

The Medial Based Bi- or Trilobed Flap for Repair of Distal Alar Defects

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Key Words

Basal cell carcinoma · Cancer ·
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surgery

Abstract

Background: Reconstruction of defects of the lateral nasal ala might be challenging. Reconstruction with a bi- or trilobed flap is common. The laterally based bi- or trilobed flap for defects of the distal ala or lateral tip of the nose produces mostly tissue protrusion in the nasal groove which is aesthetically unpleasant. Why not use more the medially based bi- or trilobed flap? **Objective:** To describe the utility of bilobed and trilobed flaps for alar defects insisting on the design of medially based flaps. **Methods:** To show the technique and practical application for this kind of reconstruction. **Results:** The bi- and trilobed flaps are useful for defect repair between the lateral nasal tip and the distal ala. We observed that in most cases the flap based medially respects anatomical subunits better than the laterally based flap for medium-sized defects of the distal ala of the nose. **Conclusion:** I suggest that the bi- and trilobed flaps for repair of the lateral tip/distal ala should more often be medially based. This flap has a specific indication and precise advantage compared to other reconstructions, especially to the laterally based multi-lobed flaps in this specific indication.

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Introduction

Skin cancer of the nose is frequent. The nose is a difficult area to reconstruct as it is a tridimensional structure with two free margins with a potential risk of retraction and consequent asymmetry. Further the nose is important for self-recognition and identification and is one of the most important structures which define a face. Therefore the reconstruction of the nose after Mohs surgery for epidermal skin cancer has to be performed with extreme prudence as distortion of the nose is strongly disfiguring. Even in elderly patients, the integrity of the patient has to be respected and does not allow arbitrary defect repairs. The literature mentions bi- and trilobed flap reconstructions for defects of the lateral tip of the nose but insists nearly always on the laterally based flap [1–3]. A medially based flap is often chosen in large defects of the tip of the nose; medium-sized defects of the lateral tip/ala are generally reconstructed by a laterally based flap although Zitelli [4] recognized already the importance of the medially based bilobed flap in this localization in his first publication. The intention is to show that a medially based flap has only advantages the more the defect is placed on the ala.

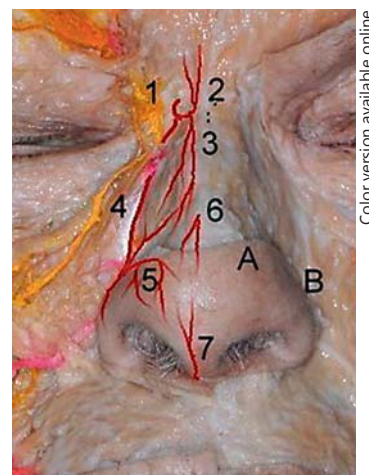
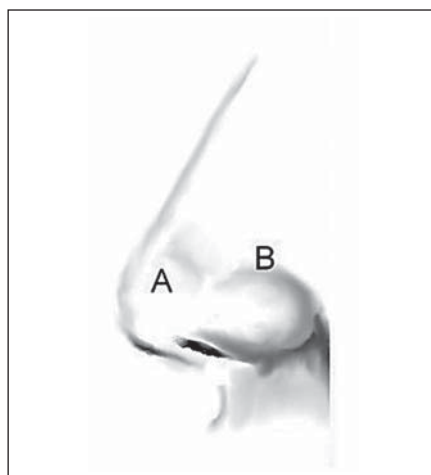
As reconstruction is mostly made from the closest donor site, the defect size should be better defined in relation to the donor site, which in our situation is the nose and less in centimeters as there is an individual variation of nose sizes.

Anatomical Subunits and Anatomy

As we have seen in previous publications, the nose presents anatomical subunits which are important to respect. Some of these are more than just to hide scars but responsible that our eye defines a nose as such. The subunits and their borders are as far as possible to be respected when we choose our placing of scars. It is particularly important to maintain the convexity of the tip, supratip and ala and the concavity of the alar sulcus (fig. 1, areas A and B).

The nose as such is a very well-vascularized organ and corresponds to a crossroad of (end-)arteries joining together (fig. 1). We differentiate an external vascular network arising from the carotis externa artery which communicates with the carotis interna artery via the dorsal nasal and ophthalmic artery and, on the back of the nose, the external nasal branch of the anterior ethmoidal artery. The carotis externa system includes: at the caudal base of the nose there is the columella branch of the superior labial artery, in the nasal groove the lateral nasal artery follows the crease and gives a branch on the side of the ala which is called nasolabial marginal artery; on the lateral side of the nose the angular artery joins the dorsal nasal artery [5]. The dorsal nasal artery takes its origin between angular and ophthalmic artery and turns caudal on the back of the nose. Some authors claim that at its origin there is the so-called central artery by Kleintjes [6].

