

## Nasal Reconstruction after Mohs Surgery: Case Report and Literature Review

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**Abstract:** The prevalence of cutaneous malignancies is frequently observed in the facial region, with a notable predilection for the nasal area. The distribution of nonmelanoma skin tumors is predominantly observed in the head and neck region, accounting for approximately 75% of cases. Specifically, the nasal area is affected in approximately 30% of these instances. Basal cell carcinoma and squamous cell carcinoma represent significant clinical-surgical indications within the medical field. Moreover, the utilization of skin flaps for nasal reconstruction exhibits remarkable versatility in its various applications. The potential outcome of the reconstruction procedure is based upon various factors, including the precise location, dimensions, and depth of the defect, as well as the feasibility of accessing a suitable donor area. Just as important are the surgeon's choices regarding the materials, techniques, and approaches employed during the intervention. The innovative research conducted by Burget and Menick has brought about a paradigm shift in the field of nasal reconstruction surgery. Their pioneering contribution lies in the introduction of the concept of aesthetic subunits of the nose, in which variations in elasticity, color, contour, and skin texture are taken into account. This innovative method has significantly enhanced the precision and finesse of nasal surgical procedures, leading to remarkable advancements in the field. The unique attributes of the dermal layer that envelops the region, along with the numerous waves and projections present on its outermost layer, necessitate careful consideration in order to restore the usual natural shape and functioning. Even a small, unnoticed alteration in structure may have a significant influence on both aesthetic appeal and structural integrity. The therapeutic approach includes both functional and cosmetic considerations, with the primary objective being the mitigation of the most minimal degree of anatomical abnormality.

**Keywords:** Basall cell carcinoma, Skin neoplasms, Surgery, Surgical flaps, Nose imperfections, Mosh reconstruction, Skin flaps.

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## INTRODUCTION

Nasal dorsal and sidewall defects are usually considered as the least complex when it comes to nasal reconstruction. It is important to note that these specific regions can be effectively repaired using relatively easy techniques, resulting in exceptional outcomes.

Nevertheless, it is imperative to note that defects of a more intricate nature, encompassing full-thickness impairments and those encompassing adjacent tissues like the medial canthus, require precise examination and strategic discussion. The comprehensive evaluation of nasal defects necessitates a meticulous assessment that

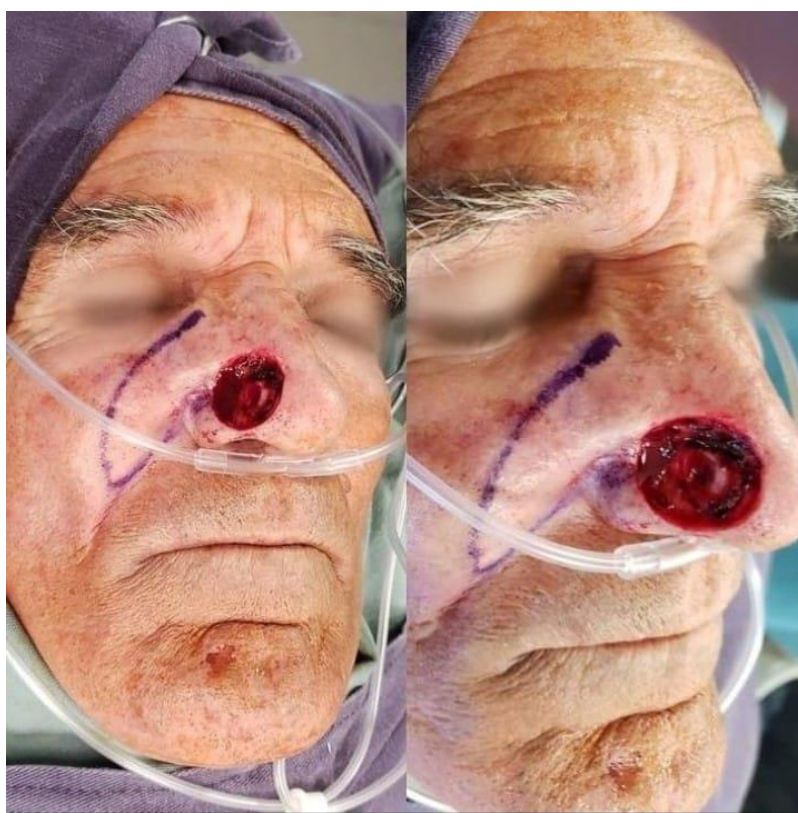
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takes into account both aesthetic and functional considerations. The incorporation of optimal reconstructive plans involves the integration of fundamental principles such as the substitution of analogous tissues and the strategic positioning of scars. Unique attributes related to the dorsum and nasal sidewall include the notable variation in dermal and subcutaneous tissue thickness as one traverses from the nasal dorsum to the cheek. Additionally, these regions exhibit a remarkable proximity to adjacent facial components such as the medial canthus, eye, cheek, and forehead. Furthermore, a notable characteristic found in this particular area is the presence of the osseocartilaginous junction. In this particular anatomical region, it is important that simple defects can be effectively remedied through the utilization of direct advancement of adjacent tissue, local flaps, or the

