Avoidance and Management of Complications in Soft Tissue Facial Reconstruction

Daniel A. Hatef, MD¹ William M. Weathers, MD¹ Erik M. Wolfswinkel, BS¹ Jayne E. Coleman, MD²
James F. Thornton, MD, FACS³

¹ Division of Plastic Surgery, Baylor College of Medicine, Houston, Texas

² Department of Anesthesiology, University of Texas Southwestern Medical Center, Dallas, Texas

³ Department of Plastic Surgery, University of Texas Southwestern Medical Center, Dallas, Texas

Address for correspondence James F. Thornton, MD, UT Southwestern Out-Patient Building, 1801 Inwood Road, WA4.220, Dallas, TX 75390-9132 (e-mail: james.thornton@utsouthwestern.edu).

Semin Plast Surg 2013;27:121–125.

Abstract

Keywords

- Mohs reconstruction
- complications
- nasal soft tissue defects

Complications in nasal soft tissue reconstruction are inevitable, and all reconstructive surgeons should be comfortable with their management. Patient and surgical complications can be minimized with appropriate preoperative planning and coordination with the anesthesiologist. When managing undesirable results, it is important to realize that most results will improve over time with appropriate wound care and dermabrasion. Patience and attentiveness to the patient are the most-effective strategies for dealing with poor results.

Complications are an inevitable occurrence in surgery. It is said that surgeons typically experience a medicolegal malpractice claim every 4 to 5 years.¹ In the perioperative period, a complication is defined as an unfavorable evolution of a patient's clinical picture after operation.² Complications in soft tissue reconstruction of the face can range from the benign, such as a hematoma, to the severe, with flap loss, or even mortality. Unfavorable results can also occur, with unsightly scars and poor contours. When performed in a safe manner, soft tissue facial reconstruction is associated with relatively low morbidity. The senior author's practice was reviewed to elicit pearls for optimizing patient selection, clinical decision making, operative techniques, and postoperative care, in an effort to minimize complications and unfavorable results.

Discussion

In the management of complications, it is important to differentiate between an inherent complication and an undesirable or suboptimal result. Patient complications can also be further divided into systemic patient complications or complications of just the reconstruction. In Mohs reconstruction, it should be remembered that these patients are usually aged

and often carry significant comorbid disease.³ In this practice, these patients have been safely managed in an outpatient setting by both quick and efficient surgeries as well as appropriate anesthetic management.

As discussed previously, not every patient needs a complex multistage reconstruction and it is incumbent upon the surgeon to match the procedure to the patient, both in expectations and patient safety requirements. Patient-level complications include immediate comorbid issues regarding anesthetic, which over a decade has included complications inherent to anesthesia, including medication error and airway issues, requiring conversion of anesthetic techniques from local to general (► **Table 1**). The majority of these can be minimized or eliminated completely with a competent anesthesia team. The second most common complication experienced is bleeding. Our patients are reconstructed with no regard to their anticoagulation status. Patients fully anticoagulated on Coumadin are still candidates for forehead flaps, as well as split- or full-thickness grafting. The only exception to this rule is that a forehead flap on a patient on clopidogrel is associated with a great deal of bleeding. In the experience of the senior author, the bleeding encountered during the dissection of this flap, and postoperatively, can be uncontrollable, effecting both flap survival and patient safety.

Issue Theme Nasal Soft Tissue Reconstruction; Guest Editor, James F. Thornton, MD, FACS

Copyright © 2013 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA.
Tel: +1(212) 584-4662.

DOI <http://dx.doi.org/10.1055/s-0033-1351233>.
ISSN 1535-2188.

Table 1 Complications during Mohs reconstruction

Patient complications	Surgical complications
Myocardial infarction	Bleeding/hematoma
Stroke	Infection
Cardiac arrhythmia	Flap or graft loss
Anesthetic medication error	Unfavorable contour or scar
Inadequate airway control/aspiration	Delayed healing
Neosporin intolerance	

Other perioperative complications sometimes seen in this aged patient class are myocardial infarction and stroke; again, these can be minimized with accurate anesthesia protocols.

Postoperative infection in these patients is very rare. For the last 7 out of 10 years patients were given only perioperative antibiotics with no postoperative antibiotics; this follows the current surgical recommendations.⁴ As there are no current globally accepted plastic surgery antibiotic prophylaxis guidelines, these cases are treated the same as clean neurosurgical cases, closed orthopedic cases, or clean vascular cases (►Table 2). The incidence of postoperative hematoma, even with significant cheek and grafting requirements, has been very low and this is attributed to reliance on intravenous (IV) sedation and not general anesthesia for these patients. One postoperative complication that has been seen frequently enough that merits comment is a patient's intolerance to bacitracin or Neosporin. This reaction occurs at a very predictable rate (~10% in this cohort) and is associated with prolonged use of bacitracin.⁵ Appropriate management of this is to discontinue topical bacitracin within 7 days of initial application, convert the patient to pure petroleum jelly, or start them on Bactroban or mupirocin antibiotic ointment, as this has shown a very low reaction rate.⁶

Complications related directly to the reconstruction are more specific and require more investigation. These usually involve complications of surgical technique with either poor or inappropriate planning or poor execution. Skin graft loss is often unpredictable, but gratifyingly rare. There is rarely an entire full-thickness graft loss that requires regrafting. Usually, it is small areas that can be managed with local wound care with adequate reconstruction results. Flap loss is fortunately very rare in our experience, 2 out of over 400 forehead flaps had complete loss. However, partial loss of both nasolabial and forehead flaps does occur, and proper management of the wound can restore or salvage a reconstruction.

