Comparison of Donor-Site Morbidity of SIEA, DIEP, and Muscle-Sparing TRAM Flaps for Breast Reconstruction

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Background: Breast reconstruction is best accomplished with lower abdominal tissue, but this results in abdominal donor-site morbidity. The superficial inferior epigastric artery (SIEA) flap is the least invasive method of lower abdominal flap breast reconstruction; however, there are no published data comparing the donor-site morbidity of SIEA flaps to that of transverse rectus abdominis myocutaneous (TRAM) or deep inferior epigastric artery perforator (DIEP) flaps.
Methods: The authors used a 12-question patient survey and retrospective chart review to compare donor-site function, pain, and aesthetics in 179 patients who had unilateral or bilateral breast reconstruction with 47 SIEA flaps, 49 DIEP flaps, and 136 muscle-sparing free TRAM flaps during a 5-year period.
Results: Unilateral SIEA flap patients scored higher on 10 of the 12 survey questions compared with unilateral muscle-sparing TRAM flap patients, including reporting significantly better postoperative lifting function ($p = 0.02$) and nearly significantly shorter duration of abdominal pain ($p = 0.06$). Bilateral reconstruction patients with at least one SIEA flap scored higher on all 12 survey questions, including reporting significantly better ability to get out of bed (sit-up motion) compared with patients with bilateral muscle-sparing TRAM or DIEP flaps ($p = 0.02$).
Conclusions: Breast reconstruction using SIEA flaps results in significantly less abdominal donor-site morbidity than DIEP flaps in bilateral cases and free muscle-sparing TRAM flaps in unilateral and bilateral cases. These are clinically relevant differences that are perceived by patients and lead to the authors' recommendation to use SIEA flaps for breast reconstruction when possible to minimize abdominal donor-site morbidity. (*Plast. Reconstr. Surg.* 122: 702, 2008.)

Methods of autologous tissue breast reconstruction have evolved in an effort to minimize donor-site morbidity. The transverse paddle of lower abdominal tissue remains unmatched in quality and quantity for breast reconstruction. However, harvest of this abdominal donor tissue can result in motor weakness, prolonged pain, functional disturbance, and formation of bulges or hernias.

Techniques used to harvest this transverse paddle of lower abdominal tissue include the pedicled transverse rectus abdominis myocutaneous (TRAM) flap,[1] the free TRAM flap,[2] the muscle-sparing free TRAM flap, the deep inferior epigastric artery perforator (DIEP) flap,[3,4] and the superficial inferior epigastric artery (SIEA) flap.[5–7] Each successive technique involves decreased excision and decreased incision of rectus abdominis muscle and fascia. The SIEA flap technique is the only one that involves neither incision nor excision of any rectus abdominis muscle or fascia. One would expect patients who undergo breast reconstruction using a SIEA flap to experience less donor-site morbidity than patients whose reconstructions use TRAM or DIEP flaps, but no published reports of which we are aware have explored this possibility.

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We therefore sought to determine whether SIEA flap reconstructions resulted in less donor-site morbidity than reconstructions using muscle-sparing free TRAM or DIEP flaps. We compared patients' perceptions of their abdominal donor site following unilateral and bilateral breast reconstruction with SIEA, DIEP, and muscle-sparing free TRAM flaps, and found that the SIEA flap patients have clinically significant decreased abdominal donor-site morbidity.

PATIENTS AND METHODS

We studied patients who had breast reconstruction using free SIEA flaps, free DIEP flaps, and free muscle-sparing TRAM flaps at the M. D. Anderson Cancer Center during the 5-year period from January 1, 1999, through December 31, 2003. All 41 patients who had had at least one SIEA flap breast reconstruction were included in the study. Although 10 different attending surgeons performed the reconstructions, the majority (26 patients, 66 percent) were performed by the senior author (P.M.C.). The 138 patients who had breast reconstruction using only free muscle-sparing TRAM and/or DIEP flaps were limited to those operated on by the two senior authors (D.W.C. and P.M.C.). This was done to minimize the possibility that different outcomes were attributable to variations in surgical technique of free muscle-sparing TRAM flap and DIEP flap harvest.[8] Flap selection was as previously described.[6–8] Eight patients who had died were excluded from the study.

