Recovery After Transverse Rectus Abdominis Myocutaneous Flap Breast Reconstruction Surgery

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Purpose/Objectives: To assess pain and activity limitations and to determine realistic goals for recovery after a transverse rectus abdominis myocutaneous (TRAM) flap breast reconstruction in a standard rehabilitation and recovery program. Assessing patient satisfaction with educational information is a secondary objective.

Design: Before and after comparison.

Setting: A National Cancer Institute–designated comprehensive cancer center in the mid-Atlantic United States.

Sample: 16 women who had TRAM flap breast reconstruction.

Methods: Data were collected before surgery and four and eight weeks after surgery using an adapted Brief Pain Inventory, a recovery and rehabilitation assessment, and an evaluation of patient satisfaction.

Main Research Variables: Presence of pain; disruption of activities, relationships, and mood because of pain; pain relief measures; active range of motion; muscle strength; and satisfaction with educational information.

Findings: Pain and activity limitation scores were elevated four weeks after surgery and returned almost to baseline at eight weeks. Abdominal pain was significantly higher for women with free versus pedicled TRAM flap surgery, and women with previous back pain reported more lower back pain after surgery. Opioids, followed by nonsteroidal anti-inflammatory drugs, were the most common pain relief method. Active range of motion and muscle strength showed no significant limitations at eight weeks. Patients were very satisfied with the educational information provided by nurses and physical therapists.

Conclusions: Women can expect to have some pain and activity limitations four weeks after surgery but will be almost fully recovered at eight weeks. Educational information on pain management and resuming an active lifestyle were useful.

Implications for Nursing: Nurses and physical therapists can positively influence recovery from TRAM flap breast reconstruction by educating patients.

Key Points . . .

- Breast reconstruction following mastectomy can improve a woman's quality of life.
- Comparisons between patients with free versus pedicled transverse rectus abdominis myocutaneous (TRAM) flaps revealed no differences in pain or activity limitation scores at baseline or eight weeks. However, the abdominal pain score was higher for women with free TRAM flaps at four weeks.
- Interdisciplinary collaboration between nurses and physical therapists improves patient expectations for recovery after surgery.

High-quality, effective patient care should provide patients with a realistic expectation of recovery time based on evidence. A literature review of transverse rectus abdominis myocutaneous (TRAM) flap breast reconstruction surgery revealed a lack of research on the location and duration of pain after surgery and a time frame for when women can expect to resume their previous lifestyle. Patients usually are told that recovery will take six to eight weeks and that they can return to work and previous activities at that time. However, patients in the current study have reported that substantial pain, as well as decreased energy levels, persists for six weeks to three months. Serletti and Moran (1997) stated that their patients did not return to work for 9–10 weeks, and Vancouver Coastal Health (2007) noted that patients take 6–12 weeks to resume normal activities or return to work (it stated 6–8 weeks in 2002). Others required 6–12 months to achieve full recovery (Petit et al., 1997; Zenn, 2001). Because of continuously changing information, the current study examined patients' experiences after surgery to determine realistic goals for recovery. In addition, patient satisfaction with standard nursing and physical therapy preparation and follow-up was evaluated.

Literature Review

Improvements in breast cancer detection are helping healthcare providers find the disease earlier, which leads to increased survival rates (Smigal et al., 2006). However, women undergoing a mastectomy will live longer with a physical defect that can lead to psychological issues related to poor self-esteem and low self-confidence. Breast reconstruction can help improve a woman's body image and feelings of sexuality and feminity, as well as eliminate the inconvenience of an external prosthesis. Morrow et al. (2005) reported that 38% of women they surveyed, who had mastectomies from December 2001 to January 2003, chose to have reconstruction.

