

CASE REPORT

Two-piece hollow bulb obturator after partial maxillectomy on ameloblastoma case

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ABSTRACT

Ameloblastoma often occurs in the mandibular area, but 15 - 20% of ameloblastoma originates from the maxilla. Ameloblastoma lesions in the maxilla can be treated with partial maxillectomy, which produces defects that alter speech, swallowing function, and aesthetic. The role of prosthodontics is needed to rehabilitate the patient's condition by fabricating an obturator that helps reduce the morbidity of patients. The main problem with the rehabilitation of substantial defects in the maxilla is the weight of the prosthesis, resulting in non-retentive prosthesis. The purpose of this case report was to evaluate the post-treatment of the partial maxillectomy in the case of ameloblastoma with the hollow bulb to rehabilitate the functions of mastication, phonetics, swallowing function, and aesthetic functions. This case report discussed the treatment of a 58-year-old female who undergone partial maxillectomy, has experienced tooth loss in 15, 14, 13, 12, 11, 21, 22, and 23, and had an anterior palate defect due to mass retrieval under the Aramany class VI classification. The chosen treatment was the fabrication of an obturator with the two-piece hollow bulb made of acrylic resin. The results of the obturator insertion are good retention, stabilization, occlusion, aesthetics, clear phonetic, and the increasing patient's confidence. The follow-up control after one week showed good retention, stabilization, occlusion, aesthetics, even clearer pronunciation and a good adaptation from the patient. This case report concludes that the two-piece hollow bulb acrylic resin obturator in ameloblastoma case can rehabilitate the maxillary defect post partial maxillectomy to restore masticatory, phonetic, swallowing and aesthetic functions.

Keywords: ameloblastoma; hollow bulb; maxillary defect; obturator

INTRODUCTION

Maxillofacial defects possibly occur due to malformation of congenital, trauma, or tumor resection surgery.¹ Ameloblastoma is one of benign tumor, which grows slowly but locally aggressive with the manifestation of swollen at jaw area and does not cause any pain. It can expand to cortical bone, causes perforation on buccal plates and infiltrates soft tissue. The tumor is located at mandibular area and around 15-20% ameloblastoma had been reported from maxilla with approximately 2% cases found at region of anterior to premolar.^{2,3} The prevalence of ameloblastoma is around 1% from all tumors in head/neck region and 11% from all odontogenic tumor. Ameloblastoma generally occurs at the

age range of 30-60 years old and usually there is a difference of occurrence between males and females.⁴

The etiology of ameloblastoma is not certainly known and may be associated with abnormalities in tooth development, trauma, or cystic lesions.⁵ Ameloblastoma therapy is excision with an adequate limit so as to minimize recurrence. Therefore, it is necessary to plan appropriate management. Ameloblastoma lesions in the maxilla can be cured by a variety of approaches, such as partial maxillectomy which will cause defects and result in the opening relationship between the oral cavity, the nasal sinuses, and/or nasal cavities, causing changes in speech and swallowing due to the presence of air and food

that can come out-enter during eating and talking. The formed defect can be overcome by using an obturator to control the defect healing.⁶

Obturator is a device that covers the gap or defect in the maxilla due to cleft palate, trauma or removal of the maxilla due to pathological mass. Obturator prostheses can improve the ability to speak, masticate, swallow and improve the aesthetic functions by rebuilding lost or-nasal boundaries. Obturator prostheses can also improve the psychological status and quality of life of patients. Obturators for patients with postoperative defects in the maxilla can be divided into 3: postoperative obturator, interim (temporary), and definitive obturator. Interim obturators are made after 3-4 weeks post surgery. This obturator consists of an artificial palate, an artificial alveolar ridge and is generally without a tooth attached. Addition of artificial teeth can be done on the mass taking involving the anterior teeth to provide psychological effects for patients.⁷