The 179 patients included in the final study group were sent a survey consisting of 12 multiple-choice questions regarding abdominal donor-site aesthetics, pain, and function (Table 1). Patients who did not return the initial survey were mailed a second survey and then called by one of the junior authors (L.C.W. and A.K.B.) who then, if the patient was willing, obtained the responses to the questions over the telephone. The surveys were mailed a mean of 1.8 years (range, 6 weeks to 4.7 years) after the participants' breast reconstruction surgery.

Survey responses were converted to a graded score, with lower scores corresponding to more favorable outcomes. Responses to all questions were scored from 1 to 4 except for question 1, which was scored from 1 to 3, and question 7, which was scored as a 1 or 2. These graded scores were then weighted by multiplying each score by the percentage of respondents who responded with that grade. A single weighted score for each question was obtained by adding together the weighted graded scores for each possible response. Lower weighted scores indicated a more favorable clinical outcome.

A weighted score was calculated for responses to each question to obtain a single numerical value that summarized the responses to that question. The weighted scores were used to determine whether the responses of one study group were more or less clinically favorable compared with the responses of another study group. The statistical analysis, in contrast, was used to determine whether responses of one study group differed significantly from another study group but could not judge whether any such difference indicated a more or less favorable clinical outcome. Accordingly, the statistical analysis was performed using the raw number of times each response to a question was given and did not use the weighted scores.

The charts of all 179 patients were reviewed retrospectively, and demographic and treatment data were extracted. This study was approved by the institutional review board at the M. D. Anderson Cancer Center.

Standard descriptive statistics using the mean and SD were used to summarize continuous variables such as patient age. The Wilcoxon rank sum test was used to compare continuous or graded ordinal variables between reconstruction types. The chi-square test or Fisher's exact test where appropriate was used to compare categorical variables between patient groups. All tests were two-sided. Values of $p < 0.05$ were considered statistically significant.

RESULTS

Of the 179 patients sent surveys, 112 completed them, for a response rate of 63 percent. There was no statistically significant difference between patients who completed the survey (responders) and patients who did not complete the survey (nonresponders) with respect to length of time between surgery and survey mailing, body mass index, timing of breast reconstruction (immediate or delayed), flap type, smoking history, or laterality of the breast reconstruction (right side, left side, or bilateral) (Table 2). The mean age of the responders was 3 years older than the nonresponders ($p = 0.04$), but we judged this difference not to have clinical relevance.

Unilateral SIEA versus Unilateral Muscle-Sparing TRAM Flaps

There were 23 unilateral SIEA flap and 79 unilateral muscle-sparing TRAM flap breast re-