application of skin grafts. These interventions have been observed to provide satisfactory outcomes. In certain instances, the management of intricate defects may necessitate the implementation of transposition flaps, interpolated flaps, or potentially even free tissue transfer techniques.

## CASE REPORT

We report 63-year-old men who presented with an invasive basal cell carcinoma at the low-mid nasal dorsum. A surgical excision with a 7-mm margin was recommended based on the pathology results. After resection, the skin defect measured 20 × 22 mm and was successfully reconstructed using our local flap, Figure 1 & 2.



**Figure 1: Surgical defect following the Mosh technique for excision of Basocellular carcinoma**



**Figure 2: Postoperative Outcome at 3 Months Follow-up**

## DISCUSSION

The reconstruction of the nasal region represents one of the oldest documented efforts in the field of reconstructive surgery, claiming a rich historical lineage. However, it continues to present itself as a complex and demanding commitment, posing significant challenges to healthcare professionals. The nasal region presents a variety of unique features that contribute to the complexity faced during its reconstructive procedures. The nasal contours exhibit considerable variability, characterized by the presence of both convex and concave surfaces that closely interact with one another. Within the superior region of the nasal cavity, a delicate dermal layer is intricately connected to the fixed osseous structure. The caudal portion of the nose exhibits a notable presence of thick, sebaceous skin that demonstrates a firm adherence to the underlying cartilage framework. Due to the current situation, there is a limited degree of flexibility in mobilizing the surrounding tissue in the lower region. The cutaneous tissue covering the nasal region exhibits a distinct texture and hue that distinguish it from the integumentary tissue found in other anatomical regions. The nasal region, situated at the center of the face, takes on a position of prominence and serves as a vital anatomical structure with multifaceted roles. It plays an essential role in the olfactory system, which includes facilitating the sense of smell while also serving as a pathway for conditioning the inhaled air. Furthermore, the nose functions as the upper airway, contributing significantly to respiratory processes. Nasal injury is a

commonly encountered phenomenon, frequently leading to tissue damage and subsequent loss. Tissue loss frequently arises from various etiologies, including trauma, infection, and the surgical resection of neoplasms. A wide range of alternatives are at the disposal of the reconstructive surgeon, tasked with the intricate task of copying the complex form and structure of the nasal structure while preserving its crucial functional capacities. When undertaking the task of nasal reconstruction with the objective of restoring both aesthetic form and function, it is essential to adhere to a number of fundamental principles. The exclusive desirable outcome is the maintenance of the normal contour. The absence of certain components necessitates the reconstitution of said elements using biological tissues. The optimal approach for the design of flaps and grafts involves utilizing the three-dimensional template derived from the anatomical framework of the unaffected facial features. The recommended approach entails the complete replacement of nasal subunits with a single flap or graft, as opposed to a partial replacement. Bony or cartilaginous defects require the replacement of similar tissue in order to provide adequate support against contracture. The final reconstructive step involves the implementation of subcutaneous sculpturing to refine the nasal contour. Local skin flaps present themselves as highly favorable alternatives for nasal reconstruction, exhibiting a multitude of apparent advantages when compared to skin grafts. The cutaneous region in close proximity exhibits a chromatic and textural resemblance akin to that of the dermal tissue found on the nasal

