Compendium of Oral Science Volume 8/2021
Case Report

Prosthetic Management of Unfavourable Nasal Defect: A Case Report

Sayfaldeen Kashmoola[1], Tengku Fazrina Tengku Mohd Ariff[2,*]

[1]Postgraduate Resident, Centre of Studies of Restorative Dentistry, Faculty of Dentistry, Universiti Teknologi MARA, 47000, Sungai Buloh, Selangor.
[2]Centre for Restorative Dentistry Studies, Faculty of Dentistry, Universiti Teknologi MARA, 47000, Sungai Buloh, Selangor.

Corresponding author:
fazrina@uitm.edu.my

Received: 23 March, 2020
Accepted for publication: 19 October 2020

ABSTRACT

Introduction*: Facial defects can affect the appearance of an individual, resulting in psychological and social problems. In certain cases, surgical reconstruction of facial defects may not be feasible and prosthodontic rehabilitation may be the best option.* **Case description***: A 72-years old gentleman was referred for the rehabilitation of a facial defect on the right side of his nose. The defect was affecting him psychologically and socially. The decision was made to construct a nasal prosthesis for him that would be retained by desirable undercuts and adhesive.* **Discussion***: Management of facial defects are challenging due to multiple reasons such as matching of the prosthesis to surrounding skin and retention of the prosthesis. The prosthesis can be retained with implants, facial accessories, desirable undercuts, or adhesives. For this patient, the prosthesis was retained by using undercuts combined with medical-grade adhesive. A thin layer of flash at the edges of the prosthesis was maintained to ensure even finish margin. The prosthesis fabrication successfully resolved the patient's condition.*

Keywords: *Nasal prosthesis, Basal cell carcinoma, Nasal defect*

INTRODUCTION

Maxillofacial defects can be caused by multiple factors such as congenital malformation, trauma, or neoplasm. Such defects can affect and individual's sense of identity and personality. Correction of facial defects involves a multidisciplinary approach involving surgical, prosthetic, and psychological rehabilitation (Aggarwal, Datta, & Kaur, 2016). Nasal defects are divided into favourable defects such as total rhinectomy and unfavourable defects such as partial rhinectomy. For partial rhinectomy, the rehabilitation is challenging due to multiple factors including displaceable residual nasal tissue, difficulty in restoring the nasal symmetry, difficulty in retaining the prosthesis and hiding the margins of the nasal prosthesis. Moreover, other difficulties in the rehabilitation of facial defects include limitation in the surrounding soft tissue quantity and mobility, reduced vascularisation, underlying physical condition of the patient, and material availability (Beumer et al, 2011).

Skin cancer in the facial region is one of the contributing to maxillofacial defects. It could be divided into non-melanoma skin cancer and melanoma. Non-melanoma skin cancer (NMSCs) includes basal cell carcinoma

PENERBIT PRESS
UNIVERSITI TEKNOLOGI MARA

(BCC; 75% of NMSCs), squamous cell carcinoma (SCC; 20% of NMSCs), and a few rarer malignancies such as Merkel cell tumour, dermatofibrosarcoma protuberans, and adnexal tumours. BCC originates from pluripotential cells in the epidermis and hair follicles. The most common predisposing factor of BCC is prolonged exposure to the sun. The treatment of BCC involves wide margin excision of the tumour and confirmation of clear margin with microscopic examination, followed by radiotherapy. Rehabilitation of the defect can be achieved by surgical reconstruction or prosthetic restoration. The treatment plan depends on several factors such as the contour of the excised lesion, availability of the soft tissue, vascularisation of defect area, need for radiation to the area of defect, and physical and medical conditions of the patient (Beumer et al., 2011; Jain et al., 2011; Miloro & Peterson, 2012).

This case report aimed to describe the prosthetic rehabilitation of a partial nasal defect by using a nasal prosthesis fabricated with silicone elastomer.

