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CASE REPORT

Obturator with hollow bulb after hemimaxillectomy – A Case Report

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ABSTRACT

Hemimaxillectomy will create oro-nasal communication which can affect the function of swallowing, masticatory, speech, aesthetic and psychological. This case report describes a method of prosthodontic management of maxillary defects using an obturator prosthesis with a hollow bulb. A 15-year-old male patient was diagnosed with central giant cell granuloma, therefore hemimaxillectomy was performed by ENT doctors at RSUP Dr. Sardjito. He has a surgical obturator that was inserted by a prosthodontist immediately after the surgery. Three weeks after surgery, soft tissues were ready to be made an interim obturator. Seven months later, he came to RSGM Prof. Soedomo with a complaint the old obturator is difficult to adapt. Intraoral examination revealed a large palate defect in the right palate durum segment (Aramany's class II type maxillary defect) and half of the right maxilla is missing. A definitive obturator using metal combination acrylic with a hollow bulb was made to cover the maxillofacial defect and replaced missing teeth. That prosthesis can cover the defects of the maxilla so the patient can speak well, and the function of masticating and swallowing can be restored. (IJP 2024;5(2):124-127)

Introduction

Central giant cell granuloma (CGCG) was an uncommon, benign tumor that was also aggressive and destructive in its localized area. Surgical excision or resection with a continuity defect, enucleation, or aggressive local curettage are possible treatments.[1] Surgical resection such as hemimaxillectomy results in several problems that cause difficulties in mastication, swallowing, speech, aesthetics, and psychologies.[2] This surgery also forms an opening or a relation between the antrum and nasopharynx, known as a maxillofacial defect.[2,3] This defect can be categorized into three groups: acquired, congenital, and developmental. Acquired defects are the most common maxillofacial defects that are the result of trauma or of disease and its treatment, congenital defects are present from birth, and developmental defects occur because of some genetic predisposition.[4]

The maxillofacial prosthetic is known as a large removable prosthetic discipline that can be divided into maxillary prostheses and mandibular prostheses. Obturator prosthesis is a type of maxillary prosthesis that use to repair those defects.[4] This prosthesis aims to the separation of the oral and nasal cavities; hence the defect can be restored.[5]

The management of neoplasm usually involves radical surgical resection, chemotherapy, and radiotherapy. Partial surgical resection of the maxilla is known as hemimaxillectomy. Prosthodontic management for neoplasm can be divided into three phases: Pre-operative construction or surgical obturator; Post-operative modification or interim obturator; Definitive obturator.

Figure 1 Aramany classified the partially defect post maxillectomy into 6 groups, such as Class I (Midline resection), Class II (unilateral resection with retaining the anterior teeth on the contralateral side), Class III (central resection that involves the hard palate and may the part of the soft palate, without involving the remaining teeth), Class IV (the defect involves both sides of the maxilla and crosses the midline), Class V (bilateral posterior resection), Class VI (anterior resection).[4,6]

This case report describes a prosthodontic rehabilitation of a patient with CGCG of the right maxilla using a surgical obturator, interim obturator with a hollow bulb, and metal framework combina-

Case Report

A 15-year-old male patient came to the Oral Health and Dental Clinic RSUP Dr. Sardjito on September 2021 with diagnosed central giant cell granuloma post mass extirpation followed by a hemimaxillectomy. He was referred from the ENT Clinic for a consultation about a surgical obturator. Pre-surgical extraoral examination revealed an asymmetrical face with visible swelling on the right side but the pain is absent figure 2 . Intraoral examination showed a large mass inside the right palatal defect, and missing teeth 17,16,15,14,13,12 figure 3. The treatment plan included extirpation of the mass followed by hemimaxillectomy to be performed by ENT doctors and surgical

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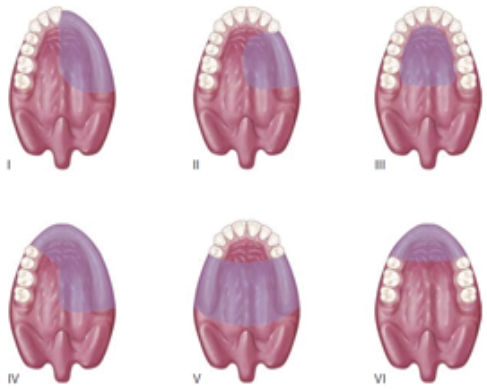

Figure 1. Aramany classification system for maxillectomy defects

Figure 2. Extraoral frontal view, Presurgery, 3 weeks presurgery, 7 months postsurgery

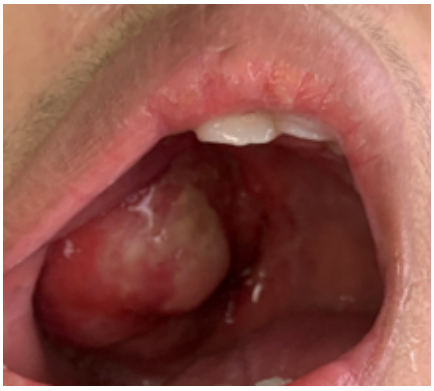

Figure 3. Intraoral preoperative condition

obturator placement by a prosthodontist.

