

Comparison of Unipedicled and Bipedicled TRAM Flap Breast Reconstructions: Assessment of Physical Function and Patient Satisfaction

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Many variations of the transverse rectus abdominis musculocutaneous (TRAM) flap breast reconstruction have been attempted since the procedure was first described. One common modification involves the use of both rectus muscles, which may accommodate a bilateral reconstruction or provide a more reliable blood supply to a unilateral reconstruction. Objective studies measuring various aspects of physical strength after bilateral rectus harvest and subjective reports of various physical symptoms have challenged the morbidity of a double-rectus harvest. Whether this represents increased morbidity in practical terms is best clarified by asking the patients. To answer this question, 124 TRAM flap reconstruction patients (62 unipedicled patients and 62 bipedicled patients) completed a survey containing questions regarding postoperative physical activities and abilities, outcome with regard to specific physical symptoms, and satisfaction with the procedure. The overwhelming majority of patients reported no untoward effect postoperatively regarding the following: workday performance (≥ 90 percent), workday performance involving physical labor (≥ 78 percent), physical recreation (≥ 77 percent), abdominal appearance (≥ 77 percent), standing posture (≥ 95 percent), and back pain (≥ 81 percent). When comparing unipedicled and bipedicled TRAM patient groups, there was no statistically significant difference between the two groups for any of these criteria. However, a subjective decrease in abdominal muscle strength was reported by 42 percent of unipedicled and 64 percent of bipedicled TRAM flap patients, and decreased abdominal muscle strength was the most frequently cited reason for dissatisfaction. Interestingly, this decreased strength did not affect the daily activities of the majority of patients, who were happy with the procedure (96 percent) and would recommend it to others (96 percent). (*Plast. Reconstr. Surg.* 113: 136, 2004.)

The transverse rectus abdominis musculocutaneous (TRAM) flap has become the preferred method for autogenous reconstruction of the breast. Since it was first described,¹ numerous variations of the procedure have been attempted to adapt to the needs of individual patients. One common modification of the TRAM flap reconstruction is to use both rectus muscles to achieve an optimal result. A bipedicle rectus harvest may be recommended to accommodate a bilateral reconstruction, to provide a more reliable blood supply to the unilateral reconstructive patient at higher risk for flap loss, or to support a larger flap for a unilateral reconstruction in the patient with a radical mastectomy defect or a large contralateral breast.² Objective studies measuring various aspects of physical strength after bilateral rectus harvest and subjective reports of various physical symptoms³⁻⁹ have challenged the morbidity of a double-rectus harvest.⁹⁻¹² Whether this represents increased morbidity in practical terms is best clarified by asking the patients.

PATIENTS AND METHODS

The authors developed a survey regarding patients' own assessments of the practical aspects of physical function before and after TRAM flap breast reconstruction. Questions were included regarding postoperative physi-

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cal activities and abilities, outcome with regard to specific physical symptoms, and satisfaction with the procedure. This survey was initially piloted blindly by mail to 10 TRAM flap reconstruction patients who were then contacted by telephone to subjectively evaluate its content, clarity, and relevance. Minor revisions were made in the format for clarity and readability before the remaining patients received the survey.

All unipedicled or bipedicled TRAM flap breast reconstruction patients treated over a 6-year period, by a single surgeon, in a community setting, were considered to be in the study group. Minimum follow-up time was 6 months. Immediate and delayed reconstructions were included. "Supercharged" and delay procedures were excluded. A total of 163 patients were then included in the list and received surveys by mail. After 2 weeks, unreturned surveys were followed up with a reminder letter followed by a telephone call. Three surveys were returned because of an insufficient address, 12 patients had died, and 24 patients did not respond, leaving 124 completed surveys (62 in the unipedicled TRAM flap group and 62 in the bipedicled TRAM flap group). A retrospective chart review was then conducted to evaluate the patient cohorts, characteristics/risk factors, and outcomes for future correlation.¹³

Data were tabulated in spreadsheet form using Microsoft Excel (Microsoft Corp., Redmond, Wash.) and then evaluated using Fisher's exact test. Statistical significance was designated at $p < 0.05$.