Case Description

A 72-years old male patient was referred to the Postgraduate Prosthodontic Clinic, Faculty of Dentistry, Universiti Teknologi MARA for rehabilitation of partial nasal defect. The patient had a history of BCC on the right side of the nasal region and underwent partial rhinectomy procedure followed by radiotherapy. He completed all his treatment a year before presenting to this clinic. The nasal defect following the cancer treatment resulted in negative psychological impact on the patient, including low self-esteem and social avoidance.

Clinical examination revealed a defect on the right side of the nose with healthy boundaries. The defect was 2 × 3 cm and bordered the right nasal alar distally, part of the right nasal wall superiorly, and mid of nasal bridge and part of the nasal tip medially (Figure 1). The nasal septum and inferior turbinate bone were exposed with intact mucosal lining. Based on the anatomical features, the defect was classified as an unfavourable defect.

In order to improve the patient's appearance and psychological well being, a treatment plan was laid out based on the limitations of the defect extension. It was aimed to rehabilitate the defect using a prosthesis that would be retained by a combination of desirable undercuts and adhesive.

Figure 1: Extra-oral view of patient showing the defect region.

CLINICAL PROCEDURE

Two primary impressions were made, namely the nasal and facial impressions. The facial impression was made by using irreversible hydrocolloid impression material (Kromopan, Lascod, USA) while the nasal impression was made using light-body and heavy-body polyvinyl siloxane impression material (VPS, Chemi-Sil, B&E, Korea). Additionally, the airway patency was maintained using a plastic tube that was held passively.

A nasal cast and facial cast were fabricated and trimmed using Type 3 dental stone (Model Stone, Zhermack, Italy). The wax pattern of the nasal prosthesis was sculptured on the facial cast to ensure the parallelism with other facial landmarks. Then, soft wax was inserted into the desirable undercuts on the nasal cast. Following that, the wax pattern was attached to the soft wax on the nasal cast to ensure the proper extension of the prosthesis the undercuts (Figure 2a, 2b, 2c & 2d). Wax pattern adaptation was assessed. Skin texture and contours were evaluated (Figure 3).

