Correspondence

Nasal Ala Reconstruction: Surgical Conundrum

Dear Editor,

Skin tumours of the nasal ala are common and surgery is the treatment of choice. Nasal ala reconstruction is challenging due to the reduced mobility and unique features of its thick and sebaceous skin. The natural arc of the ala and its boundary with the cheek are difficult features to reproduce. One should bear in mind the functional and cosmetic risks of nasal ala reconstruction. A distorted nasal contour may impair the nasal valve; the alar rim may notch or elevate; facial symmetry may be disrupted by blunting of the alar crease, trapdooring, bridging of the nasofacial sulcus and poor colour and texture match.

Our aim is to review and compare the functional and cosmetic results of different local flaps used to correct intermediate-thickness defects on the nasal ala after surgical excision of cutaneous tumours. We present representative patients who were treated at our Dermatological Surgery Unit from June 2015 to September 2016.

The choice of the flap was adapted to the patients’ physiognomy and the defects’ size: tunnelled island pedicle melolabial flap [Figure 1]; jigsaw puzzle advancement flap [Figure 2]; spiral flap [Figure 3]; dog-ear island pedicle flap [Figure 4] and banner melolabial transposition flap [Figure 5]. Surgery was performed under loco-regional anaesthesia, in an outpatient basis, followed by prophylactic antibiotic therapy. There were neither immediate complications nor subsequent flap necrosis. The tumours were completely excised.

Facial symmetry was well preserved by the spiral and jigsaw puzzle flaps [Figures 2 and 3]. The nasal sulcus was left intact by the spiral flap as well as the tunnelled melolabial island flap [Figures 1 and 3]. The melolabial flaps and the dog-ear island flap allowed for the correction of larger defects on the nasal ala [Figures 1, 4 and 5]. The dog-ear island flap [Figure 4] obtained a good result despite the large size of the primary defect. Banner’s melolabial transposition flap [Figure 5] was used to correct...
Figure 1: Female, 86-year-old, nodular ulcerated basal cell carcinoma in the nasal ala: tunnelled island pedicle melolabial flap. (a) Surgical plan, (b) primary defect, (c) secondary defect after tunnelling of the flap, (d) immediate post-operative, (e and f) result after healing (10 months after surgery)

Figure 2: Male, 76-year-old, nodular basal cell carcinoma on the nasal ala: jigsaw puzzle advancement flap. (a) surgical plan, (b) primary and secondary defects, (c) anchoring sutures secure the flap in place; (d) immediate post-operative, (e) result after healing (3 months after surgery)

Figure 3: Female, 76-year-old, nodular basal cell carcinoma on the nasal ala: spiral flap, a combination of advancement and rotation. (a) Surgical plan, (b) immediate post-operative, (c) result after healing (2 months after surgery)

Figure 4: Female, 76-year-old, basal cell carcinoma on the nasal ala: dog-ear island flap, combining two flaps: cheek advancement and rotated island pedicle. (a) Surgical plan, (b) primary defect, (c) immediate post-operative, (d) day 7 post-operative, (e) result after healing (1 month after surgery)

Figure 5: Male, 83-year-old, two nodular basal cell carcinomas on the nasal ala and dorsum: Banner’s melolabial transposition flap. (a) Surgical plan, (b) primary defect, (c) immediate post-operative, (d) result after healing (7 months after surgery)

A complex defect involving not only the nasal ala but also the nasal dorsum and resulted in facial asymmetry due to trapdooring.

The small size of the defects that can be addressed by the spiral and puzzle flaps may explain their superior cosmetic results.[1,2] The tunnelled melolabial island flap,


**Table 1: Nasal ala reconstruction: What is the optimal approach according to the defects’ size and location?**

| Defect Size and Location | Small (<1 cm; <1/3 width of nasal ala) | Medium-large | Large (>1.5 cm) or complex defects |
|--------------------------|--------------------------------------|--------------|-----------------------------------|
| Medial                   | Single-lobe transposition flap\(^6\)    | Bilobed transposition flap\(^6\) (≤1.5 cm, ala±tip) | Melolabial transposition flap (≤2.5 cm, ala±alar groove, nasal rim, dorsum or tip) |
| V to Y island pedicle flap (≤0.5 cm) | Rotation flap\(^6\) (ala±nasal sidewall) | Dog-ear island pedicle flap\(^6\) (1-2 cm, alar crease±nasal sidewall) | Nasofacial (check-to-nose) interpolation flap\(^{11,12}\) (deep defect, ala±nasal rim lobule or entire nasal ala) |
| Mid-alar                 | Spiral flap\(^{10}\) (≤1 cm)           | Melolabial-tunnelled pedicle island flap\(^{10}\) (deep defect, ala±adjacent cheek) | Forehead pedicle transposition flap (defect extending >1.5 cm beyond the ala to nasal tip, sidewall or cheek; irradiated skin, diabetics, smokers) |
| Alar rotation flap\(^7\) (deep defect) | Dog-ear island pedicle flap\(^{10}\) (deep alar-perialar defect) | Shark island pedicle flap\(^{10}\) | |
| Lateral                  | Jigsaw puzzle flap\(^{10}\) (≤1.3 cm, ala±adjacent check) | Melolabial-tunnelled pedicle island flap\(^{10}\) | |
| Shark island pedicle flap\(^{10}\) (deep alar-perialar defect) | Shark island pedicle flap\(^{10}\) | | |
| Other options            | Defect not involving alar rim           | Cheek island advancement flap (risk of blunting nasofacial sulcus) | |
| Secondary intention (light-skinned, smokers, poor surgical candidates) | Dorsal nasal flap (risk of ala distortion and trapdooring) | | |

Full-thickness skin grafting (lack of tissue mobility; young patients with thin skin)**

This non-exhaustive algorithm encompasses surgical techniques for intermediate-thickness defects of the nasal ala. *Dog-ear island pedicle flap is an adaptation of the crescentic cheek advancement flap,\(^{13}\) with the latter having a greater risk of blunting the alar crease and nasofacial sulcus. **For skin grafting on the nasal ala, the closest colour and texture match is the conchal bowl of the ear or the adjacent cheek skin.\(^{14}\) Pre- or post-auricular skin may be used.