surface. Skin flaps located in the facial region are known to possess an inherent vascular network, typically characterized by copious and dependable blood circulation. In the majority of instances, it is feasible to conceptualize them as single-stage interventions. The application of local flaps is a viable approach to effectively replicating the convex subunits and their corresponding shapes. Local flaps exhibit a significantly reduced occurrence of scar contracture in comparison to both skin grafts and second-intention healing. The majority of local flaps can be strategically planned to yield minimal adverse effects at the donor site. Despite the myriad benefits associated with the utilization of local flaps, it is imperative to underscore the indispensability of meticulous preoperative strategizing and a wealth of practical expertise in order to ensure their dependable application. In order to effectively plan and design local flaps, it is imperative for the surgeon to possess a comprehensive understanding of the intricate principles governing skin biomechanics. The dimensions of local flaps that rely on an unpredictable vascular supply are subject to inherent restrictions in terms of length and size. In the event of excessive tension being exerted, there exists the potential for compromising the blood supply, leading to the development of flap necrosis. The related viscoelastic characteristics exhibited by the integumentary system, specifically the skin, encompass stress relaxation and creep phenomena. These properties enable a flap to effectively occupy a void that surpasses the flap's own surface area. The aforementioned forces exert counteractive effects on scar contracture, a phenomenon characterized by the retraction of the flap towards its pedicle and the subsequent development of excessive bulkiness, colloquially referred to as the trapdoor effect. Through meticulous strategic planning, these challenges can be effectively surmounted and harnessed to the surgeon's benefit. The utilization of dorsal nasal flaps for the purpose of nasal dorsum or supra-tip reconstruction does not exhibit novelty. Prior studies conducted by esteemed researchers such as Rintala, Rieger, and subsequently Marchac have already presented intriguing outcomes pertaining to the implementation of these flaps. The nasal tissue can be categorized into three distinct components: the outer covering, which consists of the skin, subcutaneous tissue, and muscle; the framework, composed of cartilage and bones; and the internal lining, comprised of the vestibular skin and nasal mucosa. A meticulous assessment of the nasal reconstruction process hinges upon a thorough examination of the defect and the surrounding tissue condition. The paramount factors to scrutinize encompass the dimensions, profundity, and precise positioning of the defect. Reconstruction utilizing local flaps necessitates adherence to precise criteria in order to maximize the probability of achieving favorable outcomes. These criteria encompass a defect diameter measuring 2.0 cm, the absence of any inferior defect extension beyond the tip-defining points, and a location