Reducing the weight of the obturator prosthesis is needed to improve patient comfort, so that an obturator with hollow bulb is made. The hollow of the obturator significantly reduces the weight of the prosthesis from 6.55% to 33.06%, depending on the size of the defect.⁸ The hollow bulb design can reduce the weight of the prosthesis because it has hollow which makes it more comfortable. The hollow bulb design can add sound resonance, which can clarify the patient's voice. This type of two-piece hollow bulb is widely used because its making is relatively easy and simpler.¹ The purpose of this case report is to evaluate post partial maxillectomy treatment in the case of ameloblastoma with two-piece hollow acrylic obturator bulb to rehabilitate masticatory, phonetic, ingestion processes, and aesthetic functions.

METHODS

A 58-year-old female patient, came to Prof. Soedomo Universitas Gadjah Mada Dental Hospital at the ENT-KL referral to Sardjito General Hospital to obtain an acrylic resin obturator after using a

post-surgical obturator from shellac material due to mass retention in the front ceiling. Patient had a history of ameloblastoma in the anterior palate that had been increasing in the last 2 years. She had received partial maxillectomy treatment in the anterior region, involving teeth 15, 14, 13, 12, 11, 21, 22, and 23. After removal of the palate tissue, the patient received treatment postoperative obturator. There were no abnormalities in the medical history and dental health. Extraoral examination revealed asymmetrical lips due to mass uptake involving the anterior region (Figure 1). Intraoral examination revealed extensive defects of the anterior hard palate involving teeth 15, 14, 13, 12, 11, 21, 22, and 23 with the Class VI Aramany classification. The teeth in the mandible were still intact and the oral hygiene examination of the patient was included in the moderate category (Figure 2).

The case treatment plan was the manufacture of acrylic resin obturator with two-piece hollow

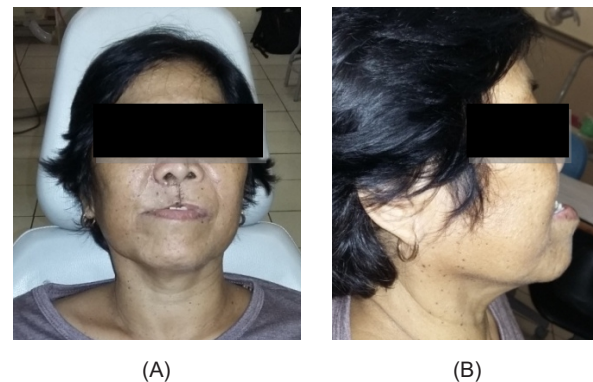


Figure 1. The profile of the patient front view(A) and side view (B)

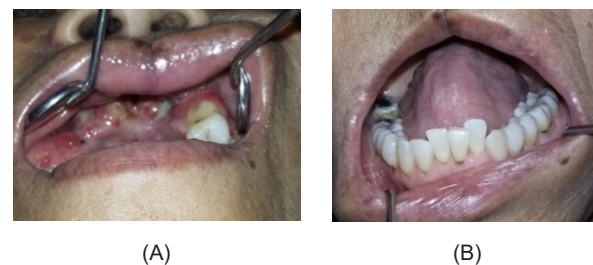


Figure 2. Image of the maxilla with palate defects (A) and mandible (B)

bulb with tripodal design on the maxilla. Before treatment, the patient received information treatment procedure and signed informed consent for treatment and publication.

The treatment began with molding the maxilla and mandible using an irreversible hydrocolloid material with mucostatic techniques to obtain a study model (Figure 3). The denture design for this case included some stage. The first stage was to determine the class of the toothless area. The missing teeth were teeth 15, 14, 12, 11, 21, 22, and 23 in the maxilla. This case included the classification of Applegate Kennedy class III, Classification of Kennedy class III, and classification of Aramany class VI. Indication of obturator: tripod acrylic resin design tripodal with two piece- hollow bulb. The second stage was to determine the type of support using a combination of support teeth and mucosa in the maxilla. The third stage was to determine the type of anchoring, using the C grip of occlusal back rest on the mesial sides of teeth 17, 25, and 27 as direct retainers. The indirect retainer was an occlusal rest on the mesial side of teeth 17, 25 and 27. The fourth stage was to determine the connector, which was an acrylic resin palatal plate with two-piece hollow bulb on the upper anterior palate defect.



