

# Decision Making in Nasal Reconstruction

## When to Use the Forehead Flap?



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### KEYWORDS

- Forehead flap • Nasal reconstruction • Decision-making • Skin cancer reconstruction • Bilobed flap
- Skin graft

### KEY POINTS

- The forehead flap is a mainstay for reconstruction of major nasal defects.
- Patient selection and discussion of preoperative surgical expectations are key.
- Studies on the psychosocial effects of major nasal reconstruction support complex reconstructive techniques, as the initial distress experienced by patients seems to resolve with time after completion of reconstruction.

### INTRODUCTION

Nasal reconstruction is a complex undertaking, and the functional and esthetic role of the nose requires a three-dimensional understanding of nasal structure and anatomy. For larger defects including a through-and-through defect, a three-layered reconstruction is necessary to reconstruct the outer skin, structural integrity, and internal lining of the nose. Adding to the complexity of the reconstruction, there is the paucity of surrounding donor tissue in the nose unlike other areas like the cheek or neck, where secondary movement from tissue is readily available to reconstruct the defect via a local flap with minimal distortion. The reconstruction must also balance preserving a patent airway and avoiding tissue bulk that may draw the eye toward tip or alar asymmetries. A reconstruction that is esthetically pleasing but functionally poor is not a successful result. Nasal subunits must be respected when planning the reconstruction, and that if more than a half of a subunit is resected, removal of the remaining subunit should be considered in order for incisions to follow esthetic lines.<sup>1</sup>

The entirety of the reconstructive ladder is available for nasal reconstruction; however, there is subunit specificity that should be considered depending on the characteristic of the defect. Although granulation/secondary intention is an option, some form of closure is often best except in the smallest of defects. Small defects may be treated with straight line closure (especially near the root of the nose where skin is less adherent to the underlying structures) or a skin graft. Small local flaps such as a transposition or V-Y advancement flaps may also be appropriate. Structural additions such as auricular cartilage or septal cartilage grafts may be necessary to prevent nasal obstruction from alar collapse when the defect involves the lower third of the nose. Composite grafts from the ear also play an important role in the alar region as well as in the area of the soft tissue facet and columella. Larger defects may be addressed with local flaps or transposition flaps such as a bilobed flap or dorsal nasal flap which allow for secondary movement. With large and deep defects, the paramedian forehead flap is a surgical mainstay.

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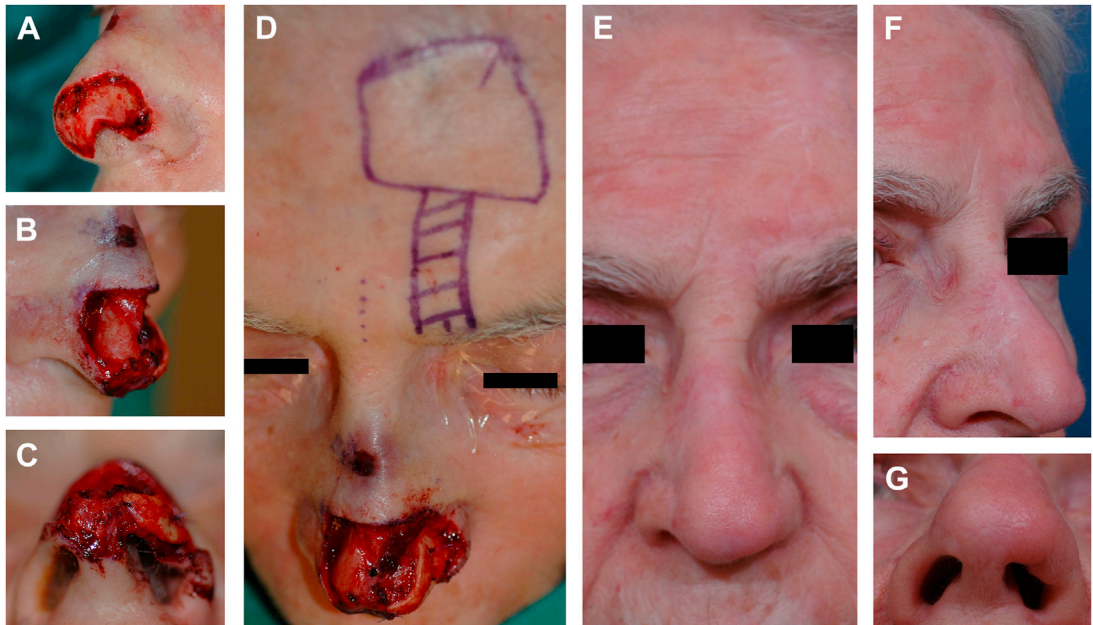
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The paramedian interpolated forehead flap (PMFF) is a reliable, pedicled flap that transfers tissue from the forehead to the nose (**Fig. 1**). It is unique in that it provides excellent nasal skin color and texture match and can provide multilayered closure with the turn-in technique<sup>2</sup> or along with a septal hinge flap, vestibular advancement flap, composite graft, or skin graft. The PMFF is based on a unilateral supratrochlear artery in addition to perforators of the proximal supraorbital artery.<sup>3</sup> The location of the supratrochlear artery is consistent, arising from the superomedial orbit medial to the supraorbital artery as a terminal branch of the ophthalmic artery, perforating the corrugator muscle, and entering the frontalis muscle 2 cm above the superior orbital rim. It then courses superiorly and becomes more superficial throughout the subcutaneous fat and skin of the forehead.<sup>1</sup> Surgically, the supratrochlear artery is located 1.7 to 2.2 cm off of midline and the flap is dissected in the subcutaneous or subgaleal plane until near the superior orbital rim where care is taken near the origin of the supratrochlear arteries.<sup>4</sup> Thinning or removing frontalis muscle in addition to back-cuts near the pedicle origin can increase the flap's reach. This is typically a two<sup>5</sup>- to three<sup>6</sup>-staged surgery, with the first stage involving the raising, thinning, and inset of the flap, with a possible intermediate step for continued contouring with the benefit of continued vascularized tissue. The final step is division of the pedicle 3 weeks after

