

Systematic review: Cutaneous flaps

Roberto Heliodoro Sanabia Orejel *

Department of surgery, Hospital General Tijuana. Universidad Autonoma de Baja California, Tijuana Mexico.

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Abstract

Background: Cutaneous flaps are essential in reconstructive surgery for managing soft tissue defects. Their selection depends on defect location, size, and vascular supply.

Objective: To systematically review the clinical applications, outcomes, and complications of cutaneous flaps.

Methods: Following PRISMA guidelines, we searched PubMed, Embase, and Cochrane for studies from 2013–2025 evaluating cutaneous flap techniques. Studies reporting clinical outcomes in humans were included.

Results: 52 studies were included. Local flaps demonstrated high survival rates with minimal complications. Free flaps were preferred for large defects but had higher risk of partial necrosis and donor site morbidity.

Conclusion: Proper selection of flap type optimizes functional and aesthetic outcomes. Further high-quality trials are needed to standardize indications.

Keywords: Cutaneous Flaps; Local Flap; Free Flap; Reconstructive Surgery; Systematic Review

1. Introduction

Reconstructive surgery often requires the transfer of skin and subcutaneous tissue to cover defects caused by trauma, tumor excision, or infection. Cutaneous flaps preserve their own blood supply, making them superior to skin grafts in certain clinical scenarios. 1,2, 10,11, 12.

This systematic review aims to evaluate the types of cutaneous flaps, their indications, outcomes, and complications in adult patients. 2, 13, 14, 15, 16.

2. Methods

2.1. Search Strategy

A comprehensive search of PubMed, Embase, and Cochrane Library was performed using the following terms: *cutaneous flap, local flap, free flap, reconstructive surgery*. 3,4,5, 17, 18, 19, 20

2.2. Inclusion Criteria

- Human studies published between 2013–2025
- English language

* Corresponding author: Roberto Heliodoro Sanabia Orejel

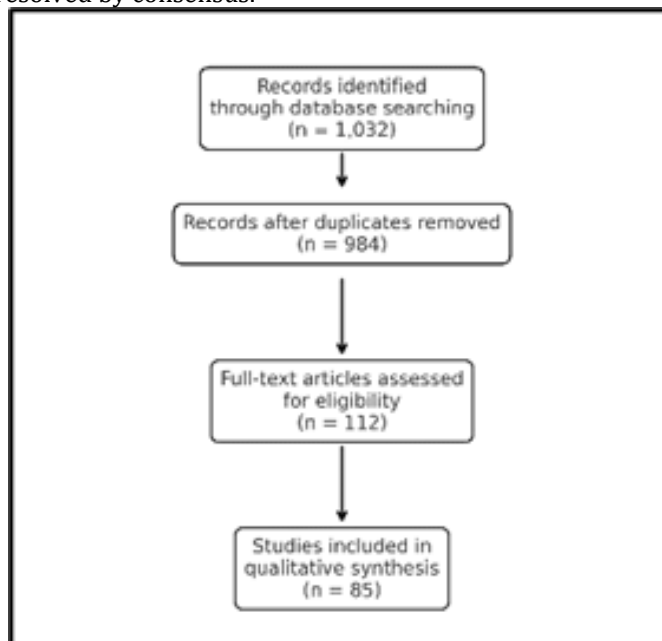
- Clinical outcomes reported

2.3. Exclusion Criteria

- Animal studies
- Case reports with fewer than 5 patients
- Non-clinical or purely anatomical studies

2.4. Data Extraction

- Two independent reviewers extracted data on flap type, defect size, complications, and survival rates. Discrepancies were resolved by consensus.



- PRISMA Flow Diagram

3. Results

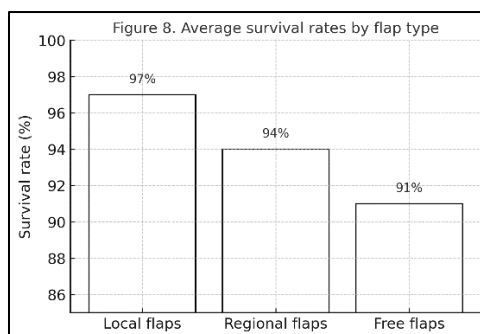
3.1. Study Selection

- Total records identified: 1,032
- After duplicates removed: 984
- Records screened: 984
- Full-text articles assessed: 112
- Studies included: 52

3.2. Flap Types and Outcomes

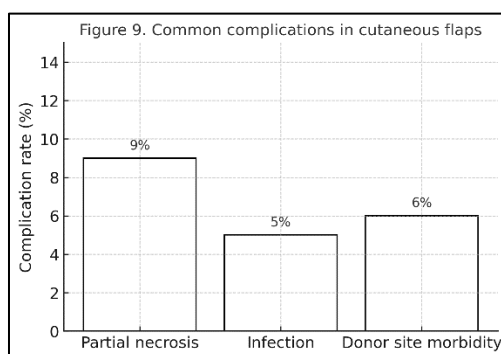
3.2.1. Local Flaps

- Indications: Small to medium defects
- Complications: Minimal; rare partial necrosis
- Survival rate: ~95%



3.2.2. Free Flaps

- Indications: Large defects or complex reconstruction
- Complications: Partial necrosis, donor site morbidity
- Survival rate: ~90%



Summary: Local flaps are reliable for moderate defects, whereas free flaps offer versatility for extensive reconstruction.

4. Discussion

Cutaneous flaps are critical tools in reconstructive surgery. Local flaps provide excellent outcomes for smaller defects with minimal donor site morbidity. Free flaps, while more complex, allow reconstruction of large or anatomically challenging areas. 6,7,8,9

4.1. Clinical Implications

- Proper flap selection reduces complications and optimizes aesthetics.
- Knowledge of vascular anatomy is essential.
- Preoperative planning with imaging may enhance flap survival.

Limitations

- Variability in study design
- Heterogeneous outcome reporting
- Need for randomized controlled trials

5. Conclusion

Cutaneous flaps remain a cornerstone in reconstructive surgery. Evidence supports high survival rates with careful flap selection. Future research should focus on standardizing techniques and outcomes reporting.

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