Maxillary Obturator Prosthesis Rehabilitation Following Maxillectomy for Ameloblastoma: Case Series of Five Patients

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Purpose: The purpose of this case report is to demonstrate the benefits and applicability of appropriate maxillofacial prosthetic rehabilitation following surgical resection of ameloblastoma of the maxilla in Kenya. ***Materials and Methods:*** Five patients presenting with ameloblastoma of the maxilla over 3 years were studied with respect to histologic type, site of tumor, resultant surgical defect, and form of definitive obturator prosthesis. Impressions were taken using irreversible hydrocolloid and poured with dental stone. Immediate surgical obturators were fabricated from casts using clear autopolymerizing acrylic resin. One patient had bilateral partial maxillectomy, whereas the rest had unilateral partial maxillectomy. Immediate surgical obturators were fitted intraoperatively and held in place using Adams clasps on the remaining natural dentition for all patients, except the one who had undergone bilateral partial maxillectomy, whose surgical obturator was held loosely using circumzygomatic wires. After 6 to 8 weeks, surgical obturators and packing were withdrawn, and new impressions were taken to fabricate definitive obturators. Patients were reviewed every 2 weeks for 3 months, then once every 3 months per year for 3 years, and thereafter once per year. ***Results:*** The immediate surgical obturators facilitated retention of the surgical packing, promoting healing with minimal postsurgical infection and scar contracture formation. This ensured the restoration of acceptable esthetics and maintenance of oral function at a reasonable level during the initial postoperative period. Definitive obturators restored esthetics, oral function, and ability to handle secretions to a satisfactory level. ***Conclusion:*** Satisfactory functional and esthetic results are achievable in patients with extensive acquired maxillary defects by means of obturator prostheses fabricated using readily available materials. *Int J Prosthodont 2004;17:464–468.*

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This article was presented at the 14th International Association for Dental Research East and Southern Africa Division Conference, 30 Aug–2 Sept 2000, Harare, Zimbabwe.

Society places value on facial appearance; therefore, persons who exhibit deformities and congenital or acquired defects become socially stigmatized. The common etiologies for acquired defects of the maxillofacial region are traumatic injuries and resection of tumors.[1,2] The primary objective in treating tumors is to eliminate disease and improve the quality of life. For benign tumors such as ameloblastoma, a locally invasive tumor of odontogenic origin, surgical resection is the treatment of choice.[3,4] However, in cases of malignant tumors, combined therapy to include surgery, radiotherapy, and occasionally chemotherapy is recommended.

The resultant maxillary and/or soft palatal defects create oronasal and/or oroantral communication, with consequent difficulties in eating, speaking, and

Fig 1a Thirty-three-year-old woman with maxillary ameloblastoma involving left side of maxilla at operation. Note the Weber-Fergusson exposure.

Fig 1b Resected tumor.

Fig 1c Surgical obturator in situ.

Fig 1d *(right)* Five-day postoperative appearance. Note the reasonable facial appearance despite postoperative edema.

breathing.[5,6] The effect is diminished quality of life and hence lowered self-esteem. Therefore, the restoration and/or replacement of lost stomatognathic apparatus and associated facial structures by appropriate artificial substitutes is advocated, especially for large maxillary defects secondary to tumor resection.[7] A multidisciplinary medical team comprising the maxillofacial surgeon, prosthodontist, oncologist/radiotherapist, speech therapist, and maxillofacial prosthesis technician is essential in the management of such patients.[5,7,8]

The use of magnets and osseointegrated implants to provide retention does enhance support and improve stability of the obturator prosthesis.[7] This is thought to significantly improve mastication and efficiency of speech and deglutition.[8] The high cost of implants, coupled with the fact that Kenya lacks trained personnel to place the implants, meant that the only option to rehabilitate these patients was to use prostheses made entirely of acrylic resin.

This study demonstrates the benefits and application of maxillary obturator prosthetic rehabilitation using readily available materials in a society where most of the population is in the low socioeconomic bracket.