The second scenario that merits discussion is the undesirable result. It should be remembered that the patient with a suboptimal reconstruction does not care whether it is a result of a complication, a result of their expectations, or a simple suboptimal result. The fact of the matter is that the reconstruction has not met their expectations and they are looking to use the surgeon to "make things right." Undesirable results or suboptimal results can result from poor flap choice, poor flap design as well as execution, or simply unpredictable

wound healing. It is incumbent upon the physician early on to decide whether redo or repeat reconstruction is going to be required or whether one can salvage the existing reconstruction with time, different techniques, and postoperative management techniques to again salvage the reconstruction. The author has converted many initially undesirable results into happy postoperative patients with both time and judicious intervention of postoperative secondary procedures. It is well recognized by senior surgeons that one has to "embrace" one's complications. These patients will require and deserve an inordinate amount of time from the surgeon and attention to achieve eventual satisfactory outcomes. One should never "run" from a complication, but rather concentrate one's time and energy on restoring these difficult cases.

Management of Graft or Flap Loss

Partial loss of a skin graft is not uncommon, but complete loss or an undesirable result from a skin graft is uncommon. Remember that many of these skin grafts are lower-third nasal reconstructions with full-thickness grafts, and the skin can be quite thick. It is not uncommon to lose the superficial part of the graft. Partial skin graft loss is managed in the clinic with debridement of all areas of nonviable tissue followed by frequent topical wound-healing agents until complete healing of the entire area has been achieved (►Fig. 1). At 4 to 5 weeks, topical dermabrasion can improve the appearance of the final scar. This typically results in a good final contour, when this has not been achieved at the outset.

Partial distal tip loss of nasolabial or forehead flaps does occur. If wound readvancement of the flap is required, this should be done when the flap itself is fully demarcated and can be safely advanced, usually within 7 to 10 days postoperatively. Complete forehead or nasolabial flap loss is rare and should be followed after wound debridement and optimization with a secondary flap procedure if needed.

Clinical Case

The following case illustrates appropriate management of a significant complication to a successful outcome. This patient was a secondary referral with a nasal tip partial columella Mohs defect. She was a current smoker that had promised to stop for the reconstruction. After a very long preoperative discussion, it was felt that the patient would be able to reach her reconstructive goals with a pedicled nasolabial flap in two stages. The patient did discontinue her smoking from the time of surgery. Shortly after flap elevation and inset, she experienced partial distal flap loss (►Fig. 2). It was quite clear postoperatively that a nasolabial flap may well not have been the best choice for her and she should have undergone a forehead flap reconstruction, as the nasolabial flap has random blood supply versus the more robust axial supply of the forehead flap.^{7,8} However, judicious wound care provided an adequate base of soft tissue from the failing flap. By the second week, flap division was undertaken using the pedicled portion of the flap as a full-thickness graft that was grafted onto the wound base (►Fig. 3). With wound care, the