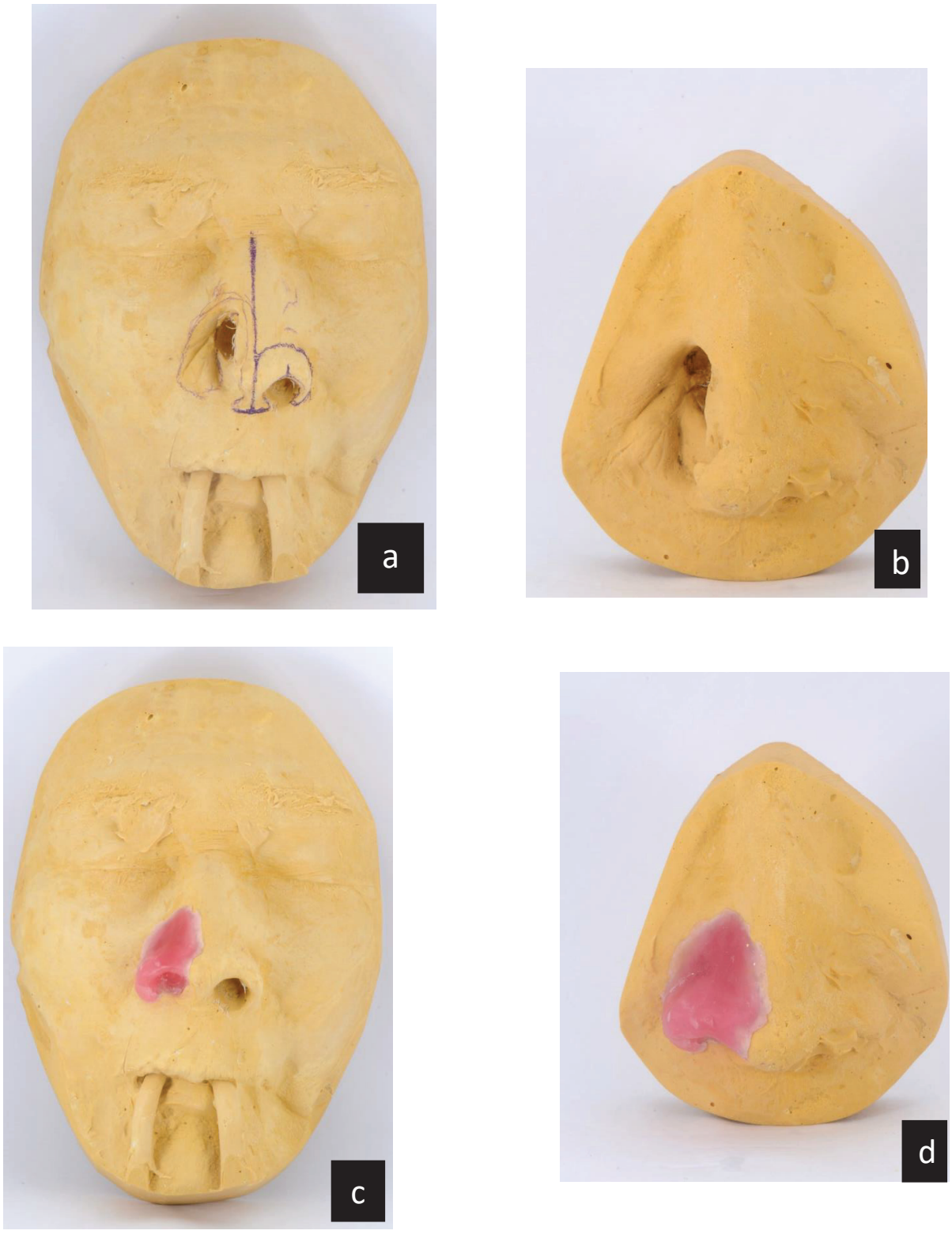

Figure 2: The facial and nasal casts without (a & b) and with (c & d) the nasal wax-up pattern.

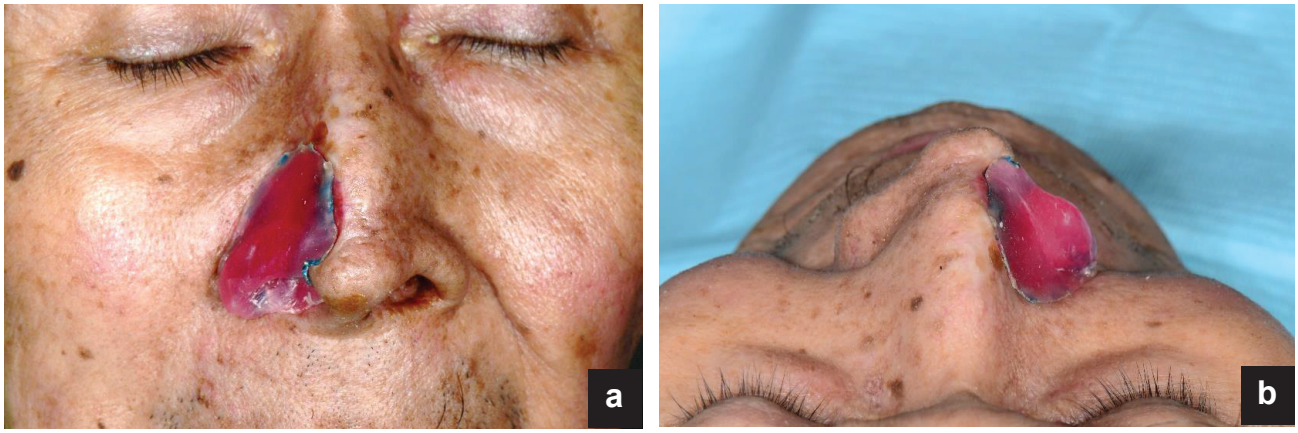

Figure 3: Try-in stage of the nasal wax pattern.