situated at least 0.5 cm away from the alar rim. Typically, minor defects measuring less than 1.5 cm can be effectively addressed through primary closure or by employing reconstructive techniques such as flap procedures utilizing local tissue or full-thickness skin grafts (FTSG). Defects of moderate size, ranging from 1.5 to 2.5 cm, may be effectively addressed through the implementation of a flap technique, utilizing either regional or local tissue, or alternatively, through the utilization of a full-thickness skin graft (FTSG). In instances where the defects exceed a size threshold of 2.5 cm, it is recommended to consider the utilization of a flap, which involves employing regional tissue, or a full-thickness skin graft (FTSG) as a viable approach. Nevertheless, the existing body of literature reveals incongruous suggestions regarding a comprehensive hierarchy, and discord persists regarding the optimal threshold for primary closure, with some advocating for a 1 cm cutoff as opposed to 1.5 cm. Similarly, there is ongoing debate surrounding the necessity of a regional flap in cases of medium-sized defects. In order to account for potential variations in size and skin mobility among patients, it is recommended to apply a variability of 0.5 cm to the previous and subsequent classifications. Prior to performing a primary closure or a local flap, it is crucial to conduct a pinch test during the preoperative phase. The utilization of secondary intention healing may not be deemed an optimal approach for management due to the potential for an unsatisfactory aesthetic outcome. Additionally, this method necessitates several weeks of meticulous wound care and may often result in social isolation. It is worth noting that the likelihood of surgical site infection or the development of undesirable scarring remains uncertain, as the existing literature on this matter presents inconclusive findings. The inconspicuous nature of small scars arising from secondary intention healing within anatomical depressions, such as alar grooves, is frequently observed. In contrast, the prominence of flaps and grafts can be more noticeable. However, it is important to note that secondary healing is characterized by greater unpredictability compared to primary healing. Consequently, an ensuing alar elevation could potentially lead to an unfavorable aesthetic outcome. In the context of elderly patients with multiple comorbidities, it is prudent to exercise caution when considering a staged procedure. Additionally, it is advisable to exercise caution in patients who are active smokers or have recently ceased smoking, as it may be prudent to avoid the utilization of skin grafts in such cases. When managing individuals who engage in active smoking or have recently ceased this habit, it is recommended to exercise caution in the utilization of skin grafts, opting for alternative approaches whenever feasible. Additionally, it is prudent to minimize the extent of thinning performed on any skin flap during the course of treatment. It is recommended that these individuals receive counseling regarding the potential occurrence of minimal thinning of the skin flap. It is imperative to provide these

patients with comprehensive counseling regarding their heightened susceptibility to potential complications. The heightened susceptibility to adverse outcomes in relation to their medical condition.

## CONCLUSION

In the context of surgical intervention for skin cancers, especially related to the nasal region, special care has to be devoted to ensure optimal reconstructive outcomes. This requires the ability to anticipate surgical outcomes and create a comprehensive surgical strategy. The challenges associated with significant nasal defects accompanied by post-surgical cosmetic deterioration cannot be effectively addressed through the utilization of straightforward soft tissue transfer techniques. The selection of an optimal reconstructive modality is of greatest significance, contingent upon the anticipated nasal defect. The nasolabial flap procedure is a well-established technique that offers a straightforward, efficient, and effective approach to addressing smaller and moderately sized deformities. Additionally, the extended rotation flap presents itself as a viable alternative for reconstructing the nasal tip and ala, providing both functional and cosmetic benefits while following to the principles of the nasal subunit.