**Table 2: Nasal ala reconstruction: major advantages and potential caveats of different surgical techniques**

| Surgical Technique                        | Major advantages                                                                 | Potential caveats                                                                 | Relevant steps to avoid risks |
|-------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------|
| Bilobed transposition flap\(^6\)          | Robust blood supply, rapid healing; excellent tissue match; integrated within the same cosmetic subunit | Nasal ala elevation or pincushioning; trapdooring; loss of the alar crease; rotation pucker | Thin excess fat; transpose each lobe by 45°; deep tacking suture along the nasofacial sulcus or alar groove; place the alar crease between the first and second lobe; remove Burrow’s triangle |
| Spiral flap\(^{6,9}\)                      | Excellent cosmesis (entire flap within the nasal ala, intact nasal sulcus, incision camouflages in alar crease); no rotation pucker | Pincushioning or trapdooring; flap ischaemia                                    | Avoid excessive tension and trauma |
| Jigsaw puzzle flap\(^{10}\)               | Minimal closure tension; similarity of adjacent skin; dog-ears hide in melolabial fold and between 2 cosmetic units | Effacement or distortion of the melonasal angle; flap swelling or necrosis; trapdooring or blunting of alar groove | Anchor suture to the periosteum in the piriform fossa; keep broad pedicle, handle carefully; trim subcutaneous fat; avoid defects that cross into other cosmetic units |
| Rotation flap\(^5\)                        | Broad base (ample blood supply); simplicity; No pincushioning                      | Rim upward retraction; swelling due to venous congestion                        | Avoid defects adjacent to the rim; avoid excessive undermining or tension |
| Dog-ear island pedicle flap\(^3\)          | Junction of the flaps recreates the alar crease; pedicle is based on nasalis muscle (robust blood supply); scars hide in natural skin lines | Nasal ala depression, usually temporary; loss of the island pedicle flap; asymmetry of nasolabial fold | Careful handling of island pedicle |
| Melolabial tunneled pedicle island flap\(^{10}\) | Preservation of nasal sulcus; pincushioning is advantageous (recreates the ala) | Technically cumbersome; damage to muscles of nares or lips; asymmetry of nasolabial fold | When designing, account for pedicle shortening due to rotation and tunnelling; careful dissection |
| Melolabial transposition flap               | Broad proximal base (ample blood supply); excellent tissue match; simple and versatile; donor scar hides in melolabial fold | Trapdoor or pincushion deformity; blunting of nasofacial sulcus; asymmetry of nasolabial fold | Remove excess fat, especially when recreating the rim; ensure tension-free suture and nasofacial sulcus recreation with proper deep tacking sutures |
| Nasofacial (check-to-nose) interpolation flap\(^{11,12}\) | Subunit boundaries are respected; alar sulcus is preserved; good tissue match; may replace alar unit | Flap ischaemia; two-step procedure; alar collapse or retraction; hair transposition (men); asymmetry of nasolabial fold | Avoid aggressive thinning of fat; over-pack the nostril with petrolatum gauze; ensure size match, anticipate flap contracture; splinter the airway or place a conchal cartilage batten |
| Full thickness skin graft                  |                                                                                   | Necrosis due to lack of a primary blood supply; skin mismatch; tenting or depression | Trim subcutaneous fat; avoid in smokers; do not use hair-bearing donor skin; thin the graft to approximate the depth of defect |
although technically demanding, may produce excellent results; compared to the cheek-to-nose interpolation flap, the tunnelling technique offers the advantage of being one-stage procedure. The dog-ear island flap is an adaptation of the cheek advancement flap; despite its apparent complexity, it offers a viable alternative to the melolabial flaps, with a lower risk of trapdoor effect and with proper preservation of the alar contour. The discussed flaps are useful alternatives to the bilobed transposition flap and the skin graft for the surgical reconstruction of the nasal ala.

When planning the surgery, it is important to assess the primary defect on the nasal ala: size and location (medial or lateral), depth, involvement of other cosmetic units/subunits and extension to the alar rim, nasal tip or adjacent cheek. Several techniques have been developed that are useful for the reconstruction of defects of the nasal ala. Based on our experience and a review of the literature, we present an algorithm [Table 1] to optimise the choices in the reconstruction of intermediate-thickness defects in nasal ala. In Table 2, we review the main advantages and caveats of some of the most useful surgical techniques for nasal ala reconstruction.

In the nasal ala, given the paucity of surrounding skin and the importance of minimizing nasal ala distortion, flaps that recruit skin from a distant site should be considered. Mastering different techniques is essential for a surgeon to optimise treatment for each patient. At the end of the day, the best choice depends on many factors and should be adapted on a case-by-case basis and to the surgeon’s expertise.

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Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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