Figure 3. Maxilla and mandible study model

At the second visit, molding was carried out to make working models using mucodynamic molding methods and irreversible hydrocolloid materials. The working model was sent to the laboratory to make denture bases. On the third visit, the obturator was made using the two-piece hollow bulb method and try-in obturator prostheses. It should be noted that the plate did

not cause any pressure, irritation or pain in the oral tissue, and good retention and stabilization. It adjusted the bite rim to the height of the remaining teeth. The maxillary bite was softened and the patient was asked to bite to occlude the existing teeth, which thus obtained the vertical dimension of occlusion. Molding of the maxilla and mandible along with the bite rim and base plate of the maxilla was performed using an irreversible hydrocolloid material. Lubricant (Vaseline) was applied to the fitting surface of base plate, filled with plaster casts, and then it was implanted in the articulator. The color and shape of teeth were adjusted to the face shape, skin color, age and gender of the patient. The artificial teeth were adjusted to other teeth and overlaps with the patient's mandible teeth (Figure 4).



Figure 4. Determination of connection of the maxillo and the mandible



Figure 5. Try in obturator

The third visit was to make a bevel on the upper edge of the hollow bulb and close the top of the hollow bulb with a layer of red wax. It was then proceeded with a dental try-in. It is necessary to examine retention, stabilization, occlusion, aesthetics and phonetics. Patients were asked to pronounce the letters p, s, f, t, th, r, m to check the sound clarity. The artificial teeth were examined to

see whether it induced pressure, irritation, or pain in the mouth tissue, then it was proceeded with an obturator.

The fifth visit was performed by obtaining the obturator (Figure 5 and 6). The conditions which need to be considered were retention, stabilization, occlusion, aesthetics, and phonetics. Retention was checked on the accuracy of the base surface fitting of the prosthesis on the mucosa and hollow on the defect site. Clutches of C with modified occlusal backrest as a direct retainer must hug the grip gear and not press against its tooth. Occlusal backs on teeth 17, 25, and 27 attaches to the occlusal surfaces of teeth, which function as indirect retainer. The obturator stabilization was observed when jaw function was performed. Occlusion was examined using articulation paper, and selective grinding was carried out in the traumatic area of the occlusion. The soft-liner material superimposed on the edges of the hollow bulb surface fitting aims to protect the irritation of the surrounding soft tissue and to increase obturator retention. The results of obturator insertion were retention, stabilization, occlusion, phonetics and good aesthetics. The treatment made the patient more confident because of the visible teeth when talking and smiling.

After obtaining an obturator, the patient received information about the method of removing and fitting the obturator, adjusting the obturator, keeping the obturator clean, and instructions to remove and immerse the obturator in clean

water and a closed place while sleeping. Patient was advisable to have an immediate visit for medical control upon the occurrence of speech disturbances, chewing, and pain.

After one week of obturator insertion, subjective evaluation resulted no pain complaints and the obturator had been used to eat soft foods. Functional obturator examination resulted in good retention, stabilization, occlusion, phonetics, and aesthetics (Figure 7).