inset,<sup>7</sup> and studies have sought whether even earlier separation is the most cost-effective and viable.<sup>8,9</sup> The pedicle is ligated, and the anatomic position of the eyebrow is restored.<sup>10</sup>

Although a PMFF is a standard and necessary procedure to reconstruct large nasal defects,<sup>11</sup> patients often have reservations about this surgery. In addition to concerns about a forehead scar, limitations on work and activities of daily living while the pedicle is in place can prove challenging for patient acceptance of the PMFF given the appearance of the flap during the initial stages of the procedure.<sup>8</sup> The attached pedicle is visually unappealing, does not allow for glasses to be worn,<sup>12</sup> and exposed tissue requires wound care which may necessitate help of another person, particularly in elderly patients or patients with physical or mental challenges.<sup>13</sup> These downsides and considerations are important to discuss and acknowledge. Identifying the patient's surgical goals is vital. To some patients, the esthetic result is worth these disadvantages, and here, the decision is easy to move forward with a PMFF. However, in other patients, with an appropriate defect, other less complicated, one-stage options may be reasonable alternatives to a PMFF.

In this review, the authors discuss when these clinical situations may occur and the considerations and requirements necessary for a successful reconstruction. Although some argue that a



**Fig. 1.** Paramedian forehead flap defect and design. (A) Left oblique view of tip/alar defect. (B) Right-sided view of tip/supratip defect. (C) Base view of the defect. Note the addition of auricular cartilage onto the left lower lateral cartilage for structural support. (D) Design of the PMFF. (E) Frontal view of healed result and forehead scar. (F) Right oblique view of healed PMFF. (G) Base view of PMFF.

forehead flap should not necessarily be a patient “choice,”<sup>1</sup> the authors suggest that by keeping in mind a patient’s priorities in conjunction with careful evaluation of the defect, there are often times where shared decision making may allow for alternative reconstructive options in lieu of a PMFF.

## DISCUSSION

### *Patient Selection: “Decision Points”*

On initial patient evaluation for nasal reconstruction, the first and most critical goal is to define the patient’s surgical goals. To some patients who are more esthetically minded, they may be willing to undergo whatever is necessary for the most natural appearing result. Others may express that their priorities are for a straightforward reconstruction, with less emphasis on the cosmetic consequences. These priorities exist on a spectrum, so a candid discussion of the benefits and disadvantages of reconstructive options is essential. Other elements to consider include an evaluation of medical comorbidities including pulmonary or cardiac ability to tolerate general anesthesia or sedation, use of anticoagulant or antiplatelet medications, or wound healing impairing factors including poorly controlled diabetes or current smoking. The presence of quickly recurrent nasal malignancies or other aggressive lesions of the nose may also affect the reconstructive method used and may sway a surgeon toward a more conservative approach until they are addressed. However, given the straightforward harvest and limited anatomic dissection of the PMFF, even patients on anticoagulation/antiplatelet agents or with severe comorbid disease or advanced age can tolerate the surgery without hemodynamic issues intraoperatively.<sup>1</sup> In particular, a PMFF can be performed under local anesthesia in a treatment room if the patient is accepting of this approach and capable of sitting still for an extended period of time until the procedure is completed. The defect itself should be carefully examined: defect depth, evidence of intact perichondrium, proximity to the alar rim, and subunits involved are all important factors. The height of patient’s forehead hairline also helps guide whether a patient might expect hair-bearing skin on the reconstruction if a PMFF were to be used.

