

Prosthetic Rehabilitation of Primary Osteosarcoma of the Orbit - A Clinical Report

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Abstract

Acquired facial defect may cause functional and psychological impairments that adversely affect patient's quality of life. Restoration of facial defect can be done surgically, prosthetically, or a combination of both. The choice depends on many factors like size, location of defect, prognosis of tumor, and patient's desire. Aggressive tumor with high recurrence rate increases the risk of complications associated with surgical reconstruction. Maxillofacial prosthesis has the advantage of being less invasive and also improves the patient's appearance. This rare clinical report describes the rehabilitation a 68 year-old female who had undergone resection of roof of left orbit, left frontal bone, and some portion of left parietal bone for the treatment of osteosarcoma with adhesive retained silicone prosthesis.

Keywords: *Extra skeletal sarcomas; Facial prosthesis; maxillofacial rehabilitation*

Introduction

Osteosarcoma is an aggressive malignant neoplasm of mesenchymal origin that exhibits osteoblastic differentiation and produces malignant osteoid [1]. It is frequently observed in adolescents (primary) and individuals over 60 years (secondary) [2]. Osteosarcoma can be further divided according to the degree of differentiation, location within the bone, and histological features. Among these sub-variants, extra skeletal sarcomas (ESOS) has the least prevalence (2%) [3] And are generally observed in deep soft tissues of the thighs, buttocks, upper extremities, and retroperitoneum [4]. In the literature, only a few cases of ESOS of orbit have been reported [5]. The recommended treatment for ESOS is wide local or radical resection of the lesion with adjuvant radiotherapy [3]. Following wide resections, these patients are left with large facial disfigurements that can impair them both physically and psychologically. Advances in surgical techniques and the use of titanium or polymethyl methacrylate based materials have helped in successful surgical reconstruction of these defects. However, it maybe contraindicated or unsuccessful in a few patients and a prosthetic rehabilitation is indicated [6].

This clinical report presents the prosthetic rehabilitation of an acquired facial defect caused due to resection of ESOS of orbit with adhesive retained silicone prosthesis.

Case Report

A 68 year-old female patient reported with a chief complaint of unaesthetic bony defect on the left forehead (Figure 1). Previous diagnostic and treatment history of the patient revealed that the patient initially reported of a bulging mass on the left orbit 10 years. A Computer-tomography (CT) scan of the orbit region had been performed which demonstrated an atypical, poorly defined, and homogeneously calcified left canthal mass. Histological examination of the mass demonstrated an infiltrate of mildly atypical cells exhibiting mitotic activity and a slightly rosette arrangement around partially calcified necrotic tissue. The diagnosis was made as ESOS with a TNM

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staging of T3N0M0, following which the left orbital roof left frontal sinus & antero-inferior portion of left frontal bone was resected with tumor mass resulting in a large facial defect (Figure 2).



Figure 1: Frontal view of patient with the defect.

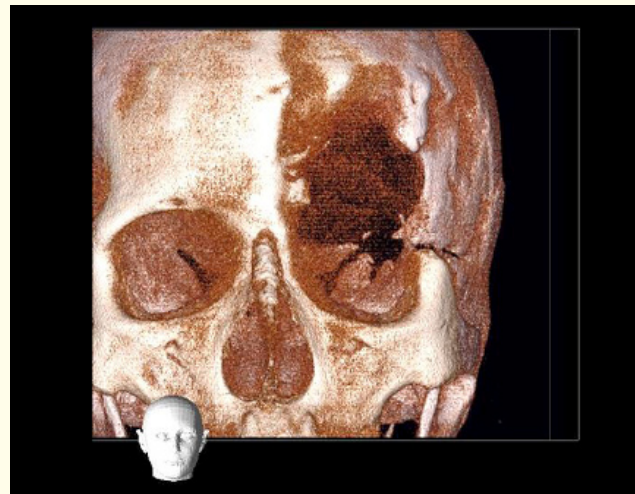


Figure 2: Computer Tomography (CT) following resection of tumor.

Clinical examination of the hard tissues revealed absence of orbital roof and antero-inferior portion of frontal bone (Figure 1). Soft tissue examination showed no inflammation, bleeding, discharge, or infection in defect area and the tissues were firm and keratinized. Eyelid movements were within normal limits. After careful discussion with the patient, the treatment plan was established to rehabilitate the defect with an adhesive-retained silicone facial prosthesis.

Impression of defect was taken with additional polyvinyl siloxane impression material; light-bodied polyvinyl siloxane impression material (Multisil Epithetik soft form; Bredent GmbH, Senden, Germany) was used first to record the details and to avoid pressure at the movable areas around the upper eyelid, following which the impression was reinforced with regular-bodied polyvinyl siloxane impression material (Multisil Epithetik hard form; Bredent GmbH, Senden, Germany) and wooden sticks (Figure 3). The impression was then poured with Type IV dental stone (Nok stone; Le farge, Petchaburi, Thailand) to fabricate a working cast. Wax pattern was sculpted using modeling wax (Cavex TT 100 soft; Cavex, Holland). During clinical try-in appointment, the margins of the wax replica were adjusted not to lie on the movable soft tissue and the movements of the eyelids were not hampered by the wax replica (Figure 4). A two-piece mold was fabricated with Type IV dental stone and de-waxing was carried out. Room temperature vulcanizing silicone (MDX 4-4210; Dow Corning, CA) was mixed according to manufacturer's instructions along with intrinsic staining (Functional staining II, Factor II, Inc, Lakeside, AZ) to achieve desired shade, which was then packed into the mold. The material was then allowed to cure for 72 hours at room temperature for complete vulcanization. Extrinsic staining (Extrinsic Staining kit; Factor II Inc) was done to match skin colour and was fixed using silicone adhesive (Silastic Medical Adhesive Type A, Factor II Inc, Lakeside, AZ). The intaglio surface of the prosthesis was then hollowed to reduce the weight (Figure 5B). The prosthesis was then delivered to the patient (Figure 6). She was instructed regarding application of adhesive and hygiene maintenance and was recalled for follow up and maintenance visits every 6 months. The patient was followed up for a period of 18 months during which she had no complaint with the prosthesis other than slight discoloration following its use.



