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Case Series

Narrow base pedicle, wide flap for facial reconstruction-a retrospective analysis of clinical outcomes in 20 patients

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ABSTRACT

The aim of facial reconstruction is to restore structural integrity or function after trauma, tumor resection, or congenital defects. the use of narrow base pedicle and wide flap has become increasingly popular, as such flaps offer greater vascularity, flexibility, and the ability to fill complex defects. Our study was conducted in Sawai Man Singh medical college Jaipur, Rajasthan (India) 302004 from January 2024-December2024 includes 20 patients who underwent surgery-narrow base pedicle, wide flap for facial reconstruction. 9 cases of nasal defects, 9 cases of forehead defect, 1 case of cheek defect,1 Case of ectropion eye. In nasal defects coverage, 1 case showed congestion in early post operative period. In forehead defects coverage , 1 patient showed partial necrosis because of tension in sutures and 1 showed congestion in post operative period In all other 17 patients , the procedure produced good aesthetically satisfactory results and no complications were observed during follow up period . Narrow base with well suitable pedicle artery is available in all facial parts, so we can skeletonize the vascular pedicle to smaller size. In addition, pliable skin with minimal fat layer and ease of rotation to any direction (180 degree) allows reliable and aesthetically favourable options for reconstruction of various facial defects.

Keywords: Narrow base pedicle, Wide flap, Facial reconstruction

INTRODUCTION

The aim of facial reconstruction is to restore structural integrity or function after trauma, tumor resection, or congenital defects. Reconstructive surgery employs numerous techniques, and the use of flaps with narrow bases and wide flap has become increasingly popular, as such flaps offer greater vascularity, flexibility, and the ability to fill complex defects. Adipose flaps depend on these features to ensure sufficient perfusion as they have stable pedicles that allow for easier handling and optimization of tissue viability while keeping complications such as ischemia or necrosis at bay.[1] It is called to a narrow based, wide flap because the donor site has a narrow attachment which may be around the base of the flap while there is a large vascularized part to allow a wide range of coverage. These flap designs are advantageous in regions where dynamic and larger area coverage is important. The type of flap selected is based on various parameters including the location of the defect, the composition of the defect and the presence of local or regional donor sites.[2]

Principles and applications

Facial reconstruction is crucial in cases that result in soft tissue defects caused by trauma, oncologic resections, infections, or congenital conditions. The narrow base pedicle, wide flap is one of the workhorse procedures of reconstructive surgery, providing robust vascularity, broad coverage, and low donor-site morbidity. This configuration allows for optimal perfusion while providing adequate mobility to allow for repositioning of the tissue over complex defects.

Anatomical and biomechanical considerations

The narrow-base, wide-pedicle flap has a large vascular supply with tapering at the base near donor site. This design offers the following advantages.

Improved perfusion

The large pedicle provides an abundant blood supply, minimizing the chances of ischemia and necrosis.[3]

Enhanced mobility

The narrow base confers greater pivoting potential, advantageous for coverage of deep facial defects.

Tension redistribution

Such flaps relieve tension over suture lines, thereby limiting complications.[2]

Advantages

Better vascularity than random-pattern flaps. Increased range of motion and rotation arc. Decreased donor-site morbidity when properly designed

Limitations

Original technical more challenging dissection and flap elevation. Possible bulkiness in areas that need exquisite reconstruction. Same texture of skin and thickness and pliability of tissue

CASE SERIES

Study was conducted in 2024 in SMS Medical college Jaipur. Between January 2024-December 2024 20 patients underwent surgery-narrow base pedicle, wide flap for facial reconstruction to minimize donor site distortion, minimal functional disruption, for better contouring to improve cosmetic outcomes.

Figure 1: A questionnaire of patients' aesthetic satisfaction (Likert scale).

Figure 2: Case 1-Post traumatic nasal defect-superiorly based nasolabial flap based on fascial artery perforator (tunnelled) (A) preoperative, (B) intraoperative and (C) postoperative.

Figure 3: Case 2-Post traumatic forehead defect-forehead flap coverage done based on supratrochlear artery. (A) Preoperative, (B) postoperative.

Figure 4: Case 3-BCC nose -paramedian flap coverage done based on supratrochlear artery. (A) Preoperative, (B) postoperative.

Figure 5: Case 4-Post traumatic nose defect-coverage by paramedian flap. (A) Preoperative, (B) postoperative.