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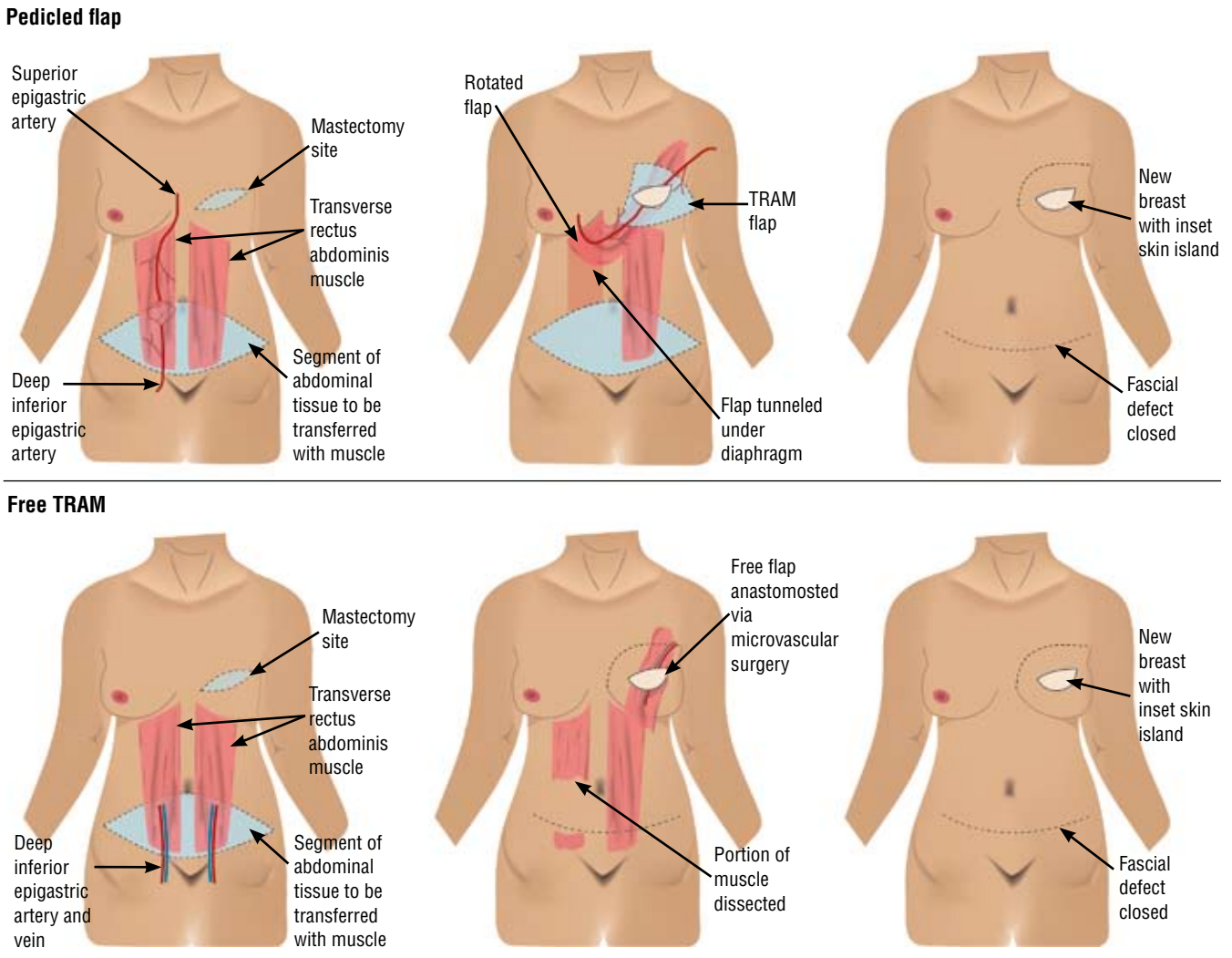

Figure 1. Transverse Rectus Abdominis Myocutaneous (TRAM) Procedures

Note. Image courtesy of Debbie Foster of Fox Chase Cancer Center. Used with permission.

Many choose to have an autologous reconstruction because the aesthetic results are believed to be better than those of an implant-based reconstruction (Weiler-Mithoff, 2006). Autologous reconstructions are believed to be more versatile, natural in appearance, durable, and better able to withstand radiotherapy and do not incite foreign-body reactions (Weiler-Mithoff; Zenn, 2001).

TRAM flap is one method of autologous reconstruction. The skin, fat, and muscle of the lower abdomen are used to create a breast mound. Two incisions are required: one for the mastectomy and another from hip to hip to obtain the tissue for the flap. The flap may remain attached by a pedicle to its blood supply. The pedicled flap is then tunneled under the skin to the mastectomy site. It also may be moved as a free tissue transfer. The entire rectus abdominis muscle is used in the pedicled TRAM flap, and blood is supplied from the epigastric system of the internal mammary vessels. In the free TRAM flap, only a small portion of the lower rectus abdominis muscle with its perforators (blood vessels that connect superficial to deep blood vessels) are removed along with the abdominal skin and fatty tissue. The perforators are supplied by the deep inferior epigastric vessels. Microvascular techniques are used to transplant the flap to the mastectomy site. The deep inferior epigastric perforator (DIEP) flap is a newer version of the free flap. Only skin and fat (with their perforators) are taken from the lower abdomen; no muscle is removed (Kozempel, Dell, & Weaver, 2003) (see Figures 1, 2, and 3).

