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Maxillofacial Rehabilitation of Nasal Defect with a Silicone Nose Prosthesis: A Case Report

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Abstract

Facial disfigurements involving the nose can severely impact an individual's psychological well-being and social interactions. Nasal defects, whether congenital or acquired, pose significant challenges for rehabilitation due to their central facial location and aesthetic importance. This case report presents the maxillofacial rehabilitation of a 57-year-old female patient with a total nasal defect resulting from trauma sustained 25 years prior. The patient's existing prosthesis exhibited discoloration, rigidity, and poor marginal adaptation. A new nasal prosthesis was fabricated using medical-grade silicone for enhanced esthetics, comfort, and durability. The prosthesis was retained using spectacles to provide mechanical stability and conceal

prosthetic margins. The rehabilitation process involved precise impression making, wax pattern sculpting, color matching with intrinsic pigmentation, and careful adaptation to the patient's facial contours. The patient reported high satisfaction with the prosthesis' color match, retention, and comfort, leading to improved confidence and quality of life. This case highlights the clinical effectiveness of silicone prostheses in restoring facial form and function and underscores the importance of periodic evaluation and replacement for sustained success. Advancements in materials and fabrication techniques continue to enhance the outcomes of maxillofacial rehabilitation for patients with nasal defects.

Keywords: Nasal Defect, Silicone Prosthesis, Maxillofacial Rehabilitation, Trauma, Nasal Reconstruction

Introduction

Facial disfigurement, especially involving the nose, can result in significant psychological and social impacts. Midfacial defects, congenital or acquired, significantly challenge rehabilitation and may affect the cheek, nose, upper lip, and underlying muscles. Causes include trauma, burns, infections, tumor surgery, radiation, congenital anomalies, and vascular malformations [1].

A nasal prosthesis can effectively restore the aesthetic form and anatomical contour of midfacial defects, often more efficiently than surgical reconstruction [2].

This particular case was managed using a silicone prosthesis retained anatomically and with spectacles. A non-surgical rehabilitation approach was chosen based on the patient's preference and financial limitations. The final prosthesis aimed to restore both aesthetics and function, ultimately enhancing the patient's quality of life.

Case Report

A 57-year-old female reported to the maxillofacial prosthetics clinic with complaints of discoloration and deterioration of her existing nasal prosthesis. She had sustained facial trauma 25 years ago in an accident, leading to total nasal loss. The patient was rehabilitated with a nasal prosthesis at that time, which she had been using continuously.

Clinical Examination:

Extraoral examination revealed a well-healed nasal defect site with no signs of active infection or inflammation. The old prosthesis was discolored, hardened, and showed poor marginal adaptation due to wear and tear. The patient expressed dissatisfaction with the esthetics and retention of the prosthesis.



Fig 1: Preoperative profile a) Frontal b) Side

Treatment Plan:

It was decided to fabricate a new nasal prosthesis using medical-grade silicone for enhanced esthetics and comfort. The goals were to improve color match, marginal fit, retention, and patient satisfaction.

Procedure

1. **Impression Making:** Petroleum jelly was applied to the patient's eyebrows and eyelashes. Moist gauze was placed to block material from entering the undercuts. A complete facial impression was made using irreversible hydrocolloid (tropicalgin) with the help of modelling wax sheet (Maarc) to provide support for the impression material which acted as a boundaries to control the flow of impression material. The cast was poured with type III dental stone (KALSTONE, Kalabhai Karson Private Limited, MUMBAI INDIA).



Fig 2: Impression making procedure



Fig 3: Wax up pattern

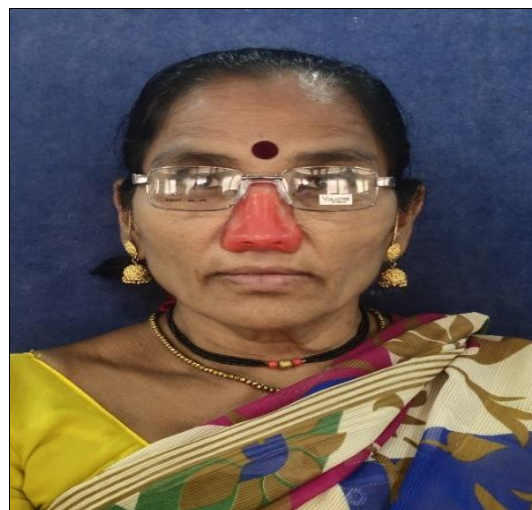


Fig 4: Wax up pattern try in

2. **Sculpting:** A heat-cured clear acrylic stent (DPI Heat Cure, Mumbai, India) was fabricated as the prosthesis base to engage the predetermined undercut and to provide mechanical retention for the silicone to the base. A wax pattern (Maarc modelling wax) of the nasal prosthesis was sculpted to match the patient's facial contours, referencing old photographs, old prosthesis and patient feedback.

3. **Trial and Evaluation:** The wax-up was tried on the patient, evaluated for esthetics, symmetry, and comfort, and adjustments were made accordingly.

4. **Mold Fabrication and Processing:** The final wax pattern was flaked normally in type III green color dental stone (KALSTONE, Kalabhai Karson Private Limited, MUMBAI INDIA.) After dewaxing it was processed using medical-grade RTV silicone where intrinsic stains were added which was matched with the adjacent tissue of the defect to achieve a realistic skin tone.