### *Indications for a Paramedian Forehead Flap*

In most cases, the indication for a PMFF is straightforward: a large, deep, or full-thickness defect or in the setting of near-total or total nasal reconstruction.<sup>11</sup> Larger defects that involve the alar margin are also frequently best suited for a PMFF given the risk of alar retraction or collapse.

In these situations, a forehead flap is the most ideal option to restore nasal form and function. Here, the decision-making process is fairly straightforward. In hesitant patients, excellent communication, preoperative education with preoperative and postoperative photographs, assurance of perioperative support of friends or family, and careful perioperative and postoperative care are essential in helping them through the reconstructive process. Appropriate counseling and education is essential to assist patients through their multistage reconstruction.

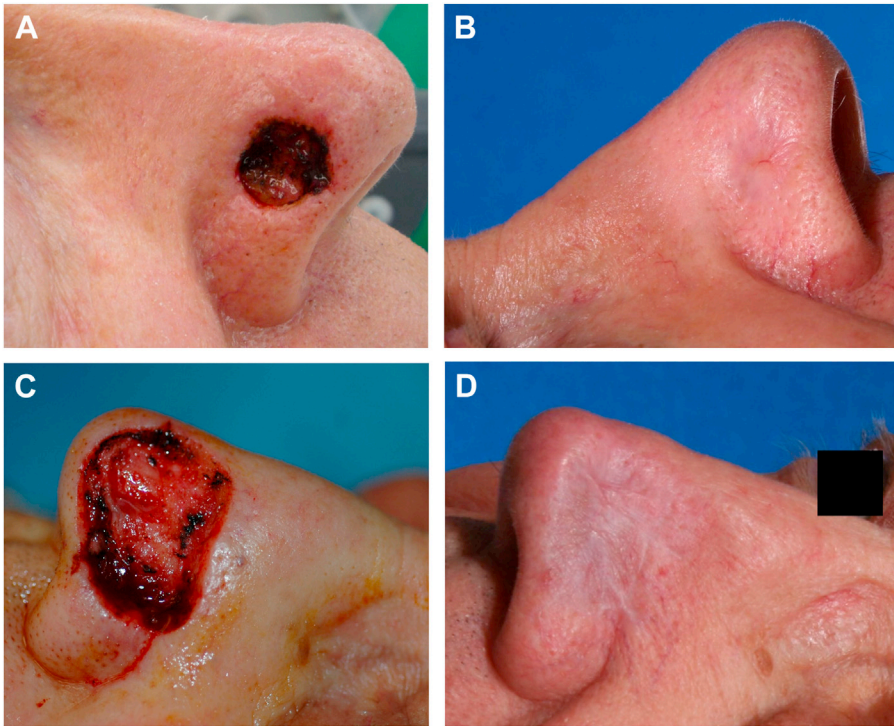
### *Forehead Flap Versus Skin Graft*

Although the consideration of skin graft in the same setting of a forehead flap may seem contradictory, in select patients with specific goals and with a particular superficial nasal defect, a skin graft may represent a viable option for those who desire to avoid a forehead flap.<sup>14</sup> For example, a patient who is willing to accept some color mismatch of the nose to avoid a forehead scar or who is not medically able to tolerate a longer surgery but is willing to accept some contour irregularity as long as function is not impaired, a full-thickness skin graft may provide an acceptable option.<sup>15</sup>

For a skin graft to be considered, the defect needs to have an amenable recipient bed and have the appropriate underlying soft tissue structural support. For example, in a more superficial yet larger diameter defect, like that seen in resection of lentigo maligna melanoma in situ, this may be the case. Perichondrium would ideally be intact and the defect depth should be fairly minimal. Sometimes, allowing natural granulation over a few weeks demonstrates that even a deeper defect can reduce its depth via secondary healing and may be appropriate for a skin graft.<sup>16</sup>

However, caution should be taken in how a skin graft may contract and potentially distort the nasal ala. In these situations, an auricular cartilage graft along with the full-thickness skin graft can help both with alar support as well as volume of the defect<sup>17</sup> (**Fig. 2**). Color mismatch may also be an issue,<sup>18</sup> as it may appear “patch-like” especially in the setting of sebaceous, erythematous, or rosacea-prone skin (**Fig. 3**). In these scenarios, discussion of expectations with the patient is critical. In the right defect, a full-thickness skin graft does not “burn bridges,” and if a patient is not satisfied with the outcome, a paramedian forehead flap can be performed secondarily, though in our experience this is rarely, if ever, needed.