Larson, Yousif, Sinha, Latoni, and Korkos (1999) compared narcotic use in patients who had undergone free and pedicled TRAM flap procedures and surveyed doctors to determine how long pain medications were required during the hospital stay and after discharge. Women with pedicled flaps required less morphine sulfate ($\bar{X}$ = 72.42 mg) during hospitalization than those with free flaps ($\bar{X}$ = 121.32 mg) ($p < 0.0005$), as well as a shorter hospital stay (4.72 versus 7.65 days) ($p < 0.001$). Out of 121 surgeons, 19% (n = 23) said postoperative pain medicine was required for less than one week, 29% (n = 35) felt it was needed for one week, 38% (n = 46) felt it was needed for two weeks, and 14% (n = 17) felt their patients required medication longer than two weeks.

Kroll et al. (2001) compared morphine use in patients who had DIEP and those who had a free TRAM flap. Patients

with DIEP flaps used significantly less morphine ($\bar{X}$ total dose = 50.96 mg) than patients with free flaps ($\bar{X}$ total dose = 107.04 mg; $p < 0.001$). The average hospital stay was 4.71 days for DIEP procedures versus 5.1 days for free TRAM flaps, but the difference was not statistically significant ($p = 0.077$).

Correll, Viscusi, Grunwald, and Moore (2001) compared epidural analgesia to IV patient-controlled analgesia (PCA) and found that epidural analgesia offered improved pain control through the fourth day after surgery ($p < 0.05$) and reduced hospital stay by 25 hours ($p = 0.05$). Sharma et al. (2001) explored the use of ketorolac (a nonsteroidal anti-inflammatory drug) to decrease narcotic use. Patients who received IV ketorolac in addition to their morphine sulfate PCA used less morphine sulfate (1.39 mg/kg versus 1.75 mg/kg). Losken, Parris, Douglas, and Codner (2005) used subcutaneous infusion pain pumps to deliver local anesthesia and PCAs to patients and lower the need for supplemental IV narcotics. Narcotics were required in 12% of patients with subcutaneous pain pumps versus 35% in those without. The average hospital stay was 3.4 days for those with subcutaneous pain pumps and 4.7 days for those without.

The majority of these studies referred only to pain after surgery and did not define location or intensity. Vancouver Coastal Health (2007) stated that patients experience a "sensation of tightness, pulling, and numbness in the abdominal and rib cage areas." Petit et al. (1997) studied abdominal strength and mild back pain in pedicled and bipedicled (two flaps are tunneled for a bilateral reconstruction) TRAM flap reconstructions. The researchers found weakness in the upper portion of the rectus abdominis muscle and the oblique muscle in 50% of those receiving a pedicle procedure and in 60% of patients who underwent a bipedicle procedure. Impairment in the lower portion of the rectus abdominis was felt in 15% of the bipedicle TRAM recipients. Fifty-five percent of patients in the pedicle group and 30% in the bipedicled group reported mild back pain at six months. Zenn (2001) cautioned that preexisting back pain may be exacerbated by the surgery. Back pain is a concern because it can affect all aspects of a person's life, including psychological well-being, family, and the ability to return to work and recreational activities (Mayo Clinic, 2007).

Abdominal wall morbidity has been studied more thoroughly than back pain. Numerous authors have found incidences of abdominal wall weakness, but the sacrifice of even the entire rectus muscle is well tolerated by patients after 6–12 months (Edsander-Nord, Jurell, & Wickman, 1998; Kind, Rademaker, & Mustoe, 1997; Larson et al., 1999; Suominen et al., 1996). Simon, Bouwense, McMillan, Lamb, and Hammond (2004) compared pedicled and bipedicled reconstructions (minimum follow-up time of six months) and found the majority of patients reported no negative effects on work performance, physical recreation, standing posture, or back pain. No statistical differences were found between the two groups; however, a subjective decrease was reported in abdominal strength, which was the most frequently cited reason for dissatisfaction in both groups. The effect that this temporary abdominal weakness has on the resumption of activities has not been previously reported. Kozempel et al. (2003) proposed the assistance of a physical therapist to minimize abdominal wall weakness, but that conclusion is based on anecdotal results.

a. Preoperative view
b. Intraoperative view of the DIEP flap
c. Postoperative view showing DIEP flap in which no muscle is removed and the free flap consisting of skin and fat is transplanted to the mastectomy site
d. Later postoperative view showing left nipple reconstruction, tattoo of areola, and right breast reduction
e. Complete healing following DIEP flap procedure