Materials and Methods

Five patients presenting with maxillary ameloblastoma at the University of Nairobi Dental Hospital from 1997 to 1999 were studied with regard to histologic type, site of tumor, resultant surgical defect, and form of definitive obturator prosthesis used. After comprehensive preoperative assessment and counseling of the patients, impressions were taken using irreversible hydrocolloid material (Blue Print, Dentsply). The impressions were then poured with dental stone to make casts, from which the surgical obturators were made using clear autopolymerizing acrylic resin (Dentsply).

One patient had bilateral partial maxillectomy, whereas the rest had unilateral partial maxillectomy. In all cases, a Weber-Fergusson incision was employed to expose the tumor. Some of the treatment procedures for one of the patients are presented in Fig 1. A surgical packing of zinc oxide iodoform paraffin paste (ZIPP) in sterile gauze was used. The surgical obturators were fitted intraoperatively and held in position using Adams clasps on the remaining natural dentition for all patients, except the one who had undergone bilateral partial maxillectomy, whose surgical obturator was held loosely using circumzygomatic wires. This ensured ease of changing the surgical packing for this patient.

Patients were reviewed every 2 weeks for change of the surgical packing for 6 to 8 weeks. After consultation with the attending surgeon, the surgical obturators and surgical packing were withdrawn. This was done under local anesthesia (Lignospan, Septodont) for the patient whose surgical obturator was held in place using circumzygomatic wires. Normal saline was used to clean the defect, after which new impressions were taken using irreversible hydrocolloid material. These were poured with dental stone, from which casts were obtained. From these, special trays were made to obtain secondary impressions using irreversible hydrocolloid material. These were poured with dental stone to produce the working casts. Jaw relation records were done, and the casts were mounted on average value articulators. Denture teeth (Acrotone) were waxed in. The prostheses were tried in the patients to verify the occlusion with the mandibular teeth. The definitive prostheses were processed using pink heat-cured acrylic resin (Dentsply), then finished and polished in the customary manner. Wire clasp retainers on the remaining natural dentition were used to retain the prosthesis for those who had undergone unilateral partial maxillectomy. The patient who had bilateral partial maxillectomy had palatal fenestrations following healing (Figs 2a and 2b). These were engaged to enhance the retention of the definitive prosthesis, which was fabricated as a closed-hollow obturator prosthesis to reduce weight and a complete denture design since he was completely edentulous in both jaws (Fig 2c).

At delivery, patients were instructed in the care and use of the obturators. No adhesive was used in these cases. They were reviewed every 2 weeks for easing of any pressure spots for 3 months. Once stable, the review visits were reduced to once every 3 months for 3 years; patients were subsequently seen once per year as a follow-up.

Results

Five patients (three men, two women) presented with ameloblastoma of the maxilla during the study period. Histopathologic reports revealed that two patients had a follicular type, whereas two others had a mixed follicular and plexiform pattern. The fifth patient showed histologic features consistent with the unicystic variant of the disease (Table 1).

The surgical obturators provided a matrix on which the surgical packing was placed. They also reduced oral contamination of the wound and therefore reduced the incidence of local infection during the immediate postsurgical period. The surgical obturator provided an artificial palate, ensuring restoration of oral function, especially speech and deglutition, thereby eliminating the need for nasogastric tube feeding. Tissue collapse about the defect was overcome with the use of the surgical obturators, which ensured the restoration of the facial contour to a reasonable level (Fig 1d).

The definitive obturator prostheses restored the patients' ability to feed and swallow to a reasonable level. Intelligible speech was achievable with the definitive prostheses. Speech intelligibility was assessed by asking the patients to repeatedly utter the word "Mombasa." The patients' ability to handle oral secretions was significantly improved with the use of the obturator prostheses. Acceptable esthetic results were also achieved (Figs 2d and 2e). This had a positive psychologic effect on the patients, thereby enhancing their self-esteem postsurgically.

Discussion

Prosthetic rehabilitation is the treatment of choice for patients with large defects of the maxillary complex following surgical resection of tumors.[7] The prosthesis may be needed for various reasons, namely as a support for surgery, as a vehicle for radiotherapy, or for protection from radiation and an adjunct to rehabilitation medicine for training and stimulation of the defective neuromuscular palatopharyngeal structures.[1,8]

The tolerance and retention of obturator prostheses are improved if the defect is lined with a split-thickness skin graft.[7] However, this is not recommended if there

Fig 2a *(left)* Sixty-year-old edentulous man with ameloblastoma involving both maxillae.