Assessment of an individual’s desire for an optimal esthetic outcome in a patient willing and able to undergo multistage surgery should steer a



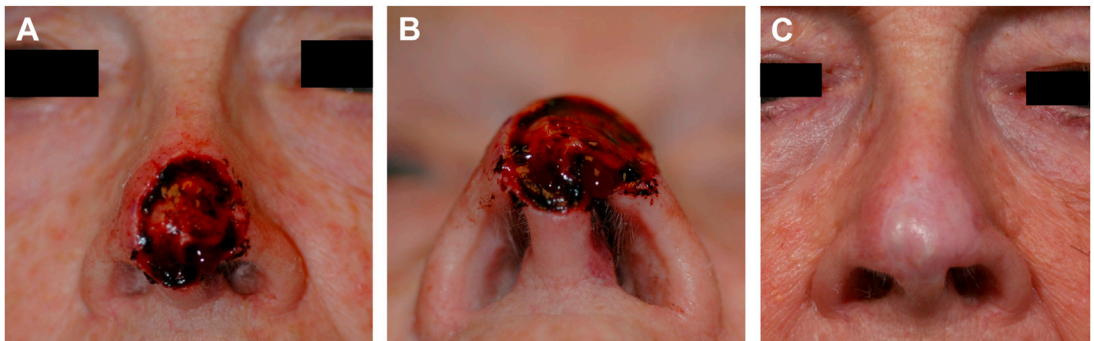
**Fig. 2.** Examples of full-thickness skin graft with auricular cartilage for larger nasal defects. (A) Right alar defect of Patient 1. (B) Patient 1 status post full-thickness skin graft (FTSG) with auricular cartilage graft (ACG). (C) Patient 2 with a larger left alar/tip/supratip defect. (D) Patient 2 status post-FTSG with ACG.

surgeon toward a PMFF. However, in the ideal defect and with a patient's priorities aligned with a single-staged reconstruction, a full-thickness skin graft on a larger, more superficial or secondarily-healed defect will save the patient the morbidity of a forehead flap.

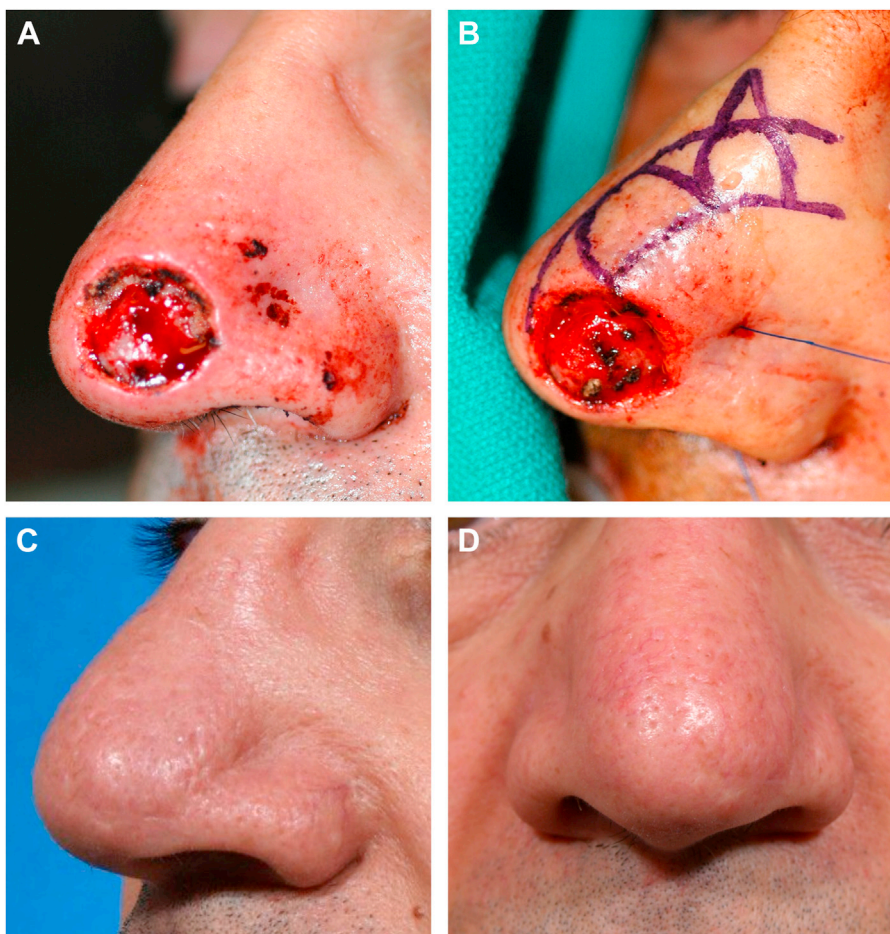
#### ***Forehead Flap Versus Local Flap (i.e., Bilobed Flap)***

Another decision point is whether to use a local flap, such as a bilobed flap, instead of a PMFF.