Table 1. Patient Responses by Survey Question and Weighted Score*

	Unilateral						Bilateral		
Questions and Response Choices	**SIEA (%)**	**Muscle-Sparing TRAM (%)**	***p* Value†**	**SIEA (%)**	**DIEP (%)**	***p* Value†**	**with SIEA (%)**	**without SIEA (%)**	***p* Value†**
1. Which best describes your lower abdominal contour?			0.63			0.91			0.26
(1) Firm and flat	11 (65)	29 (66)		11 (65)	9 (60)		10 (71)	11 (50)	
(2) Has a bulge on one side	0 (0)	7 (16)		0 (0)	1 (7)		2 (14)	6 (27)	
(3) Has a generalized bulge	6 (35)	8 (18)		6 (35)	5 (33)		2 (14)	5 (23)	
Weighted score	171	152‡		171‡	173		143‡	173	
2. How do you feel about your abdominal contour?			0.52			0.58			0.27
(1) Very satisfied	7 (41)	19 (43)		7 (41)	8 (53)		9 (64)	10 (45)	
(2) Satisfied	5 (29)	19 (43)		5 (29)	4 (27)		3 (21)	6 (27)	
(3) Acceptable	4 (24)	4 (9)		4 (24)	1 (7)		2 (14)	6 (27)	
(4) Not satisfied	1 (6)	2 (5)		1 (6)	2 (13)		0 (0)	0 (0)	
Weighted score	194	175‡		194	180‡		150‡	182	
3. Which best describes your abdominal pain after the surgery?			0.35			0.61			0.26
(1) No pain	4 (24)	5 (11)		4 (24)	1 (7)		2 (14)	3 (14)	
(2) Minimally painful	5 (29)	10 (23)		5 (29)	6 (40)		5 (36)	3 (14)	
(3) Painful but well tolerated	4 (24)	20 (45)		4 (24)	5 (33)		4 (29)	8 (36)	
(4) Very painful	4 (24)	9 (20)		4 (24)	3 (20)		3 (21)	8 (36)	
Weighted score	247‡	275		247‡	267		257‡	296	
4. How long did abdominal pain associated with your surgery last?			0.06‡			0.21			0.77
(1) Few days	9 (53)	12 (25)		9 (53)	4 (27)		4 (29)	9 (41)	
(2) Few weeks	5 (29)	20 (45)		5 (29)	9 (60)		8 (57)	5 (23)	
(3) Few months	3 (18)	10 (23)		3 (18)	1 (7)		2 (14)	7 (32)	
(4) Over a year	0 (0)	3 (7)		0 (0)	1 (7)		0 (0)	1 (5)	
Weighted score	165‡	211		165‡	194		186‡	200	
5. Which best describes your low back pain after surgery?			0.16			0.93			0.39
(1) No low back pain before or after surgery	11 (65)	24 (56)		11 (65)	10 (67)		11 (79)	13 (59)	
(2) Same low back pain before and after surgery	4 (24)	7 (26)		4 (24)	2 (13)		2 (14)	4 (18)	
(3) Low back pain before, and worse after surgery	1 (6)	11 (16)		1 (6)	2 (13)		1 (7)	5 (23)	
(4) Low back pain after, but not before surgery	1 (6)	1 (2)		1 (6)	1 (7)		0 (0)	0 (0)	
Weighted score	153‡	174		153‡	160		129‡	155	
6. Which of the following best describes your ability to lift, in comparison with your ability to lift prior to surgery?			0.02‡			0.88			0.09
(1) Improved	2 (12)	0 (0)		2 (12)	1 (7)		1 (7)	0 (0)	
(2) No difference	10 (59)	19 (43)		10 (59)	10 (67)		8 (57)	9 (41)	
(3) Somewhat less but acceptable	5 (29)	21 (48)		5 (29)	3 (20)		5 (36)	9 (41)	
(4) Significantly less	0 (0)	4 (9)		0 (0)	1 (7)		0 (0)	4 (18)	
Weighted score	218‡	266		218‡	227		228‡	277	
7. Have you returned to the same job as before surgery?			1.0			0.44			1.0
(1) Yes	10 (100)	23 (92)		10 (100)	7 (88)		6 (100)	14 (88)	
(2) No	0 (0)	2 (8)		0 (0)	1 (12)		0 (0)	2 (13)	
Weighted score	100‡	108		100‡	113		100‡	113	

Table 1. Continued

Questions and Response Choices	Unilateral						Bilateral		
	SIEA (%)	Muscle-Sparing TRAM (%)	*p* Value†	SIEA (%)	DIEP (%)	*p* Value†	with SIEA (%)	without SIEA (%)	*p* Value†
8. Which of the following best describes your ability to perform your job, in comparison with your ability prior to surgery?			0.19			0.26			0.13
(1) Improved	1 (10)	0 (0)		1 (10)	0 (0)		0 (0)	0 (0)	
(2) No difference	8 (80)	19 (76)		8 (80)	5 (71)		6 (100)	9 (64)	
(3) Somewhat less but acceptable	1 (10)	5 (20)		1 (10)	1 (14)		0 (0)	3 (21)	
(4) Significantly less	0 (0)	1 (4)		0 (0)	1 (14)		0 (0)	2 (14)	
Weighted score	200‡	228		200‡	243		200‡	250	
9. Which of the following best describes your ability to perform housework, in comparison with your ability prior to surgery?			0.96			0.66			0.31
(1) Improved	0 (0)	0 (0)		0 (0)	0 (0)		0 (0)	0 (0)	
(2) No difference	12 (71)	31 (70)		12 (71)	12 (80)		12 (86)	15 (68)	
(3) Somewhat less but acceptable	5 (29)	12 (27)		5 (29)	2 (13)		1 (7)	6 (27)	
(4) Significantly less	0 (0)	1 (2)		0 (0)	1 (7)		1 (7)	1 (5)	
Weighted score	229‡	232		229	227‡		221‡	241	
10. Which of the following best describes your ability to participate in sporting activities, in comparison with your ability prior to surgery?			0.30			0.30			0.28
(1) Improved	1 (6)	0 (0)		1 (6)	2 (13)		0 (0)	0 (0)	
(2) No difference	11 (65)	27 (61)		11 (65)	11 (73)		10 (71)	11 (52)	
(3) Somewhat less but acceptable	5 (29)	14 (32)		5 (29)	1 (7)		3 (21)	7 (33)	
(4) Significantly less	0 (0)	3 (7)		0 (0)	1 (7)		1 (7)	3 (14)	
Weighted score	224‡	245		224	207‡		235‡	262	
11. Which of the following best describes your ability to participate in your favorite activities, in comparison with your ability prior to surgery?			0.57			0.91			0.37
(1) Improved	2 (12)	1 (2)		2 (12)	1 (7)		1 (7)	0 (0)	
(2) No difference	11 (65)	33 (75)		11 (65)	11 (73)		11 (79)	17 (77)	
(3) Somewhat less but acceptable	4 (24)	8 (18)		4 (24)	2 (13)		1 (7)	3 (14)	
(4) Significantly less	0 (0)	2 (5)		0 (0)	1 (7)		1 (7)	2 (9)	
Weighted score	212‡	225		212‡	220		214‡	232	
12. Which of the following best describes your ability to get out of bed in comparison with your ability prior to surgery?			0.14			0.49			0.02‡
(1) Absolutely no difficulty	3 (18)	0 (0)		3 (18)	0 (0)		0 (0)	0 (0)	
(2) Need to rotate upper body	10 (59)	30 (68)		10 (59)	12 (80)		11 (79)	8 (36)	
(3) Need to support with one or both arms	4 (24)	13 (30)		4 (24)	2 (13)		3 (21)	14 (64)	
(4) Need another person's assistance	0 (0)	1 (2)		0 (0)	1 (7)		0 (0)	0 (0)	
Weighted score	206‡	234		206‡	227		221‡	264	