**Conflicts of Interests:** The researchers have disclosed no conflicts of interest.

## REFERENCES

- Cavaliere, A., Maisto, B., Zaporozhan, T., Giordano, L., Sorbino, L., Zaffiro, A., Voza, A., La Padula, S., D'Andrea, F., & Schonauer, F. (2021). Extended rotation flap for reconstruction of partial thickness defects of the tip and nasal ala region: in search of better aesthetic results. *JPRAS Open*, 29, 82–88. <https://doi.org/10.1016/j.jpra.2021.05.004>
- Chu, M. W., & Dobratz, E. J. (2011). Reconstruction of the dorsal and sidewall defects. *Facial Plastic Surgery Clinics of North America*, 19(1), 13–24. <https://doi.org/10.1016/j.fsc.2010.10.011>
- D'Arpa, S., Cordova, A., Pirrello, R., & Moschella, F. (2009). One-stage reconstruction of the nasal ala: the free-style nasolabial perforator flap. *Plastic and Reconstructive Surgery*, 123(2), 65e–66e. <https://doi.org/10.1097/PRS.0b013e318195955d>
- Eberlin, K. R., Nguyen, B., Karia, P. S., Carter, J. B., Liang, C. A., & Schmults, C. D. (2014). The Z-advancement flap for reconstruction of lateral nasal tip and medial alar defects. *Dermatologic Surgery*, 40(2), 101–109. <https://doi.org/10.1111/dsu.12409>
- Ezzat, A. S., Abdelmofeed, A. M., Mohamed, M. A., & Ebrahim, A. F. (2021). Different Nasolabial flaps in nasal reconstruction. *Benha Journal of Applied Sciences*, 6(2), 155–160. <https://doi.org/10.21608/bjas.2021.169137>
- Fronck, L. F., & Dorton, D. (2022). Surgical outcomes following Mohs micrographic surgery for basal cell carcinoma on the distal third of the nose. *The Journal of Clinical and Aesthetic Dermatology*, 15(6), 32–36.
- Guesnier, M., Claveleau, X., Longeac, M., Barthélémy, I., Dang, N. P., & Depeyre, A. (2019). A new flap combination for reconstruction of lower nasal dorsum and supra-tip skin defects. *Archives of Plastic Surgery*, 46(05), 480–483. <https://doi.org/10.5999/aps.2018.01354>
- Jacobs, A. M., Christenson, L. J., Weaver, A. L., Appert, D. L., Phillips, K. P., Roenigk, R. K., & Otley, C. C. (2010). Clinical outcome of cutaneous flaps versus full-thickness skin grafts after Mohs surgery on the nose. *Dermatologic Surgery*, 36(1), 23–30. <https://doi.org/10.1111/j.1524-4725.2009.01360.x>
- Kim, M. J., Lim, H., & Park, D. H. (2022). Current strategies for aesthetic soft tissue refinement in nasal reconstruction. *Archives of Craniofacial Surgery*, 23(3), 95–102. <https://doi.org/10.7181/acfs.2022.00689>
- Kokkinos, C., Yassin, A. M., & Nikkiah, D. (2022). Nasal reconstruction with local flaps versus grafts: Long term perspectives. *Journal of Plastic, Reconstructive & Aesthetic Surgery: JPRAS*, 75(3), 1285–1286. <https://doi.org/10.1016/j.bjps.2022.01.010>
- Losco, L., Bolletta, A., Pierazzi, D. M., Spadoni, D., Cuomo, R., Marcasciano, M., Cavalieri, E., Roxo, A. C., Ciamarra, P., Cantisani, C., & Cigna, E. (2020). Reconstruction of the nose: Management of nasal cutaneous defects according to aesthetic subunit and defect size. A review. *Medicina (Kaunas, Lithuania)*, 56(12), 639. <https://doi.org/10.3390/medicina56120639>
- Marinho, C. C. C., Miranda, M. L. de, Lima, R. C., Rodrigues, C. J., Pego, K. V. T., Reis, C. F. dos, Guimarães, S. de F., & Rodrigues, H. L. de R. (2021). Reconstruction of the nasal subunits after tumor resection. *Revista Brasileira de Cirurgia Plástica*, 36(2), 156–163. <https://doi.org/10.5935/2177-1235.2021rbcp0062>
- Megahed, M. A. (2010). Forehead versus nasolabial flaps for alar subunit reconstruction. *Ain Shams Journal of Surgery*, 7(2), 227–233. <https://doi.org/10.21608/asjs.2010.178496>
- Steiger, J. D. (2011). Bilobed flaps in nasal reconstruction. *Facial Plastic Surgery Clinics of North America*, 19(1), 107–111. <https://doi.org/10.1016/j.fsc.2010.10.013>
- Vasilakis, V., Nguyen, K. T., Klein, G. M., & Brewer, B. W. (2019). Revisiting nasal reconstruction after Mohs surgery: A simplified approach based on the liberal application of local flaps: A simplified approach based on the liberal application of local flaps. *Annals of Plastic Surgery*, 83(3), 300–304. <https://doi.org/10.1097/SAP.0000000000001937>
- Veldhuizen, I. J., Brouwer, P., Aleisa, A., Kurtansky, N. R., Dusza, S. W., Nehal, K. S., Hoogbergen, M. M., van der Hulst, R. R. W. J., & Lee, E. H. (2022). Nasal skin reconstruction: Time to rethink the reconstructive ladder? *Journal of Plastic, Reconstructive & Aesthetic Surgery: JPRAS*, 75(3), 1239–1245. <https://doi.org/10.1016/j.bjps.2021.11.028>
- Vinciullo, C. (2014). Reconstructing the nasal dorsum. *The British Journal of Dermatology*, 171 Suppl 2, 7–16. <https://doi.org/10.1111/bjd.13238>