



Prosthetic Rehabilitation of a Maxillofacial Defect in a Chondrosarcoma Patient

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ABSTRACT

Chondrosarcoma is a malignant tumor in which the tumor cells produce cartilage but not bone. The recommended management is wide local or radical excision, followed by surgical and prosthetic reconstruction. This article explains postsurgical prosthetic rehabilitation of a chondrosarcoma patient by means of intraoral acrylic, and extraoral silicone prosthesis for restoration of normal orofacial function and appearance.

Keywords: Chondrosarcoma, Palatal obturator, Silicon prosthesis.

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INTRODUCTION

Chondrosarcoma is a malignant tumor in which the tumor cells produce cartilage but not bone. Chondrosarcoma of the jaws is a rare lesion. Although the peak incidence is at 20 to 40 years, many cases have been reported in old age. These tumors do not appear to be radiosensitive and have not responded well to chemotherapy. The recommended management is wide local or radical excision, followed by surgical and prosthetic reconstruction.¹

Postsurgical maxillary defects predispose the patient to hypernasal speech, fluid leakage into the nasal cavity and impaired masticator function. In the total rehabilitation of the maxillectomy patient, the maxillofacial prosthodontist has two primary objectives:

- To restore the functions of mastication, deglutition and speech,² and
- Possible support of the orbital contents to prevent enophthalmos and diplopia, support of the soft tissue to restore the midfacial contour, and an acceptable esthetic result.³

Thus, even after surgical reconstructive procedures are performed, prosthetic treatment of patients by means of both intraoral and extraoral prosthesis is still indicated for restoration of normal orofacial function and appearance.⁴ Obturators are maxillofacial prosthesis used to close a congenital or acquired tissue opening, primarily of the hard palate and/or contiguous alveolar/soft tissue structures.⁵ These prostheses continue to be the preferred method of rehabilitation for most maxillectomy defects.

CASE REPORT

A 45-year-old farmer was referred by his surgeon, for definitive prosthetic rehabilitation of the face and oral cavity. The patient had been treated over the past 15 months for a recurrent and progressive chondrosarcomatous lesion of the left maxilla. Numerous surgical procedures resulted in a maxillectomy defect (Fig. 1), as well as removal of the left zygomaticomaxillary complex, the left ala, the left upper lip up to the midline, and left orbital exenteration. A flap from the left frontal region was used to close the cover and



Fig. 1: Intraoral defect

close the orbital cavity. The patient was psychologically traumatized by the repeated number of surgeries and desired a prosthetic solution for function and esthetics. For this purpose, the treatment planned for this patient encompassed oral prophylaxis, followed by fabrication of intraoral (obturator) and extraoral prostheses.

INTRAORAL PROSTHESIS

A preliminary impression required that a suitable stock tray be selected and built up with impression compound just in the area of the maxillary defect, so as to support and carry the elastic impression material into the defect as well as the surrounding areas. The tray was then loaded with alginate, covered with a layer of gauze in the defect area, and impression of the maxillary arch was made, with maximum extension into the surgical site.

A preliminary cast was made, undercuts were blocked, and a custom tray was constructed over it that extended 3 cm into the cavity. Border molding was done by adding low fusing compound incrementally to the periphery of the surgical site of prosthesis. A definitive impression was then made using medium bodied addition silicone material. The impression was poured to obtain the definitive cast (Fig. 2).

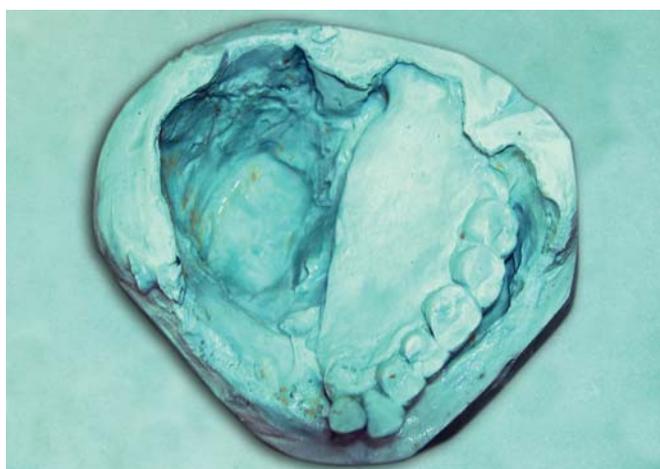


Fig. 2: Cast showing intraoral defect

Jaw relations were recorded, teeth arranged and the obturator was tried in. A continuous clasp given on the dentulous side was used for retention of the prosthesis. Satisfactory occlusion and phonetics were achieved, but postsurgical contraction of the lip and cheek resulted in an unesthetic display of teeth. Since, an extraoral prosthesis was to be fabricated to restore the facial appearance in this region, this aspect was overlooked. The final palatal contours of the obturator were waxed to symmetry (Fig. 3) and evaluated for phonetics, deglutition and patient comfort.