RESULTS

The first portion of the survey requested the patient's assessment of his or her own physical abilities postoperatively with regard to work performance and physical recreation (Fig. 1). An overwhelming 96 percent of unipedicled and 90 percent of bipedicled TRAM flap patients reported their work performance as the same or better. A subset of patients with jobs involving physical labor, defined as lifting more than 10 pounds on a regular basis, reported similar numbers. Patients also rated their ability to participate in their physical recreation of choice, with 81 percent of unipedicled and 77 percent of bipedicled TRAM flap patients reporting the same or better. The three most common activities cited were walking, swimming, and golf. Note that results from

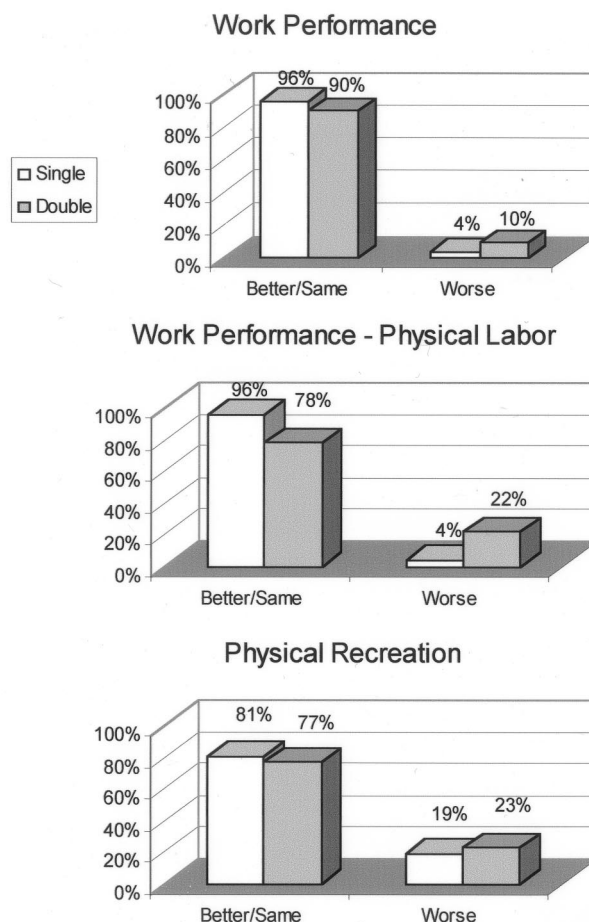


FIG. 1. Patients' evaluations of general physical ability after TRAM flap breast reconstruction (unipedicled TRAM flap group, $n = 62$; bipedicled TRAM flap group, $n = 62$). In the areas of work performance (*above*), work performance involving physical labor (*center*), and physical recreation (*below*), there was no statistically significant difference between unipedicled and bipedicled TRAM flap patients ($p > 0.05$).

the unipedicled and bipedicled groups were not significantly different.

The next questions related to the abdomen specifically (Fig. 2). When asked to subjectively evaluate their own perception of abdominal muscle strength postoperatively, significantly more people in the bipedicled group (64 percent) perceived a decrease in muscle strength relative to the unipedicled group (42 percent). Appearance of the abdomen, however, was the same or better for 77 percent of the unipedicled group and 79 percent of the bipedicled group.

Standing posture was then evaluated, with 98 percent of unipedicled and 95 percent of bipedicled TRAM flap patients reporting posture as the same or better (Fig. 3, *below*). A subset of patients who stated they had preexisting back

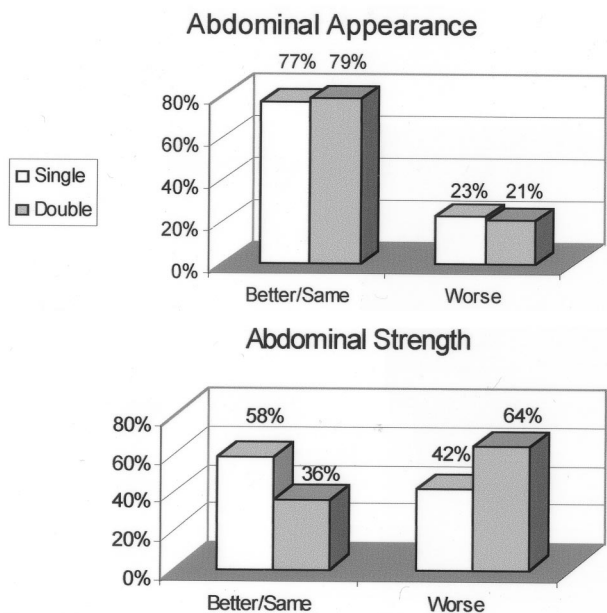


FIG. 2. Patients' evaluations of the abdomen after TRAM flap breast reconstruction. (Above) Abdominal appearance was judged as the same or better by most patients in both groups ($p > 0.05$). (Below) Abdominal strength decrease was reported significantly more often by subjects in the bipediced TRAM flap group relative to subjects in the unipediced TRAM flap group ($p < 0.05$).

pain rated their postoperative back pain as the same or better (81 percent of the unipediced group and 91 percent of the bipediced group). Of patients who reported no back pain before the operation, 84 percent of the unipediced group and 88 percent of the bipediced group reported no change after the operation. Overall, unipediced and bipediced groups were the same with regard to posture and issues of back pain, with no significant differences between the two groups.

