PILATES FOR BREAST CANCER SURVIVORS

A Guide to Recovery, Healing, and Wellness

Naomi Aaronson, MA, OTR/L, CHT, CPI, CET
and Ann Marie Turo, OTR/L
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Ann Marie Turo, OTR/L
This book is dedicated to Beth Mast, an occupational therapist and Pilates practitioner who has used Pilates to recover from breast cancer and who is now using Pilates on her journey through living with metastatic cancer. Beth says that, “Pilates can be done by even the weakest.” It was the only exercise that she could tolerate after going through chemotherapy and becoming increasingly anemic, unable to stand even to brush her teeth.
Learning to live with cancer is an art, not a science. Each person must find her own way, in her own style. What is important to realize is that a way can be found regardless of the circumstances and prospects.

—Jane E. Brody
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Ann Marie’s Journey through Breast Cancer

I was always a person who exercised, took a whole arsenal of vitamins, read everything on health and fitness, and ate correctly. As an occupational therapist, I prided myself on being up on my health and well-being. So when I got the diagnosis of breast cancer, I was in shock. How could this be? But in January of 1991, my doctor found a tiny lump the size of a pea in my left breast. My breast cancer journey began.

My mind was telling me: They read the wrong pathology report: **DENIAL.** I took care of myself how could this be: **ANGER.** If I could just have my health back, I’ll never stand in front of the microwave again and will only eat organic foods: **BARGAINING.** There were days I couldn’t dress myself, or days that I would put the same clothing on that I had dumped on the chair the night before: **DEPRESSION.** These stages should sound familiar to every person who has been diagnosed with a life threatening illness or disease. Many people will go through at least one or all of the Kübler-Ross stages of grief.

I was lucky. I received a lumpectomy/partial mastectomy and clean margins were reached.

In 2001, eleven years after my first diagnosis, breast cancer came knocking at my door again in the left breast. At that moment, I felt a sense of acceptance as I knew what I needed to do, but immediately, I moved again into the denial stage. I told my doctor that “I was here today for my yearly mammogram and not for surgery.” The cycle of anger, bargaining, and depression repeated itself.

When you are diagnosed with a disease such as cancer, your life changes from that moment on. You begin to think about your future, and whether you will be here one year from now. You also think about what is important to you and your family, and what life really means to you. You make decisions based on the information that is available to you. You think about what you are willing to endure. The what ifs and the if nots play around in your head. But each of us is different and will make different treatment decisions. I made mine based on what I felt would provide me the best chance of survival and quality of life.

In 2002, three months after another partial mastectomy, I decided to enroll in Pilates reformer training (a reformer is a piece of resistance exercise equipment designed by Joseph Pilates). I had been trained in
mat Pilates in 2001, but felt this was a natural next step. I got the OK
from my surgeon and moved forward. When I look back on it today, it
wasn’t the best decision. I was not completely healed, had poor endur-
ance, left shoulder tightness, and my scapula was nowhere to be found!
My proprioception (awareness of my own body in space) and kines-
thetic awareness (my ability to sense movement) was so poor that I
had no clue where my left arm was or what it was doing. The training
was tough, but I kept on telling myself, “If I got through breast cancer,
I could get through anything.” I don’t recommend that you start with
reformer training, but Pilates is an excellent way to heal. Pilates was the
best thing for me then. It helped me regain my strength and the confi-
dence to navigate the world after undergoing life changing surgery and
treatment. The deep breathing along with the specific Pilates exercises
in this book helped me to focus and relax, as well as stretch my tight
chest, side, and back muscles. Finally, Pilates offered me the opportunity
to regain control over a body that had betrayed me as well as providing
a safe and nurturing space to relax and focus on healing and recovery.

That saying, “It’s the journey not the destination,” is so true. Pilates
has come full circle for me in the healing process, as now I am sharing
this modality with my patients and other health professionals. In 2004,
I opened Integrated Mind & Body, a health and wellness studio, and
completed my yoga, Pilates, and Reiki training. It was important to me
to offer a range of mind-body therapies in addition to traditional reha-
bilitation techniques in order to holistically and optimally meet patient
and client goals.

