oro-nasal communication blocked out with petroleum laden gauze, C and D: border molding done using green stick compound

The study casts were then used for further planning of the treatment. The maxillary study cast was used for the fabrication of custom tray for border molding. The incisor and molars of the unaffected quadrant were used for a clasp assembly in the interim prosthesis. The custom tray was trimmed and adjusted accordingly and border molding was done using green stick compound. The final impression was taken using A silicone light body material as it will record the healing tissue better (figure 6).

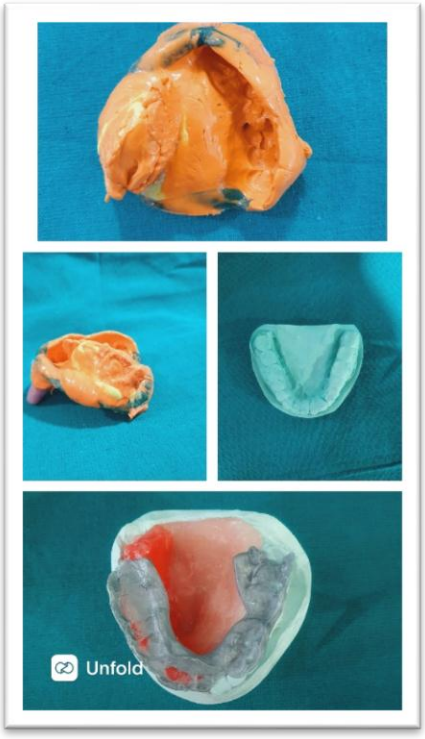

Figure 6: A and B: final wash impression using A-silicone light body, C: master study model, D: bite registration by Alu wax

Beading and boxing was done on the obtained final wash impression of the maxillary border molding. Master cast was retrieved from the boxed impression. Record base and rim was fabricated on the master cast which was later used for the face bow. Face bow was recorded and was transferred on Hanau Wide Vue. The maxillary cast was mounted according to the face bow transfer. The maxillary rim was placed into the patient's oral cavity and was asked to close in centric. Bite registration was obtained using Alu wax.

The mandibular cast was later mounted using the bite and centric record obtained. Teeth arrangement was done using monoplane or zero degree teeth, followed by try-in (figure 7).

Figure 7: A and C: final master cast, B: teeth arrangement, D: teeth arrangement mounted on hanau wide vue

The denture was then dewaxed and acrylised using the hollow denture procedure as hollow dentures are light in weight after fabrication and are found to be more useful in the obturators case.[2] The first layer of heat cure was placed onto the dewaxed flask of maxilla where a small salt pouch was placed into the defect area (figure 8,9). A second layer of heat cure material was then placed onto the salt pouch covering it.

Figure 8 and 9: shows dewaxed hollow denture

The flask was closed and placed into the hydrolic press to remove the excess material. It was then left for bench curing and then curing was done by long curing cycle (figure 10,11).

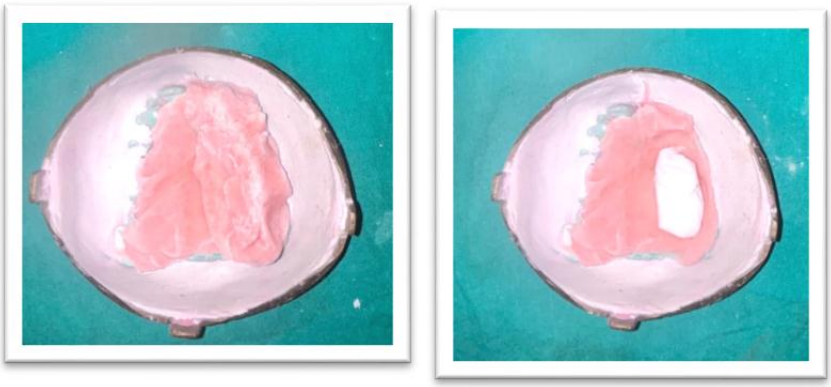

Figure 10 and 11: shows the placement of salt pouch in the defect area and final layer of heat cure acrylic resin.

The obtained denture was then retrieved, in the defect area where the salt pouch was placed a small hole was made by frenum relieving bur and the salt pouch was retrieved. The hole was closed using colored acrylic. The denture was trimmed and polished and tried into patients mouth and adjusted accordingly. Lastly pressure indicating paste was applied into the palatal surface of denture to rule out any extensions which later might impinge on the tissue causing any inflammation (figure 12).

Figure 12: A: shows hollow denture in a beaker, B,C and D: shows post delivery front and side profile of the patient.

A layer of soft liner was then applied before delivering the denture to the patient for better retention and support to the adjusting structures. Patient was given post insertion instructions and was put on follow up after 24 hrs, 1 week and 3 months to check for any change in defect size and to rule out any inflammation or re-growth of the carcinoma or denture loosening.

III. Discussion:

Patients who have had a maxillectomy frequently experience recurrent difficulties during prosthodontic therapy that are specifically linked to inadequate stability, retention, and support. The prognosis for prosthodontic treatment in these patients depends on a number of factors, including the severity of the defect, the number of remaining teeth, the amount of remaining bone structure, the state of the surrounding mucosa, the effects of radiation therapy, and the patient's capacity to adapt to the prosthetic device.[1,3] For patients undergoing unilateral maxillectomy, saving as many natural teeth as possible may be essential to the best possible prosthesis design and functionality. Such a large, heavy obturator puts constant pressure on the other components, compromising tissue integrity, patient function, and comfort.

The secret to getting prosthetics stable is occlusion. To reduce prosthesis movement and the associated forces on specific components, it is essential to make sure that occlusal forces are distributed equally in both centric and eccentric jaw locations. It is crucial to choose an occlusal scheme carefully, remove any early occlusal contacts, and employ stabilizing materials with wide dispersion in order to lessen the stress brought on by lateral forces.[2]

Building the final obturator must wait until the defect site has fully healed and achieved dimensional stability. This can happen anywhere from three to six months after surgery, depending on a number of variables such as the size of the defect, the prognosis of the tumor, the rate at which healing proceeds, and whether or not teeth are present.[1]

IV. Conclusion:

Making sure a maxillectomy patient has enough retention, stability, and support is the main recovery difficulty. Effective rehabilitation of these patients requires in-depth knowledge of their demands as well as a great deal of experience. A final obturator prosthesis with optimal coverage and design can greatly enhance the patient's speech intelligibility, masticatory ability, and general quality of life.

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