DISCUSSION

Patient had a complaint with chewing difficulty and lack of confidence because many of the upper front teeth were missing and the front palate was open after mass taking on the palate. Post-maxillectomy defects can cause an association between the oral cavity and the nose that causes oral dysfunction, including: inability to chew and swallow, phonation disorders, and declining aesthetics, all of which affect the patient's psychology.⁹

The history and clinical examination of the patient showed defects in the palate starting from the middle of the hard palate to the anterior, involving teeth 15, 14, 13, 12, 11, 21, 22, and 23 with Class VI Aramany defect classification and Kennedy Class III and Applegate Kennedy classifications Class III. Treatment in the form of making acrylic resin obturator was carried out 4 weeks after partial maxillectomy to restore function and aesthetics to improve the quality of life of the patient. This is consistent with the statement that an interim obturator was made after 3-4 weeks after surgery.⁷

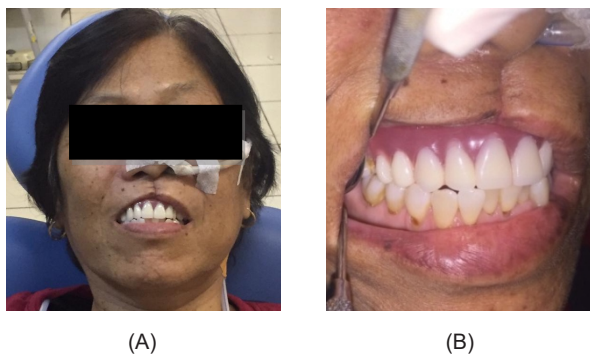


Figure 6. (A) obturator Insertion of front view; (B) Obturator insertion of side view



Figure 7. (A) Control one week after obturator insertion; (B) Palatal plate appearance closes palate defects

Denture support was provided using a combination of tooth and base plate because there some teeth can still be used as a grip. Dental support is obtained from teeth 17, 25, and 27 because it has large crowns, long and strong roots. Removable partial denture support can be obtained from the supporting mucosa with the underlying bone and the supporting teeth.¹⁰ Mesial side teeth were 17, 25, and 27. Retention can be achieved with the presence of a direct retainer placed on the closest and farthest teeth from the defect to allow maximum protection from the supporting teeth during functional movements.¹¹ Occlusal rest was placed in the mesial or anterior part of the supporting tooth to provide better soft tissue support to the alveolar ridge.¹²

The tripodal design was selected because it can provide good retention and stabilization as a way to evenly spread the masticating load on the teeth. This treatment is in line with the results of previous studies indicating that quadrilateral or tripodal designs are more widely used because they provide better support, stabilization, and retention of the prosthesis.¹¹

Full palatal plates with hollow bulbs were chosen as major connectors because they provided maximum support to increase retention and stabilization of dentures. This is in accordance with the statement that a full palatal plate can provide better support to the palate with a large defect.¹ The making of two-piece hollow bulb on the palatal plate to cover the defect is because it is simplified. Making obturator using two-piece hollow bulb and extended into the defect was useful to close the defect optimally to make the prosthesis become lighter, the patient's voice become clearer, to make it useful for increasing the retention and stabilization of the prosthesis, and because it is easier and simpler in the making.¹³

Soft liners on the fitting surface around the hollow bulb were used to reduce the risk of mucosal irritation and increase obturator retention. Soft liners in the long run play a role in increasing retention by utilizing the soft tissue undercut section, evenly distributing the mastication burden,

and reducing the mastication burden received by the tissue so that it does not irritate the mucosa.¹⁴

After using the obturator, the patient had no difficulty of eating and food no longer entered the nose. The patient's phonetics and aesthetics became better, and she no longer produced nasal sound when speaking. The patient became more confident in smiling and laughing. Retention, stabilization and occlusion were also in good condition, which made the patient feel comfortable. This is in accordance with the statement that obturator prostheses with hollow bulb increase the comfort, retention, stabilization, occlusion and phonetics of the patient. The use of hollow bulbs reduces the weight of the prosthesis, and prevents the accumulation of food scraps, reduces air gap, and provides maximum expansion. The presence of a substitute denture enhances aesthetics in the patient.

CONCLUSION

This research demonstrates that the use of two-piece hollow bulb obturator after partial maxillectomy on ameloblastoma can rehabilitate defect and restore masticatory, phonetic function, swallowing function, and aesthetic function of the patient.

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