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APPLICATION OF THE EXTERNAL-PEDICLED AND INFERIOR-PEDICLED CHEEK ROTATION FLAPS IN THE RECONSTRUCTION OF SKIN DEFECTS AT THE MEDIAL AND LATERAL CANTHI OF THE LOWER EYELID

Ngo Duc Hiep, Luong Nguyen Tan Luc
Cho Ray Hospital

ABSTRACT

Objective: *To evaluate the effectiveness of the lateral-pedicled cheek rotation flap and the inferior-pedicled cheek rotation flap in reconstructing skin defects of the lower eyelid, particularly at the medial and lateral canthal regions - areas that present significant reconstructive and aesthetic challenges.*

Subjectsand methods: *A case series of patients with lower-eyelid skin defects following tumor excision, trauma, or burn injury. Defects ranged from 1-3 cm and involved the medial or lateral canthus without full-thickness eyelid loss. Reconstruction was performed using either a lateral-pedicled cheek rotation flap based on branches of the facial artery or an inferior-pedicled cheek rotation flap based on the angular arterial system. Outcomes assessed included flap survival, eyelid position, contour, complications, and aesthetic satisfaction over a 1-3-month follow-up.*

Results: *All flaps survived completely with good color and thickness match to the lower-eyelid region. No cases of ectropion, lid retraction, or flap necrosis occurred. Scars were well concealed within natural facial creases. Functional and aesthetic outcomes were rated as good to excellent in all patients.*

Conclusion: *Lateral- and inferior-pedicled cheek rotation flaps provide a reliable, simple, and aesthetically favorable option for reconstructing lower-eyelid skin defects involving both the medial and lateral canthi. Their robust vascularity, tissue match, and minimal risk of eyelid distortion make them an effective method for periocular reconstruction.*

Keywords: *Lateral-pedicled rotation flap, Inferior-pedicled rotation flap, Lower eyelid defect.*

[1] Chịu trách nhiệm: Ngô Đức Hiệp, Bệnh viện Chợ Rẫy
Email: hiepngoduc1908@gmail.com
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1. INTRODUCTION

The lower eyelid and the medial-lateral canthal regions have delicate anatomical structures with high functional and aesthetic demands. Skin defects in this area (due to skin tumors, trauma, burns, or necrotic debridement) can easily lead to deformities such as:

- **Ectropion,**
- **Cicatricial retraction,**
- **Disruption of the eyelid margin,**
- **Impaired eyelid closure.**

Reconstruction of lower eyelid skin defects requires flaps with appropriate thickness, color match, and favorable vector of tension. Cheek flaps-particularly the external-pedicled and inferior-pedicled rotation flaps-provide several advantages:• Skin texture similar to the eyelid,

• Rich blood supply from the facial artery and angular artery,

• Versatile flap design suitable for both medial and lateral canthal defects,

• Donor-site scars concealed along the nasolabial fold or lower cheek crease.

This study presents the application of these two flap designs in reconstructing lower eyelid defects at the two most challenging locations: the lateral and medial canthi.

2. PATIENTS AND METHODS

2.1. Patients

- Patients presenting with lower eyelid or medial/lateral canthal skin defects following:

- Excision of skin tumors, Trauma, Burns or necrotic tissue debridement.

- Defect size: 2 - 5 cm, extending to subcutaneous tissue but without tarsal plate exposure.

2.2. Methods

• **Study design:** Case series.

• **Reconstructive techniques:**

1. **External-pedicled cheek rotation flap** (harvested along the nasolabial fold, superior-lateral pedicle).

2. **Inferior-pedicled cheek rotation flap** (inferior-medial pedicle, rotated upward to the defect).

• **Surgical steps:**

- Preoperative marking:

+ Tumor/defect excision with safety margins and intraoperative frozen-section biopsy.

+ Flap design following natural tension lines of the cheek.

+ Flap elevation down to the SMAS layer.

+ Rotation and anchoring sutures to prevent ectropion,

+ Donor-site closure.

- Postoperative monitoring: Flap perfusion, marginal necrosis, cicatricial contraction, and lower eyelid malposition.

3. SURGICAL TECHNIQUES

3.1. External-pedicled cheek rotation flap

Indication: Lower eyelid and lateral canthal defects.

Vascular supply: Perforators of the facial artery and infraorbital artery.

Characteristics:

• Triangular or semilunar flap oriented along the nasolabial fold.

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• Well suited for lateral canthal coverage,

• Donor-site scar concealed along the nasolabial crease.

Key steps:

- Marking along the nasolabial fold,

Skin incision and elevation of the flap at the SMAS level,

Rotation of 45^0 - 90^0,

Anchoring the flap to the periosteum of the lateral orbital rim to prevent eyelid traction,

Insetting and layered closure.

3.2. Inferior-pedicled cheek rotation flap

Indication: Lower eyelid and medial canthal defects.

Vascular supply: Angular branch of the facial artery (upper lateral nasal region).

Characteristics:

• Upward and medial rotation,

• Ideal for the narrow, thin-skinned medial canthal area,

• Minimal tension transmitted to the lower eyelid.

Key steps:

1. Designing the flap 1-2 mm below the defect,

2. Low cheek incision to conceal the scar,

3. SMAS-level elevation, preserving the inferior-medial pedicle,

4. Rotation of 60-120^0 toward the medial canthus,

5. Anchoring the flap to the periosteum of the medial orbital rim.

4. RESULTS

Parameter	Case 1	Case 2
Defect location	Lower eyelid - lateral canthus	Lower eyelid - medial canthus
Defect size	2 × 3 cm	2.5 × 4 cm
Flap used	External-pedicled rotation flap	Inferior-pedicled rotation flap
Flap survival	100%	100%
Complications	None	None
Eyelid deformity	None	None
Patient satisfaction	Good	Good

All flaps survived completely with good color match to the lower eyelid skin. No cases of ectropion or cicatricial contraction were observed. Donor-site scars were well hidden within natural facial creases.

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Figure 1: Preoperative, intraoperative, and postoperative photographs of a patient undergoing excision of basal cell carcinoma of the lower eyelid.

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Figure 2: Preoperative, intraoperative, and postoperative views of a patient with medial lower eyelid skin cancer.

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5. DISCUSSION

• Cheek skin provides the closest match to lower eyelid skin in terms of color, thickness, and elasticity.

• Rotation flap design minimizes direct vertical tension on the eyelid, decreasing the risk of ectropion.

• The facial and angular arteries ensure robust vascularity, allowing safe rotation even over large arcs.

Comparison with alternative methods:

• Split-thickness skin grafts: High risk of retraction and ectropion.

• Mustardé flap: Suitable for large defects but leaves long scars and requires greater expertise.

• Tenzel flap: Effective for lateral canthal defects but less reliable for medial canthal coverage.

• Cheek rotation flaps (external or inferior pedicle): Simple, fast, low complication rate, effective for both medial and lateral defects.

Strengths of this case series:

• Short operative time (30-60 minutes),

• Optimal aesthetic outcomes with concealed scars,

• No direct manipulation of eyelid support structures (tarsus, canthal tendons), reducing the risk of postoperative malposition.

6. CONCLUSION

External-pedicled and inferior-pedicled cheek rotation flaps are reliable, safe, and aesthetically favorable techniques for reconstructing lower eyelid skin defects involving both the medial and lateral canthi. These flaps are straightforward to perform and well suited for moderate-sized defects, particularly in cases where postoperative eyelid deformity must be minimized.

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