A reline impression was made by relining the wax pattern using light-body silicone impression material. The light-body Vinyl PolySiloxane (VPS, Aquasil, Dentsply Sirona, USA) was injected on the borders of nasal defect and the remaining area of the nose. Then, the wax pattern was picked up with a special tray loaded with heavy-body VPS (Aquasil, Dentsply Sirona, USA) (Figure 4). The base colour of the skin shade was taken during the same visit. It was a mixture of cream, light brown, and grey intrinsic stains (P115 intrinsic colour, Technovent, UK).

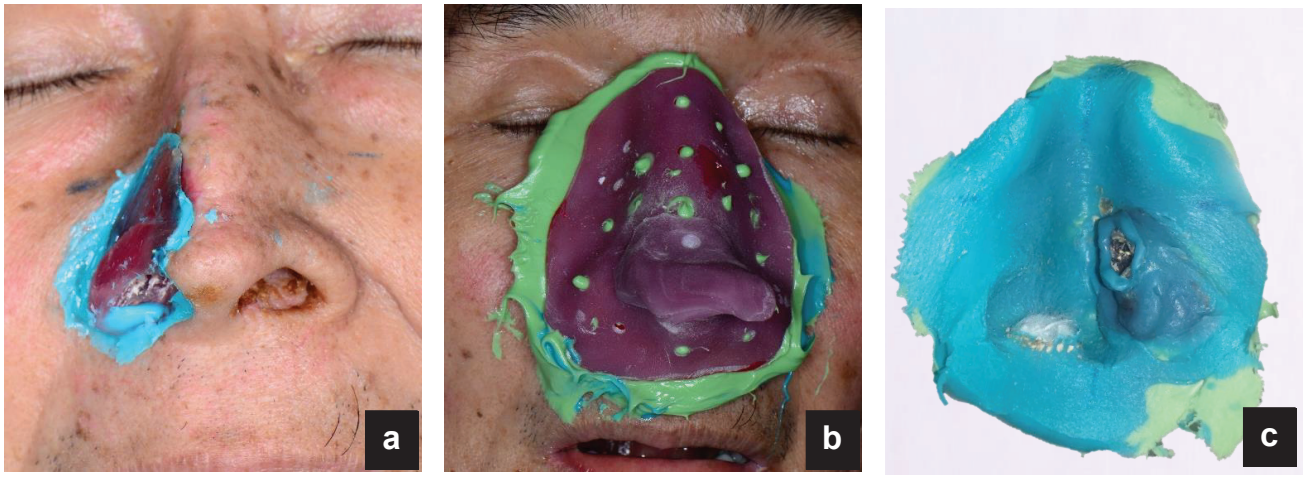

Figure 4: Reline impression of the wax pattern (a), custom tray loaded with heavy-body polyvinyl siloxane (b), and picked-up impression (c).

The nasal prosthesis was then fabricated using heat-vulcanised silicone material (Cosmesil series maxillofacial rubber M511, Technovent Co, UK). The maxillofacial silicone was mixed and packed into two-piece dental flask and polymerised according to the manufacturer's instructions (Figure 5).

