Advancing DIEP flap surgery: robotic-assisted harvest reduces pain and narcotic use

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Introduction

- Breast cancer is the most common cancer among women, with 2.3 million diagnosed in 2022. [1]
- 80,000+ mastectomies are performed in the U.S. each year. [2]
- Breast reconstruction can reduce negative psychosexual effects of mastectomy. [3]
- **Deep inferior epigastric artery perforator (DIEP) flaps** offer ample tissue while preserving the rectus abdominis, reducing morbidity. [4]
- Robotic harvestation of the flap can improve recovery and cosmetic outcomes. [5]
- Interest in breast reconstruction research has increased, but there is little data on robotic breast reconstructions. [6]
- **Purpose:** to compare clinical outcomes of robotic DIEP flap breast reconstruction with traditional open methods

Methods

- **Robo-DIEP group:** 14 patients who underwent robotic DIEP flap breast reconstruction from 3/2024 - 3/2025
- **Control group:** previously published set of 40 patients who underwent abdominal based free flap breast reconstructions [7]
- **Outcomes measured:** pain scores (1-10), antiemetic and narcotics use from postoperative days 1-3
- **Statistical analysis:** two-sided Welch's t-test; statistical significance defined by p-value <0.05

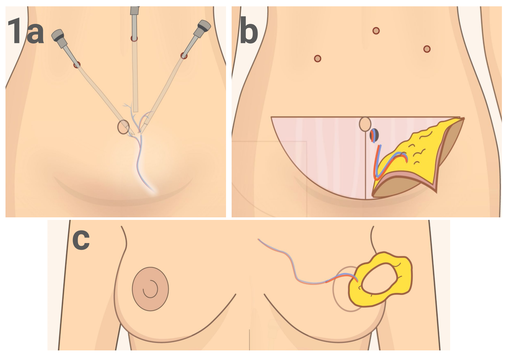
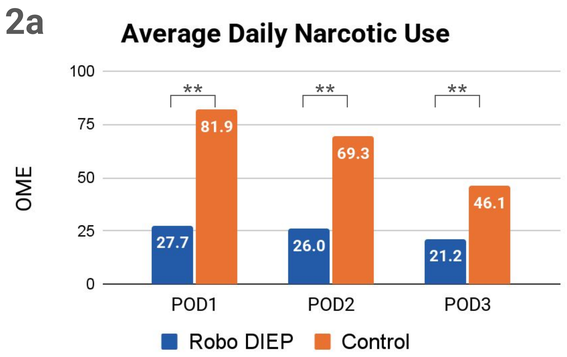
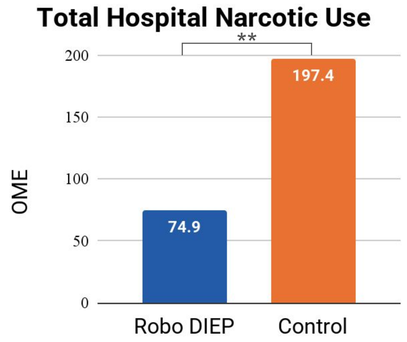


Figure 1a) Robotic dissection of vessels **b)** removal of DIEP flap (vessels, skin, adipose tissue) **c)** DIEP flap in breast

Results





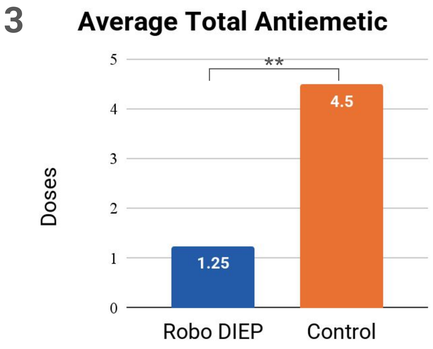


Figure 2. Narcotics usage was measured in oral morphine equivalents (OME) for postoperative days (POD) 1-3, **p<0.0001. **a)** Average daily narcotic usage between the Robo-DIEP group and the control. **b)** Average total narcotic use between the Robo-DIEP group and the control.

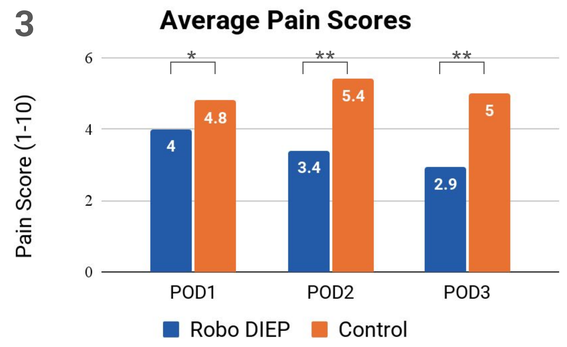


Figure 3. Pain scores were reported for POD 1-3 using a ten-point scale, with 10 being the most severe. Average daily pain scores of the Robo-DIEP group compared to the control, *p=0.0002, **p<0.0001

	Robo-DIEP (n=14)	Controls (n=40)
Procedure Details		
Bilateral Reconstruction	10	23
Unilateral Reconstruction	4	17
Procedure Timing		
Immediate	2	18
Delayed-immediate	10	0
Delayed	12	22
Reconstruction Method		
Robotic DIEP	14	-
DIEP	-	8
MS-TRAM	-	30
TRAM	-	2

Table 1. Patient procedure demographics and details for autologous breast reconstruction in the Robo-DIEP group versus controls. Controls consisted of non-robotic DIEP, muscle-sparing transverse rectus abdominis myocutaneous (MS-TRAM), and transverse rectus abdominis myocutaneous (TRAM) flaps.

Conclusions

- **This study has shown, through a small patient group, the benefits of robotic DIEP flap breast reconstruction over the traditional DIEP flap and other reconstructive methods: significantly lower narcotics use, antiemetic use, and pain scores during the first three days of recovery.**
- Further usage of this technique to a larger patient population will allow for better assessment of the robotic DIEP flap's benefits.

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