At the first visit, patient history was taken and an impression of the maxilla and mandibula was performed using a perforated stock tray with irreversible hydrocolloid impression material. The negative impression was modified and filled with a dental gips stone. A modified working model was used to design and fabricate the surgical obturator figure 4A. The design was formed like an essix retainer using thermoforming foils material that covers the entire surface and left maxillary teeth, with perforation on the labial and left buccal flange area for suturing or fixation figure 4B.

Surgery was scheduled 1 month later. After the mass was removed, the maxilla was imprinted using a perforated stock tray with polyvinyl siloxane impression material (to make an individual custom tray). The surgical obturator was fitted and sutured at three sites of the anterior mucosa region figure 5.

Two days after surgery, the patient was checked to make sure there was no discomfort from the surgical obturator and educated patient about how to clean the oral cavity and scheduled for control to the Oral Health and Dental Clinic. One week later, the patient come to control and unstitched the surgical obturator.

Three weeks after surgery, the patient was examined, and the healing of soft tissue was well enough for the replacement of the interim obturator. Clinical intraoral examination presented quite good oral hygiene; large palate defect in the right palate durum segment (Aramany's class II type maxillary defect); half of the right maxilla is missing from region 17 to 12 missing teeth 17,16,15,14,13,12; unstable occlusion; slightly posterior crossbite; and anterior overjet 5 mm figure 6. The preliminary impression was made using the individual custom tray with irreversible hydrocolloid impression material, and the cast was poured figure 7.

The working model was sent to the dental laboratory to customize an interim obturator. The design of the interim obturator was using a round stainless-steel wrought wire (diameter 0.7mm) C-clasp for teeth 24,25,26; an acrylic hollow bulb to close the palatal defect; artificial teeth with light contact (with the opposing teeth) figure 8. This procedure takes 1 month long with 4 times visits until it is inserted. During the insertion time, a soft liner was added to the posterior side of the prostheses, then the patient was educated on how to clean the obturator and counseled that chewing on the defective side is not allowed. One week after insertion, the patient was scheduled to control and there is no complaint about pain or discomfort felt.

Seven months later, he came to RSGM Prof. Soedomo with a complaint the old obturator is difficult to adapt and loosen. Intraoral examination showed quite good oral hygiene; no fresh complications; decreased size of the defect. Extraoral examination showed a curved profile, an asymmetrical face, and slight lack of lip support. At this visit, preliminary impressions of maxilla and mandible were recorded with hydrocolloid irreversible impression material with metal stock perforated trays. The impressions were poured with dental gips stone and casts were obtained figure 9A. For the design of the framework, double akers clasp was selected for teeth 26,27; Y-clasp for tooth 11, modified palatal type of major connector (half plate – half mesh) figure 9B.

One week later, the framework was tried in the patient's mouth to assess the fit with supporting structures, and bite rim blocks were attached to the framework figure 10A. Centric jaw relation was recorded and the casts were mounted on an articulator figure 10B. The artificial teeth were arranged and the prosthesis was tried to confirm the occlusion with the mandibular teeth, aesthetic appearance, and support for the underlining tissues figure 11. The prosthesis was sent to the dental laboratory to process with acrylic, add the hollow bulb to close the defect, finished, polished, and inserted. The patient received post-insertion instruction on how to take care of and use the obturator.

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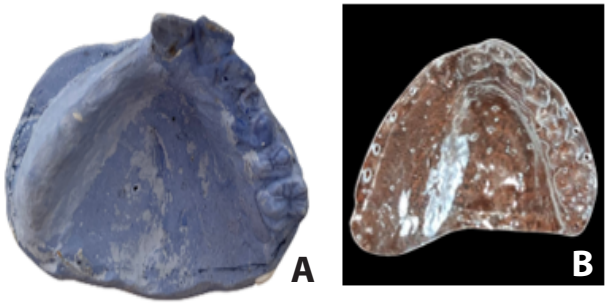

Figure 4. **A. Modified working model, B. Surgical obturator**

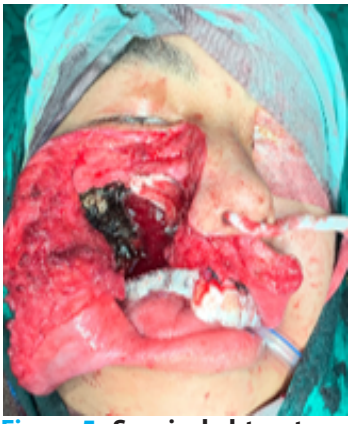

Figure 5. **Surgical obturator was inserted immediately after surgery**

Figure 6. **Intraoral view; 3 weeks postsurgery, 7 months postsurgery**

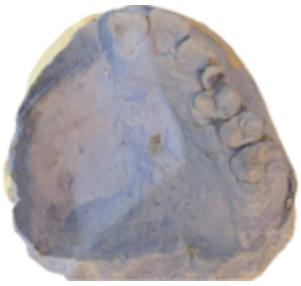

Figure 7. **Working model for interim obturator**

Discussion

Most patients with maxillary defects post maxillectomy require a surgical obturator, interim obturator, and definitive obturator.[7] Typical goals of removable maxillofacial prostheses are well-supported, minimal movement under function, maximum engagement of the remaining teeth to control the retention, minimal movement under function, and placement of artificial teeth to facilitate tooth-tissue contact during normal functional contacts.[4]