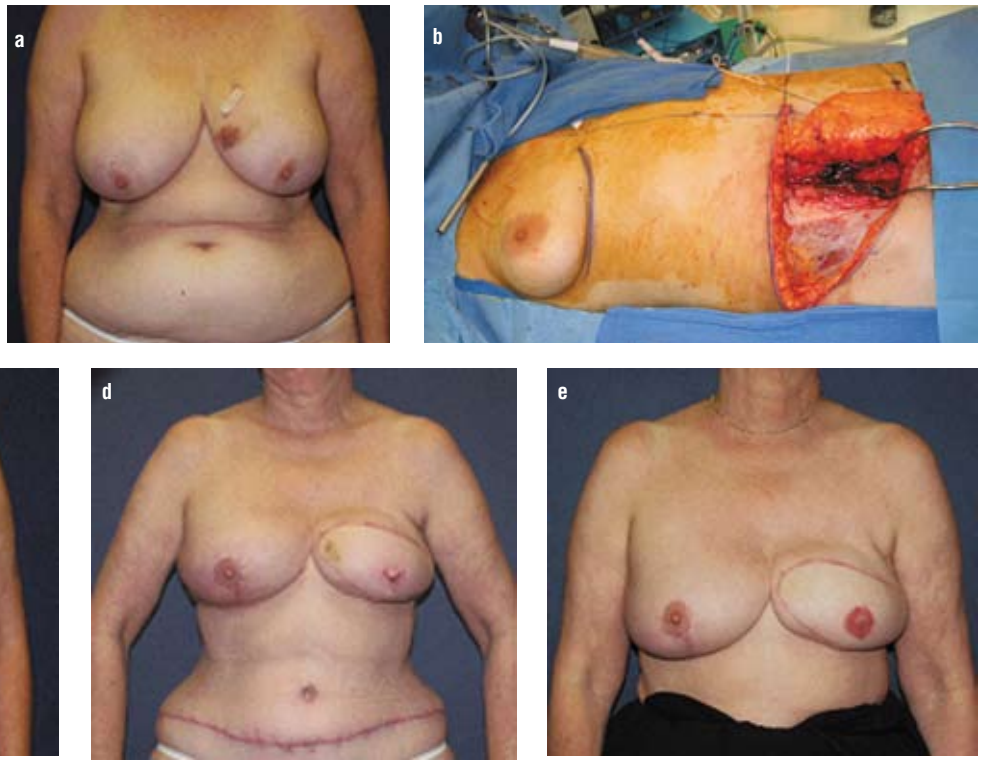

Figure 2. Deep Inferior Epigastric Perforator (DIEP) Flap Procedure With Intraoperative View of Flap

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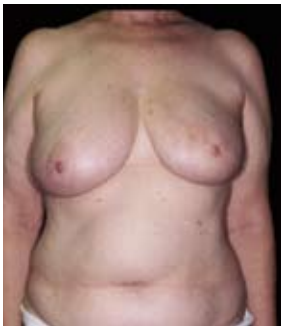
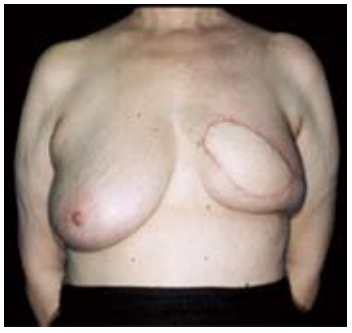
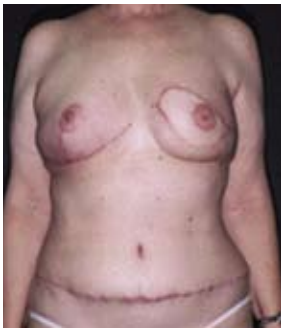
Abdomen marked prior to free transverse rectus abdominis myocutaneous flap procedure in which the flap containing a rectus abdominal muscle is detached and transplanted to the mastectomy site.



Preoperative view



Postoperative view showing transplanted flap



Later postoperative view following nipple reconstruction, tattoo of areola, and right breast reduction surgery

Figure 3. Transverse Rectus Abdominis Myocutaneous Flap Procedure With Abdomen Marked

Note. From "Control of Pain After Breast Reconstruction Procedure," by D. Damsky Dell, 2003, *Clinical Journal of Oncology Nursing, 7*(3), p. 336. Copyright 2003 by the Oncology Nursing Society. Reprinted with permission.

Conceptual Model

The Roy Adaptation Model (Andrews & Roy, 1991) provides the conceptual framework for the current study. In this model, the goal of nursing is to promote adaptation of individuals and groups in four adaptive modes: physiologic-physical, self–concept-group-identity, role function, and interdependence. Nurses should assess behavior and factors that influence the ability to adapt and intervene to expand the individual or group's abilities to adapt (Andrews & Roy). Providing patients with evidence-based information about recovery and effective pain management strategies should promote adaptation of all four modes, although lack of knowledge and prolonged pain could delay recovery. The outcome of patient satisfaction with nursing and physical therapy education and support was measured.

The objectives of the current study were to

- Determine the presence and intensity of lower back, abdominal incision, and other pain at four and eight weeks after TRAM flap breast surgery.
- Describe the use and helpfulness of specific supportive care interventions to decrease pain.
- Evaluate patients' abilities and activity levels four and eight weeks after TRAM surgery.
- Determine patient satisfaction with information provided by the physical or occupational therapists and clinical nurse specialists.