Fig. 1. The convexity of the tip and supratip (A) and the concavity of the nasal sulcus (B) are landmarks for the reconstructions mentioned in this article. 1 = Ophthalmic artery; 2 = central artery [6]; 3 = dorsal nasal artery; 4 = angular artery; 5 = lateral nasal and nasoalar marginal artery (on the side of the ala); 6 = external nasal branch of the anterior ethmoidal artery; 7 = columella branch of the superior labial artery.



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Surgical Technique

The bilobed flap produces a combination of rotation and transposition movement (fig. 2). Dependent on the design, the angle of each transposition varies between 45 and 60° as this was already mentioned by Zitelli for the bilobed flap and others [1, 4]. The sum of the angles defines the total rotation at the pivot point which ranges from 90 to 120°. The design of the flap varies depending on the laxity and thickness of the skin and the defect size. The defect should always be evaluated in relation to the nose length, therefore the literature recommends the use of the bilobed flap for defects which take not more than one third of the nose length, and this corresponds mostly to a diameter of 15 mm. I want to insist on defects which correspond to probably one quarter of the nose length or the height of the distal ala which means about 7–12 mm (fig. 2). For bigger defects, the medially based bilobed flap might be difficult to realize because of the limited size of the donor site on the lateral side of the nose between the defect and dorsum of the nose.

The design of the flap is shown in figures 3, 4 and 8; it is generally pediculated medially, and I try to respect the sulcus of the nasal ala for harvesting of the lobes and to avoid to cross the nasal sulcus so as not to fill out this important landmark (fig. 5a–c). This point is important for the bilobed flap. The trilobed flap shows a similar approach as shown in figures 7 and 9.

Generally I choose the first lobe with a smaller diameter than the defect, but as the tip of the nose is convex and/or the first lobe has to be rotated slightly on itself, one has to be careful not to underestimate the ra-

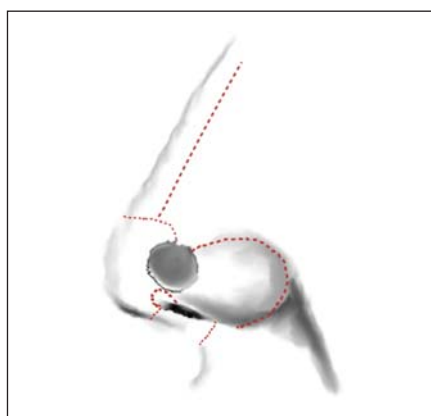


Fig. 2. Defect on the lateral ala between three different anatomic subunits.

dius or length of the first lobe as mentioned by other authors [1, 4, 7]. If one wants to avoid lifting of the ala, one should consider to add 2–4 mm to prevent lifting of the latter. The second lobe can be designed with a smaller diameter as a function of laxity and availability in the donor site.

The incision of the skin is made until the layer of the underlying muscle or cartilage at the periphery of each lobe. Under the pivot point which is mostly at the lateral back or sidewall of the nose, I carry the separation level to the perichondrium at the pedicle base. On the second lobe I trim only until the muscular layer. Undermining has to be extended until the contralateral side of the nose as well all around the primary, secondary and tertiary defects. This is necessary on the one hand for better

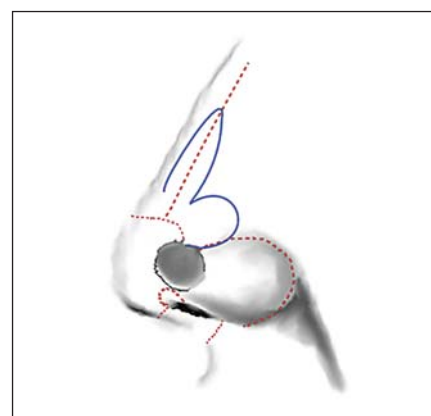


Fig. 3. Design of a medially based trilobed flap, following anatomical subunits.

mobilization of the flap and on the other to avoid pincushioning [4].

The first suture is between the first and second lobes and the angle of the defect. This gives us the first impression whether the flap will move in correctly. After this the flap is sutured in with polyglycolic acid 5-0 buried sutures. Corrections have to be accomplished to adapt the flap correctly to the defect. Final skin adaptation can be finished by continued or interrupted polypropylene 6-0 sutures.