Naomi and I met at the Cotting Connection Conference in Boston
in October 2007. The medical community, patients, and vendors were
brought together to learn about some of the new and innovative treat-
ments in the area of breast cancer treatment and rehabilitation. Naomi
had a vendor table set up with her breast cancer CDs, courses, and
books on exercise for breast cancer recovery and had presented a ses-
sion on exercise. We are both occupational therapists with an emphasis
upon improving function and wellness as well as fitness professionals,
so we had a lot in common. We discussed doing a course together one
day, exchanged business cards, and went our separate ways.

In December 2007, Naomi contacted me and asked if she could
interview me for an article in Advance for Occupational Therapy
Practitioners that was entitled “Movement Towards Healing.” We
then decided to integrate our passion for the healing properties of
movement and the power of occupational therapy to rehabilitate
cancer survivors. We formed a company named Integrated Rehab
and Fitness with the goal of educating other rehabilitation and fit-
ness professionals. In September 2008, we presented our first course
“Breast Cancer Rehabilitation Using a Pilates Based Approach” in Natick, Massachusetts. Since then, we have spread the word to therapists and other rehabilitation professionals about the benefits of Pilates for breast cancer survivors. Our CD *Return to Life: Breast Cancer Recovery Using a Pilates Based Approach* is available for continuing education at home. We are excited to be able to bring our information to breast cancer survivors throughout the world through publication of this book!

Our goal with this book is to help you heal, regain control, strength, and confidence, and be able to perform daily living tasks more easily, whether or not you’ve ever done Pilates before. We’ve provided various programs and modifications so that no matter where you are in treatment, what side effects you may be experiencing, or your general fitness level, you will be able to find exercises you can do comfortably and safely and achieve benefit. However, to attain wellness, exercise alone is not enough; you must adopt habits and behaviors that promote an improved quality of life. Wellness is a lifelong journey: a process of growing. Unfortunately, cancer treatment has some long-lasting effects. In the final section of the book, we’ve included ways to deal with issues such as chemo brain, sleep deprivation, and peripheral neuropathy.

Throughout the book, we’ve also included the experiences of other survivors who have used Pilates as part of their journey to health. We hope you’ll find their reflections and insights helpful:

**Beth Mast**, who is an occupational therapist as well as a Pilates instructor, underwent 16 months of treatment, including a double mastectomy, breast implants, chemotherapy, and radiation, and used Pilates daily. It helped her battle scar tissue, maintain strength and range of motion in her arms, address sensory issues such as sensitivity to touch, and move through menopause.

**Nicole T.** felt pain in her chest immediately after surgery, and was unable to sit up without assistance for two weeks after undergoing a mastectomy and breast reconstruction with saline implants. She had difficulty raising her arms, but this got easier over time. The more she did, the better she felt. The repetition was important to her. She warns other women beginning a Pilates routine that you will receive a lot of information at once and may not be able to absorb all of it. So you may have to re-visit the basics throughout your recovery. She found that it felt good to be in the company of people who understood her condition. When she finished her Pilates exercise sessions, Nicole left feeling loose and optimistic.

**Grace T.** had bilateral preventive mastectomies followed by silicone implant breast reconstruction. She had tenderness in both shoulders, tightness across her chest, and weakness in her arms. She felt beaten up, tired, sensitive, weak, and bloated. Gaining back strength and flexibility
contributed to her confidence and reconnection with her body. This helped her to feel better emotionally. “Pilates is a great way to recover, as it seems meant for people recovering from illness as well as getting back to physical fitness.”

Sharon B. had a lumpectomy with sentinel node biopsy, followed by a second surgery for clean margins, radiation, and chemotherapy. She experienced pain and muscle tightness at her scar sites and limited range of shoulder motion. Exercises such as Wall Angels, Swimming, and Scapula Protraction and Retraction have helped her recover.

