

A Simplified and Easy Approach for the Fabrication of Nasal Prosthesis: A Clinical Report

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Introduction

A facial defect caused by either traumatic injury or extirpation of neoplasm induces esthetic and functional problems for the patient. A considerable number of people each year acquire facial defects as a result of malignant disease, trauma, congenital deformity, acid injuries and burns [1].

Prosthetic treatment of a nasal defect is typically performed in conjunction with a prosthodontic procedure when the defect includes the maxilla or it passes through the palate [2]. This clinical report is to provide a simple and economic method for prosthetic rehabilitation of a patient who met with an accident in a marriage and lost his mid face as well as few teeth in the maxilla. The aim of this clinical report is to rehabilitate the patient with a prosthesis so that he can resume his daily duties comfortably and confidently.

Clinical Report

A 24-year-old man went to attend a marriage where a sudden dispute took place between two groups of people and in the rage of anger they fired in the air and amidst this hassle, subject got a gun shot injury in the mid facial region. Patient had undergone removal of all the sharpnells from the mid facial region and up to a general surgeon's limits surgical reconstruction was done with the grafts but

the facial deformity was still discernable. In this case, again reconstructive plastic surgery could be performed as advised by plastic surgeons but due to unaffordable financial status of patient, surgery could not be performed. Alternative to reconstructive plastic surgery, maxillofacial autopolymerising resin prosthesis was explained to the patient as the other treatment option, he chose to proceed with the same in order to enhance the confidence and quality of life.

On examination of the defect, it was noted that the right side of the nose and part of the nasal septum were removed. Nasal bridge was depressed and inner canthus of the left eye was affected. Upper lip from right side was also affected due to this surgical procedure. Various scars were there on the remaining mid facial region as well as on the right side of the face and upper lip region (Figs. 1, 2).

Patient was placed in the physiological rest position preferably semi-supine position for making impression of the affected area.

Subject was draped with green surgical cloth. Thin layer of petroleum jelly was applied in the areas where minute undercuts were noticed.

The impression of the defect was made with hand mixed irreversible hydrocolloid (Imprint; Dental Products of India Ltd.) with appropriate water powder ratio (Fig. 3) and reinforced with type II dental plaster (Fig. 4).

The impression was removed and poured in Type III dental stone (Dentstone; Pankaj Industries, Mumbai Maharashtra, India) to obtained undamaged definite cast for the laboratory phase of prosthesis fabrication (Fig. 6).

Donor nose impression was made and poured with wax (Fig. 5).

Waxed up nose was made adapted on the cast (Fig. 6) and try-in was done on the patient face (Fig. 7a). Patient's preoperative photograph was used to carve the wax pattern

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Fig. 1 Pre-operative photograph frontal view



Fig. 2 Pre-operative photograph profile view



Fig. 3 Impression was made with alginate impression material



Fig. 4 Alginate impression was supported by impression plaster

of prosthesis. Wax pattern was tried and evaluated for its esthetics and marginal adaptation on overlying skin of nasal septum, frontal bone as well as with the remaining part of the nose. The edges of wax prosthesis were kept feather edge to ensure marginal adaptation with patient's skin to create natural merged appearance as well as to avoid unnecessary trimming of definite prosthesis.

A final evaluation of complete wax prosthesis was performed with glass spectacle, which was used as a primary retentive device to hold the prosthesis (Fig. 7b).

After taking consent from the patient, the wax prosthesis was duplicated with alginate (Fig. 8a) and the wax was eliminated. A mold was prepared and packed with self polymerizing resin and cured (Fig. 8b). While mixing the

self curing polymer and monomer, oil based paints (Camel oil colours: Camlin Ltd. Mumbai Maharashtra, India) (Fig. 8b) were added in the monomer to match the skin color of the patient. The prosthesis was recovered after polymerization and rinsed with water to eliminate all residues. Feather-edged borders were developed using an acrylic bur (No. 180-203; Dentaaurum, Ispringen, Germany) to blend with the surface of the skin. The prosthesis was evaluated on the patient face. The prosthesis was held in position on the face with an eyeglass frame. The frame and prosthesis were oriented with the help of cyanoacrylate. The assembly was removed, and the prosthesis was firmly fitted to the spectacle frame with autopolymerizing acrylic resin (DPI-RR; Dental Products of India Ltd). The prosthesis



Fig. 5 Donor nose impression and waxed up nose



Fig. 6 Wax pattern was adapted on the master cast

Fig. 7 a Wax try-in was done on the patient's face, **b** wax try-in with spectacles was done on the patient's face



provided a life-like appearance and matched skin color and texture. To enhance esthetics, some extrinsic water-resistant coloration to break the monochromic appearance was required. The prosthesis was further characterized to simulate the surface texture of the skin (Fig. 9). The prosthesis was placed onto the defect, and the patient was instructed for follow up and adjustment (Fig. 10a, b).