Discussion

Postsurgical defects of the lateral nose tip and distal ala after Mohs surgery are frequent. When the defect involves the lateral



Fig. 4. **a** Example of a medially based bilobed flap for a defect on the distal ala. **b** Result after 6 weeks; notice the nasal alar groove which is persistent and not washed out. **c** Half side view. **d** Front view; notice the recreation of a convex aspect of the upper nose tip, corresponding to the upper crus of the nasal cartilage.

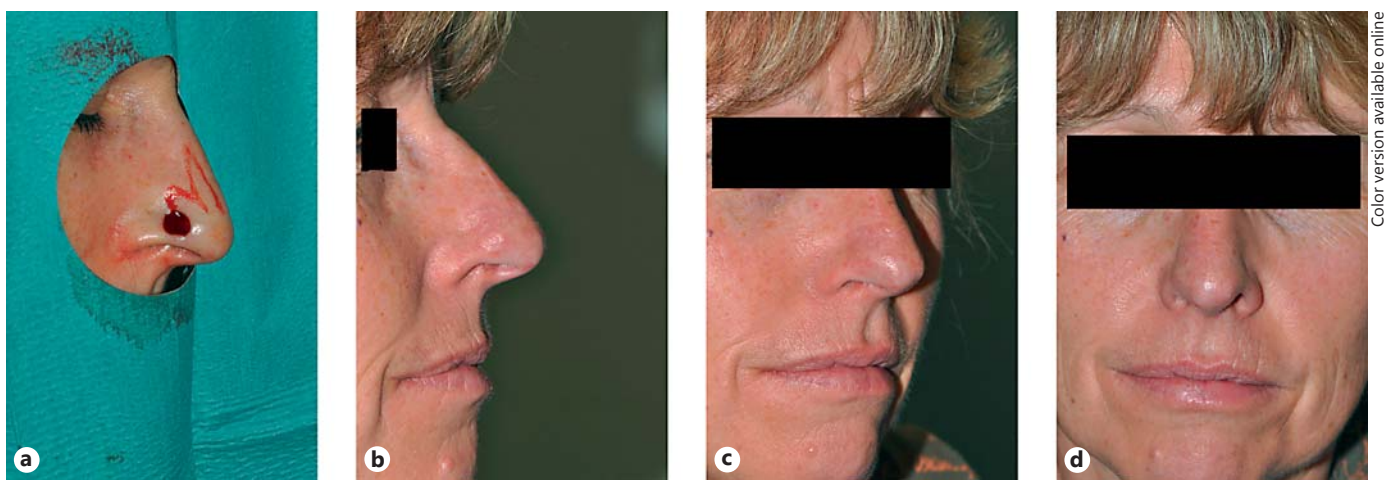


Fig. 5. **a** Example of a medially based bilobed flap for a defect on the distal ala. **b** Result after 6 weeks; notice the nasal alar groove which is persistent and not washed out. **c** Half side view. **d** Front view; notice the recreation of a convex aspect of the upper nose tip which is probably slightly too pronounced, but the patient did not desire correction.

part of the nose tip between the ala and tip, repair is most challenging (fig. 2). Even small defects can be difficult to repair. Loss of symmetry and/or washed out nasal sulcus or even tissue protrusion in this region is associated with a feeling of disfigurement and/or with loss of identity. Any reconstruction of the nose should respect the principle to maintain and restore the form and symmetry of the nose [8]. Reconstruction of the nose can be complicated when the patient presents low elasticity of the

dorsal nasal skin due to e.g. recurrent sunburns, history of traumatism, recurrent treatment with cryotherapy, radiotherapy or rhinophyma.

The donor site for skin for a defect repair on the lateral tip or distal part of the nose is mostly extended to the back or sidewall of the nose. In some cases where the defect is not too big and only slightly lateralized, the donor site can be the same anatomical subunit as I published in 2006 for a rotation flap of the tip of the nose [9].

Some authors have proposed second-intention healing which, in our opinion, is only an option for very superficial defects to get an acceptable result on this convex surface. A full-thickness skin graft can be a possibility but has disadvantages concerning texture and color mismatch; to see good results one has to wait 1 year.

Patients with strongly redundant skin, for example patients with scar tissue, rhinophyma, after different combined or repeated treatments (radiotherapy, Efudix,

cryotherapy), anamnestic traumatism on the nose or several heavy sunburns, are more difficult to repair. In this case the donor site with more laxity of the skin is the lateral sidewall of the nose.