Overall, the unipediced and bipediced TRAM flap groups report identical results regarding satisfaction with their reconstruction, with 96 percent "happy with the overall results" and 96 percent "recommending the procedure to others" (Fig. 4). Among all patients, the top three reasons for satisfaction with the procedure were natural appearance of the breast, use of own tissues for breast reconstruction, and improved appearance of the abdomen. Unipediced and bipediced groups were comparable in their response (Fig. 5). The top three reasons for dissatisfaction were decreased abdominal muscle strength, abdominal appearance, and partial flap loss. Numbers for appearance and flap loss were similar in the unipediced and bipediced groups. However, a

significantly higher percentage of patients from the bipediced group (15 percent) cited decreased abdominal strength compared with the unipediced control group (2 percent; Fig. 6).

The overwhelming majority of patients reported no untoward effect postoperatively regarding the following: workday performance (≥ 90 percent), workday performance involving physical labor (≥ 78 percent), physical recreation (≥ 77 percent), abdominal appearance (≥ 77 percent), standing posture (≥ 95 percent), and back pain (≥ 81 percent). When unipediced and bipediced TRAM flap patient groups were compared, there was no statistically significant difference between the two groups for any of these criteria. However, a subjective decrease in abdominal muscle strength was reported by 42 percent of unipediced and 64 percent of bipediced TRAM flap patients. Furthermore, decreased abdom-

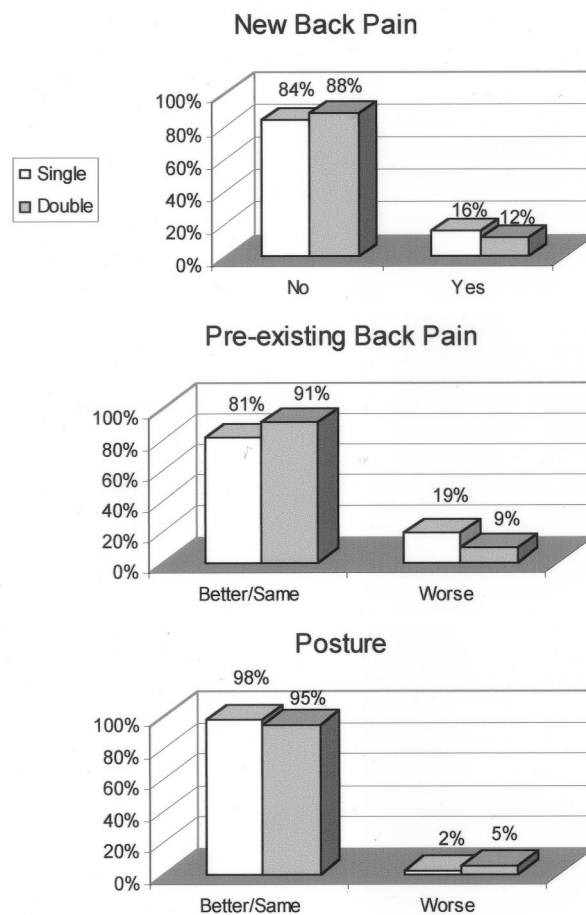


FIG. 3. Patients' postoperative evaluations of new back pain after TRAM flap reconstruction (above), preexisting back pain (center), and posture (below). The overwhelming majority of patients in both groups judged these categories as the same or better ($p > 0.05$).

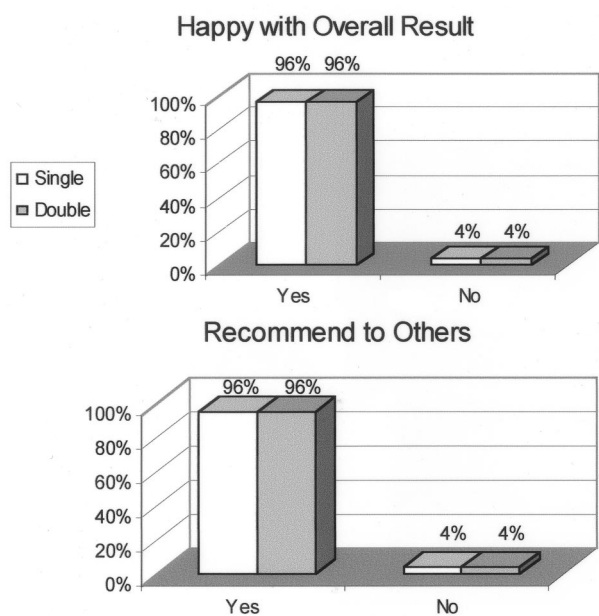


FIG. 4. Patients' overall impressions of their TRAM flap breast reconstruction. Ninety-six percent of patients are happy with their reconstruction (*above*) and would recommend it to others (*below*). Responses for unipedicled and bipedicled TRAM flaps were absolutely identical ($p > 0.05$).