A one piece hollow bulb obturator was to be fabricated for which the prosthesis was flaked and boiled out in the



Fig. 3: Trial prosthesis

usual manner. The mold was completely flushed with boiling water and thoroughly dried, and a shim was constructed in the following manner: the undercut areas in the defect were blocked out, and the entire defect area was relieved with one thickness of baseplate wax. Three stops deep enough to reach the underlying stone of the master cast were placed in the wax to facilitate proper positioning of the shim. One thickness of baseplate wax was also placed in the top half of the flask over the teeth and palate area to form the top wall of the shim. This also allows for a thickness of heat cure acrylic on the palatal side of the denture.

Autopolymerizing resin was mixed and rolled to about 2 mm in thickness after reaching the dough like stage. A layer of resin was then contoured over the wax relief in the defect site, with another layer over the wax in the top half of the flask. The flask was then closed and allowed to set for a minimum of 15 minutes. After curing, the flask was then opened and the wax was flushed off the shim with a stream of boiling water. The excess of acrylic was then removed from the shim (Fig. 4) and placed back into the defect, using the three stops for correct positioning for final



Fig. 4: Shim stock

processing with heat cure resin. At this point, there will be at least one thickness space of baseplate wax between the shim and the mold, with the exception of the three stops.

The heat cure acrylic was mixed. A layer of material was pressed to place in the bottom of the defect, and the shim was reinserted for final processing (Fig. 5). The heat cure acrylic was placed in the top half of the flask, and the mold was trial packed. After final closure of the flask, the curing, deflasking, finishing and polishing was carried out.⁶ Necessary adjustments were done to relieve pressure areas and to correct minor occlusal discrepancies and the prosthesis was delivered (Figs 6 to 8).

EXTRAORAL PROSTHESIS

At the 24 hour recall appointment following obturator placement, the moulage impression and working cast were fabricated. The patient was prepared by blocking the nostrils with an evacuator (suction) tube for ventilation, petroleum jelly applied to facial hair, and the obturator was left inserted in the oral cavity, as part of the extraoral prosthesis would rest on the obturator in the lip and cheek region.



Fig. 5: Shim stock oriented in mold



Fig. 6: Obturator in place



Fig. 7: Front view of patient with extraoral defect



Fig. 8: Profile view of patient with extraoral defect

A cardboard ring was used to box the area of the face to be impressed. The moulage impression was then made with alginate and reinforced with plaster (Fig. 9). The impression was then poured in vacuum mixed dental stone to make the working model.

The model was coated with separating medium and the prosthesis pattern was sculpted on it in modeling wax (Fig. 10). The contralateral facial features on the mold and an old photograph of the patient served as useful guides for the sculpture. Wrinkles were carved in and skin texture was created by pressing wet gauze in the softened wax. Margins of the pattern were thinned out to make them feather edged.

The sculpture was then tried onto the patient's face and evaluated for fit, symmetry and contour with the contralateral side of the face. Feedback from the patient



Fig. 9: Moulage impression



Fig. 11: Free-standing mold for facial prosthesis



Fig. 10: Wax pattern of facial prosthesis

and his wife helped to further refine the facial features in the sculpture.

The next step was to reproduce the pattern in silicone. Since the prosthesis was fairly large in size, a freestanding stone mold was employed. The pattern was sealed to the working model, undercuts on the model blocked out with plaster, and then separating medium was applied to the model before investing it in dental stone. A dewaxing procedure was then carried out and the mold obtained was cleaned with boiling water and detergent (Fig. 11).

A room temperature vulcanizing prosthetic silicone elastomer material, Technomed India (pvt) Ltd which is specifically designed to make natural looking facial and body prosthetics was used to fabricate the prosthesis. The elastomer is available in a two component system.

Comp A: base

Comp B: catalytic agent

The components are mixed to vulcanize in the ratio of Comp A: Comp B = 10 : 1.

The intrinsic coloration was carried out with the patient in front, and several samples of silicone were mixed with

pigments until the desired base color was achieved. Then the bulk of silicone was mixed in a vacuum jar and packed into the mold cavity. After the mold was pressed under light pressure to achieve maximum closure, the expressed flash was left on the mold's external surface to test for complete polymerization.