Although some of these defects may be covered with a hatched flap, this might be difficult between the lateral tip and ala. As the hatched flap is a rotation flap, it has – in my experience – mostly the tendency to lift the ala as it shortens the length axis. This can be avoided if the flap design starts more laterally of the defect and the donor site is extended largely to the lateral side wall. In this case the flap fills out the nasal sulcus which means a less good aesthetic outcome. This is even more pronounced in defects of the distal ala. Therefore it seems to me no option for lateral defects between ala and tip or ala of the nose. A transposition flap from the melolabial fold are two valuable options but they are two-time procedures and should be reserved for bigger or through-and-through defects.

Some authors have mentioned an island pedicle flap from the ala. This is a valuable option but diminishes unfortunately the size of the ala and has a tendency for trapdoor deformity; further, it is not an option on a slim nose.

I published a myocutaneous pedicle island flap from the back of the nose for the reconstruction of the ala. This reconstruction is possible but the subcutaneous pedicle can cause a valve-like deformation on this narrow point of the nostril wherefore the patient should be preoperatively checked for septal nasal deviation [10].

The bilobed or trilobed flap is probably best placed to solve all these inconveniences. In contrast to the hatched flap there is no shortening of the vertical axis and in consequence no lifting of the ala [1, 2]. The donor sites are mostly the back and side of the nose and therefore generous; the transposition movement is $2 \times 45\text{--}60^\circ$. The bilobed flap has also a tendency of trapdoor deformity, but in contrast to an island flap trapdooring is less important and might be even desired to shape the convexity on this part of the nose.

The bi- and trilobed types are random flaps, therefore – contrary to some samples of the literature [2] – the underlying vascular bed is of minor importance. Some authors argue that the alar artery guarantees better vascularization for the laterally based flap [2]. This might be true but we are speaking about random flaps in a very well-vascularized area. As we have seen above,

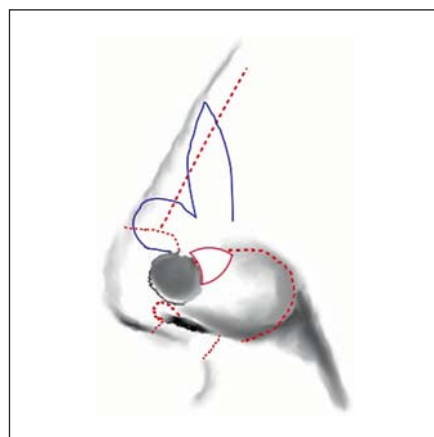


Fig. 6. Design of a laterally based bilobed flap. The pivot point lies in the nasal sulcus and therefore fills out this concave region and creates unaesthetic bulking.

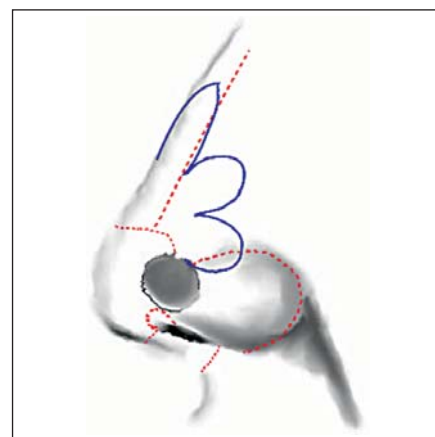


Fig. 7. Design of a medially based trilobed flap. The pivot point lies above the nasal sulcus, therefore the concave nasal sulcus can be saved without unaesthetic blunting.