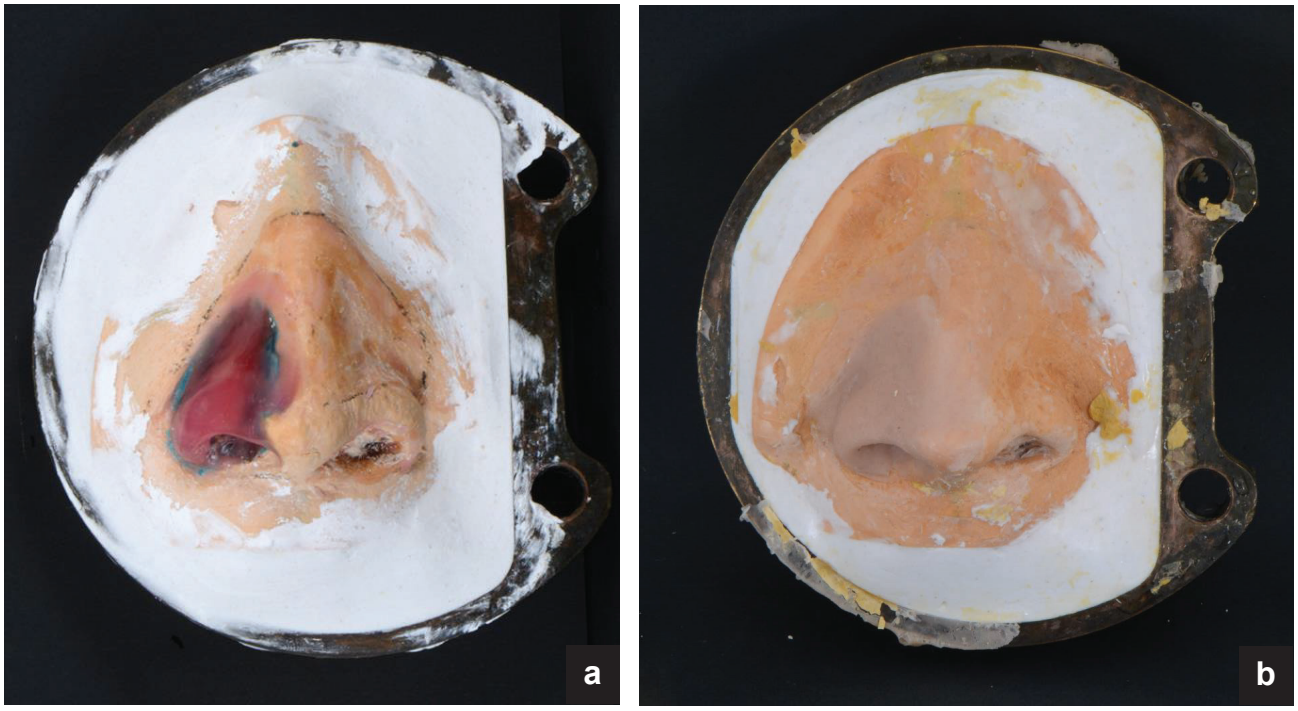

Figure 5: The master cast investment (a) and the final nasal prosthesis after polymerization (b).

On the day of delivery, the nasal prosthesis was first fitted to the nasal defect. It was able to engage all the available undercuts, thus providing sufficient retention. The silicone flash on the peripheries was retained on purpose to ensure transitional blending to the skin. The prosthesis was in an acceptable symmetry when compared to the left side of the nose and other facial structures (Figure 6). After checking the fitting of the prosthesis, the external surface was stained with extrinsic stains (P702i extrinsic colour, Technovent, UK) followed with sealant application (P799 extrinsic sealant, Technovent, UK). The wearing of the prosthesis was demonstrated to the patient. Detailed instructions regarding the care and use were provided to the patient and his son.