Nancy M. had a lumpectomy and radiation. The Pilates exercises that stretched her side and strengthened her core helped her the most. She encourages others to start a program of Pilates immediately. “Do not wait until the situation has progressed to a point where your body has become rigid from under movement. Pilates integrates well with breast cancer recovery, as the focus is on thoughtful movement or movement with intent.”

Bonnie O. is a personal trainer who knows how important movement is. She experienced surgery and chemotherapy. Immediately after surgery her body felt like it had been hit by a truck, and in the weeks and months following she primarily felt tightness in the chest and shoulders, as if a belt was buckled tightly around her ribcage. She developed cording in her right arm, where she had 16 lymph nodes removed, and a frozen shoulder. Exercising regularly, focusing on regaining flexibility, and keeping her core strong aided her recovery.

We’ve made it our mission to educate others about the benefits of an integrated approach to rehabilitation and recovery. We hope this book will help you achieve maximum wellness, now and throughout your journey living life after cancer. This is your action plan for health!
Acknowledgments

Alexander Gence for providing his expertise in photographing models. Our Pilates models Diana Laird and Cheryl Lanava Gence for their patience while undergoing numerous takes of the photos.

Our brave breast cancer survivors who were willing to help others through their cancer journey: Beth Mast, Grace T., Sharon B., Nicole T., Nancy M., and Bonnie O.
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Pilates for Breast Cancer Survivors:
A Guide to Recovery, Healing, and Wellness
PART I

Introduction to Pilates for Breast Cancer
Why Pilates for Breast Cancer?

Pilates is a gentle form of exercise that engages the mind, body, and spirit. The various exercises in Pilates help to develop muscular flexibility and strength while increasing metabolism and promoting lymphatic, respiratory, and circulatory function. They improve balance and coordination and will also help you to “get centered” and relax. Pilates is able to meet you where you are, and it can be done throughout your life and wherever you are, even while seated. For these reasons, it is an excellent approach to healing for breast cancer survivors.

Pilates was first developed by Joseph Pilates to strengthen muscles, increase flexibility, and improve overall health. It is a mixture of yoga, martial arts, and gymnastics. He first taught his method as “Contrology,” a mash-up of Eastern and Western philosophies and techniques, to a small group of devoted teachers and students in the United States after emigrating from Germany following World War I. Years later, in the 1950s, Pilates used his method to rehabilitate dancers at his studio in New York City without receiving much recognition for his method.

One of Pilates’s first protégés was Eve Gentry. She was rehabilitated by Joseph Pilates after a radical mastectomy. She was able to regain full use of her arm and torso, which is remarkable since all of her lymph nodes and chest muscles, as well as breast tissue, were removed with this procedure. Doctors could not believe the success that she had obtained with the Joseph Pilates method. Pilates was a man ahead of the times. Fortunately, research is now being conducted that documents the benefits of Pilates for breast cancer recovery.

What are the benefits of Pilates?

Beth Mast has used Pilates daily throughout her breast cancer journey. It is a form of exercise that is always available to her, even on really bad days. Here are the benefits Beth has found with her Pilates practice:

1. You can do Pilates in many different positions: supine (on the back), prone (on the stomach), side lying, standing, or seated.

2. The exercises and equipment can be modified for any level.

3. You will be able to use the affected arm(s) more easily and naturally since Pilates is a whole body exercise system that includes the arms and legs in the movements.

4. The principles help you to live in the moment by keeping you focused on moving properly, with control, and without momentum.
5. Deep rib cage breathing and the multidimensional breathing patterns help to ease tension, foster lymphatic drainage, and stretch tight areas affected by scars.

6. Pilates provides a gentle introduction or reintroduction to exercise.

7. Pilates increases muscle strength, especially in the back of the shoulders and middle back where you need it after breast cancer surgery.

8. Pilates increases your ability to perform activities of daily living (ADL) as you build core strength allowing you to roll over and move from different positions more easily.

9. Pilates improves muscle proprioception and kinesthesia, often lost after surgery where nerves and muscles may have been inadvertently cut.

