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Prosthetic Rehabilitation of a Patient with Ameloblastoma using a hollow open bulb obturator- A case report

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Abstract

Surgical treatment for head and neck neoplasm's drastically impacts patients' quality of life. Maxillary defects can cause speech, mastication, and swallowing issues, as well as affect facial appearance. A prosthodontist can successfully solve all of these problems that interfere with a patient's social well-being by providing a well-fitting prosthesis. Clinicians should emphasize on reducing prosthesis weight for better retention and stability. This case report presents the rehabilitation of a hemi- maxillectomy patient using a definitive cast partial obturator.

Keywords: Hemi-Maxillectomy, Cast Partial Obturator, Prosthesis, Ameloblastoma, Hollow obturator, Maxillary Obturator.

Introduction

The buccomaxillofacial region may be the side of choice in the appearance of pathological processes involving cysts and tumors, classified as odontogenic and non-odontogenic types. Among them, the ameloblastoma is the most clinically significant epithelial odontogenic tumor.[1] Ameloblastoma of the jaw is an aggressive benign tumor of epithelial origin. It is the most common odontogenic neoplasm affecting the jaws, yet it accounts for only1% of all tumors of the maxilla and mandible. Men and women are equally affected with a peak incidence in the 3rd-4th decade of life. The most common site for ameloblastoma is the mandibular [80%] region, and the remaining in the maxillary region [20%]. [2] Ameloblastoma of the maxilla is comparatively rare, and the molar area is the most commonly affected site compared to the premolar and anterior regions. [3] Ameloblastomas can be classified as solid/multicystic, intraosseous, or unicystic, with peripheral subtypes even though it is a benign tumor, it is treated aggressively because of the myelin nature of its growth. [2] There are three forms of ameloblastomas, namely peripheral, unicystic, and multicystic tumors. Multicystic ameloblastoma is commonly seen among all and represents 86% of cases. Peripheral tumors are odontogenic tumors, with the histological characteristics of intraosseous ameloblastoma that occur solely in the soft tissues covering the tooth-bearing parts of the jaws. Unicystic tumors include those that have been referred to as ‘‘mural ameloblastomas’’, luminal ameloblastomas, and ameloblastomas arising in dentigerouscysts. Diagnosis mainly from tissue biopsy and characteristic findings on plain X-rays does assist in differentiating between types of ameloblastoma. [4]

Case report

A 52-year-old female patient was referred to the Department of Prosthodontics, Crown and Bridge, Pandit Deendayal Upadhyay Dental College and Hospital, Solapur with a complaint of difficulty in eating food, nasal regurgitation due to missing teeth in the upper right back teeth region. A thorough medical history revealed that the patient was surgically operated on for partial right maxillectomy as a sequel to the treatment of ameloblastoma that developed six years ago. Upper right lateral incisor to third molar was extracted along with the tumor. Intra-oral examination revealed several missing teeth 12, 13, 14,15,16,17 & 18. [Fig 1, 2 & 3]

After extra and intra-oral examination, the treatment plan was discussed with the patient, and the rehabilitation with a cost-effective, conventional method i.e. the conventional cast partial denture [CPD] along with open hollow obturator was planned.

Treatment procedure

Primary impressions of the maxillary arch were made with elastomeric impression material i.e. putty [Zhermack Hydrorise Putty, Italy], and the mandibular arch was made using irreversible hydrocolloid impression material [Zhermack Neocolloid, Italy] [Fig 4]. The impressions were poured with dental stone [Kalabhai Dental Stone Class III, Germany] to obtain the primary casts [Fig 5]. Surveying of the maxillary cast was done and the design of the metal framework was decided. As per the planned design, the obturator prosthesis was to be retained by an embrasure clasp between 26 & 27 and 23 & 24 regions. Rest seats were prepared on distal of 26, mesial of 27, mesial rest on 24 and cingulum rest on 23 before making secondary

impressions for the fabrication of the metal framework [Fig7]

Fig. 1 & 2: Intra-oral view of Maxillary arch with defect

Fig. 3: Intra-oral view of Mandibular arch

A custom tray was fabricated on the primary cast [Fig 6] and border moulding was carried out with low-fusing green stick compound [DPI Pinnacle Tracing Sticks, Bangalore] and the final impression was recorded with polyether [3M ESPE Monophase Polyether Impression Material, Australia] [Fig 8]. The master cast was poured with Type IV dental stone. The metal framework was fabricated and inserted into the patient's mouth to evaluate the fit. Wax occlusal rims [DPI Modelling Dental Wax, Bangalore] were fabricated after evaluating the proper fit of the framework [Fig 9 & 10].