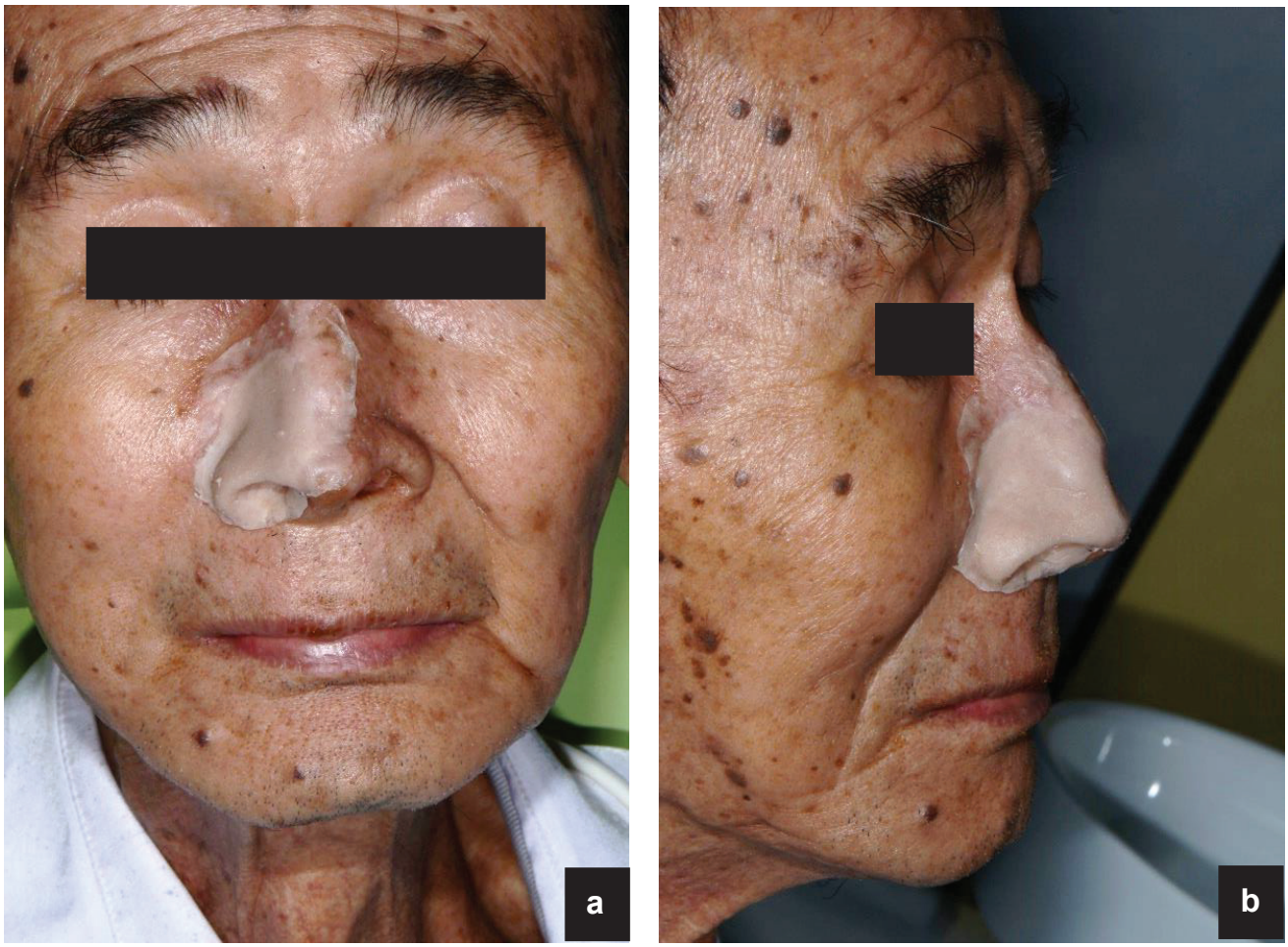

Figure 6: Try-in of nasal prosthesis prior to extrinsic staining.

The patient returned for first review after one week. He was concerned about slight losseness of the prosthesis. However, he was satisfied with the appearance and color of the prosthesis. A decision was made to improve the retention of the prosthesis by usage of adhesive.

Therefore, the patient was reassured and provided with a water-based adhesive (G609 Probond Adhesive, Technovent, UK). Instructions on its usage were given to the patient. Color stability, tissue health, and his satisfaction towards the prosthesis were also assessed. In general, he was satisfied with the outcome (Figure 7).