In select cases, when a defect is deeper and a full-thickness skin graft would likely create a significant contour deformity and is generally 1.5 cm or less, a bilobed flap can be considered (Fig. 4).<sup>19</sup> The bilobed flap can be based medially or laterally and takes advantage of the secondary tissue movement from the nasal sidewall where skin is thinner, more lax, and less adherent in order to provide for coverage of supratip and tip defects.<sup>20</sup> The ideal defect is in the tip or supratip region, though medial alar defects, sidewall, and dorsal defects may also be appropriate for a bilobed



**Fig. 3.** Demonstration of hypopigmented FTSG. Columellar, soft tissue triangle, and tip defect. (A) Frontal view of defect. (B) Basal view of defect. (C) Status post full-thickness skin graft. Example of the challenge of color mismatch with the FTSG.



**Fig. 4.** Bilobed flap for a “Borderline” sized defect. (A) Left tip/supratip defect. (B) Design of laterally based bilobed flap. (C) Left oblique view of healed bilobed flap. (D) Frontal view of healed bilobed flap.

flap. The defect needs to be far enough from the alar rim or soft tissue facet to prevent alar retraction.<sup>21</sup> The patient’s nose must be anatomically large enough to provide the appropriate soft tissue movement and skin availability, as a small nose may not be able to provide enough tissue for a 1.5 cm defect.<sup>22</sup> With wide undermining of the entire nasal superficial musculoaponeurotic system and precise flap design, the surgeon can often reconstruct “borderline” defects with a bilobed flap in defects where traditionally a PMFF would be used. The bilobed may risk raising the tip or ala and distorting other areas of the nose if undermining is not sufficient and/or the defect is excessively large. Additional nasal scars are introduced due to the flap design; however, incisions are limited to the nose. Using adjacent tissue avoids the color mismatch of a skin graft.

A study comparing the bilobed and the forehead flap with both scar assessment scores and three-dimensional optical scans found that reconstructive

outcomes were not significantly different between the reconstructive modalities. Not surprisingly, the greatest clinical difference found between the two flaps was that the paramedian forehead flap was used for larger defects.<sup>23</sup>

### ***Psychosocial Considerations***

Although to the surgeon a forehead flap is a routine procedure that yields consistent and excellent reconstructive results, patients are often wary of this reconstructive approach. The multistaged nature and time with the attached pedicle means that they may be unable to participate in work or daily activities. This consideration is significant and is meaningful to patients who may feel disfigured for several weeks awaiting the next surgical stage.<sup>24</sup> Although it is important to take the patient’s goals and expectations for surgery into account, psychosocial considerations are also important in determining the best reconstructive approach.

Pepper and colleagues<sup>25</sup> surveyed 59 patients undergoing nasal reconstruction (including 14 interpolated flaps) via the Derriford Appearance Scale,<sup>24,26</sup> a 24-item survey which delineates patients' distress related to their appearance. Regardless of reconstruction method (skin graft, local flap, or interpolated flap), levels of distress were significantly higher at their postoperative visit for all patients. During this first visit, those who underwent an interpolated flap did have significantly higher levels of distress compared with cohorts who underwent full-thickness skin graft. However, at later follow-up (>12 weeks), the distress differential between those who underwent interpolated flap and skin graft was no longer different and became equivalent among the groups. This demonstrates that the mode and complexity of reconstruction does not have long-lasting psychosocial effects. Those who do undergo PMFF are expected to have increased levels of distress given the visibility and care required of their surgical sites while awaiting detachment, but in time this lessens. Timing also likely plays a part in quality of life after nasal reconstruction, as completion of the reconstruction within 6 months is associated with better quality of life.<sup>27</sup>

Another group<sup>28</sup> used the Derriford Appearance Scale in addition to a few other measures including the Brief Fear of Negative Evaluation Score<sup>29</sup> for 48 patients who underwent PMFF. The patients were stratified by defect severity into the number of nasal subunits involved in the reconstruction. As expected, social avoidance and distress measures were high immediately after surgery which then decreased after flap division or adjuvant procedures. The time point in the reconstructive process was associated with the level of psychosocial distress. This study supports the concept that despite the immediate anxiety, the PMFF may cause in time; this improves in sync with the healing process.