Table 2 Antibiotic guidelines by surgery type

Procedure	Likely pathogens	Recommended antibiotic	Penicillin allergy	Recommended duration
Cardiothoracic surgery	<i>Staph epi, Staph aureus, Streptococcus, Corynebacteria, enteric-Gram-negative bacilli</i>	Cefazolin 1 g	Clindamycin 600 mg	48 h
General surgery <ul style="list-style-type: none"> • Appendectomy (nonperforated) • Colorectal surgery • High-risk esophageal, gastroduodenal or biliary surgery • Penetrating abdominal trauma 	Enteric Gram(-) bacilli Enteric Gram(-) bacilli, <i>Enterococcus</i> , anaerobes Enteric Gram(-) bacilli, Gram (+) cocci Enteric Gram(-) bacilli, <i>Enterococcus</i> , anaerobes	Cefoxitin 1 g OR Cefotetan 1 g Cefoxitin 1 g OR Cefotetan 1 g Cefazolin 1 g Cefoxitin 1 g OR Cefotetan 1 g	Clindamycin 600 mg + Gentamicin 2 mg/kg OR Cefazolin 1 g + Metronidazole 500 mg Clindamycin 600 mg + Gentamicin 2 mg/kg OR Cefazolin 1 g + Metronidazole 500 mg Clindamycin 600 mg + Gentamicin 2 mg/kg OR Cefazolin 1 g + Metronidazole 500 mg	Single dose Single dose Single dose 24 hours
Gynecologic surgery <ul style="list-style-type: none"> • C-section • Hysterectomy 	<i>Staph epi, Staph aureus, Group B Strep, Enterococcus</i> Enteric Gram(-) bacilli, Group B <i>Strep, Enterococcus</i>	Cefazolin 2 g Cefazolin 1 g	Clindamycin 900 mg + Gentamicin 2 mg/kg Clindamycin 600 mg + Gentamicin 2 mg/kg	Single dose Single dose
Head & neck surgery	Anaerobes, <i>Staph aureus</i> , Gram(-) bacilli	Clindamycin 600 mg OR Ampicillin/sulbactam 3 g	Clindamycin 600 mg	24 h
Neurosurgery <ul style="list-style-type: none"> • Clean • Skull fracture, CSF leak • Penetrating trauma • Spine 	<i>Staph aureus, Staph epi</i> <i>Anaerobes, Staph epi, Staph aureus</i> <i>Staph, Strep, Gram(-) bacilli, anaerobes</i> <i>Staph aureus, Staph epi</i>	Cefazolin 1 g Cefazolin 1 g Cefoxitin 1 g OR Cefotetan 1 g Cefazolin 1 g	Clindamycin 600 mg Clindamycin 600 mg Clindamycin 600 mg Clindamycin 600 mg	Single dose Single dose 5 d Single dose
Orthopedic surgery <ul style="list-style-type: none"> • Closed fractures • Open fractures 	<i>Staph epi, Staph aureus</i> <i>Staph, Strep, Gram(-) bacilli, anaerobes</i>	Cefazolin 1 g Cefazolin 1 g + Gentamicin 2 mg/kg/d	Clindamycin 600 mg Clindamycin 600 mg + Gentamicin 2 mg/kg	Single dose Grade I/II – 24 h Grade III – 48 h
Urologic surgery <ul style="list-style-type: none"> • Genitourinary (high risk only) 	Gram(-) bacilli, <i>Enterococcus</i>	Cefazolin 1 g	Ciprofloxacin 400 mg	Single dose
Vascular surgery	<i>Staph epi, Staph aureus, Gram(-) bacilli, Enterococcus</i>	Cefazolin 1 g	Clindamycin 600 mg	24 h

Abbreviations: CSF, cerebrospinal fluid.

Fig. 1 (A) Superficial graft loss. (B) Excellent results after 6 months of conservative therapy.

Fig. 2 (A) Columellar defect repaired with nasolabial flap. (B) Partial distal flap loss.

Fig. 3 Postop after division and inset grafting.

patient achieved a perfectly adequate reconstruction (►Figs. 4 and 5). It should be noted that this patient was employed in a law office at the time; by her second postoperative visit, she would bring a lawyer with her to the clinic to take notes. A

Fig. 4 1 month after division and inset.

Fig. 5 3-months postop.

potentially difficult legal as well as medical situation was ameliorated by embracing and addressing her concerns and finally being able to deliver an adequate reconstruction

despite known complications. Gratifyingly, the patient has discontinued smoking to this day and is happy with her results of her surgery.

Conclusion

Major complications with soft tissue facial reconstruction can be avoided with experienced planning and meticulous execution. Unfavorable results are inevitable, but are minimized in the same manner. When they are encountered, it is important to embrace the situation. The patient's proverbial hand must be held to buy time and allow postoperative inflammation and edema to subside. Judicious use of secondary interventions is then undertaken at the appropriate juncture.

References

- 1 Michota FA, Donnelly MJ. Medicolegal issues in perioperative medicine: Lessons from real cases. *Cleve Clin J Med* 2009; 76(Suppl 4):S119-S125
- 2 Reisman NR. Ethics, legal issues, and consent for fillers. *Clin Plast Surg* 2006;33(4):505-510
- 3 Delaney A, Shimizu I, Goldberg LH, MacFarlane DF. Life expectancy after Mohs micrographic surgery in patients aged 90 years and older. *J Am Acad Dermatol* 2013;68(2):296-300
- 4 Antimicrobial prophylaxis for surgery. *Treat Guidel Med Lett* 2009;7(82):47-52
- 5 Smack DP, Harrington AC, Dunn C, et al. Infection and allergy incidence in ambulatory surgery patients using white petrolatum vs bacitracin ointment. A randomized controlled trial. *JAMA* 1996;276(12):972-977
- 6 Lever R, Hadley K, Downey D, Mackie R. Staphylococcal colonization in atopic dermatitis and the effect of topical mupirocin therapy. *Br J Dermatol* 1988;119(2):189-198
- 7 Rohrich RJ, Conrad MH. The superiorly based nasolabial flap for simultaneous alar and cheek reconstruction. *Plast Reconstr Surg* 2001;108(6):1727-1730, quiz 1731
- 8 Reece EM, Schaverien M, Rohrich RJ. The paramedian forehead flap: a dynamic anatomical vascular study verifying safety and clinical implications. *Plast Reconstr Surg* 2008;121(6): 1956-1963