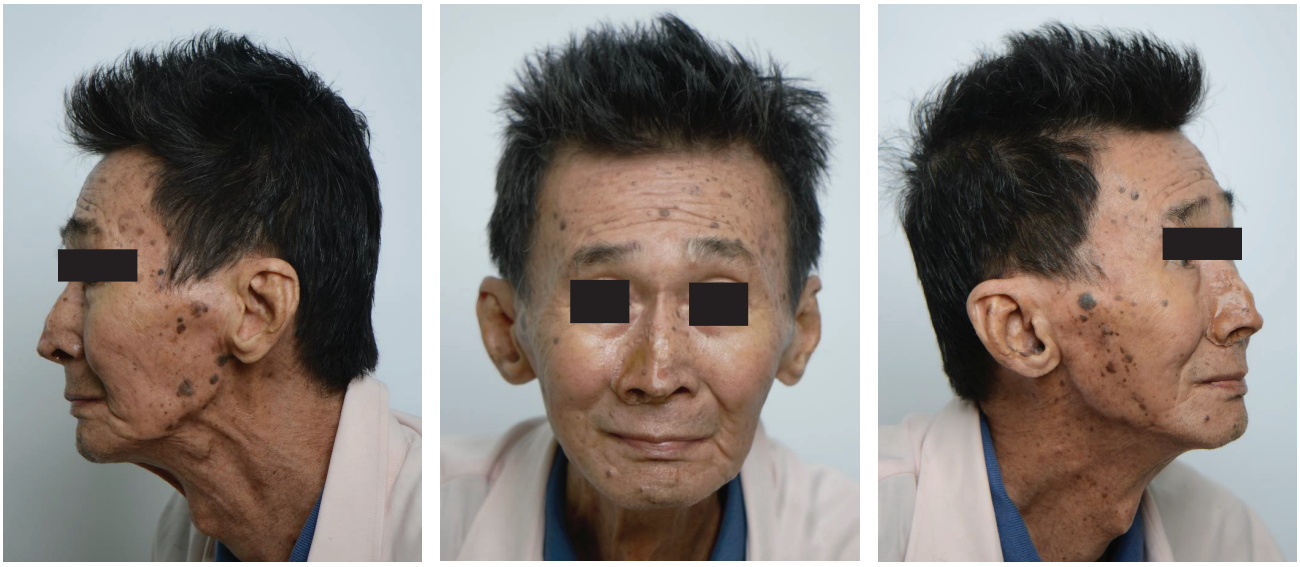

Figure 7: Nasal prosthesis after extrinsic staining, glazing and characterization.

DISCUSSION

Defects in the nasal region can be divided into favourable and unfavourable defects. Total rhinectomy is a more favourable defect compared to partial rhinectomy. The rehabilitation of partial rhinectomy can be challenging due to multiple factors such as displaceable residual nasal tissue, difficulty to restore the symmetry, and difficulty to hide the margins (Beumer et al., 2011). Moreover, the usage of an implant to rehabilitate nasal defect is limited by the physical condition of the patient, availability of bony structure, financial limitation, and history of radiation to defect area (Louis, Torres Terán, & Cardín, 2016). For this case, the nasal defect was considered as unfavourable based on the limited remaining undercuts and position of the defect. Furthermore, it was difficult to match the colour due to the variety of skin tone and amount of hyperpigmentation on his facial region.

Nasal prosthesis can be retained by multiple methods such as undercuts, facial accessories (such as spectacles), medical-grade adhesive, or osseointegrated implants (Beumer et al., 2011; Jain et al., 2011; Saker, Zarrati, Mroue, & Mangoli, 2018). However, implant placement is also a challenge nasal defect rehabilitation. In this case, implants were not considered due to the location of the defect and unavailability of bone, and a history of radiotherapy. In addition, spectacles were not considered as a mean of retention because the location of defect margin were not in proximity to the nasal bridge. Therefore, the best retention option the prosthesis would be the utilization of available undercuts and skin creases with the usage of an adhesive if needed. However, prolonged usage of adhesive was not recommended mainly due to the level of maintenance required to apply the adhesive and it would be possible to tear the borders during the application. Furthermore, it would require more care for cleaning of the prosthesis and defect. The purchase of the adhesive would also represent an extra financial burden to the patient.