Methods

Study Design and Sample

The present study used a before-and-after design, with pre- and post-test comparisons (Law, 2002). This was used so that care would not be withheld from any patients. Institutional review board approval was obtained, and each participant signed an informed consent document prior to beginning the study. A pilot study with five patients examined the feasibility of study procedures.

The study was conducted from a comprehensive cancer center that treats patients in a tristate region. Information about the initial status of the patients was collected and again after treatment was completed. Twenty-five patients were enrolled and completed the first data point. Sixteen patients completed all three data points. The remaining nine did not complete the study because they lived too far away (n = 2), experienced wound complications (n = 1), or data was missing and they could not be reached (n = 6). Participants were recruited from one plastic surgeon to control variables related to the surgeon's techniques and preferences. All patients having a free or pedicled, immediate or delayed, or pedicle or bipedicle TRAM flap breast reconstruction were eligible. Patients were included if they read and spoke English. Patients were excluded if they were unable to be evaluated prior to surgery by a physical or occupational therapist.

Procedures

All of the procedures evaluated in this study were standard clinical practice at the comprehensive cancer center. Standard clinical practice involves a patient evaluation by a physical therapist prior to surgery. The assessment consists of a brief evaluation of active range of motion of the shoulder, cervical, and lumbar spine; strength of the upper extremities; posture; and ability to isometrically contract the abdominal muscles. Information about correct body positioning, lifting and movement restrictions, activity progression, postural and pelvic stabilization, and leg exercises, as well as back care, was reviewed by the physical therapist. A regimen of two exercises to restore posture, two to prevent or reduce lower back pain, and one to regain abdominal strength was created by the physical therapist. Combined, the regimen should have taken patients 10–15 minutes per day to complete.

Patient mobilization began on the first day after surgery. Patients were instructed on proper techniques for getting out of bed and ambulating, incorporating surgical precautions. Routine pain management in the hospital after surgery included an IV PCA pump using morphine sulfate or hydromorphone. When solid food was tolerated, oxycodone with acetaminophen most often was used. Education, including pain management, constipation prevention, lymphedema prevention, upper-extremity exercises, use of hot and cold pads, use of abdominal support, and rehabilitation techniques, was offered by the clinical nurse specialist within 48 hours of discharge (see Figure 4).

Instruments

Variables of interest included the presence and degree of lower back, abdominal incision, and other pain before surgery and at four and eight weeks after surgery; the degree of pain limiting usual activities at four and eight weeks after surgery;

Preadmission

Physical therapist

- Explained study
- Obtained informed consent
- Assessed patient
- Had patient complete baseline assessment of pain
- Had patient complete transverse rectus abdominis myocutaneous (TRAM) flap information sheet.

Day 1 After Surgery

Physical therapist

- Assisted patient with transfers out of bed and into chair
- Reviewed activity instructions.

Prior to Hospital Discharge

Clinical nurse specialist

- Provided education on pain management, activities, and resources.

Four Weeks After Surgery

Physical therapist

- Had patient complete the assessment of recovery post-TRAM flap breast surgery questionnaire.

Eight Weeks After Surgery

Physical therapist

- Repeated patient assessment
- Readministered assessment of recovery post-TRAM flap breast surgery questionnaire.

Figure 4. Study Schema

range of motion; muscle strength; and satisfaction with educational information and supportive care. Patients completed a self-administered questionnaire on which they rated pain and activity limitation on a scale from 0 (no pain) to 10 (most pain). The scale was adapted from the Brief Pain Inventory to measure intensity and impact of pain. The Brief Pain Inventory has been used widely, and its validity and reliability in patients with cancer has been well established. For reliability, the coefficient alpha ranged from 0.75–0.97 for intensity items, and from 0.78–0.91 for activity limitation items. Factor analysis proved the tool is valid and has significant correlation between pain severity and activity limitations and the Eastern Cooperative Oncology Group performance status score (Cleeland & Ryan, 1994; Jensen, 2003; Keller et al., 2004). The Brief Pain Inventory was adapted for this study to measure pain severity in specific body locations, including the lower back, abdomen, and other patient-described sites. The adapted scale was pilot tested on five patients to ascertain question clarity.

Satisfaction with the educational information provided by the nurses and physical therapist were assessed with a single question: "How valuable was the information you received to help manage your pain?" Satisfaction was rated on a 11-point scale with 0 indicating "not valuable" and 10 indicating "very valuable."

The physical therapy assessment measured shoulder, cervical, and lumbar spine movement by observing if active range of motion was within normal limits defined by McCreary, Provance, Rodgers, and Romani (2005). Upper extremity strength was manually tested for shoulder flexors, abductors, internal and external rotators, biceps, and triceps by assessing the amount of resistance that can be given to a muscle causing a movement. Abdominal strength was not formally assessed. The ability of each patient to contract abdominal muscles was assessed by palpation. Upper-extremity girth measurements were taken at 12 cm and 35 cm above the radial styloid.