Discussion

Facial defects secondary to the treatment of neoplasms, congenital malformations, and trauma result in multiple functional and psychosocial difficulties [3]. Surgical reconstruction techniques, prosthetic rehabilitation or a combination of both the methods to restore these facial disfigurements may improve the level of function and self-confidence for patients [3, 4]. The site, size, and etiology of the defect, patient's age, general medical condition and desire are used to determine the methods of reconstruction. Prosthetic rehabilitation can be preferred due to probability of recurrence, complexity of the surgical reconstruction procedure, radiation therapy, and esthetic importance [5, 6].

Biomaterials such as polymethyl methacrylate and silicone have been used for prosthetic rehabilitation for facial defects [7]. Silicone materials are the most widely used for facial prostheses. Important factors to consider when choosing silicone are biocompatibility, flexibility, translucency, color stability, and durability [7]. Advantages of silicones include a simplified fabrication process, optimal esthetics, light weight, and the ability to use soft flexible projections that can gently engage minor tissue undercuts to enhance retention and stability [7]. However, silicone

Fig. 8 **a** Wax duplication was done by using alginate and soap box as a duplicating material, **b** intrinsic staining was done by using fabric stains

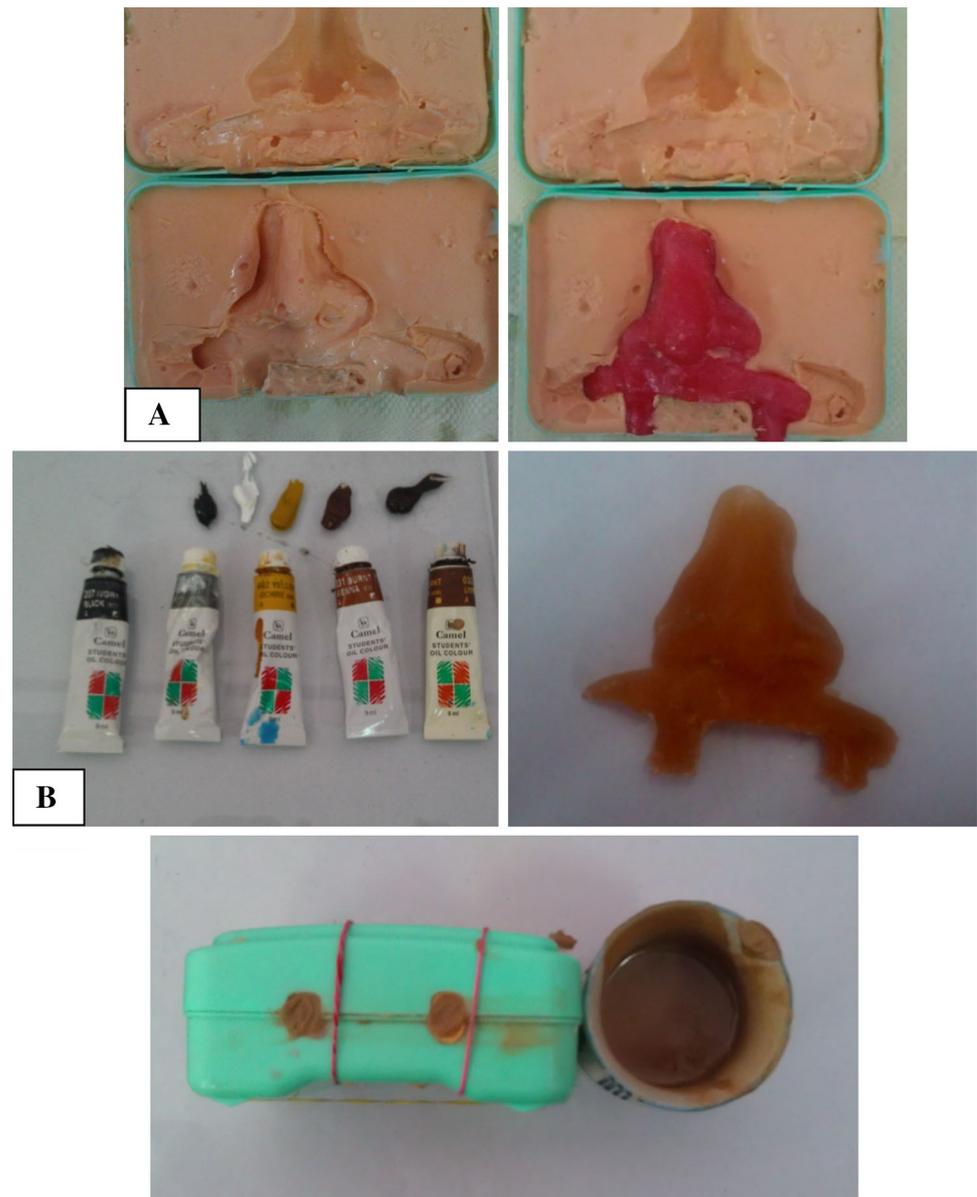


Fig. 9 Completed prosthesis with spectacles attachment as a mechanical retentive measure



materials fall short of an ideal maxillofacial prosthetic material as adhesives do not work well with silicones, and silicones are difficult to polish, have low tear resistance, and have microbial growth promoting characteristics [1].