Nasal prostheses can be fabricated by using conventional or digital techniques. The conventional technique requires multiple lengthy clinical and laboratory steps. With the current advancement with digital dentistry, nasal and other maxillofacial prostheses can be fabricated by the utilization of Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) systems (Farook, Jamayet, Abdullah, Rajion, & Alam, 2019). While the initial cost of conventional technique is lower, running cost and time required for fabrication of nasal prosthesis digitally is lower. Additionally, MRI, CT Scan, photogrammetric systems, or laser scanners are usually used for fabrication of digital impressions which will reduce discomfort to the patients (Farook et al., 2019). Despite the advantages of digital nasal prosthesis, the availability of a CAD/CAM systems hindered the usage in many cases including this case.

There are multiple materials that can be used for fabrication of nasal prosthesis such as acrylic resins, vinyl polymers, polyurethane elastomers, and silicone elastomers; However, none of them is fulfilling all the requirements for a satisfactory prosthesis (Shetty, Mohammed, Kamath, & Shenoy, 2018). Maxillofacial silicone material is commonly used to fabricate extraoral prostheses for its good surface texture and hardness. The main problem lies within the short lifespan of the prosthesis when made using this material. A study was conducted to evaluate the stability of HTV silicone (Cosmesil series maxillofacial rubber M511, Technovent Co, UK) by immersing it for six months (equivalent to 1.5 years of clinical service) in different solutions. It was found that continuous immersion of silicone specimens for six months revealed only slight colour changes and limited solution absorption (Al-Dharrab, Tayel, & Abodaya, 2013). In view of its superior properties, this material was chosen. Yet, the patient was still be reminded not wash the prosthesis with acidic or basic solutions to decelerate colour fading.

CONCLUSION

Utilization of remaining undercuts with assistance of adhesive are advantageous for prosthesis retention in un favorable nasal defect. Excellent homecare maintenance, avoidance of exposure to direct sunlight and periodic reviews are the essential cores to ensure prosthesis success.

REFERENCES

Aggarwal, V., Datta, K., & Kaur, S. (2016). Rehabilitation of post-traumatic total nasal defect using silicone and acrylic resin. *The Journal of Indian Prosthodontic Society*, *16*(1), 87.

Al-Dharrab, A. A., Tayel, S. B., & Abodaya, M. H. (2013). The Effect of Different Storage Conditions on the Physical Properties of Pigmented Medical Grade I Silicone Maxillofacial Material. *ISRN Dentistry*, *2013*(March 2013), 1–9.

Beumer, J., Marunick, M. T., & Esposito, S. J. (2011). *Maxillofacial Rehabilitation: Prosthodontic and Surgical Management of Cancer-related, Acquired, and Congenital Defects of the Head and Neck*.

Farook, T. H., Jamayet, N. B., Abdullah, J. Y., Rajion, Z. A., & Alam, M. K. (2019). A systematic review of the computerized tools and digital techniques applied to fabricate nasal, auricular, orbital and ocular prostheses for facial defect rehabilitation. *Journal of Stomatology, Oral and Maxillofacial Surgery*, (October 2019).

Jain, S., Maru, K., Shukla, J., Vyas, A., Pillai, R., & Jain, P. (2011). Nasal prosthesis rehabilitation: A case report. *Journal of Indian Prosthodontist Society*, *11*(4), 265–269.

Louis, R. Saint, Torres Terán, J. F., & Cardín, V. G. (2016). Implant-supported nasal prosthesis. Clinical case report. *Revista Odontológica Mexicana*, *20*(1), e44–e49.

Miloro, M., & Peterson, L. J. (2012). *Peterson's Principles of Oral and Maxillofacial Surgery*.

Saker, J., Zarrati, S., Mroue, M., & Mangoli, A. (2018). Rehabilitation of a partial nasal defect in AML patient with facial prosthesis: A case report. *Journal of Cranio-Maxillofacial Trauma*, *4*(4), 6.

Shetty, S., Mohammed, F., Kamath, J., & Shenoy, K. K. (2018). Nasal reconstruction with silicone using customised impression technique. *Journal of Indian Prosthodontic Society*, Vol. 18, pp. 68–71.