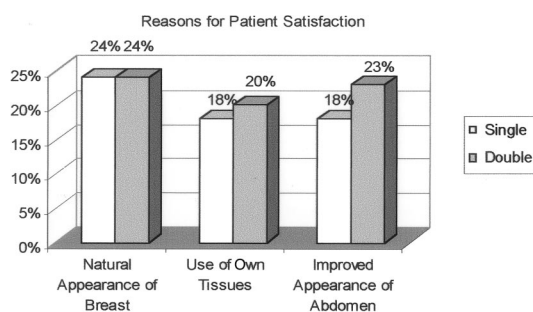


FIG. 5. Reasons for patient satisfaction with TRAM flap breast reconstruction among all patients surveyed.

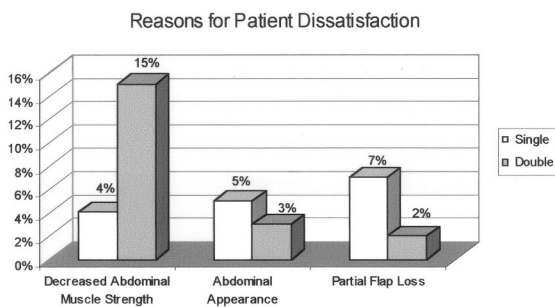


FIG. 6. Reasons for patient dissatisfaction with TRAM flap breast reconstruction among all patients surveyed.

inal muscle strength was the most frequently cited reason for dissatisfaction in both groups, with the bipedicled group reporting decreased

strength much more frequently than the unipedicled group. Interestingly, however, this did not affect the daily activities of the majority of patients, who were happy with the procedure (96 percent) and would recommend it to others (96 percent).

DISCUSSION

Informed consent for any surgical procedure must include a thorough discussion of all the potential risks and benefits. In the case of autogenous breast reconstruction with the TRAM flap, potential complications include donor-site issues as a consequence of the rectus harvest. Symptoms subjectively reported after TRAM flap reconstruction have included problems with posture and back pain, therefore leading to questions about changes in work performance and ability to participate in physical recreation activities. These issues are attributed to a decrease in abdominal muscle strength that is intuitively presumed to occur after rectus harvest and further presumed to be more severe after double-rectus harvest.

Evaluations of the physical consequences of rectus harvest have largely centered on a patient's ability to perform a specific exercise, usually a sit-up,³⁻⁹ and have further measured a patient's abdominal muscle strength with resistance equipment.¹⁴ When specifically measured, abdominal muscle strength has been shown to decrease after TRAM flap reconstruction.³⁻⁹ This has been presumed to then affect the patient's physical activities and abilities, leading to criticism of the procedure and condemnation of the double-rectus harvest in particular.¹⁰

When questioned specifically about these issues, our patients overwhelmingly reported no untoward effect postoperatively on their workday performance, physical recreation, abdominal appearance, standing posture, or back pain. There is no statistically significant difference between the single and double-rectus harvest for any of these criteria. However, a subjective decrease in abdominal muscle strength was reported by 42 percent of unipedicled and 64 percent of bipedicled TRAM flap patients. Furthermore, decreased abdominal muscle strength was the most frequently cited reason for dissatisfaction in both groups, with the bipedicled group reporting decreased strength much more frequently than the unipedicled group. In our series, patients' perceptions of abdominal strength decrease were consistent

with previous subjective and objective studies on this topic.³⁻⁹ Contrary to popular assumption, however, the presence of decreased strength of the abdomen secondary to a single or double-rectus harvest did not seem to lead to perceptible problems with daily activities and other symptoms such as back pain in our series. This would lead us to conclude that decreased abdominal muscle strength after a TRAM flap is not as significant a factor as previously thought, and that a bipediced TRAM is no more a "hit" than a unipediced TRAM flap in the practical aspects of patients' day-to-day lives.

Limitations in a study of this type include lack of randomization, differing cohort groups, recall bias, and data limited to those patients who completed the questionnaire. Clinical decision making in the planning of a TRAM flap breast reconstruction necessarily places patients in either the single-rectus or double-rectus harvest groups. Naturally this would result in very different patient cohorts in the two groups, especially with regard to certain risk factors. For example, a patient who has known risk factors for TRAM flap loss would be much more likely to receive a bipediced rather than a unipediced reconstruction. Different cohorts obviously have different risks regarding outcomes, and they may have variable criteria in their evaluations of activities and symptoms. In light of this factor, it is especially interesting that the unipediced and bipediced reconstruction patients are so similar in their responses.

CONCLUSIONS

These results indicate that informed consent for TRAM flap reconstruction patients should include a discussion of decreased abdominal muscle strength, and that a double-rectus harvest may greatly increase this risk. However, this is unlikely to have any noticeable effect on the patient's day-to-day activities.

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