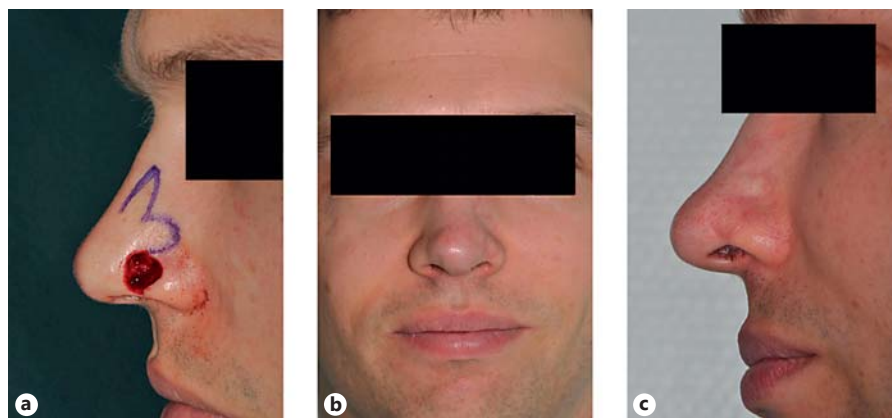


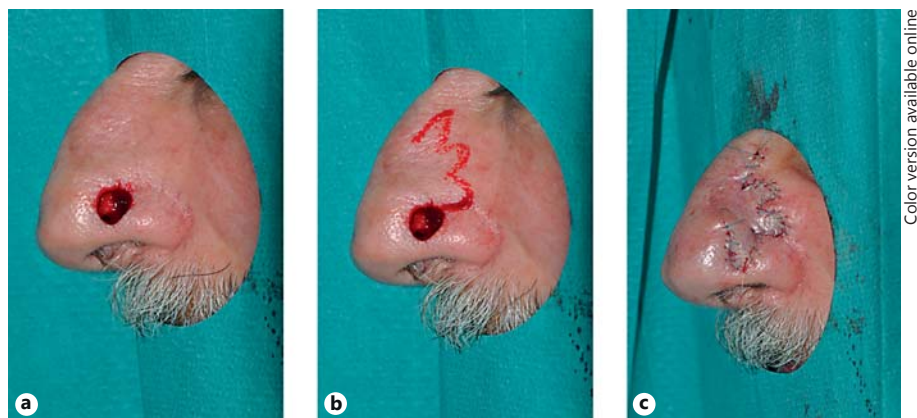
Fig. 8. **a** Young patient with a defect on the lateral ala: design of the flap. **b, c** Result after 3 months. Please note minimal accentuation of the supratip which is not disturbing the patient.

the back and tip of the nose present a very dense network of several arteries which guarantee an excellent vascular bed. So I think that this dogma of an underlying artery which might improve the survival of this random flap is not essential.

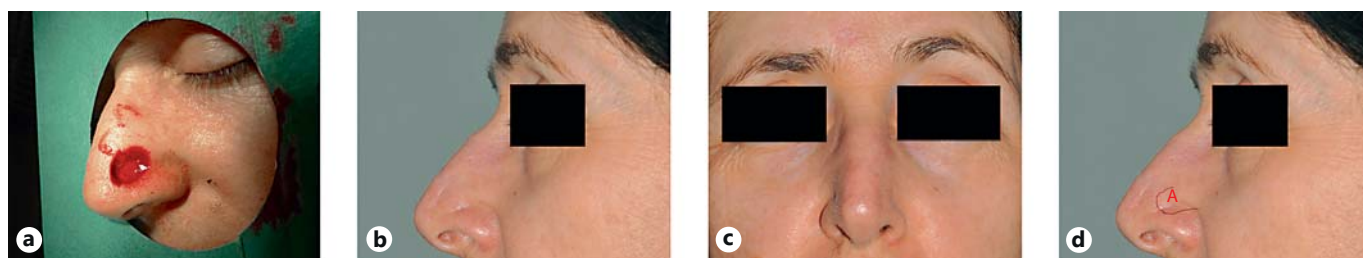
Most recent authors have published cases where bilobed flaps and trilobed flaps are pediculated laterally even for alar defects [1–3]. This is contrary to the initial article of Zitelli [4] where he insists on the point that laterally based flaps should be used for the distal nasal tip wherefore medially based flaps should be used for alar

defects. From an aesthetic point of view the laterally based flaps have some major inconveniences for defects of the ala. The pivot point is placed two thirds or half of the diameter of the defect more laterally than the defect, which means about 3–9 mm more laterally, directly in the nasal alar groove (fig. 6). The nasal alar groove is a very fibrous tissue and creates tissue protrusion exactly around the alar groove which fills it out from the defect until the pivot point. This dog ear in the alar groove creates asymmetry and a less aesthetic final result. If the rotation point is more cranial

Fig. 9. a, b Example of a medially based trilobed flap for a defect on the distal ala. This kind of flap was chosen because of redundant skin on the nose of the patient. **c** Flap sutured into the defect, respecting the nasal alar groove, which allows to keep this important landmark.