10. Pilates strengthens the transverse abdominis: a muscle that is very important for back stability and strength after a TRAM flap (transverse rectus abdominis myocutaneous) or DIEP flap (deep inferior epigastric perforator) breast reconstruction procedure.

11. Pilates can help with bladder control problems such as stress incontinence, a common complication of menopause. Many treatments for breast cancer can induce menopause in women who are not yet menopausal. Pilates helps by strengthening the pelvic floor muscles, which are the muscles responsible for bladder control.

12. Pilates takes the focus off of the damaged areas of your body and what you can’t do and reinforces what you can do. You’ll appreciate all of the movement your body is capable of, no matter how “small” or limited at first, and its capacity to heal.

The “American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Survivors” recommend that breast cancer survivors should avoid inactivity and return as soon as possible to normal activities after surgery and during radiation and adjuvant treatment (chemotherapy, hormone therapy, and/or targeted therapy). They recommend regular physical activity, strength training at least twice a week, and to aim for 150 minutes of exercise per week.

Physical activity offers other benefits for breast cancer survivors, such as the following.

- Boosts positive mood
- Improves physical condition and movement
● Improves body image
● Increases sexuality
● Decreases depression
● Decreases fatigue
● Maintains bone health

We know that exercise is good for us. We just need to start somewhere and feel safe. Pilates is a gentle, safe place to begin.

What does the research say?

The first study on the benefits of Pilates for breast cancer survivors was completed by physical therapists in 2008. It was a pilot study with only four participants, so the conclusions we can draw from this study are limited. They found that Pilates increased the flexibility of the affected arm after a 12-week program during which participants exercised three times a week.

Another study, done in 2010, examined the effects of Pilates exercises on functional capacity, flexibility, fatigue, depression, and quality of life in female breast cancer patients. Pilates was performed three times a week for eight weeks. After participation in the Pilates exercises, improvements were noted in the subjects’ levels of fatigue, flexibility, quality of life, and performance on a six-minute walk test. This study proved that Pilates was safe and effective for breast cancer survivors.

The most recent study, published in 2012, found that after 12 weeks of Pilates 13 participants improved their shoulder and neck flexibility. Improvements were noted in quality of life, body image, and mood. Although volume increased on the affected arm (a sign of lymphedema), one must note that this program did not modify the exercises for the class and that the sessions increased in frequency over the 12-week period.

What are the issues faced by breast cancer survivors?

You have done your best to follow your medical treatment plan, but there may be some lingering physical, emotional, or cognitive issues. Breast cancer surgery involves removal of tissue and lymph nodes from the breast region. Due to the large area that the breast tissue covers, you may experience difficulty performing daily life activities, working, and caring for your children. In addition, chemotherapy and radiation can cause a variety of side effects such as fatigue and nausea.
Here are some things to look out for during and after your treatment. An occupational therapist or physical therapist will be able to help you regain your functional abilities, make recommendations for assistive devices, or train you in alternative methods of performing your life tasks. The good news is that rehabilitation, including the Pilates program outlined in this book, can help you get stronger, regain function, and alleviate these side effects.

1. **Lymphedema** is one of the most common conditions faced by survivors after removal of lymph nodes and/or radiation. Early recognition is important for treatment. Although there is a significantly lower rate of lymphedema for sentinel node biopsies (the node that is the first to receive lymphatic drainage is called the sentinel node), one is still at risk. Thus, you are at risk for lymphedema both for axillary lymph node dissections as well as sentinel node biopsies. Know what type of surgery you had, whether lymph nodes were removed, and any precautions to follow. Be sure to educate yourself about strategies to decrease risk.

Lymphedema is characterized by a feeling of fullness, achiness, decreased movement, tightness, heaviness, or tingling in the chest wall, arm, shoulder, neck, trunk, breast, and/or hand due to abnormal accumulation of protein rich fluid. You may notice that jewelry is tight or that your clothes don’t fit properly. Lymphedema is the buildup of fluid in soft body tissues when the lymph system is damaged or blocked from breast cancer surgery and/or radiation. The lymphatic system is responsible for removing waste products, fighting infection, and regulating body fluid balance. After the surgery, your lymphatic system may lose its ability to perform these functions, causing a “traffic jam” or buildup of lymphatic fluid.

