

V-Y Flap for Nasal Reconstruction

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Summary: The nasal tip is a complex zone for reconstruction. Numerous flap reconstructions have been proposed. In addition to the technique presented here, only the Gillies-Millard bishop's miter flap and the paramedian forehead flap should be considered. The bilobed flap should be discontinued. The double-opposing V-Y flap for nasal tip reconstruction described here is an excellent method for reconstruction of limited defects of the nasal tip. These are mirror-image cutaneous flaps which require careful, skillful technique to preserve the delicate nerves and vessels. This challenging technique should only be attempted by qualified surgeons. Triangular cutaneous flaps are marked on either side of the defect, oriented transversely. The flaps are elevated and advanced with careful, gentle dissection. Ligamentous structures are cut while preserving the neurovascular supply. No cautery is used. The procedure is performed in an operating room with local anesthesia and with the patient under IV sedation. A patient who underwent this reconstruction is shown preoperatively, early postoperatively, and late postoperatively. The results demonstrate no tip distortion with imperceptible scars. The steps to undertake this procedure are outlined in detail. Rules for nasal tip reconstruction are proposed. (*Plast Reconstr Surg Glob Open* 2020;8:e3040; doi: 10.1097/GOX.0000000000003040; Published online 11 August 2020.)

INTRODUCTION

Double-opposing V-Y flaps with muscular pedicles or as cutaneous flaps have been used successfully for repairing defects of the breast,¹ scalp,² and gluteal region.³ An original use of cutaneous double-opposing V-Y flaps for reconstruction of a nasal tip defect is described here. These are triangular-shaped cutaneous flaps that are oriented transversely. They are elevated and the donor sites are closed in a standard V-Y fashion.

Photographs should be taken preoperatively, intraoperatively (if possible), early postoperatively, and late postoperatively. Proper consent should be obtained from the patient, and eyes should not be blacked out.⁴

The authors propose 9 rules for nasal reconstruction. First, there should not be excessive scarring.⁴⁻⁹ The recommended V-Y flaps follow this rule very well. Second, the tip should not be distorted.⁵ It may be slightly elevated, as is often seen with the bishop's miter flap. Third, only nasal tip skin should be used to

reconstruct the nasal tip, unless one is using a paramedian forehead flap.⁶ Fourth, the supratip region must not be depressed.^{7,10} Fifth, the nasal alae should not be elevated.^{8,11,12} Sixth, the columella should not be used as a donor site, as this obviously narrows the columella, creating an unnecessary deformity.^{4,7} Seventh, pinching the tip is a form of distortion.^{7,10} Eighth, rotating the tip is a form of distortion.⁴ Finally, making the tip more bulbous is a form of distortion.^{4,13}

INDICATIONS AND CONTRAINDICATIONS

The bilateral double-opposing V-Y flap is a method used especially for reconstruction of nasal tip defects. These are pure cutaneous island flaps with delicate neurovascular pedicles. They can be used to reconstruct defects of 1.0–1.5 cm in diameter. The larger defects, in a bulbous nose, may be closed using this method. Other methods for reconstructing larger defects are beyond the scope of this presentation. Other techniques used for reconstruction of the nasal tip include the Gillies-Millard bishop's miter flap and the paramedian forehead flap.⁹

In elderly patients, or in patients with significant underlying disease, strong consideration should be given to more conservative treatment with a full-thickness skin graft harvested from the postauricular area. The color match will not be perfect, but the thickness is ideal and the success rate is nearly 100%, even when some fat is left on the graft, making it a composite graft. Only in a

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moribund patient should treatment with dressing changes be instituted.

Patients with potential for poor wound healing include those with diabetes mellitus, Raynaud's disease, severe peripheral vascular disease, or connective tissue diseases, such as scleroderma, systematic lupus erythematosus (SLE), dermatomyositis, and calcinosis, Raynaud's phenomenon, esophageal dysmotility, sclerodactyly, and telangiectasia (CREST) syndrome.¹⁴ The complete clinical picture, however, should be considered. If the patient is not infirm and their underlying disease is well-controlled, then a flap repair is indicated. In these patients, a sensible approach is a flap delay, with completion taking 14 days.

