

Down with the Bean Bag: A Multi-institutional Experience with Total Latissimus Muscle Free Flap Harvest in the Supine Position

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Summary: The latissimus muscle continues to be a head to toe workhorse in free tissue transfer for coverage of large defects. Traditional full muscle harvest is performed in the lateral decubitus position which is frequently suboptimal or requires position change based on the recipient site and laterality. We present a multi-institutional case series of full muscle flap harvest from the supine position for a range of defects in 32 patients. The relevant operative setup and technique are described. In our experience, supine harvest has become the preferred open harvest technique compared to lateral positioning for both optimal exposure of the pedicle and reduction in operating time. (*Plast Reconstr Surg Glob Open* 2023; 11:e4755; doi: [10.1097/GOX.00000000000004755](https://doi.org/10.1097/GOX.00000000000004755); Published online 13 January 2023.)

INTRODUCTION

For many reconstructive surgeons, the latissimus dorsi muscle is the go-to flap for coverage of large defects ranging from the scalp to the lower extremity.¹⁻³ Its anatomic consistency, size, reliability, and minimal donor site morbidity often make it among the first choices for a range of clinical scenarios and experience levels. The latissimus and subscapular system offer a tool chest in reconstruction with multiple variations including a full muscle or myocutaneous flap, split or muscle-sparing, thoracodorsal artery perforator (TDAP) fasciocutaneous, and chimeric variations with scapular bone or serratus muscle. For a muscle only flap, the latissimus can be harvested minimally invasively using the DaVinci robot, as the authors reported previously, or open.^{4,5} Traditionally, open latissimus flap harvest is taught in residency and performed in practice in the lateral decubitus position with the employment of a bean bag system for positioning.

Many defects are suboptimal for lateral positioning and necessitate a position change intraoperatively depending on the recipient site and laterality. The

authors report our experience and preference for the harvest of the latissimus muscle from the supine position. Supine harvest of the TDAP and muscle-sparing anterior border latissimus flaps has been described in prior work⁶⁻¹⁰; however, supine harvest of the total muscle has not been described. We report our multi-institutional experience with supine full muscle harvest. The authors feel this approach is significantly easier and faster compared to the lateral or prone positions. The access and exposure to the thoracodorsal pedicle is superior, and the need for position change is eliminated (Fig. 1).

TECHNIQUE

The patient is positioned with the ipsilateral arm prepped and positioned in standard 90-degree horizontal abduction with an arm board. Before induction/preparation, a thick foam/egg-crate pad is placed beneath the back, and a semicircular piece of the pad is cut out on the ipsilateral side from the midline spine to the edge of the table. This allows for additional working space under the patient extending to the midline. The ipsilateral arm is prepared and positioned across the chest to prepare the back to the midline spine (Fig. 2). The use of a small ipsilateral hip bump can be helpful in larger patients but is not routinely necessary. Flap harvest is then performed in a standard fashion with a longitudinal anterior border incision. The surgeon will

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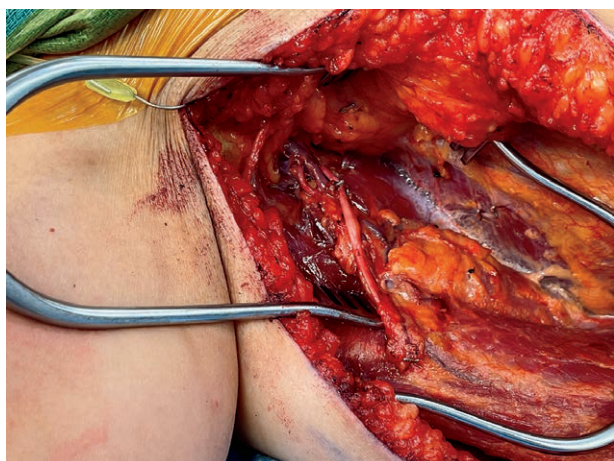


Fig. 1. Thoracodorsal pedicle exposure with visualization of the descending and transverse branches afforded by latissimus harvest in the supine position.

find the latissimus anterior border easily accessible from the supine position. The anterior border interdigitation with the serratus is more easily discernible in the supine position as the latissimus falls posteriorly with gravity as it is dissected, and as shoulder abduction while the serratus anterior remains tightly adherent to the chest wall. The complete superficial surface muscle dissection is performed first by utilizing the surgeon's nondominant hand to apply downward pressure on the overlying skin, posteriorly toward the table. The deep muscle dissection is then performed in a similar fashion by providing down pressure/counter-traction on the undersurface of the muscle away from the chest wall. With the arm resting at 90 degrees in horizontal abduction, the pedicle is easily identified on the undersurface. The exposure of the pedicle and subscapular system is optimal and provides a unique view of the intramuscular descending and transverse branches before and during any muscle transection. Pedicle dissection may then be completed safely and rapidly with complete visualization. Following the pedicle dissection, the muscle origin is transected off the iliac crest and transverse processes, whereas tension may be retained or divided at the tendinous insertion to the humerus. The authors prefer the use of a LigaSure (Medtronic, Minneapolis, Minn.) to provide hemostatic and expeditious muscle transection along the caudal

Takeaways

Question: Can the total latissimus muscle be harvested safely from the supine position for free tissue transfer?