If you note the above, ask your doctor for a referral to a certified lymphedema therapist who can perform a special type of massage to reduce the traffic jam and divert this build up to other “roads” in your body. Your doctor may recommend bandaging or wearing a special garment that applies pressure to the arm, as well as a glove called a gauntlet, on a daily basis.

2. **Loss of range of motion and strength in the affected arm(s).** Since there is so much loss of tissue, you can experience decreased flexibility in the chest, trunk, and shoulder regions, impairing your ability to perform daily life tasks such as dressing, making your bed, and reaching for items.
3. **Pain** can be an issue after surgery that can affect the neck, shoulder, chest, and arm, thus impairing mobility and strength. Postmastectomy pain syndrome (PMPS) is chronic pain that is thought to be caused by nerve damage after surgery. You may experience burning or shooting pain in the underarm, arm, shoulder, or chest wall. Drain sites may be painful as well.

4. **Scar tissue** may cause tightening under the arm and around the incisions, drain sites, and reconstruction sites. Scars can be itchy and painful. Your therapist can show you how to perform scar massage or recommend silicone pads to decrease scar thickness and redness.

5. **Axillary web syndrome or “cording”** may be seen soon after lymph node removal but can occur any time after having lymph nodes removed. You may notice an inability to straighten your elbow and bring your arm out to the side. There is usually a visible, tight cord from your armpit down the arm, and pain in the armpit or when bringing your arm out to the side.

6. **“Chemo brain”** refers to the cognitive changes caused by chemotherapy such as changes in attention, concentration, working memory, and executive function. Prevalence rates can range from 17% to 75% in individuals with breast cancer. Perceived cognitive difficulties are more commonly reported than objective measurements from testing, so be sure to let your provider know if you are experiencing cognitive challenges.

Nicole T. felt that chemo brain was the hardest thing to deal with after treatment. It was something that she was not warned about, so she was surprised and unprepared for it. She was unable to remember things and speak the way that she had before undergoing chemo treatments. She had difficulty remembering how to do the Pilates exercises that she had to perform at home.

It is important to let health care providers know that you have cognitive challenges such as difficulty multitasking or remembering simple things. Ask your doctor for a referral to an occupational therapist who can evaluate your cognitive functioning and recommend some simple adaptations to your daily routine. Medication may also prove beneficial if warranted.
Chemotherapy-induced peripheral neuropathy (CIPN) is damage to and lack of function of the peripheral nerves—the motor, sensory, and autonomic nerves that connect the brain and spinal cord to the rest of the body. It results from chemotherapy drugs and can cause a lack of sensation in the hands and feet. There may be numbness, decreased sensitivity to heat and cold, decreased feeling of light touch, decreased position sense, tingling, or pain from drugs such as Taxol, carboplatin, cisplatin, or vinorelbine. There can be a high risk for falls, so caution when standing, walking, or running is advised. To determine if you may be experiencing CIPN, ask yourself: Do I drop things? Do I have difficulty walking? Do I have difficulty climbing stairs? Do the sensations interfere with my ability to work or perform daily activities? (Cooking, cleaning, dressing, writing, and typing may be affected.)

The National Comprehensive Cancer Network Panelists agreed that transcutaneous electrical nerve stimulation (TENS) can be a helpful adjuvant therapy for CIPN in those with contraindications or for whom pain medication is ineffective. Also, acupuncture may be considered an adjunct option in treating patients who do not respond to medication. In addition, occupational therapists or physical therapists can prove invaluable by recommending alternative ways to strengthen the affected areas and modify daily activities with special equipment. Since Pilates can be performed in seated or supine positions, it is a safe form of exercise to build strength without worry of falling.