SURGICAL ANATOMY

A subdermal plexus of neurovascular structures lies below the nasal tip skin. Strong ligamentous filaments tether the skin to the underlying perichondrium analogous to the skin of the palm and volar digits. Some individuals have a thin layer of nasalis muscle or fascia immediately superficial to the perichondrium of the alar cartilages. These deeper structures are not visualized here. The area described is small and subject to great injury by the burning of tissue with a cautery. Thus, cautery is always contraindicated. Unfortunately, in the usual patient with a Mohs defect, the base and edges of the wound may have already been cauterized in a futile attempt to obtain perfect hemostasis. All cauterized tissue must be gently removed by scrubbing or with sharp debridement before the reconstruction begins, regardless of how much bleeding is encountered or even if cartilage is exposed. Burned cartilage must be debrided. The total amount of necrotic tissue will be small, but it must be completely removed to avoid infection. Although a zone of injury extends around a burn injury, one must not debride tissues that are not obviously damaged.

SURGICAL TECHNIQUE

1. The patient should have a preoperative medical clearance. It is imperative to control the patient's hypertension. Regarding aspirin or other anticoagulant use, confer with the medical doctor. The need to continue anticoagulation is not a complete contraindication to surgery. A hematologist should be consulted. Keep in mind that use of the sequential compression device may create molecules or compounds that aid in the prevention of venous thromboembolism.¹⁵
2. The procedure is performed in the operating room with excellent lighting under local anesthesia and with the patient under IV sedation (Fig. 1).
3. The patient is placed supine on the operating room table, with padding under the heels, knees, hips, shoulders, and head. The head of the bed is elevated to 30 degrees.
4. The sequential compression device is applied to the legs. It may be applied to the forearm if the legs are unavailable.



Fig. 1. Preoperative view of a 39-year-old, fair-skinned white woman with premalignant pigmented changes on the nasal tip.

5. The nose and surrounding skin are cleansed with alcohol.
6. The defect and the V-Y flaps are marked with a marking pen (Fig. 2).
7. The surgeon should prepare the face with Betadine.
8. The patient is draped in the usual sterile fashion.
9. The Betadine solution is wiped away, and the eyes are rinsed with normal saline.
10. The surgeon should inject a solution of 50% of 1% lidocaine with epinephrine mixed with 50% of plain Marcaine and wait 10 minutes.
11. Using "supercut" curved iris scissors, all necrotic skin, soft tissue, and cartilage are debrided away, regardless of its location. Any black or brown tissue is necrotic. 2.5x loupe magnification may be helpful.
12. The surgical assistant is continuously suctioning the bleeding with the Frazier suction tip.
13. Photographs should be taken once the final defect is revealed. Blood from the surgical field is removed and the surgical ruler is placed next to the defect along with the patient's name.



Fig. 2. Preoperative view of the patient's nasal tip with margins of the lesion marked. The flaps are marked oriented transversely.



Fig. 3. Early postoperative view of the patient at 2 weeks.

14. On the dry operative site, the flaps are again marked, with the flaps oriented horizontally. One flap may be smaller. The total area is overestimated to be 10% larger than that of the defect. The flexible OR ruler is used. The V-Y flaps are incised always perpendicular to the skin with a No. 15 blade.
15. Use the curved iris scissors to spread, then to cut the restraining ligaments while preserving the less taut neurovascular structures. The surgeon must be able to differentiate between the ligamentous structures, which are tight and tether the flaps and the neurovascular elements, which are more relaxed.
16. No cautery is used. This makes it safer to provide oxygen via nasal cannulae.
17. The flaps are advanced bilaterally without tension. If tension persists, more ligamentous filaments are cut. The flaps should nearly fall into position.
18. The wound is closed with interrupted 6-0 nylon sutures 1 cm apart. The wound will be oozing.
19. The stems of the Y's are closed in a similar fashion. These areas should be carefully advanced to achieve a tension-free closure.
20. No buried sutures are placed.
21. At completion, firm pressure using a gauze is applied for 10 minutes without peeking.
22. There still will be mild oozing. The flaps may appear blanched. This is normal.



Fig. 4. Late postoperative view of the patient with imperceptible scars at 6 weeks.

23. An occlusive nonpressure dressing of Xeroform is applied, and the gauze is secured with paper tape.
24. A gauze dressing is lightly secured below the nostrils to collect blood and mucous. This dressing only is changed by the patient when needed.

25. In the recovery room, if significant bleeding persists despite elevation and pressure, ensure that there is no hypertension. In this case, the nasal dressing is removed and gentle, yet firm pressure is applied with sterile gloves and a sterile gauze for 10 minutes or until bleeding ceases. A new dressing is applied.

POSTOPERATIVE CARE

The patient is seen in the office at 48 hours. Blood clots are not removed. The still-open wound is cleansed with normal saline. If either flap is blanched, the patient is put on observation. A thin film of triple antibiotic ointment is placed over the incisions and flaps. The wound is covered with sterile gauze secured with flesh tone Steri-Strips. This dressing may come off on its own. The patient may shower but still limit activities.