Methyl methacrylate resin has been used as a maxillofacial material because it is easy to work with, hygienic, durable, and economical [1]. Also, it can be satisfactorily colored to match individual skin tone. However, its use is

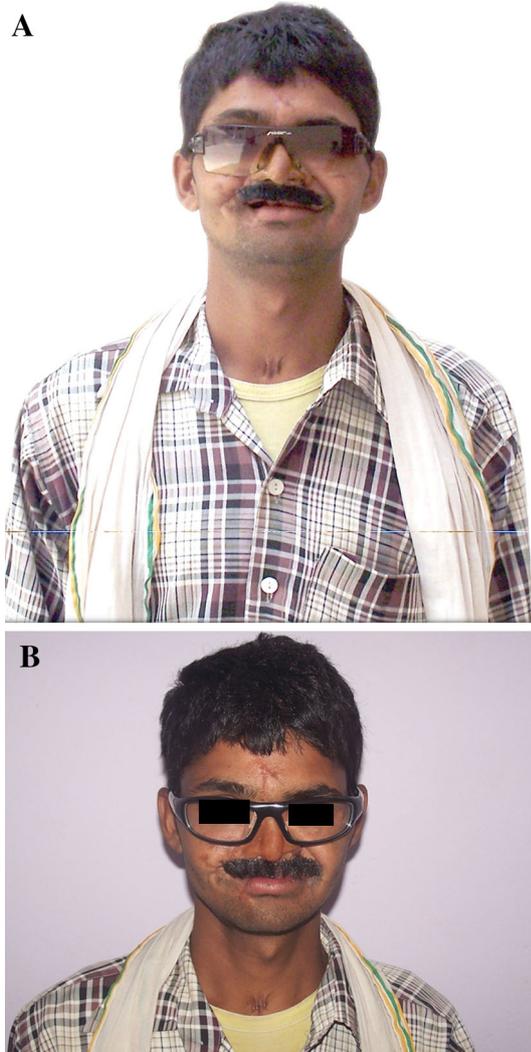


Fig. 10 a Completed prosthesis, b completed prosthesis

limited by its rigidity [1]. Although attempts have been made to greatly improve the properties of various maxillofacial materials, there is still no ideal material that resembles or duplicates human skin [1]. This clinical report describes a simple and economic method for prosthetic rehabilitation of a patient with mid facial deformity.

Various maxillofacial impression techniques described so far have been based upon the materials available and the dexterity of the operator, making fabrication of an extraoral facial prosthesis more art than science [8]. The conventional method of making maxillofacial impression involved the use of irreversible hydrocolloid material reinforced with Type II gypsum [9]. Alternatively, high-viscosity polyvinyl silicone impression [10] material was used with the help of a suitable carrier. In our case, we have used the conventional method. Impression was made with the help of irreversible hydrocolloid impression material and reinforced with type II dental plaster.

In this case, we have made a impression of a donor nose from a person having a same height, gait and personality to duplicate which helps in achieving better aesthetic results (Fig. 5). For making a donor nose impression again irreversible hydrocolloid impression material was used which was reinforced with type II dental plaster.

Retention is one of the most important consideration in fabricating a successful facial prosthesis. In this case mechanical retention such as eye-glasses were used that aid in better retention of the prosthesis. Today, numerous methods of retention for facial prostheses have been described in the literature; they include eyeglasses extensions [11] that engages tissue undercuts, magnets, adhesives, attachment to maxillary obturators, and osseointegrated implants [12, 13]. Although osseointegrated implant [12] may provide the most reliable prosthesis retention, additional surgeries, expenses, inadequate bone, and prior radiation to the area may contraindicate this type of treatment [13, 14, 15].

In recent advancements, different processing methods such as laser, CAD/CAM and rapid prototyping technologies have been reported which helps the maxillofacial prosthodontist to achieve better results in lesser time. The disadvantage with CAD-CAM system is that the operator should have good computational skills and the system is very expensive [16].

Prosthesis must be light weight so that it can be easily placed without irritation to soft tissues [17]. The facial prosthesis described in this article was fabricated from autopolymerising acrylic resin. No evidence of inflammation or irritation has been found on follow up for 6 months.

This clinical report describes a simple, effective, method for prosthetic rehabilitation of a midfacial region defect with a mechanical retention design using an eyeglass frame. The advantages of this prosthesis are that the technique is non-invasive, cost-effective, tissue tolerant, esthetic to the patient, comfortable to use, and easy to fabricate and clean. Additionally, these prosthesis are often preferred by the patients because the weight and the cost of such a prosthesis are low. The presence of moisture, mobile soft tissues, secretions from the sweat glands as well as sebaceous glands may affect the extrinsic staining of the prosthesis.

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