Bone metastasis is the spread of cancer cells from the initial area of cancer through the bloodstream to the bones. This can damage the bones, making them weaker and more likely to break. Bone metastases are a common cause of pain. The most common sites of bone metastases are the upper arms and legs, pelvis, rib cage, skull, and spine. Bone metastases can wear away portions of the bone, leaving small holes. Thus, the bone becomes more vulnerable to fracture. One needs to be careful with exercises that can increase your risk of fractures. The seated Pilates program would be the safest and most recommended program for you to participate in to decrease your risk of falling. It would be best to work with a therapist who specializes in breast cancer and knows how to modify the exercises for you if your breast cancer has metastasized to the bone.
9. **Osteoporosis or osteopenia** is thinning of bone mass and density. You may have a higher risk of breaking a bone. The bones most likely to fracture are in the spine, wrist, and hip. Risk factors include getting older, being small and thin, a family history of osteoporosis, and low bone mass, or osteopenia. Chemotherapy and hormonal treatments such as Arimedex, Aromasin, or Femara, as well as ovarian shutdown, can contribute to bone loss. Be sure to check with your medical provider about a dual-energy x-ray absorptiometry (DEXA) scan to get a baseline measure of your bone density. Make sure to get enough calcium. Usually, 1200 mg of calcium and 600 IU of vitamin D per day is recommended for women over 50. Weight-bearing exercises that put weight on your joints, such as walking, dancing, lifting weights, and the standing program in Pilates, also build bone strength. Please be sure to check with your medical provider before beginning any exercise plan.

10. **Cancer related fatigue (CRF).** Approximately 58% to 94% of breast cancer patients experience CRF. It is the number one problem with cancer survivorship, and is a persistent state of tiredness related to cancer or cancer treatment. Women who undergo surgery, radiation, and chemotherapy experience the most fatigue. It can affect your sense of well-being, your ability to work and perform ADL, and your relationships with family and friends. Aerobic exercise such as walking, biking, and Pilates has been found to help with this fatigue. In addition, anemia or low red blood cell count impairs the body’s ability to carry oxygen. Be sure to know your blood counts to see if you are anemic during chemotherapy, as you may need to scale back your exercise.

11. **Cardiotoxicity** is damage to the heart from chemotherapy treatment. Thirty-three percent of breast cancer survivors may experience a cardiotoxic treatment effect. Be sure to have your weight under control and to stop smoking to decrease risk.

Nicole T. struggled with fatigue. She found that she often had to stop what she was doing and lie down. This made it difficult for her to return to her fast-paced job. She was unable to carry out the duties and responsibilities that she had prior to breast cancer. This was extremely frustrating for her, but Pilates helped her regain her energy.
12. **Impaired sensation after surgery.** This can include sensations near the incision, phantom sensations (feeling that the breast is still there after a mastectomy), or chest tightness related to tissue expanders. There have been 18 sensations reported after breast surgery, including tenderness, soreness, pulling, aches, pain, twinges, tightness, stiffness, pricking, throbbing, shooting, tingling, numbness, burning, hardness, sharpness, penetrating, and nagging. These sensations can come and go.

13. **Arthralgias** are indicated by joint pain and stiffness. One recent study found that 50% of breast cancer survivors had this condition, and 10% of those women were on Tamoxifen. You may especially notice morning stiffness in your hands or knees, as with arthritis.

14. **Weight gain.** This is probably the last thing you want to think about now. Weight gain during treatment adds insult to injury after hair loss, skin changes, and other side effects that affect your appearance. If you are overweight, using a combination of healthy diet and exercise is the best approach to get back to a healthy weight. Your ideal weight depends upon your height, so recommendations are based upon BMI (body mass index). It is a measure that combines height and weight. A BMI that is between 18.5 and 25 is considered healthy. The BMI Calculator app, from the National Institutes of Health, available on iOS devices, offers an easy way to determine your BMI. This information is important because weight gain may increase the risk of breast cancer recurrence. More evidence has suggested that heavier survivors are more likely to die from their cancer. Obesity also increases the risk of other health problems such as diabetes or heart disease. Having a healthy diet and participating in a regular exercise program can be a lifesaver!

