

Superthin Free Flaps in Obese Patients Undergoing Lower Extremity Reconstruction: Maximizing Function While Minimizing Morbidity

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Abstract

Obesity is a growing public health challenge, with nearly half of patients requiring lower extremity reconstruction presenting with elevated body mass index (BMI). Although obesity is associated with higher wound complication risk, free tissue transfer remains essential for limb salvage in this population.¹⁻³ We reviewed 202 patients undergoing free flap reconstruction and compared thin versus conventional flaps. Thin flaps were associated with fewer complications, markedly lower debulking rates, earlier ambulation, and excellent limb salvage. Superthin flaps may offer a functional advantage by optimizing recovery while minimizing morbidity in obese patients undergoing limb salvage.

Introduction

Conventional muscle and fasciocutaneous flaps are the mainstay of lower extremity reconstruction, but are often limited by excess bulk:

- Impaired contour and shoe fit
- Restricted ambulation and delayed recovery
- Secondary debulking required in up to 50% of patients
- Multiple staged procedures may be needed to optimize function^{4,5}

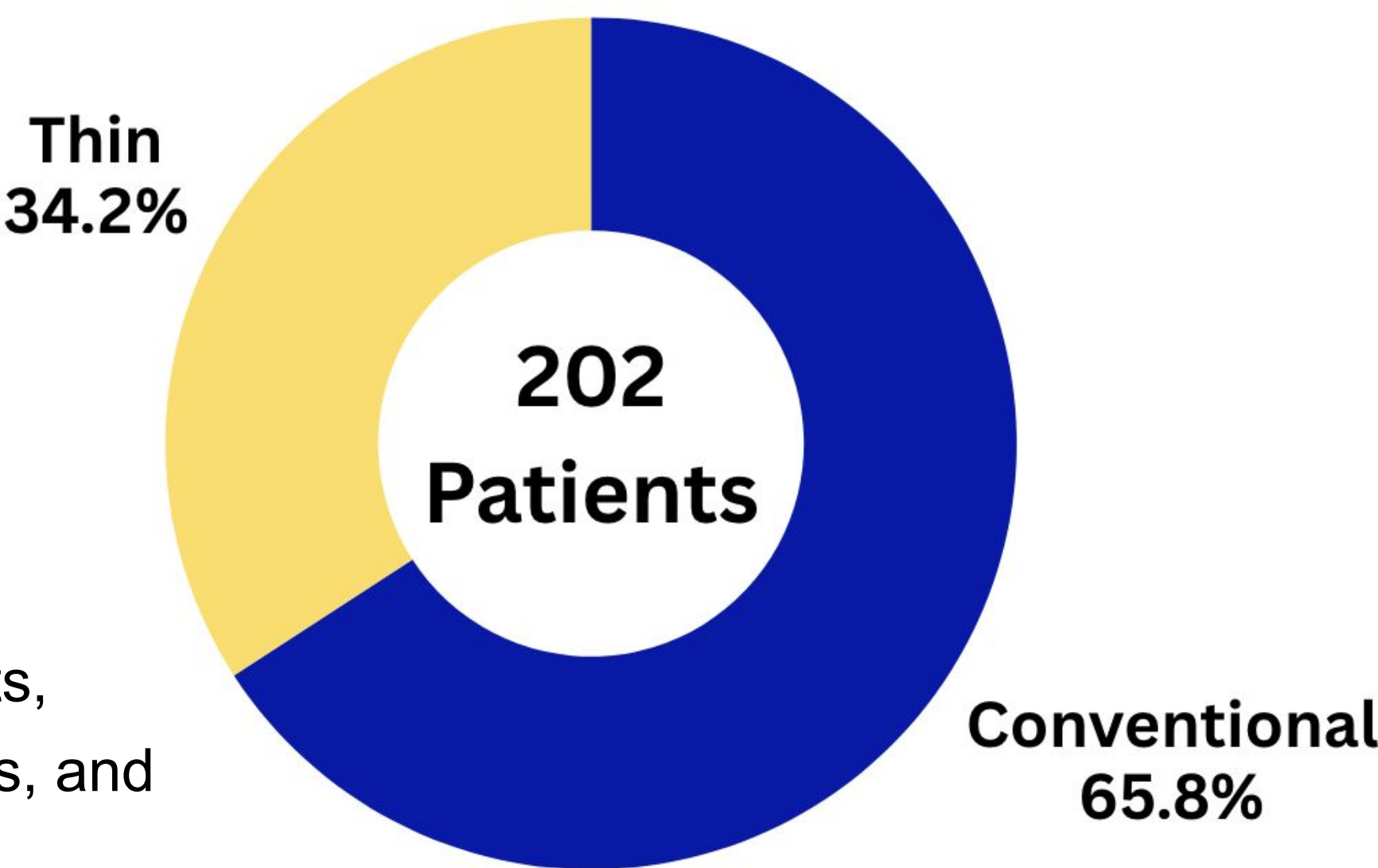
Superthin free flaps offer thin, pliable tissue better matched to lower extremity anatomy and functional demands.^{6,7}

Despite these theoretical advantages, their role in predominantly high-BMI populations remains poorly defined. We therefore compared outcomes of thin versus conventional flaps in obese patients undergoing lower extremity reconstruction, focusing on complications, debulking, and functional recovery.

Methods

Single-institution retrospective review of lower extremity free flaps:

- January 2020- January 2025
- 69 thin flaps vs. 133 conventional flaps
- Mean BMI: 30.0 kg/m²
- Mixed etiologies (trauma/orthopedic defects, diabetes-related wounds, oncologic defects, and prior reconstructive failure)



Results

Groups were similar at baseline (age, sex, BMI, CCI, ADI; all $p>0.05$).