*Although 112 patients returned questionnaires, not all patients answered every question. The weighted scores were calculated using percentages carried to one decimal place, not using the percentages rounded to the nearest integer as shown in the table. Please see the Materials and Methods section for an explanation of the purpose for, and method of, calculation of the weighted scores.

†Fisher's exact test was used to compare the categorical responses of questions 5 and 7. The Wilcoxon rank sum test was used to compare the ordinal responses in questions 1–4, 6, and 8–12.

‡Statistically significant, and nearly statistically significant *p* values, and the lower weighted score in each pairwise comparison.

Table 2. Comparison of Survey Responders and Nonresponders

Characteristic	Responders	Nonresponders	*p* Value	Total
No. of patients	112	67	NA	179
Mean ± SD age (yr)	51.0 ± 8.6	48.4 (8.6)	0.04*	50.0 ± 8.7
Mean ± SD BMI (kg/m^2)	26.3 ± 5.3	26.8 (4.9)	0.43*	26.5 ± 5.1
Mean ± SD days between surgery and survey (median)	681 ± 479 (589)	751 ± 490 (728)	0.35*	707 ± 483 (645)
Timing of reconstruction, immediate/delayed/both (%)	76/20/4	70/27/3	0.56†	74/22/4
Smoking, current/never/past (%)	13/71/17	7/78/15	0.50†	11/73/16
Laterality of reconstruction, right/left/bilateral (%)	33/35/32	30/45/25	0.40‡	32/39/30
Type of flap(s)	—	—	0.68†	—

BMI, body mass index; NA, not applicable; —, not shown (the nine possible combinations of unilateral and bilateral breast reconstructions using different combinations of SIEA, DIEP, and muscle-sparing TRAM flaps).
*Wilcoxon rank sum test.
†Fisher's exact test.
‡χ^2 test.

construction patients. These two groups did not differ significantly with regard to age, time between surgery and survey mailing, timing of breast reconstruction, or smoking status (Table 3). However, the unilateral SIEA flap patients had a mean body mass index that was 3.3 kg/m^2 greater than the unilateral muscle-sparing TRAM flap patients, and this was a significant difference ($p = 0.001$).

The SIEA flap patients had significantly better ability to lift objects after surgery compared with the muscle-sparing TRAM flap patients ($p = 0.02$). Seventy-one percent of the SIEA flap patients reported that their ability to lift was the same or improved after surgery, compared with 43 percent of the muscle-sparing TRAM flap patients (question 6) (Table 1).

The SIEA flap patients reported overall shorter duration of postoperative abdominal pain, with 53 percent reporting that postsurgical pain lasted only a few days, compared with 25 percent of the muscle-sparing TRAM flap patients. Conversely, 30 percent of the muscle-sparing TRAM flap patients reported that their abdominal pain lasted a few months to over a year, compared with only 18 percent of the SIEA flap patients (question 4) (Table 1). These differences were nearly statistically significant ($p = 0.06$).