Data Analysis

Descriptive statistics including means and standard deviations were used to characterize continuous variables, such as age, pain ratings, activity limitation items, and value of the educational information received. Frequency distributions and percentages were used to characterize categorical variables, including demographics, pain presence and location, surgical characteristics, and medical history. T tests were used to examine differences in pain severity, edema, and activity limitations for different groups (free or pedicled and immediate or delayed) and back pain prior to surgery. All measures were analyzed using the SPSS Statistical Package®, version 14.0 (SPSS Inc.).

Although follow-up evaluations were scheduled 28 and 56 days (four and eight weeks) after surgery, the actual evaluations ranged from 24–46 days after surgery ($\bar{X}$ = 32.3, SD = 4.8) for the four-week evaluation and 42–78 days ($\bar{X}$ = 57.9, SD = 9.1) for the eight-week evaluation. Differences in the planned and actual dates of data collection were a result of patient noncompliance at the time of the four-week evaluation. The eight-week evaluation was scheduled in conjunction with a doctor's visit, therefore affecting the desired data collection time.

Results

Demographics

Patients ranged in age from 34–67 years ($\bar{X}$ = 44.5, SD = 7.45). Fifteen of the 16 patients were Caucasian, representative of the patient population at the institution. Five were employed full-time outside of the home, five were employed part-time, five were homemakers, and one was disabled.

Clinical Factors

The sample was almost evenly distributed between free and pedicled procedures. All but three patients had reconstruction immediately after their mastectomy (see Table 1). Forty-four percent (n = 7) had prior chemotherapy as neoadjuvant treatment or because reconstruction occurred after adjuvant treatment. Thirty-one percent (n = 5) had previous radiation therapy, 56% (n = 9) had a history of back pain (see Table 2), and 38% (n = 6) reported lower back pain at baseline.

Frequency of Pain Reported Over Time

Thirty-eight percent (n = 6) of the study participants complained of lower back and other pain prior to surgery. Four weeks after surgery, 75% (n = 12) reported lower

Table 1. Characteristics of Transverse Rectus Abdominis Myocutaneous (TRAM) Flap Surgery

Characteristic	n	%
TRAM procedure		
Free	9	56
Pedicled	7	44
TRAM type		
Immediate	13	81
Delayed	3	19
Surgery location		
Right side	10	63
Left side	5	31
Both sides	1	6

N = 16

Table 2. Pertinent Patient History

Variable	n	%
Previous chemotherapy		
Yes	7	44
No	9	56
Previous radiotherapy		
Yes	5	31
No	11	69
Previous back pain		
Yes	9	56
No	7	44

N = 16

back pain, 69% (n = 11) reported abdominal pain, and 75% (n = 12) reported other pain. Eight weeks after surgery, 31% (n = 5) continued to report lower back pain, 38% (n = 6) reported abdominal pain, and 75% (n = 12) still reported other pain (see Table 3). Other pain at four and eight weeks was reported most often at the reconstructed breast site (see Table 4).

Mean Pain and Activity Limitation Ratings

Throughout the assessment, mean pain ratings were low. No mean was greater than 1.63. Four weeks after surgery, the mean lower back pain rating actually had decreased slightly from baseline, although the other mean pain rating slightly increased. By eight weeks, the mean pain ratings for all sites decreased from the four-week rating. The average duration of lower back pain for the 11 patients who reported it after surgery was 17 days (range 0.5–62 days).

Activity limitations because of pain were higher four weeks after surgery than at eight weeks. At the four-week evaluation, pain limited general activity, enjoyment of life, relationships, mood, and ability to work, walk, and sleep. By eight weeks, pain limited general activity, walking, work, and sleep. Limitations on relationships, mood, and enjoyment of life were back to baseline at eight weeks (see Figure 5).

Differences in Groups

Abdominal pain scores were higher for women with free flaps ($p = 0.027$) at four weeks than for those who received a pedicle flap. No differences were found in the groups concerning pain or activity limitation scores at baseline or eight weeks. In addition, no differences existed at four or eight weeks in immediate versus delayed TRAM flaps in overall mean pain score (combining lower back, abdomen, and other) or mean pain activity limitation scores at four or eight weeks. Women who had delayed TRAM flaps (n = 3) tended to have higher other pain scores at baseline ($p = 0.10$).

Women with a history of back pain had more lower back pain ($p = 0.007$) and tended to have greater limitations on activity ($p = 0.063$), sleep ($p = 0.066$), and relationships ($p = 0.104$) at baseline. Four weeks after surgery, those patients' lower back pain was more severe than those without a history of back pain ($p = 0.02$), and they seemed to have more pain at eight weeks ($p = 0.094$). They also tended to have more limitations with walking at eight weeks ($p = 0.094$).