The patient is seen again on postoperative day 5 for suture removal, and the flaps are left open. Leaving the sutures longer will leave suture marks. The patient is instructed to continue head elevation and to avoid exercise through postoperative day 7 (Figs. 3, 4). The patient should wear sunblock and avoid sun exposure for 6 months to a year for best scarring.

PEARLS AND PITFALLS

Dog ears should never be excised preemptively, as the size and shape of the standing cone is unpredictable. Additionally, this excess tissue may be needed. “Burow’s triangles” is a euphemism for preemptive dog-ear excision. All plastic surgeons are familiar with excision of a standing cone.

Antibiotics active against methicillin-resistant staphylococcus aureus (MRSA) should be prescribed for 5 days to begin the evening before surgery. The surgeon should prescribe 500 mg Duricef daily or 500 mg Levaquin daily for those with penicillin allergy. Clearly written instructions should be given to the patient, preoperatively if possible.

Although scars are inevitable and permanent, in the glabrous skin of the nasal tip, they will be imperceptible. They can be easily concealed with a trace of liquid makeup in either gender.

COMPLICATIONS

Poor sensibility or dysesthesias may occur due to damage to the terminal nerve branches. Damage may occur from poor dissection or from the use of cautery. But these complications may also occur due to tension on the flaps. If the flaps are elevated properly, there will be good nasal tip sensibility.

Flap necrosis is rare, but edge necrosis is not uncommon due to closure under tension. Nicotine use can also cause edge necrosis. All smoking, vaping, or use of other nicotine products must cease 2 weeks before surgery.

If there is flap failure, all necrotic tissue must be sharply debrided, regardless of its location. Nonviable skin, soft tissue, cartilage, and even muscle and bone must be debrided. Daily normal saline dressing changes should be instituted. Nothing further can be attempted until the

wound is clean without any necrosis or infection. If the necrosis is not extensive, it may be possible to readvance either or both flaps. If not, then the area should be reconstructed with a bishop’s miter flap. If the patient prefers, the area may be reconstructed with a postauricular full-thickness skin graft.

Infections may occur due to buried sutures, which should never be used. Necrotic tissue may also cause infection. A culture swab should be taken and empirical antibiotics begun immediately, along with daily normal saline dressing changes in the office. An Infectious Disease consultation should be obtained urgently.

A hematoma may develop, which should be expressed as soon as it is identified. A pressure dressing should be applied to the site of the hematoma with daily normal saline dressing changes in the office and a new pressure dressing daily. Oral antibiotics should be prescribed. Hypertension must be controlled pre- and postoperatively. A careful history should be obtained before surgery. Patients with medical problems or taking medications should be medically cleared before surgery.

One should not try to maintain perfect hemostasis while performing nasal tip reconstruction. The area will bleed, even when using epinephrine. Do not cauterize the tissue, as this will create necrosis, a nidus for infection. There will be bleeding, even during wound closure.

Poor scarring is rare but, if present, may be reevaluated at 6 months and at 1 year. Treatment may be by scar revision or by light hand dermabrasion.

CASE EXAMPLE

A 39-year-old, fair-skinned, white woman was referred by her dermatologist for excision of an area of premalignancy of the nasal tip with plastic surgical reconstruction. The patient was examined in the office, and a consultation was performed. Surgical options were discussed. The patient agreed to the above procedure. Five days later, the procedure was performed as an outpatient. The patient experienced no complications. Photographs of the patient were taken by the surgeon of record pre- and postoperatively, as well as late postoperatively. Excellent results were observed. During the office consultation, the areas of skin discoloration and 2 mm biopsy scar were identified. The nose was examined for similar areas, and none were observed. Note was made of the patient’s fair skin and refined nasal tip. The area in question and planned V-Y flaps were marked and shown to the patient. The areas were then cleansed and the nose photographed. The preoperative photograph was later marked similarly.

DISCUSSION

Admittedly, this method of reconstruction violates the basic principle of nasal reconstruction by subunits championed by Burget and Menick.¹⁶ But it can be extremely useful in avoiding an extensive operation.

Like all flaps, they require meticulous dissection and tension-free advancement. Some surgeons may feel more confident using 2.5× loupe magnification. “Supercut” curved iris scissors are indispensable. Cautery should



Fig. 5. An elderly man with malignant actinic changes on the nasal tip.