	Thin Flaps (n=69)	Conventional Flaps (n=133)	p-value
Age, years	46.2 ± 15.5	48.2 ± 15.9	0.40
Male sex, n (%)	47 (68.1)	94 (70.7)	0.83
BMI, kg/m ²	30.7 ± 6.6	29.6 ± 6.9	0.27
CCI	3.36 ± 3.2	3.47 ± 3.5	0.82
ADI decile	6.26 ± 2.74	5.86 ± 2.56	0.31

Table 1. Baseline patient characteristics by reconstructive cohort.

Comparison of demographic, clinical, and socioeconomic variables between patients undergoing thin versus conventional free flap reconstruction for lower extremity defects. Groups were similar with respect to age, sex, body mass index (BMI), Charlson Comorbidity Index (CCI), and Area Deprivation Index (ADI). Values are presented as mean ± standard deviation or number (%). P-values reflect between-group comparisons.

Thin flaps demonstrated significantly improved postoperative outcomes:

- Lower postoperative morbidity
- Reduced need for secondary revision
- Improved limb salvage
- Earlier functional ambulation (3.3 months sooner)

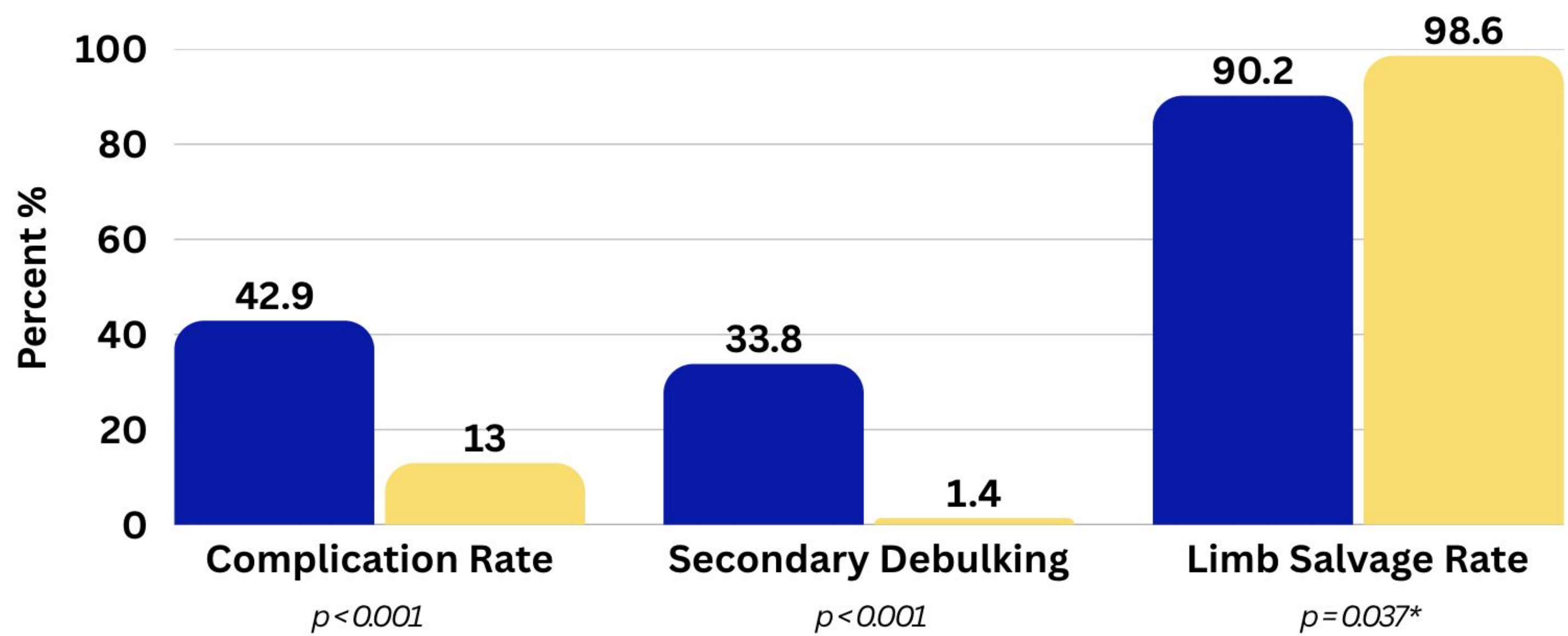


Figure 1. Comparative clinical outcomes following lower extremity free flap reconstruction.

(A) Postoperative complications, (B) secondary debulking, and (C) limb salvage in thin versus conventional flaps. Thin flaps were associated with fewer complications, fewer secondary procedures, and higher limb salvage. P-values are shown below each comparison. Categorical outcomes were compared using Pearson's chi-square or Fisher's exact test; * Fisher's exact test was used for limb salvage.

Limitations or next steps

- Retrospective single-institution study design may introduce selection bias and reflect institutional practice patterns.
- Flap selection was not randomized and may have been influenced by surgeon preference or defect complexity.
- Functional recovery is multifactorial and may be affected by comorbid injury and rehabilitation access.
- Prospective multicenter studies are warranted to validate external generalizability.
- Future analyses should incorporate patient-reported outcomes, long-term function, and health economic impact.

Conclusions

Superthin flaps may shift lower extremity reconstruction from simple wound coverage toward restoration of function.

By reducing flap bulk, they may lessen the need for secondary contouring and revision procedures.

Improved contour and earlier ambulation suggest meaningful benefits in postoperative recovery and return to mobility.

In obese patients undergoing limb salvage, superthin flaps represent a safe and effective reconstructive strategy with the potential to improve overall outcomes.

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Acknowledgements

The author is grateful to the MedStar Plastic Surgery clinical teams whose patient care made this study possible, and to the faculty, mentors, and research collaborators for their guidance, support, and contributions to this work.