Medications and Interventions That Aided in Abdominal or Lower Back Pain Relief

Oxycodone with acetaminophen was mentioned most often (n = 7) as an effective relief for lower back and abdominal pain, followed by codeine with acetaminophen (n = 5). Morphine sulfate was reportedly the most beneficial for abdominal pain (n = 3). Nonsteroidal anti-inflammatory drugs also were found to be helpful, more often related to lower back than abdominal pain (n = 6).

Patients reviewed a list of the nonpharmacologic treatments, stated whether they used the intervention, and indicated whether it was helpful in reducing lower back pain. Although few of the nonpharmacologic measures were used, the lumbar towel roll was helpful for some patients (n = 5). Others (n = 4) reported that a heating pad was helpful. A cold pack was helpful for two individuals, but not for two others. Pillows, support underwear, and sweatpants also were reported as helpful (n = 3). Nonpharmacologic interventions that reduced abdominal pain included resting with two pillows for support (n = 2), lying on one side with knees bent (n = 1), walking or exercising (n = 3), massaging the incision (n = 1), and reclining (n = 2).

Physical Therapy

Only one patient with delayed TRAM flap reconstruction had decreased shoulder flexion and abduction bilaterally at baseline. The patient demonstrated improved shoulder flexion on the surgical side at eight weeks, but no change in abduction. At eight weeks, five of the nine patients who underwent free TRAM flap surgery had reduced shoulder flexion on the surgical side, and two had reduced abduction compared to baseline measurements. Those changes were not noted in the pedicle TRAM flap group. Cervical or lumbar spine active range of motion did not change significantly from baseline to eight weeks in either group.

No significant changes were found in upper extremity strength from baseline to eight weeks. All findings were within normal functional limits. Abdominal strength was not assessed formally; however, patients' ability to isometrically

Table 3. Frequency and Location of Pain Reported

	Baseline				Four Weeks After Surgery				Eight Weeks After Surgery			
Location of Pain	**n**	**%**	**$\bar{X}$**	**SD**	**n**	**%**	**$\bar{X}$**	**SD**	**n**	**%**	**$\bar{X}$**	**SD**
Lower back	6	38	1.40	1.99	12	75	1.25	1.81	5	31	0.93	1.73
Abdomen	–	–	–	–	11	69	1.62	1.75	6	38	1.00	2.48
Other	6	38	1.53	2.50	12	75	1.56	1.36	6	38	1.09	2.35

N = 16

contract the abdominal muscles was assessed by palpatation and all patients were found to produce good contractions at baseline and eight weeks.

Arm circumference of each patient was measured and compared from baseline to eight weeks to assess for the presence of edema. The physical therapist reported significant change in one patient and minor changes in the other 15. Significant change was considered to be any change greater than 1 cm.

Patients reported excellent compliance with their home exercise programs at four weeks, with 94% stating they exercised at least once a day, with 44% continuing at eight weeks. Only one patient attended outpatient physical therapy at four weeks, but three patients attended at eight weeks. Patients reported attending physical therapy to regain range of motion and normal posture.

Baseline standing posture was assessed by plumb line (i.e., knee, pelvis, and head aligned over the ankle with deviations relative to location of the connecting line) and revealed mild rounded shoulders and slight forward head positioning for the majority of participants. No significant changes in posture existed at eight weeks.

Seventy percent (n = 7) of the participants who were employed returned to work within eight weeks of surgery, four of five to full-time and three of five to part-time work. One could not return to work because of chemotherapy side effects.

Helpfulness of Information and Suggestions

Four and eight weeks after surgery, patients were asked to rate how valuable the educational information was for pain management and resumption of usual activities. The information was rated as very valuable both times (see Table 5). Suggestions to improve nursing and physical therapy services included knowing in advance the various types of discomfort, expected progress, and emotional reactions. Other comments by patients indicated that they had been well informed by the interdisciplinary team, received great guidance, noted good interdisciplinary communication, and were thankful for the opportunity to talk to other women who had the surgery if they requested it.

Discussion

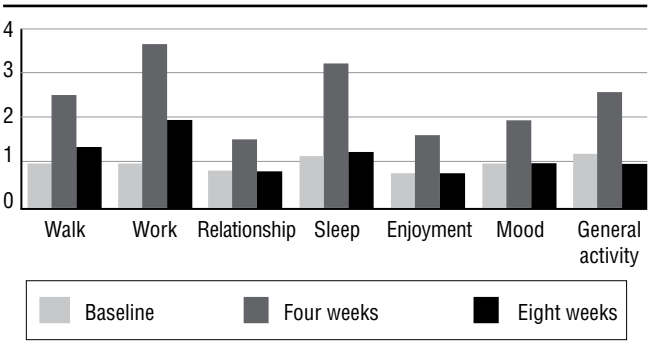
The main purpose of the present study was to assess pain and activity limitations and to determine realistic goals for recovery after a TRAM flap breast reconstruction in a standard rehabilitation and recovery program. A secondary objective was to assess patient satisfaction with educational information.