Fig 5: Dewaxed mould

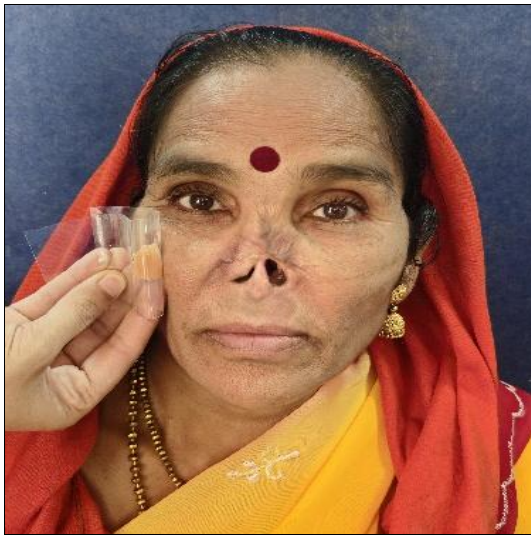


Fig 6: Shade selection



Fig 7: Final prosthesis with spectacle as retentive aid

5. Delivery: Retention was aided by spectacle. The superior margins of the silicone nasal prosthesis were meticulously contoured to achieve intimate adaptation with the eyeglass frame. The frame was utilized to enhance prosthesis retention and to effectively mask the prosthetic margins. It was subsequently affixed to the prosthesis using appropriate means. The patient was instructed on the placement and removal of the prosthesis, following which the final prosthesis was delivered.



Fig 8: Postoperative profile a) frontal b) Side

The new prosthesis demonstrated excellent color matching, better fit, and improved patient satisfaction. On follow up after 24 hours and after 7 days patient reported satisfaction with the prosthetic outcome. She was instructed to return for follow-up appointments every three months to monitor the prosthesis fit and assess any changes in her quality of life post-rehabilitation.

Discussion

Maxillofacial prostheses need periodic evaluation and replacement due to material degradation over time. Silicone prostheses typically require replacement every 1–2 years, depending on usage and environmental exposure. This case reinforces the importance of patient follow-up and the benefits of modern silicone materials in achieving superior esthetic and functional outcomes.

Nasal defects, due to the nose's central location and significant contribution to facial aesthetics, can greatly alter one's appearance. Restoration often requires surgical intervention, prosthetic solutions, or a combination of both, with the approach guided by the defect's characteristics and the patient's needs and expectations [3].

Traditionally, nasal prostheses were retained using straps, intraoral attachments, or eyeglass frames—methods that continue to be favored for their affordability. In contemporary practice, medical-grade adhesives are more commonly employed, providing convenient application and reliable retention, although they may occasionally cause skin irritation or compromise the prosthesis margins during removal [4].

Effective retention techniques are essential for achieving successful rehabilitation outcomes. In certain situations, maintaining the position of nasal bones post-surgery can improve eyeglass stability and reduce the risk of displacement. Various approaches are used to retain facial prostheses; for instance, mechanical retention that utilizes natural anatomical undercuts can be beneficial when anatomical conditions are favorable, though it may offer limited effectiveness in areas with flat or insufficient tissue support [5, 6].

Facial prostheses do have certain limitations, such as poor retention, discoloration over time, patient dissatisfaction, and potential skin irritation from adhesive use. However, enhancing the aesthetic appeal, stability, and retention of the prosthesis can significantly increase patient acceptance and satisfaction [7–9].

Durability is a key characteristic of facial prosthetics. Over time, material breakdown and color changes are the main factors that necessitate their replacement. According to studies, facial prostheses typically need to be replaced every 1.5 to 2 years, which can place a significant financial and emotional burden on patients [10, 11].

A well-designed prosthesis should closely replicate the missing facial contours, helping patients feel more confident in social settings. This principle applies to both permanent and temporary prostheses, especially in cases where surgical reconstruction is not feasible. Providing thorough and high-quality rehabilitation can significantly enhance a patient's overall quality of life [10, 12].

Facial prostheses have traditionally been crafted manually using sculpted wax or clay models. However, advancements in technology have introduced computer-aided design (CAD) techniques, allowing for the creation of nasal prostheses based on virtual laser scans of the affected area before surgery. These digital models are then adapted to match the post-surgical anatomy. Using CAD-CAM methods, molds can be rapidly prototyped, leading to improved precision and overall quality of the final prosthetic [13]. However its use is restricted due to technical complexity, high costs, and limited availability in many facilities [10, 14].

Despite challenges, the field of maxillofacial prosthetics is progressing quickly, with ongoing advancements aimed at enhancing the quality of the final outcome.

Conclusion

The successful rehabilitation of a 57-year-old female patient with a new silicone nasal prosthesis emphasizes the significance of updated prosthetic techniques and materials in restoring facial esthetics and patient confidence. This direct method of impression using wax sheets allows for better adaptation to individual facial contours, improves the accuracy of the impression, and enhances patient comfort during the procedure. Particularly in cases requiring precise prosthesis fabrication for optimal functional and aesthetic outcomes Periodic assessment and timely replacement of the prosthesis are key to long-term success.

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