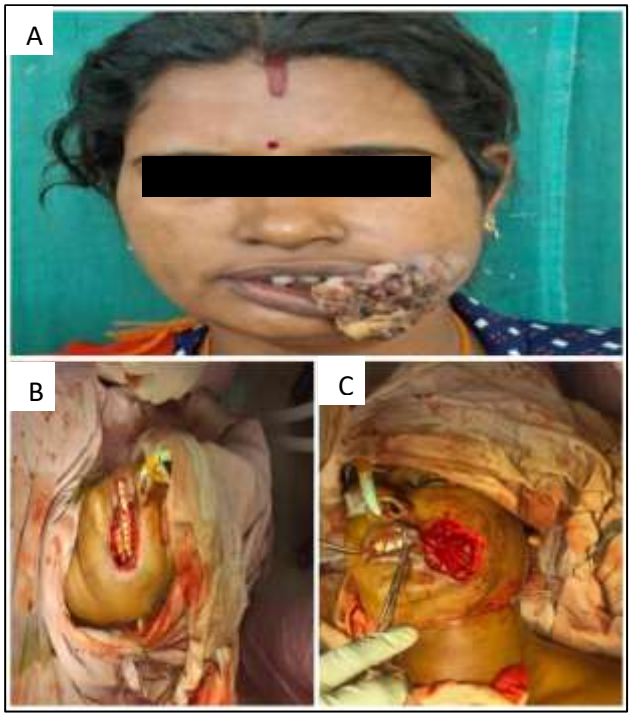

Figure 6: Case 5-Pseudo epithelioma cheek: coverage by submental flap based on submental artery. (A) Preoperative, (B and C) intraoperative.

Figure 7: Case 6-Right paramedian flap coverage for ectropion right upper eyelid. (A) Preoperative, (B) postoperative.

For this retrospective data was obtained from patient demographics, defect location, flap size, complications, donor site morbidity, revision surgery, patients anaesthetic satisfaction based on likert scale which is used to compare attitudes across different populations or demographics.

Flap design and harvesting

Flap outline and marking

The surgeon outlines the flap on the donor area, emphasizing a narrow base that tapers toward the site of rotation while ensuring the pedicle remains wide enough to incorporate the dominant vascular network. Illustrations in surgical texts (e.g., schematic diagrams or intraoperative photos) often show the contrast between the narrow base and wide flap, aiding in conceptual clarity.[2]

Incision and dissection

A careful incision is made along the pre-marked boundaries. Step-by-step diagrams can illustrate how to separate the flap from the underlying fascia, showing key landmarks such as muscle borders and vascular structures.[4]

Table 1: Age distribution of patients.

Patient characteristics	Results	%
Mean age	42±15.88	
Sex		
Female	11	55
Male	9	45
Location (defects)		
Nose	9	45
Forehead	9	45
Cheek	1	5
Eye	1	5

Continued.

Patient characteristics	Results	%
Complications		
Congestion	2	10
Partial necrosis	1	5
Donor site morbidity none		
Patient anaesthetic satisfaction (likert scale)		
Very satisfied	16	80
Satisfied	3	15
Not satisfied	1	5
Revision surgery	none	

DISCUSSION

A narrow-base pedicle, wide flap is designed to allow for maximal vascularity via a wide base because of well contained vascular caliber (small and good flow) and rotation does not allow kinking because of narrow pivot point to enable the flap to be moved and rotated with precision. This technique reduces the risk of distal ischemia and necrosis, a frequent consequence of nasal reconstruction, from the retention of an abundant perforator system that preserves flap viability.[5] The careful planning of the dimensions of the flap is important to optimize the blood supply and the reach required to cover the defect. Even the perforator-based flap can be used in face from fascial and nasolabial artery. one of the main advantages of this approach is the increased vascular supply as a result of the preservation of the supratrochlear artery. The small base minimizes donor site morbidity and encourages flexibility, and the wide pedicle provides calibrated blood supply to the flap, thereby lowering the risk of necrosis.[6] This configuration also helps contour and achieve a natural aesthetic by reducing the bulkiness while keeping a structural integrity.[7] Advancements in surgical technique have led to aggressive thinning of the forehead flap. By preserving the subcutaneous vascular plexus, surgeons can create a flap that better conforms to the nasal contours, resulting in improved cosmetic outcomes.[8]

The balance between adequate vascularity and reduced tissue bulk is essential for a successful reconstruction.[5] In cases involving deep defects, the inclusion of a supporting structural graft, such as cartilage or dermal substitutes, may enhance both functional and aesthetic outcomes. Forehead reconstruction with a PMFF is traditionally conducted in two stages, with a second-stage pedicle division and contouring after three weeks. However, single-stage procedures are increasingly being explored by deepithelializing the pedicle and tunneling it beneath the forehead tissue.[9] This technique minimizes the number of procedures and enhances patient recovery, although careful patient selection is required to ensure vascular integrity. A single-stage approach is particularly beneficial for elderly patients or those with comorbidities that may complicate multiple surgical interventions. As in our study single stage approach is preferred for reconstruction of defect over cheek by submental flap.

Despite its advantages, the narrow-base, wide-pedicle flap requires precise planning to avoid excessive tension at the pedicle, which can compromise perfusion. Additionally, ensuring symmetry between reconstructed forehead subunits necessitates meticulous planning, dissection, shaping and incision placement.[10]

CONCLUSION

Narrow base with well suitable pedicle artery is available in all facial parts, so we can skeletonize the vascular pedicle to smaller size. In addition, pliable skin with minimal fat layer and ease of rotation to any direction (180 degree) allows reliable and aesthetically favourable options for reconstruction of various facial defects.

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