Figure 3: Impression of the defect using light bodied and regular bodied polyvinyl siloxane impression material.

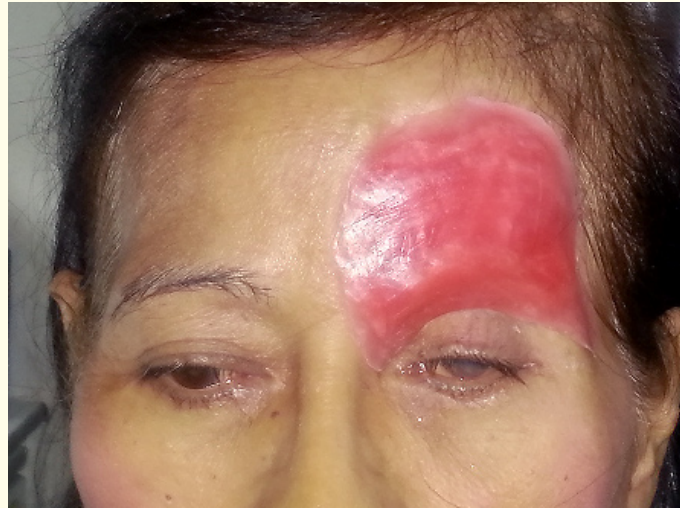


Figure 4: Wax-up clinically evaluated for contour, form, and movements of the eyelids.

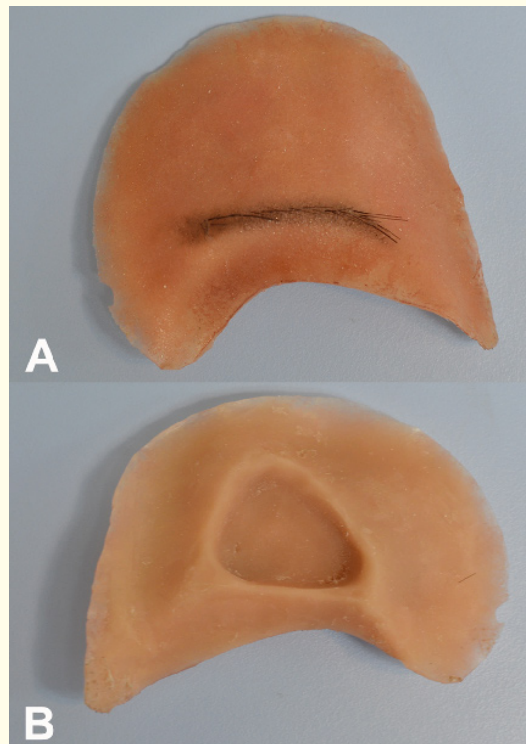


Figure 5: Silicone prosthesis following curing and extrinsic staining (A front side) (B back side).



Figure 6: Final delivery of the adhesive retained silicone prosthesis.

Discussion

Plastic and reconstructive surgery may be the treatment of choice for patients with facial defects. However, for defects with poor tumor prognosis and patient's unwillingness for surgical procedures, a more suitable alternative is prosthetic rehabilitation [7]. Maxillofacial prosthesis can provide a naturally looking aesthetic outcome, which at times can be superior to those of surgical reconstruction [8,9]. During the last five decades, silicone elastomers have been material of choice for fabricating maxillofacial prosthesis [10]. The introduction of room temperature vulcanizing polymers (e.g. MDX4-4210; Dow Corning) has been an improvement over materials such as polymethyl methacrylate, polyvinyl chloride, and polyurethane for fabricating maxillofacial prosthesis. Various methods of auxiliary retention for facial prostheses have been described in the literature, which includes use of anatomical undercuts, mechanical methods, and osseointegrated implants [11]. In this clinical report adhesive retained prosthesis was used successfully as the patient was not willing for any surgical reconstruction and loss of anatomic structures also limited the placement of the craniofacial implants. The objective was to restore the lost natural tissue with adhesive retained silicone prosthesis following surgery to maintain appearance, morale, and confidence of the patient and to facilitate the social acceptance, which simple dressings or patches cannot achieve. The patient could wear the prosthesis throughout the day and was overall satisfied with the treatment.

Conclusion

Extra-skeletal osteosarcoma of orbit is a rare occurrence. Aggressive treatment with wide or radical surgical resection and adjunctive radiotherapy are preferred treatment modalities. An aesthetic and retentive prosthesis are the primary determinant factors in the successful prosthetic restoration of facial defects. A conservative treatment with adhesive-retained silicone prosthesis was attempted in the patient in lieu of more invasive procedures and the overall outcome was successful.

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