Table 4. Other Pain Sites Reported at Four and Eight Weeks Post-Transverse Rectus Abdominis Myocutaneous Flap Surgery

	Four Weeks		Eight Weeks	
Pain Site	**n**	**%**	**n**	**%**
Reconstructed breast	7	44	6	38
Underarm	2	13	2	13
Neck or back	3	19	1	6
Rib, side, and chest area	2	13	–	–

N = 16

Note. Some patients reported no pain whereas others reported pain at more than one site.



Note. Activity limitation scores were based on a scale of 0–10, with 10 indicating the most pain.

Figure 5. Mean Pain Interference Scores

Seventy-five percent of the women (n = 12) still had some degree of pain at four weeks ($\overline{X}$ = 1.48), but those reporting pain was reduced by almost 38% (n = 6) ($\overline{X}$ = 1.01) eight weeks after surgery. Although pain was present, it was at a low intensity. All of the patients reported that some type of pain medicine was helpful. The total duration of medication use was not assessed.

Seven women at four weeks and six women at eight weeks experienced pain in the reconstructed breast, which was unexpected because the nerves that provide sensation to the transplanted abdominal flap are transected when the flap is elevated. Because of this, the women had been told to expect numbness, not pain. The possibility of pain in the reconstructed breast should be added to standard patient education.

As expected, women with previous back pain had more lower back pain after surgery. Additionally, women with free TRAM flaps had higher abdominal pain scores at four weeks than women who had pedicle TRAM flaps. Although the removal of less muscle might be expected to result in less pain, the findings do correlate with those of Larson et al. (1999), who noted that patients who underwent free TRAM flap required pain medicine for a longer time period. Communicating those findings can help patients make informed decisions about which TRAM reconstruction is right for them.

Interestingly, the mean lower back pain score was higher at baseline ($\overline{X}$ = 1.4) than at four weeks after surgery ($\overline{X}$ = 1.25), which could be a function of the increased medication, physical therapy intervention, or decreased normal activity level. The one patient with decreased shoulder flexion on the surgical side also showed improvement at eight weeks, possibly as a result of physical therapist intervention.

Perhaps the reason that only three patients attended physical therapy was because of the high compliance with the prescribed exercises. Women reported that limitations on activities, work, and sleep continued at eight weeks ($\overline{X}$ = 1.4), reinforcing previous findings from Petit et al. (1997) and Zenn (2001) that full recovery can take more than eight weeks.

At eight weeks, 70% (n = 7) of the women who worked full- or part-time were able to return to work at baseline levels, which is consistent with other reports (Serletti & Moran, 1997; Vancouver Coastal Health, 2007). Some women reported that they felt fine at eight weeks but were overwhelmed once they returned to full-time work. Three of the five patients who did not work outside of the home and

Table 5. Information Value in Managing Pain and Resuming Usual Activities

	Four Weeks		Eight Weeks	
Variable	$\bar{X}$	SD	$\bar{X}$	SD
Managing pain	8.40	1.96	8.37	2.09
Resuming usual activities	8.56	2.06	9.00	1.32

Note. Possible range was 0–10, with 10 being most painful.

the one disabled patient reported continuing limitations at four and eight weeks.

Overall, women were highly satisfied with the interventions and educational information they received. The majority felt they were told everything they needed to know; therefore, the usual standard of care will continue with more information on other pain sites, the low level of pain commonly experienced, and the low scores for activity limitations at eight weeks incorporated.

Limitations

The current study adds to the limited knowledge on recovery time after TRAM flap breast surgery. Limitations included small sample size, patients of only one reconstructive surgeon, no control group without standard interventions, and the possibility that researchers may have transferred their positive feelings about the interventions to the patients.

Conclusion

Nurses and physical therapists positively influenced patient outcomes by educating patients about typical recovery times and useful interventions. The importance of nurses being knowledgeable about pain management after this particular type of surgery, as well as the exercises necessary to improve physical function and recovery, is evident. Patients can be reassured that, although pain may persist for as long as eight weeks, the levels are generally low and most activity can be resumed eight weeks after surgery. Future research could obtain additional information by assessing pain and activity limiations at discharge, before four weeks, and after patients return to work; when in their recovery patients stopped taking pain medicine; the effect of returning to work; and whether any relationship exists between routine abdominal exercising before surgery and pain after surgery.

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