Surveys can also help identify those who are at greater risk of psychosocial distress during major nasal reconstruction. Vaidya and colleagues<sup>30</sup> used the FACE-Q Skin cancer survey and found that younger patients, those who had surgery on their nose, and a history of depression or anxiety scored higher in the self-consciousness and unhappiness domains in the first 3 months following surgery and were independent risk factors with distress. The psychological distress scores improved over time, however, self-consciousness persisted through the postoperative period.<sup>30</sup> Despite the psychosocial distress associated with a major nasal reconstruction process, the PMFF technique has been associated with high satisfaction in quality of life measures and functional outcomes.<sup>27</sup>

It is the nature of the PMFF to increase patient-related distress during the time of reconstruction, which eventually dissipates as the final result is realized and healing is completed. However, the best way to optimize patient satisfaction is by setting patient preoperative expectations, ensuring good communication, and initiating in-depth preoperative discussion for a team-driven approach to the reconstruction.

### ***Preoperative Preparation and Postoperative Expectations***

Studies have been performed on the importance and value of standardized wound care protocols and resources for Mohs micrographic surgery (MMS), although the importance of this in the setting of a forehead flap has not been robustly evaluated. One study showed that preoperative educational materials improved patient comprehension before forehead flap surgery.<sup>31</sup> In-person education remains a gold standard of preoperative communication that best addresses patient's needs and questions<sup>32</sup> (ie, "What should I buy before the procedure? How do I take care of the pedicle?"). Of note, most research on how best to institute patient education has been performed during a patient's initial MMS, but there is a paucity of best practices in how to better the patient's reconstructive experience, and represents an area for further study in the facial plastic and reconstructive field.

A preoperative phone call 1 week before MMS did not improve satisfaction in patients,<sup>33</sup> though postoperative telephone calls do improve patient anxiety.<sup>34</sup> Other methods for patient communication and education include online modules<sup>35</sup> or communication like postoperative text messaging,<sup>36</sup> which lessened patient anxiety by 19%. Although multiple modalities allow for flexibility and increased access for postoperative questions, the in-person consultation and visit with the surgeon or a nurse educator are critical.<sup>32</sup>

In the authors' experience, the preoperative visit with the surgeon can be combined with time spent with a nurse educator who can discuss wound care and expectations in detail with written instructions that are available online as well. The use of photographs that clearly demonstrate what the patient will experience during the perioperative period are essential so that they can mentally prepare for the 3 or more weeks that the flap is in place. Having patients understand the final result is also important for the acceptance of the PMFF. In addition, showing patients what are common results with skin grafts and color mismatch as well as incisions for the bilobed flap are also helpful for tailoring discussions of what

is most appropriate for any given patient. Discussing expectations is essential, and discussing common postoperative concerns like pain control, how to wear glasses, and the expected oozing, crusting, care of the pedicle and incisions, and other topics unique to the PMFF should be addressed. Addressing whether primary closure of the forehead defect is expected depending on the size of the nasal defect also allows for a comprehensive evaluation of “what to expect” which is best discussed preoperatively rather than postoperatively. With a thorough preoperative discussion, issues that arise are not an afterthought, but are expected avenues that may be encountered; the patient’s mental preparation is key to good patient–surgeon communication and postoperative satisfaction.

Another aspect of the reconstructive process that can be discussed with patients preoperatively is the potential need for laser, dermabrasion, laser hair removal,<sup>37</sup> or scar revision.<sup>38</sup> Especially in patients with rosacea or sebaceous skin,<sup>39</sup> a fractionated or ablative laser<sup>40,41</sup> helps to obtain color and texture match of the forehead flap. Preemptive discussion of these options with patients in order to better the cosmetic result demonstrates the surgeon’s eye for esthetic goals and willingness to continue to follow them after the immediate postoperative period to ensure the best possible functional and esthetic result.

### **Viewing the Defect**

In our clinical experience, occasionally patients ask not to view their post-Mohs defect before reconstruction. However, Veldhuizen and colleagues<sup>42</sup> argue that patient viewing of the defect is an important part of the reconstructive process. The patient should see where they have started to understand their progress. This helps set expectations appropriately which is key in managing patient satisfaction. This study evaluated whether there was difference in patient satisfaction if they looked in the mirror before reconstruction. A patient’s view and appraisal of their scar changed when they looked in the mirror preoperatively. Specifically, female patients who looked in the mirror beforehand had higher satisfaction with their scar and reconstructive outcome. Those who viewed their defect before their reconstruction experienced overall less distress related to their reconstruction. The authors urge surgeons to encourage patients to view their defect preoperatively as a communication tool, as the complexity or the need for a forehead flap should be seen as necessary step to ensure mutual understanding between patient and surgeon.<sup>42</sup>

### **SUMMARY**

The PMFF is an essential modality in the reconstructive ladder for nasal reconstruction. In select situations—with the right patient and the right defect—a skin graft (with or without cartilage) or a bilobed flap can be considered for defects that some reconstructive surgeons might consider most appropriate for a PMFF. Although patients experience some level of distress with major nasal reconstruction, this subsides in time as the reconstruction matures. Encouraging a patient to view their defect is an important communication tool which can help patients better understand reconstructive needs. Excellent preoperative education with preoperative and postoperative photographic results, expectation-setting, and postoperative communication if questions arise is key to ensuring patient satisfaction.