Bulb extension is very important for removable maxillary prostheses because of using the hollow bulb reduces the weight of an obturator. Another consideration for using the hollow bulb is to aid speech resonance; reduce the weight on the unsupported side; increase physiological function, decrease the unnecessary stress on the surrounding tissues and teeth; decrease the pressure on the surrounding tissues aid in swallowing; easy to clean the internal surface from saliva and mucous crust; and there are no accumulated nasal secretions which can lead to foul-smelling.[8]

The history and clinical examination of the patient in this case report showed maxillary defects classification Class II Aramany, which was rehabilitated by a surgical obturator, interim obturator with a hollow bulb using the acrylic material, metal framework combination acrylic with hollow bulb for definitive obturator.

The surgical obturator is a maxillofacial prosthesis that recovers and preserves function to an acceptable level during the early stages of healing. This obturator is inserted immediately at the time of surgery. It may act as a barrier between the oral cavity and nasal cavity; hence per-oral contamination can be avoided.[8-10]

In this case, the interim obturator was constructed three weeks following the operation. Artificial teeth were added with light contact with the opposing teeth. The addition of artificial teeth to an interim obturator (fabricated 3-4 weeks after surgery) showed a bigger percentage of speech intelligibility (95.60%) than an immediate obturator that was inserted on the second day post-operative (94,10%).[5] An initial focus on improvement in swallowing and speech to help boost the rehabilitation process significantly. The patient is prohibited from using the defective side for chewing to prevent prosthesis movement.[4]

The definitive obturator was constructed until the defect site is completely healed and stable. This may take 3 to 6 months after surgery depending on the prognosis of the tumor, size of the defect area, recovery period, and existence or absence of teeth.[4,8,10] The chosen material for this phase obturator was metal framework because the bracing component, maximum extension to the muco-buccal fold, the extension of the labial flange can improve the stabilization, retention durability and longevity of the prosthesis.[11,12] Aramany's class II type maxillary defect is similar to a Kennedy class II which a single, unilateral defect is located posterior to the remaining teeth. Therefore, a tripodal design can be used.[12]

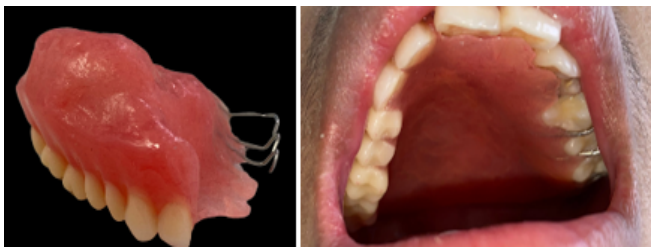

Figure 8. **The interim obturator acrylic with hollow bulb; Before insertion, after insertion**

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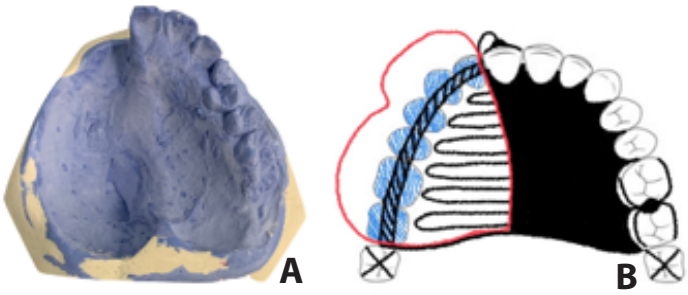

Figure 9. A. Working model for definitive obturator, B. Design for definitive obturator

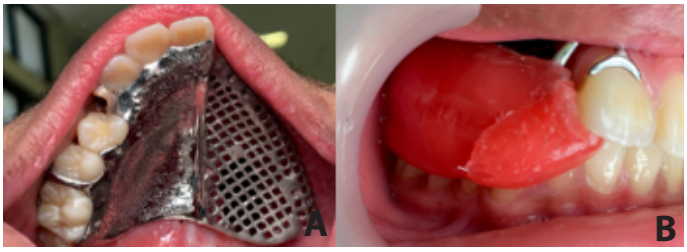

Figure 10. A. Try in the metal framework, B. Record the centric jaw

Figure 11. Metal framework combination acrylic with hollow bulb, definitive obturator was inserted.

Conclusion and Suggestion

Patients post hemimaxillectomy with maxillary defects suffer from a lot of psychological trauma. Hence, we as a prosthodontist should try to restore the function of the oral structures and regain the lost form of peri-oral structures. The maxillary prostheses such as surgical obturators, interim obturators, and definitive obturators with hollow bulb modification improve the function of masticatory, swallowing, aesthetic, comfort, and psychological. The patient suggested maintaining oral hygiene, prosthesis hygiene, and regular checkups

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