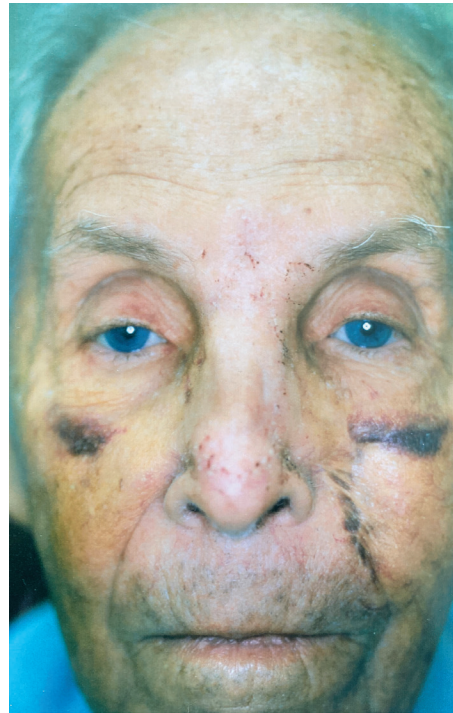


Fig. 6. View of the nasal tip of the elderly man at 2 weeks following bishop's miter flap reconstruction.

never be used. We are recommending that these procedures take place in an operating room with IV sedation for the benefit of the patient and the surgeon, as well as for blood pressure control. Also, in this manner, the assistant surgeon with suction can help, and with pictures also.

Surgeons with lesser qualifications, or surgeons unfamiliar with surgery of the external nose, should not venture here.^{5,6,8,10,12} Examples found outside the plastic surgical literature were decidedly poor.^{11,12,13,15,16}

A PubMed search of “nasal tip flap reconstruction” produced nearly 500 results! This vast number of unique ways to reconstruct the nasal tip simply cannot exist. Many articles are merely breathless variations of classic, time-tested flaps, such as the dorsal nasal flap, a miniature bishop's miter flap. Others, unfortunately, are poorly conceived flaps which distort the nasal tip. That is not cricket. A reconstruction must be a true reconstruction, not just simply covering with a flap. Some papers report reconstructions that create extensive scarring, when better methods already exist. Yet others succumb to marketing forces with catchy names such as “checkmark rotation flap,”⁷ “pincer flap,”⁶ and “omega flap.”¹² Others appear to use creative photography,^{5,13} while some are fantastical flaps that have never been performed as depicted (Banner flap).

In our opinion, flaps used for reconstruction of the nasal tip include the Gillies–Millard bishop's miter flap and the paramedian forehead flap. The bishop's miter flap, in our estimation, is superior to the bilobed flap of Esser and Zitelli. Rather than placing scars at the center of the nasal dorsum and nasal tip, the bishop's miter flap elegantly conceals the proximal V-Y component in the

glabellar region and camouflages the rotation advancement component along the natural contours of the nasal dorsum and nasal tip. For these reasons, we believe that the bilobed flap should be abandoned. The paramedian forehead flap is important for strict subunit reconstructions or when a total nasal reconstruction is required. Well-known flaps that should be retired here include the banner flap, Limberg and Dufourmentel flaps, the nasolabial flap, cheek advancement sliding flap, scalping flap, auriculo-temporal flap, and arm, cervical, chest, and abdominal flaps. Some of these flaps create excessive scarring, some are unnecessarily complex, and some place scars in places that are noticeable. A microvascular free flap should only be considered to reconstruct an entire nose. We feel that this calamity should best be managed using a forehead flap with cartilage and mucosal grafts rather than with an extensive, potentially dangerous microvascular free flap.

V-Y flaps function so well because as the flap is advanced, the donor defect remains small and constant, albeit on either side of the advancing triangle. This is the elegance of the V-Y flap and explains, in part, why it can be used in so many different parts of the body. V-Y flaps function on the principle of skin laxity perpendicular to the direction of motion of the flap. They may be myocutaneous, fasciocutaneous, or cutaneous, pedicled on delicate neurovascular elements. Loupes are useful in raising cutaneous flaps. The bishop's miter flap, despite wide undermining and tension-free advancement, may elevate the nasal tip due to fascial contracture, a quality that may be pleasing, even desirable, in a woman when not overdone. It may improve a plunging tip in either gender (Figs. 5, 6).

The double-opposing V-Y flap reconstruction of the nasal tip is a true cutaneous flap repair. The fascia and muscle are not seen. The minimal tip distortion is not visible. Only nasal tip skin is used. The nasal alae are not elevated. The columella is untouched. By using adjacent skin, the color and texture match are ideal.

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PATIENT CONSENT

The patients provided written consent for the use of their images.

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