### **CLINICS CARE POINTS**

- Nasal reconstruction requires careful evaluation of the defect alongside assessment of the patient’s goals.
- Local flaps and full-thickness skin grafts can be considered for larger defects in select situations.
- Preoperative viewing of a cutaneous defect is beneficial as it helps patients understand the “starting point” of their reconstruction.
- Regardless of technique, nasal reconstruction is likely to cause most patients distress in the acute period, which then improves over time.

### **DISCLOSURE**

The authors have nothing to disclose.

### **REFERENCES**

1. Correa BJ, Weathers WM, Wolfswinkel EM, et al. The forehead flap: the gold standard of nasal soft tissue reconstruction. *Semin Plast Surg* 2013;27(2):96–103.
2. Menick FJ. A new modified method for nasal lining: the Menick technique for folded lining. *J Surg Oncol* 2006;94(6):509–14.
3. Oleck NC, Hernandez JA, Cason RW, et al. Two or three? approaches to staging of the paramedian forehead flap for nasal reconstruction. *Plast Reconstr Surg Glob Open* 2021;9(5):e3591.
4. Shumrick KA, Smith TL. The anatomic basis for the design of forehead flaps in nasal reconstruction.

- Arch Otolaryngol Head Neck Surg 1992;118(4):373–9.
5. Menick FJ. Nasal reconstruction with a forehead flap. *Clin Plast Surg* 2009;36(3):443–59.
  6. Menick FJ. A 10-year experience in nasal reconstruction with the three-stage forehead flap. *Plast Reconstr Surg* 2002;109(6):1839–55. discussion 1856–1861.
  7. Shaye DA, Tollefson TT. What Is the optimal timing for dividing a forehead flap? *Laryngoscope* 2020;130(10):2303–4.
  8. Calloway HE, Moubayed SP, Most SP. Cost-effectiveness of Early Division of the Forehead Flap Pedicle. *JAMA Facial Plast Surg* 2017;19(5):418–20.
  9. Rudy SF, Abdelwahab M, Kandathil CK, et al. Paramedian forehead flap pedicle division after 7 days using laser-assisted indocyanine green angiography. *J Plast Reconstr Aesthetic Surg* 2021;74(1):116–22.
  10. Yalamanchali S, Alvi SA, Hamill CS, et al. Eyebrow position after paramedian forehead flap nasal reconstruction. *JAMA Facial Plast Surg* 2019;21(1):79–81.
  11. Menick FJ. Forehead flap: master techniques in otolaryngology-head and neck surgery. *Facial Plast Surg* 2014;30(2):131–44.
  12. Qu LT, Kelpin JP, Eichhorn MG, et al. Spectacles under pedicles: eyewear modification with the paramedian forehead flap. *Plast Reconstr Surg Glob Open* 2016;4(8):e1003.
  13. Chen CL, Most SP, Branham GH, et al. Postoperative complications of paramedian forehead flap reconstruction. *JAMA Facial Plast Surg* 2019;21(4):298–304.
  14. Weathers WM, Bhadkamkar M, Wolfswinkel EM, et al. Full-thickness skin grafting in nasal reconstruction. *Semin Plast Surg* 2013;27(2):90–5.
  15. Gloster HM. The use of full-thickness skin grafts to repair nonperforating nasal defects. *J Am Acad Dermatol* 2000;42(6):1041–50.
  16. Robinson JK, Dillig G. The advantages of delayed nasal full-thickness skin grafting after Mohs micrographic surgery. *Dermatol Surg* 2002;28(9):845–51.
  17. Zopf DA, Iams W, Kim JC, et al. Full-thickness skin graft overlying a separately harvested auricular cartilage graft for nasal alar reconstruction. *JAMA Facial Plast Surg* 2013;15(2):131–4.
  18. Segawa Y, Tono H, Chiba H, et al. Case series of modified dermis graft for skin defects of the nasal region. *J Dermatol* 2022;49(12):1330–3.
  19. Okland TS, Lee YJ, Sanan A, et al. The bilobe flap for nasal reconstruction. *Facial Plast Surg* 2020;36(3):276–80.
  20. Steiger JD. Bilobed flaps in nasal reconstruction. *Facial Plast Surg Clin North Am* 2011;19(1):107–11.
  21. Cook JL. Reconstructive utility of the bilobed flap: lessons from flap successes and failures. *Dermatol Surg* 2005;31(8 Pt 2):1024–33.