Findings: Total latissimus muscle free flaps may be harvested easily from the supine position and offer numerous advantages over lateral decubitus harvest.

Meaning: We are taught to elevate the full muscle latissimus flap in lateral decubitus position with a bean bag, but harvest from the supine position may be easier, faster, and optimal for many defects.

and posterior medial borders. The dissection may be completed by transecting the tendinous insertion off the humerus, and total muscle harvest is achieved for large defects. (See Video [online], which demonstrates the simple positioning and technical considerations for harvest of the full latissimus muscle flap from the supine position.)

METHODS

Multi-institutional retrospective IRB approval was obtained from the University of Texas MD Anderson Cancer Center, Duke University, and Washington University. A retrospective review of all patients who underwent free latissimus muscle flap harvest in the supine position by the authors from 2020 to 2021 was performed. Patient demographics, indications, operative times, need for position change, clinical outcomes, and complications were recorded.

RESULTS

A total of 32 patients were identified with an average follow-up time of 187 days. All flaps were harvested in their entirety as free muscle flaps with no skin paddle. Patient demographics and harvest times are demonstrated in Table 1. No cases required positional change, and average time for flap harvest was 52 minutes for total muscle harvest to cover a mean defect size of 21.2×12.3cm. Defect etiology, recipient locations, and complications are summarized in Table 2. There was one total flap loss in a lower extremity limb salvage patient (3.1%), one partial distal flap necrosis (3.1%) requiring additional surgery, and three donor site seromas (9.3%).

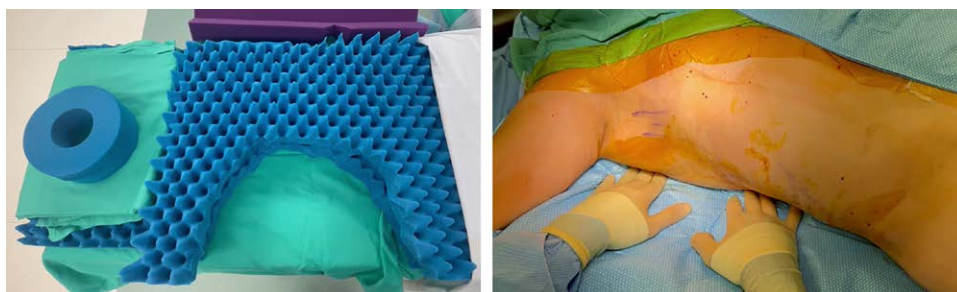


Fig. 2. Foam cut out allowing prep to midline spine in the supine position.

Table 1. Patient and Flap Characteristics (n = 32 Patients)

Flap Characteristics	Average ± (SD)
Harvest time, min	52 ± 15.8
Need for position change	0/32 (0%)
Average defect length, cm	21.2 ± 7.9
Average defect width, cm	12.3 ± 4.2
Patient Demographics	No. patients n (%)
Age, y	56.8 ± 21.7
Sex	26 M, 8 F
Body mass index	26.8 ± 8.3
Diabetes mellitus	17 (53.1%)
Hypertension	18 (56.2%)
Peripheral vascular disease	11 (34.4%)
Coronary artery disease	7 (21.9%)
Smoking history	14 (43.8%)
Prior radiation therapy	5 (15.5%)

Table 2. Recipient Etiology and Complications (n = 32 Patients)

Defect Etiology	No. Patients, n (%)
Oncologic (SCC/sarcoma)	12 (37.5)
Hardware infection (cranioplasty/TKA)	5 (15.6)
Chronic wound (DFU/PVD)	11 (34.4)
Trauma	4 (12.5)
Defect Location	No. Patients, n (%)
Scalp	12 (37.5)
Upper extremity	4 (12.5)
Lower extremity	14 (43.8)
Abdominal wall	2 (6.3)
Complication	No. Patients, n (%)
Total flap loss	1 (3.1)
Partial flap loss	1 (3.1)
Donor site seroma	3 (9.4)
Donor site hematoma	0 (0)
Donor site infection	0 (0)

DFU, diabetic foot ulcer; PVD, peripheral vascular disease; SCC, squamous cell carcinoma; TKA, total knee arthroplasty.

DISCUSSION

Supine harvest of the latissimus offers numerous advantages over lateral decubitus harvest and has become our preferred open harvest approach. Supine positioning is optimal for many defects and/or a two-team approach with referring surgeons. It also allows for harvest of either left or right muscle, irrespective of defect/recipient vessel location. In contrast, the lateral position with planned recipients to the left posterior tibial or right superficial temporal vessels necessitates use of the right latissimus muscle.

The current series includes muscle only free latissimus flap elevation; however, either muscle only or a thin, longitudinally oriented anterior skin island harvest may be performed in the supine position. When a larger island

is needed, the lateral decubitus position is generally preferred for oblique design and ease of closure.

Several authors have reported partial anterior border muscle-sparing flap harvest from the supine position as the optimal approach.^{6–9} We extend this indication and report safe and efficient harvest of the entire muscle for a wide range of indications in three teaching institutions. The exposure for pedicle dissection, ease of anterior border delineation from the serratus, and gravity-assisted countertraction when performing the superficial and deep muscle dissection is preferable to the lateral position in the author's collective experience.

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