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Research Article

PROSTHETIC MANAGEMENT OF AN CRANIOFACIAL DEFECT WITH A REMOVABLE EXTRA CRANIAL PROSTHESIS - A CASE REPORT

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A B S T R A C T

Craniofacial prosthetics is that specialty of prosthodontics concerned with the restoration of extra oral defects of the head and neck with prostheses that may or may not be removed on a regular or elective basis which improve the quality of life. This case report presents one such removable extra craniofacial prosthesis using an alloplastic heat cure acrylic resin material to a patient who was not willing for surgical correction of the cranial defect due to accidental trauma.

INTRODUCTION

Facial disfigurement can be the result of a congenital anomaly, trauma or tumor surgery. Surgical reconstruction may not be possible owing to size or location of the defect. The patient's medical condition or personal desires may also preclude reconstructive surgery. In such cases, prosthetic rehabilitation with maxillofacial prosthetic devices is indicated that restores normal anatomy and appearance, protects the tissues of a defect, and provides great psychological benefits to the patient.[1] The primary goal of prosthetic rehabilitation is to help patient's to achieve esthetics, improve quality of life and restore their self esteem without the risks associated with surgery.

Case Report

A 50 year old male patient reported to the department with a chief complaint of correction of the depression on the left side of his head caused by accidental trauma 2 years back. On examination, the defect was approximately measuring 8cm x 6cm in size involving parieto-fronto-temporal region (Figure 1 & Figure 2) with no sensorineural dysfunctions. This patient with poor socioeconomic status had undergone bypass surgery a year ago, and was reluctant to undergo another surgical procedure for reconstruction using cranial acrylic prosthesis with titanium screws. Thus, to meet the need of the patient and to restore the defect, a removable custom made extra craniofacial acrylic prosthesis was planned.

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The patient consent was obtained after explaining the treatment procedure including its limitations.

Preparing the patient

The patient's head/scalp in the defect area was shaved to access the bony margins and for accurate registration of the defect borders. After careful palpation, indelible pencil was used to mark the borders of the defect. An adequate margin beyond the defect border area was included in the outline to obtain perspective for reproducing the cranial contour. [2]

Impression procedure

The patient was seated in supine position. Petroleum jelly was applied on the skin and hair in and around the defect area to prevent interlocking into the impression. Boxing wax was used to confine the impression material of the region to be recorded. Irreversible hydrocolloid (Zelgan Plus, Dentsply, India) was used for making the impression by mixing twice the manufacturer's recommended amount of water-powder ratio (Figure 3). Paper clips were embedded into the setting irreversible hydrocolloid for providing retention of a reinforcing matrix. Fast setting type II dental plaster (Kaldent, Kalabhai Karson Pvt. Ltd, India) was mixed and poured to reinforce the boxed irreversible hydrocolloid impression. The reinforced impression was then removed carefully from the patient's head and working cast was poured using type III dental stone (Kalstone, Kalabhai Karson Pvt. Ltd, India) by boxing method.[2,3]

Wax pattern fabrication

The working cast was beveled with multiple 'V' shaped notches around the periphery. Wax pattern fabricated using base plate wax (Modeling wax, DPI, India) of 2-4mm thickness to approximated areas and checked on the patient for its contour and fit (Figure 4). After wax pattern try in, mold was prepared over the working cast with wax pattern after applying separating media using type III dental stone by boxing method. The mold was then separated after dewaxing, separating media applied and heat cure clear acrylic resin (Heat cure, DPI, India) was mixed according to manufacturer's instructions, packed and cured in a regular manner. After curing, the mold was separated, heat cure clear acrylic prosthesis was trimmed, finished and polished in a regular manner and checked for the fit on the patient (Figure 5). The outer surface of the acrylic prosthesis was beveled to have feather edge at the borders of the defect. [2,3,4]

Coloring and hair adaptation

Once the acrylic cranial prosthesis was checked for symmetry with that of the patient's face from both frontal and lateral views, acrylic paint was used to color the outer surface of the prosthesis that matched with that of patient's skin tone. For a natural like appearance, patient's own trimmed hair of adequate thickness was implanted into prepared holes of diameter 1.5-2mm with No 8 round bur by injecting thin mix of self cure clear acrylic resin.[2,4] The acrylic craniofacial prosthesis with customized implanted hair was finally attached to the defect area using medical grade adhesive as a retentive aid to mimic with that of contra lateral side (Figure 6). To mask the customized removable craniofacial prosthesis, the patient was asked to grow his beard and to wear spectacles as an additional retentive aid (Figure 7) to face the world with confidence. Through instructions were given to the patient about how to wear the prosthesis, its maintenance and to visit every 4 months for prosthetic care.

Figure 1 Patient showing left craniofacial defect (Frontal View).

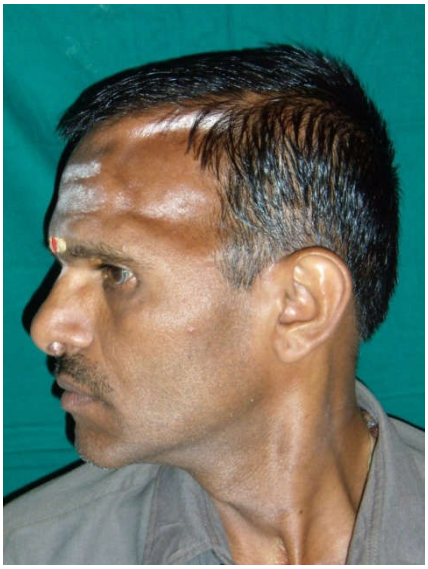

Figure 2 Patient showing left craniofacial defect (Lateral View).