The mold was allowed to polymerize for 24 hours at room temperature and the prosthesis was retrieved from it. The excess flash was trimmed back to the margin with scissors and finished with abrasive stones (Fig. 12). The prosthesis was once again tried onto the patient to check for color match and margin adaptation. A slight discrepancy in color necessitated extrinsic staining for which the prosthesis was dabbed with silicone mixed with pigments and allowed to cure for another 24 hours.⁷

The final prosthesis had remarkable retention due to undercuts. The margins of the prosthesis though, were distinctly standing out. For this purpose, it was decided to camouflage these areas by means of a readymade moustache stuck with cyanoacrylate in the upper lip region of the prosthesis. The superior margin of the prosthesis and the



Fig. 12: Silicone prosthesis

surgically closed orbital cavity were masked with the help of tinted spectacles⁸ (Figs 13 and 14).

Follow-up

The patient reported back for a follow-up after a period of 6 months. The patient complained of heaviness and loss of retention of the obturator. On examination, it was found that the patient was constantly secreting nasal fluids which were seeping in through the porous acrylic into the obturator bulb, adding to the weight of the obturator (Fig 15).

It was then decided to modify the bulb of the obturator by opening it and allowing access to maintain hygiene in the tissue surface of the prosthesis. Holes were drilled into the superior surface of the bulb and the roof of the bulb was cut out in such a way that the patient could insert his fingers or a brush into all aspects of the bulb for cleansing out the secretions and slough (Fig. 16).



Fig. 13: Front view of patient with facial prosthesis



Fig. 14: Profile view of patient with facial prosthesis



Fig. 15: Obturator after follow-up period

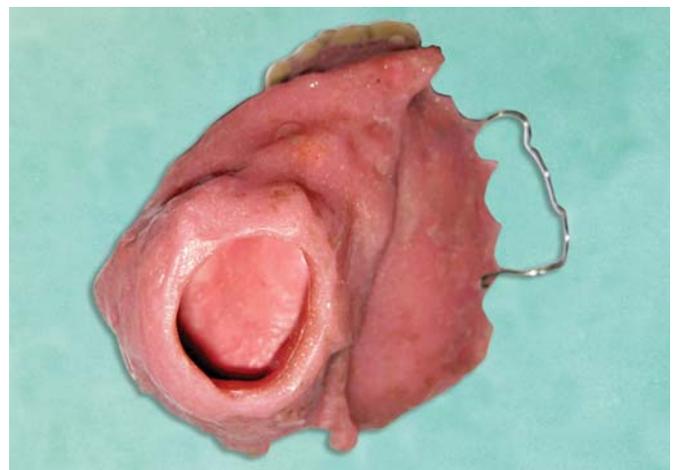


Fig. 16: Obturator with bulb modified

CONCLUSION

The one-piece hollow bulb obturator technique has the following advantages as compared to a two-piece hollow bulb obturator:

1. There are no lines of demarcation on the denture to discolor.
2. The undercut areas of the defect are thick enough to allow for adjustment if necessary.
3. It is simple and consumes less laboratory time.
4. Accuracy is assured.

It is the god given right of every human to appear human. Successful functional and esthetic rehabilitation by means of an obturator and silicone facial prosthesis gave the patient comfort, managed to restore his lost enthusiasm for life, and an overall boost in self-esteem.

REFERENCES

1. Raymond J Fonseca. Oral and Maxillofacial Surgery, Vol.5, Surgical Pathology, Saunders, Elsevier 2000.
2. Beumer III, Curtis TA, Firtell DN. Maxillofacial Rehabilitation. Prosthodontic and surgical considerations. The CV Mosby Co. St Louis, Toronto, London 1979:188-243.

3. Wang RR. Sectional prosthesis for total maxillectomy patients: A clinical report. *J Prosthet Dent* 1997;78: 241.
4. Curtis TA, Beumer J. Restoration of acquired hard palate defects: Etiology, disability and rehabilitation. *Maxillofacial rehabilitation: Prosthodontic and surgical considerations*. St Louis (MO): Ishiyaku EuroAmerica, Inc; 1996: 225-84.
5. Glossary of prosthodontic terms. *J Prosthet Dent* 2005;94(1):5.
6. Chalian VA. *Maxillofacial Prosthetics-Multidisciplinary Practice*. The Williams & Wilkins Co, Baltimore 1971:142-46.
7. Metz HH. Maxillofacial prosthetic rehabilitation after mouth and facial surgery. *J Prosthet Dent* 1964;14:169-73.
8. Fonseca EP. The importance of form characterization and retention of facial prosthesis. *J Prosthet Dent* 1966;16: 338-44.

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