Fig 2b *(below)* Intraoral view 2 months postoperative and after removal of surgical obturator and packing shown in Fig 2a. Note fenestrations on superior aspect of defect.

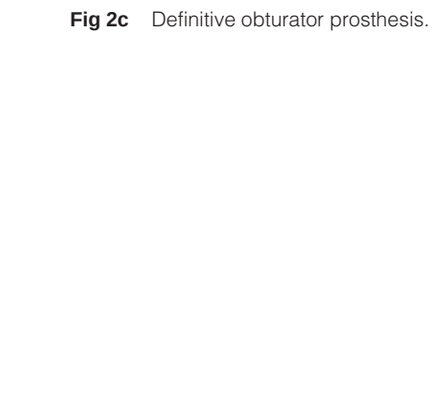

Fig 2c Definitive obturator prosthesis.

Fig 2d *(left)* Three months after prosthodontic rehabilitation. Note the satisfactory facial appearance.

Fig 2e *(below)* Intraoral view of obturator prosthesis and mandibular complete denture in occlusion.

Table 1 Summary of Patient Data

Patient	Gender	Age (y)	Histology	Site	Procedure/defect
1	M	40	Follicular	Right maxilla	Partial maxillectomy (R)
2	F	33	Follicular	Left maxilla	Partial maxillectomy (L)
3	M	45	Mixed follicular and plexiform	Right maxilla	Partial maxillectomy (R)
4	F	60	Mixed follicular and plexiform	Left maxilla	Partial maxillectomy (L)
5	M	60	Unicystic	Both maxillae	Bilateral partial maxillectomy

is a likelihood of recurrence. In this study, mucosa was left to granulate and epithelialize because of the potential of the tumor to recur. The retention of the prosthesis was enhanced by engaging the palatal fenestrations for the patient who underwent bilateral partial maxillectomy. This was confirmed by the degree of resistence to dislodgment when the prosthesis was pulled downward. For those who had unilateral partial maxillectomy, retention was enhanced by use of wire clasps on the remaining natural dentition. In all cases, the obturator portion of the prostheses was made smooth to reduce the possibility of trauma to the mucosa and therefore improve tolerance of the prosthesis. The weight of the prosthesis is reduced if it is fabricated as a closed-hollow obturator prosthesis.[9]

Prosthetic rehabilitation of patients with acquired surgical defects of the maxilla is usually done in three phases.[1,7,10,11] First is the surgical obturation phase, the primary objective of which is to restore and maintain oral functions at reasonable levels during the immediate postoperative period. Interim obturation is the second phase, and its objective is to provide the patient with a comfortable and functional prosthesis until healing is complete. The interim obturator is usually fabricated 2 to 6 weeks postsurgical.[1,7,11] After the surgical site has healed well, the third phase of prosthodontic treatment is done. This involves the fabrication of a definitive obturator prosthesis and is usually undertaken 3 to 6 months after surgery.

Because of the inability of the patients to meet the cost of fabrication, the interim obturation phase was not undertaken in this study. Six to 8 weeks after surgery, definitive obturator prostheses were fabricated and fitted. The results so far are encouraging. The removable nature of the prostheses allows for inspection of the surgical site to check for evidence of recurrence of the disease. Ameloblastoma is reported to have a recurrence rate of 17% to 40%.[3,4]

Despite using obturator prostheses fabricated using acrylic resin, the patients have reported satisfaction with regard to their ability to swallow, masticate, and produce intelligible speech. These claims have been confirmed by close relatives who have been with the patients from the time of surgery through the prosthetic rehabilitation phase of treatment. Satisfactory functional and esthetic results can be achieved in patients with extensive maxillectomy defects by means of obturator prostheses fabricated using readily available materials following ablative surgery.

Acknowledgment

The authors would like to thank Miss Carolyne Imbayi for typing the manuscript.

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