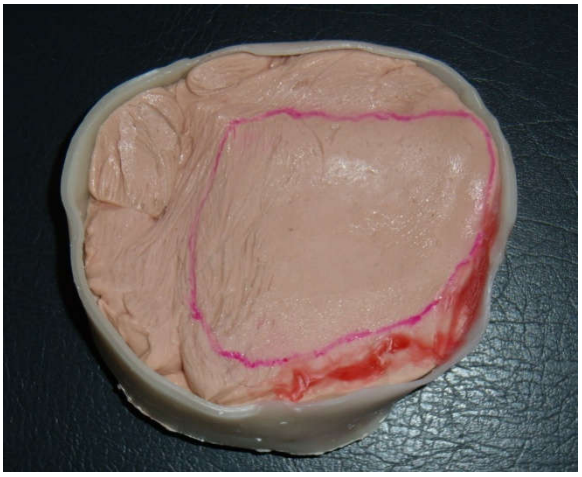

Figure 3 Irreversible hydrocolloid impression of the defect.

Figure 4 Wax pattern try in.

Figure 5 Heat cure clear acrylic resin try in.

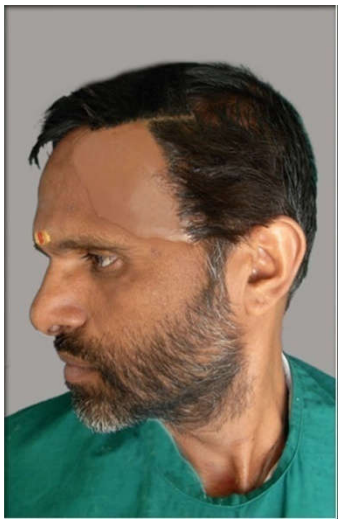

Figure 6 Customized prosthesis with implanted hair (Lateral View).

Figure 7 Craniofacial prosthesis retained by mechanical aids.

DISCUSSION

Craniofacial defects can occur because of trauma, congenital disorders, and ablative oncologic surgery. For emotional and cosmetic reasons, these defects can be very distressing to patients. Craniofacial deformities are reconstructed with surgical, prosthetic or combination of both. Craniofacial defects are externally reconstructed with the use of silicone and acrylic resin materials.[5] In the present case, heat cure acrylic resin material was preferred over silicone because of the anatomical contour of the defect.

Removable prostheses made in the maxillofacial/craniofacial areas may be fixed anatomically to already existing structures, mechanically to spectacle frames, chemically using adhesives, and surgically by osseointegrated titanium implants.[6]

The choice of anatomic retention relies on factors such as location and size of the defect, tissue mobility, undercuts and material weight of final prosthesis. The most common method of mechanical retention for facial prosthesis has been with medical grade adhesives. These adhesive systems are classified based on method of dispensing such as spray-on, pastes, double sided tapes and liquid emulsions to secure the prosthesis against accidental dislodgment. The adhesives create a better marginal seal, border adaptation and enhance the blend between skin and prosthesis.[7,8,9]

The main problem with skin adhesives is that it is difficult to correctly position the prosthesis which can dissolve leading to loss of retention and can cause skin irritation and allergic reactions.[7,8,9] In the present case, the patient was asked to grow his beard and to wear spectacles as an indirect mechanical retention to mask the removable extra cranial prosthesis margins which he was carrying with skin adhesive.
The main disadvantage with this removable extra cranial prosthesis is that of periodic remake because of loss of color stability by constant exposure to the outside environmental conditions over time and degradation of static and dynamic mechanical properties of the polymeric materials.[7,8] Extra craniofacial removable prosthesis can thus still be an option for the patients with craniofacial defects when economic status plays an important role.

The following instructions were given to the patient about the maintenance of the prosthesis [7,9,10]:

1. How to orient and place the prosthesis after applying adhesive judiciously.
2. Remove the prosthesis before going for sleep and to clean the residual adhesive from the skin and the prosthesis using guaze or textured cloth.
3. To use room temperature water and neutral soap for cleaning the prosthesis.
4. Follow up every 4 months due to color instability of prosthesis.

It is challenging to reconstruct craniofacial defects which require multidisciplinary approach with a combination of invasive and non invasive treatment options.[11] Surgical reconstruction is particularly difficult to perform from a technical perspective, has high risk of complications and seldom leads to patient satisfaction. Non surgical reconstruction of prosthesis can provide a natural looking cosmetic situation which in many cases, the esthetic outcomes are superior to those of surgical reconstruction.[12]

Those who can't afford for invasive method and surgical implant placement can have a reliable treatment option of non invasive removable external prosthetic rehabilitation with mechanical retentive aid for craniofacial defects alleviating patient concern and improving quality of life.[13]

The disadvantages with craniofacial implants supporting the prosthesis that come in contact with skin are more prone for microbial infections leading to peri-implant skin reactions. Also, all removable craniofacial prosthesis fabricated for a patient need to be remade every 1.5-2 years which is burden to the patient as well as to the concerned skilled manual work of maxillofacial prosthetist.[5,12] However, prosthetic rehabilitation efforts can only be successful when patients can appear in public without fear of attracting unwanted attention.
This case report describes a procedure that overcome problems associated with invasive surgical approach with titanium implants avoiding multidisciplinary therapeutic techniques described in the literature[5,14,15] by a non invasive conventional prosthetic rehabilitation in a cost effective way that was positively achieved and accepted by the patient in the presented case restoring his self esteem.

CONCLUSION

The treatment of patients with craniofacial defects presents psychosocial as well as technical challenges. Unusual facial features exacerbate the social challenges of meeting new people and getting along with others. These individuals may become less confident in actual ability and question self worth that can become a self fulfilling prophesy of failure.

The changes in appearance, function, and psychological well being have an enormous impact on patient's personal lives and are rewarding for the maxillofacial prosthodontist providing this care.

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