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Fig. 10. a, b Patient with a defect on the distal nasal tip and reconstruction with a laterally based bilobed flap. **c** Result after 1 year; note convexity of the first lobe and standing cone. **d** If you projected this first lobe 5 mm more laterally to the right side (A) – as for a defect of the distal ala – you would fill out the nasal sulcus and create asymmetry.

and lateral the pincushioning of the flap washes out the alar groove. The concave alar groove cannot be easily recreated in this particular situation as there is excessive protruding fibrotic tissue which has no elasticity and no fat. Additionally you do not only have to flatten down a simple dog ear but you even have to create a concave shape. The experienced surgeon knows that in some situations with thin or soft skin the dog ear can be inverted to create a crease or concave surface. This is unfortunately only rarely possible on the lateral nose. This point is clearly visible for example in the review of Albertini and Hansen [3] where 2 out of 5 illustrated cases show a filled out or protruded alar sulcus and in consequence loss of symmetry which could be prevented with a medially based flap. In 2 out of 5 cases the result would have been symmetric with a concave nasal sulcus if the flap had been based medially. This observation is confirmed with their 5th case where a medially based flap was chosen which allowed to create a concave nasal sulcus and complete symmetry [3].

The advantage of a trilobed flap lies in its minimal rotational movement which allows defect repair with redundant skin as in the case of rhinophyma or scar tissue (fig. 7, 9) [1, 11].

The bi- and trilobed flap has a special place in the reconstruction of the nose. In accordance with Cook, Zitelli and others, we think that the bi- and trilobed flaps have a very definite specific application in defects on the lateral tip of the nose depending on skin laxity (fig. 9) [1, 2, 4]. In contrast to some of these authors and to recent publications [1–3], I am convinced that more of these flaps should be based medially particularly if the defect is on the lateral tip or the ala. The principle is clearly shown in figure 10 where a patient underwent reconstruction for a defect on the distal tip of the nose with a laterally based bilobed flap which is convenient and aesthetically correct. If you transferred the defect 4 mm to the right so that it corresponds to an alar-lateral tip defect and in consequence transferred the reconstruction by same distance, you would realize that the

concave nasal sulcus is filled out with the convexity of the first lobe and the standing cone, wherefore this approach should not be used.

Concerning complications the medially based bi- or trilobed flap shows the same risks as the laterally based flap. If the second flap is designed correctly, there is no risk of ala retraction. But as much as the laterally based flap, nearly 70% of the cases show trapdooring and 50% out of these would need 1 or 2 injections of 0.1 ml Kenalog A40 at 6-week intervals to correct it. This is probably due to the fact that the distal ala is very thin and shows only slight convexity in some patients so that one third of all patients need corticosteroid injections. None of these patients need surgical correction. I have to outline that I am only slightly undermining the tissue surrounding the defect because I am not convinced that this will prevent trapdooring. Secondly the standing cone of the first lobe is on the tip, sometimes on the supratip of the nose. This can produce slight asymmetry as in figure 5, but as this standing cone proj-

ects into the convexity of the tip or supratip, surgical correction is very rarely needed (less than 5%).

There are at least 3 reasons to do so: (1) It allows to maintain the concavity of the distal part of the nasal groove and avoids to fill it up as shown in different publications [1–3]. (2) Using a medially based bi- or trilobed flap allows to match the last incision of the flap on the border of the anatomical subunits between nasal dorsum and nasal sidewall and one incision in the nasal groove which respects the recommendation of scars and anatomical subunits (fig. 2, 3); this allows us to avoid all incision lines on the most visible part of the nose which means the dorsum of the nose. (3) The final scar of the secondary defect is as vertical as possible in this situation and

meets the arguments of Zoumalan et al. [12] to horizontalize the pull and avoid any distortion of the alar rim. (4) The pedicle is located on the supratip of the nose and creates therefore a slight convexity which corresponds in most cases to the natural anatomical form of the supratip of the nose (fig. 1), as we have published this already in a previous article for the birhombic flap [13]. Still it is true that in some cases the standing cone can be too pronounced which will need eventually secondary correction. We think that for small to medium defects between the lateral tip and distal ala the bi- or trilobed flap can and should mostly be pediculated medially without any risk of ischemic complication and with a better aesthetic outcome than the laterally placed flaps.

Conclusion

The place of the bi- and trilobed flap in the reconstruction of the distal ala of the nose is undisputed. The medially based bi- and trilobed flap for small- to medium-sized defects of the lateral tip and distal ala may be more adequate with regard to symmetry and aesthetic outcome. This kind of reconstruction is probably better adapted to the concept of anatomical subunits and preservation of concavity and convexity compared to laterally based flaps in this localization.

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