  22. Losco L, Bolletta A, Pierazzi DM, et al. Reconstruction of the nose: management of nasal cutaneous defects according to aesthetic subunit and defect size. A Review. *Medicina (Kaunas)* 2020;56(12):639.
  23. Peters F, Mücke M, Möhlhenrich SC, et al. Esthetic outcome after nasal reconstruction with paramedian forehead flap and bilobed flap. *J Plast Reconstr Aesthetic Surg* 2021;74(4):740–6.
  24. Koster ME, Bergsma J. Problems and coping behaviour of facial cancer patients. *Soc Sci Med* 1990;30(5):569–78.
  25. Pepper JP, Asaria J, Kim JC, et al. Patient assessment of psychosocial dysfunction following nasal reconstruction. *Plast Reconstr Surg* 2012;129(2):430–7.
  26. Carr T, Moss T, Harris D. The DAS24: a short form of the Derriford Appearance Scale DAS59 to measure individual responses to living with problems of appearance. *Br J Health Psychol* 2005;10(Pt 2):285–98.
  27. Pagotto VPF, Tutihashi RMC, Ribeiro RDA, et al. Application of Face-Q and nose in nasal reconstruction with paramedian frontal flap after skin cancer resection. *Plast Reconstr Surg Glob Open* 2021;9(4):e3533.
  28. Yen CI, Su YJ, Chang CS, et al. Forehead flap reconstruction in different nasal defect: 58 patients' psychological outcomes. *J Craniofac Surg* 2023;34(5):1387–92.
  29. Collins KA, Westra HA, Dozois DJA, et al. The validity of the brief version of the Fear of Negative Evaluation Scale. *J Anxiety Disord* 2005;19(3):345–59.
  30. Vaidya TS, Mori S, Khoshab N, et al. Patient-reported aesthetic satisfaction following facial skin cancer surgery using the FACE-Q skin cancer module. *Plast Reconstr Surg Glob Open* 2019;7(9):e2423.
  31. Krane NA, Smith JB, Fassas S, et al. Educational materials improve patient comprehension in forehead flap surgery. *Facial Plast Surg Aesthet Med* 2021;23(6):489–90.
  32. Patel P, Malik K, Khachemoune A. Patient education in Mohs surgery: a review and critical evaluation of techniques. *Arch Dermatol Res* 2021;313(4):217–24.
  33. Sobanko JF, Da Silva D, Chiesa Fuxench ZC, et al. Preoperative telephone consultation does not decrease patient anxiety before Mohs micrographic surgery. *J Am Acad Dermatol* 2017;76(3):519–26.
  34. Hafiji J, Salmon P, Hussain W. Patient satisfaction with post-operative telephone calls after Mohs micrographic surgery: a New Zealand and U.K. experience. *Br J Dermatol* 2012;167(3):570–4.
  35. Migden M, Chavez-Frazier A, Nguyen T. The use of high definition video modules for delivery of informed consent and wound care education in the Mohs Surgery Unit. *Semin Cutan Med Surg* 2008;27(1):89–93.
  36. Hawkins SD, Koch SB, Williford PM, et al. Web app- and text message-based patient education in Mohs

- micrographic surgery—a randomized controlled trial. *Dermatol Surg* 2018;44(7):924–32.
37. Ci Y, Cj C, Cs C, et al. Laser hair removal following forehead flap for nasal reconstruction. *Laser Med Sci* 2020;35(7). <https://doi.org/10.1007/s10103-020-02965-9>.
  38. Quatela VC, Sherris DA, Rounds MF. Esthetic refinements in forehead flap nasal reconstruction. *Arch Otolaryngol Head Neck Surg* 1995;121(10):1106–13.
  39. Austin GK, Shockley WW. Reconstruction of nasal defects: contemporary approaches. *Curr Opin Otolaryngol Head Neck Surg* 2016;24(5):453–60.
  40. Brightman LA, Brauer JA, Anolik R, et al. Reduction of thickened flap using fractional carbon dioxide laser. *Laser Surg Med* 2011;43(9):873–4.
  41. Rohrich RJ, Griffin JR, Ansari M, et al. Nasal reconstruction—beyond aesthetic subunits: a 15-year review of 1334 cases. *Plast Reconstr Surg* 2004;114(6):1405–16. discussion 1417–1419.
  42. Veldhuizen IJ, Lee EH, Kurtansky NR, et al. To see or not to see: Impact of viewing facial skin cancer defects prior to reconstruction. *Arch Dermatol Res* 2021;313(10):847–53.