Overall, the SIEA flap patients gave more favorable responses than the muscle-sparing TRAM flap patients on 10 of the 12 survey questions. The lower mean body mass index of the muscle-sparing TRAM flap patients may account for the more favorable responses of this group to the two remaining questions, which dealt with abdominal donor-site contour.

Unilateral SIEA versus Unilateral DIEP Flaps

There were 23 unilateral SIEA flap and 24 unilateral DIEP flap breast reconstruction patients. These two groups did not differ significantly with regard to age, body mass index, time between surgery and survey mailing, timing of breast reconstruction, or smoking status (Table 3). The unilateral SIEA flap patients gave more favorable responses (lower weighted scores) to nine of the 12 survey questions. However, none of these differences was statistically significant (Table 1).

Bilateral with at Least One SIEA Flap versus Bilateral without a SIEA Flap

Eighteen patients had bilateral breast reconstruction with at least one SIEA flap (six SIEA plus SIEA, five SIEA plus DIEP, and seven SIEA plus muscle-sparing TRAM flaps), and 35 patients had bilateral breast reconstruction that did not include a SIEA flap (eight DIEP plus DIEP, four DIEP plus muscle-sparing TRAM, and 23 muscle-sparing TRAM plus muscle-sparing TRAM flaps). The differences in age, body mass index, time between surgery and survey mailing, and timing of breast reconstruction between these two groups were not significant (Table 3). However, the two groups differed significantly with regard to smoking status, with 77 percent of the non-SIEA flap patients not having smoked, compared with 56 percent of the group who had at least one SIEA flap ($p = 0.01$).

The bilateral breast reconstruction patients who had at least one SIEA flap gave more favorable responses to all 12 of the survey questions (Table 1). The responses to question 12 showed that bilateral breast reconstruction patients with at least one SIEA flap were statistically significantly better able to get out of bed compared with bilateral breast reconstruction patients who did not have a SIEA flap ($p = 0.02$).

DISCUSSION

The SIEA flap harvest is the least invasive method of obtaining lower abdominal tissue for

Table 3. Comparison of Breast Reconstruction Patients by Flap Type

	Unilateral						Bilateral		
Characteristic	SIEA	Muscle-Sparing TRAM	*p* Value	SIEA	DIEP	*p* Value	With SIEA	Without SIEA	*p* Value
No. patients	23	79	NA	23	24	NA	18	35	NA
Mean ± age (yr)	51.4 ± 7.5	51.4 ± 8.8	0.89*	51.4 ± 7.5	51.2 ± 8.7	0.72*	48.7 ± 8.4	45.9 ± 8.3	0.29*
Mean ± BMI (kg/m^2)	28.6 ± 3.9	25.3 ± 4.9	0.001*	28.6 ± 3.9	27.0 ± 4.6	0.12*	26.3 ± 8.0	27.5 ± 4.4	0.37*
Mean ± days between surgery and survey (median)	672 ± 550 (497)	764 ± 511 (706)	0.30*	672 ± 550 (497)	596 ± 388 (648)	0.81*	790 ± 481 (756)	636 ± 430 (500)	0.27*
Timing, immediate/delayed/both (%)	61/39/0	77/23/0	0.12‡	61/39/0	67/33/0	0.68‡	67/11/22	83/9/6	0.36†
Smoking, current/never/past (%)	4/70/26	11/73/15	0.39†	4/70/26	8/83/8	0.38†	6/56/39	17/77/6	0.01†

BMI, body mass index.
*Wilcoxon rank sum test.
†Fisher's exact test.
‡χ^2test.

breast reconstruction, as it involves neither incision nor excision of rectus abdominis muscle or fascia. In addition, the deep inferior epigastric vessels, the dominant blood supply to the rectus abdominis muscle, are not removed as they are in all types of free TRAM flap and DIEP flap harvest. It is therefore reasonable to believe that abdominal donor-site morbidity is minimized when a SIEA flap can be used for breast reconstruction. However, to our knowledge, there are no prior studies published examining abdominal donor-site function of patients who have had breast reconstruction with SIEA flaps.