Occlusal vertical and horizontal dimensions were determined and centric jaw relation was recorded with alu wax (Aluwax Dental Products Co. – USA), facebow (Louisville, KY 40217 USA) transfer was made and the casts were articulated on a semi-adjustable articulator (Whip Mix Corporation 361 Farmington Avenue Louisville, KY USA) [Fig 11, 12]. Artificial teeth were arranged to the contours established by the wax rims [Fig 13]. The waxed-up denture was tried and checked for retention, stability, and comfort in the mouth. Phonetics was a cause of concern, so the denture movements were rechecked during phonation, and corrections were made accordingly [Fig 14]

Fig. 4: Primary impression recorded

Fig. 5: Primary cast

Fig. 6: Custom tray fabricated

Fig. 7: Mouth preparation

Fig. 8: Polyether washes impression

Steps of making open bulb obturator

An open bulb is preferred to a closed one as it is less heavy and easier to adjust, and speech may be better with this configuration. Hence a simple and convenient method of fabricating an open hollow bulb was conceived for this purpose. [6] A putty pillar of predetermined dimensions was incorporated during the processing stage to create the open hollow bulb [Fig 15]. An index of the putty pillar was made and the index was poured with type II dental plaster [Kalabhai Dental Plaster Class II, Germany] [Fig 16, 17]. The conventional method off abrication of dentures was carried out. During the packing stage, the heat cure material was first packed around the plaster pillar and well-adapted to ensure adequate flow in this region [Fig 18].

The remaining material is then packed over the denture teeth and palate & the material is then cured. After completion of curing cycles, the prosthesis was then retrieved from the cast.

Trimming, finishing, and polishing were done and the obturator is now ready for insertion [Fig 19, 20 & 21].[6]

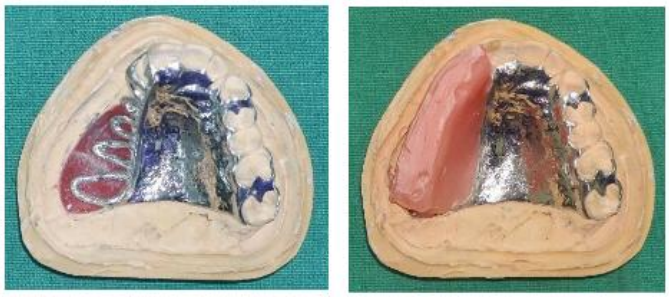

Fig. 9 &10: Metal framework and occlusal rim

Fig. 11: Face bow transfer

Fig. 12: Jaw relation & centric record

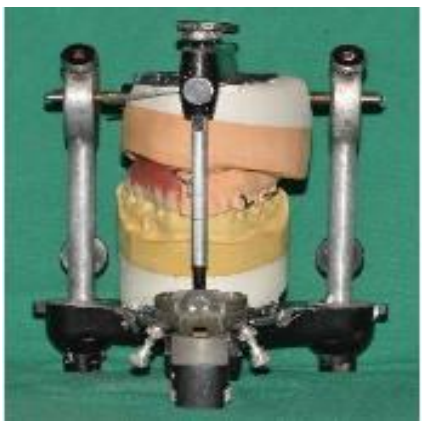

Fig. 13: Teeth arrangement

Fig. 14: Try in

This approach provided distinct advantages,

- Control over the exact width and depth of the defect.
- It is time-saving. Since the hollow bulb is included during the fabrication stage itself, the final prosthesis requires only finishing and polishing.
- It alleviates the risk of over-trimming while creating the hollow bulb as in the conventional approach.
- It allows the operator to easily enlarge the size of the hollow bulb following fabrication if required, with minimum trimming.
- It is not technique-sensitive. The additional step of building a plaster pillar during the processing stage is effortless and straightforward. It does not need an expert hand to incorporate the steps in forming the pillar.[6]

Fig. 15: Putty pillar

Fig. 16: Putty index of pillar

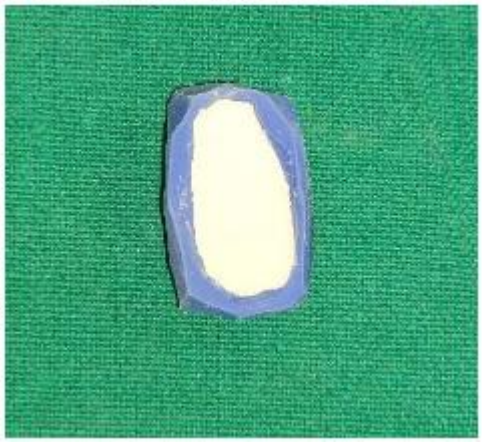

Fig. 17: Index poured in plaster

Fig. 18: Plaster pillar in deflasked denture after Dewaxing

Fig. 19, 20 & 21: Finished and polished final prosthesis

Fig. 22: Intraoral right view

Fig. 23: Front view

Fig. 24: Intraoral left view

Fig. 25: Occlusal view

Fig. 26& 27: Extra-oral view before and after prosthesis insertion.

Discussion

Ameloblastoma in the maxilla can progress to great size and cause facial asymmetry, displacement of teeth, loose teeth, malocclusion, and pathologic fractures.[4] In dentate patients, primary retention, support, and stability of an obturator depend on the number and distribution of remaining teeth. Structural durability is mandatory for the longevity of the prosthesis. In these patients, chewing function is confined to the nonsurgical side due to the lack of support on the surgical defect side. [7] The article described a technique for the fabrication of a hollow bulbobturator, i.e., new, simple, economical, and with less time consumption. [8]

There have been numerous techniques described in the literature for the creation of hollow obturators. Grinding out the unwanted part directly after processing described by Habib and Driscoll was once a classic technique. However, this technique is time-consuming and it is difficult to maintain the adequate and uniform thickness of the prosthesis wall. The present technique is advantageous in many ways. It provides a predictable internal dimension of the hollow space since the hollow space is determined by the putty used. This ensures a uniform thickness of the obturator wall. Also, it is a one-step procedure wherein the obturator is made as a single unit.[8]

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