We have previously reported that patients do not perceive a significant difference between abdominal donor-site morbidity of free muscle-sparing TRAM flap and DIEP flap reconstructions.[8] Another recent study did not detect a significant difference in the ability of patients who had free muscle-sparing TRAM or DIEP flaps to perform a sit-up.[9] Two other studies comparing the abdominal donor-site morbidity of free TRAM flap and free DIEP flap harvest have demonstrated statistically significant greater measured abdominal strength in patients who had breast reconstruction with free DIEP flaps.[10,11] However, these quantitative differences were detected using a dynamometer and were not differences that the patients themselves noticed. In fact, no previous studies comparing free TRAM and free DIEP flaps have detected any statistically significant differences in abdominal donor-site morbidity based on patient self-assessments.[8,10–12] This suggests that although DIEP flap patients have measurably greater abdominal donor-site strength compared with free TRAM flap patients, this difference is subclinical and not evident to the patients.

We compared the abdominal donor-site function of SIEA flap patients with free muscle-sparing TRAM and DIEP flap patients. We found that patients who have breast reconstruction using a SIEA flap have significantly decreased donor-site morbidity compared with patients having unilateral breast reconstruction with muscle-sparing TRAM flaps or bilateral breast reconstruction with DIEP flaps and muscle-sparing TRAM flaps. Our findings are significant because the patients notice these differences in abdominal donor-site function in their everyday lives. In other words, these findings are clinically relevant and provide evidence on which clinical decisions can be made with a rational basis.

Patients with a unilateral SIEA flap breast reconstruction had significantly better ability to lift

objects postoperatively and nearly significantly shorter duration of postoperative pain compared with patients who had a unilateral muscle-sparing TRAM flap (questions 4 and 6) (Table 1). Patients with a unilateral SIEA flap also responded more favorably in 10 of the 12 survey questions.

Unilateral SIEA flap patients had a significantly higher mean body mass index than unilateral muscle-sparing TRAM flap patients (Table 3). This difference probably exists because we believe patients with a higher body mass index tend to have a larger abdominal pannus and therefore tend to have larger SIEA vessels when they are present, and in turn are more likely to have a SIEA flap used for breast reconstruction. Similarly, patients with higher body mass indexes are more likely to have one or more large vessels perforating the rectus abdominis muscle and are therefore more likely, in our hands, to have a DIEP flap used for breast reconstruction. This could explain why SIEA flap patients did not have a significantly higher mean body mass index than DIEP flap patients (Table 3).

Our analyses also revealed a significantly greater incidence of smoking in bilateral breast reconstruction patients having at least one SIEA flap versus those who did not have a SIEA flap (Table 3) ($p = 0.01$). Even though these differences in body mass index and smoking status would presumably decrease the likelihood that benefits from using SIEA flaps would be obvious, we still detected a benefit in patients who underwent a SIEA flap procedure.

The two questions that unilateral SIEA flap patients answered less favorably than other groups concerned abdominal contour (questions 1 and 2) (Table 1). This could be explained by considering that the significantly higher mean body mass index of the SIEA flap patients probably reflects a greater degree of intraabdominal fat and a more protruding abdomen. This results in a relative lack of a flat abdomen, a greater propensity for abdominal bulging postoperatively, and likely less favorable perception of the abdominal donor-site contour.

The greatest advantage of using a SIEA flap occurs in the case of bilateral breast reconstruction where two hemi–lower abdominal flaps are used. If one of the two flaps is a SIEA flap, the donor site is effectively converted from a bilateral to a unilateral free muscle-sparing TRAM flap or DIEP flap donor site. Indeed, bilateral breast reconstruction patients who had at least one SIEA flap found it easier to get out of bed than patients without a SIEA flap (question 12) (Table 1), and there was a trend toward patients with at least one SIEA flap reporting better lifting ability (question 6) (Table 1).

We found no statistically significant differences between patients with unilateral SIEA flaps and DIEP flaps with regard to postoperative abdominal contour, pain, or function. However, the SIEA flap patients answered three-quarters of the survey questions more favorably than the DIEP flap patients.

CONCLUSIONS

We conclude that breast reconstruction with SIEA flaps results in significantly less abdominal donor-site morbidity than unilateral breast reconstruction with free muscle-sparing TRAM flaps or bilateral breast reconstruction with DIEP and/or free muscle-sparing TRAM flaps. We advocate the use of SIEA flaps when possible, especially in bilateral breast reconstruction patients, to minimize abdominal donor-site morbidity.

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