Some suggestions for getting back to a healthy weight include:

- Eating at least 2 ½ cups of vegetables and fruits every day
- Choosing 100% whole grain foods like brown rice and quinoa
- Limiting red meat and processed meat; you can get protein from chicken, beans, or fish instead
- Cutting down on bad fats (saturated and trans fats) and eating more polyunsaturated and monounsaturated fats such as olive oil
- Exercise: Slowly build up to 30 minutes or more of moderate aerobic activity such as brisk walking or riding a stationary bike for five or more days a week, an equivalent of 150 minutes per week. Engage in strength training twice a week (Pilates counts!).
What muscles are affected by breast cancer surgery?

For the best rehabilitative experience, it is important for you to understand the muscles and other anatomy that have been affected by your breast cancer surgery. We will now explain which anatomical structures have been affected, where they are, what they do, and why you need to rehabilitate after surgery.

If you received a lumpectomy (Figure 1), the cancerous tissue was removed along with a margin of clean tissue. Usually, a sentinel node biopsy is performed along with this procedure, and if the node is positive (indicating cancer) then an axillary lymph node dissection (usually removal of 12–15 lymph nodes) is performed. Since tissue has been removed from the axillary area (the area directly under the joint where the arm connects to the shoulder, also known as the armpit or underarm) this can affect your ability to raise your arm up toward your head, to the side, behind your back, or behind the head as a result of scar tissue build up.

Mastectomies (Figure 2) and modified radical mastectomies (Figure 3) remove more breast tissue and modified radical mastectomies also remove lymph nodes. These procedures can result in more disfigurement as well as loss of range of motion and function.

Did you know that the breast area is very large and extends from the clavicle bone to the last four ribs and from the sternum to the underarm? Breast tissue overlies the uppermost portion of the *rectus abdominis* (Figure 4) as well as the *pectoralis major* (chest muscle) (Figure 4). As a result, the *pectoralis major* can be affected by breast cancer surgeries, especially mastectomies, making shoulder and arm movement difficult to the side, to the back, behind the head, or behind the head as a result of scar tissue build up.
head, and up. This can even affect movement of our ribs during deep breathing.

Other shoulder and scapula muscles that can be tight and limited include the *serratus anterior* and *latissimus dorsi* (Figure 4). In addition, the *rectus abdominis* can be affected, especially if you received a TRAM flap reconstruction or a mastectomy.

The *pectoralis major* (Figure 4) lies right behind the breast tissue. Its job is to help move the arm up, and rotate the arm downward and toward the side. It gets stronger when you do push-ups. This muscle is usually extremely tight, especially after mastectomies, as a result of scar tissue.

The *serratus anterior* rotates the *scapula* (shoulder blade) up and forward, called protraction. Axillary lymph node dissection might affect this muscle. For example, when you reach out to hug your significant other, this muscle is being used. It might be tight and weak after surgery.

The *latissimus dorsi* (Figure 4) moves the arm behind one’s back when you scratch and also toward your side. Axillary lymph node dissection can also affect this muscle. We use this muscle to push up off a chair. It can be used in breast reconstruction and pulled forward onto the breast region.

The *rectus abdominis* bends the trunk forward, for example when you bend to put your socks and shoes on. This is the area that everyone is always trying to strengthen to get a “six pack” appearance. It also inserts at the ribs and is involved with Pilates breathing. The rectus abdominis is used along with fat to form a breast after a mastectomy for a
TRAM flap reconstruction. Using this muscle, can affect the strength of your core and may lead to back problems later on.

The good news is that Pilates can help rehabilitate all of these muscles.

How does Pilates help?

Pilates promotes shoulder mobility by working the scapula muscles and emphasizes good scapula stabilization. Many of the exercises, such as Scissors, Mermaid, Cane Raises, Scapula Elevation and Depression, and Scapula Protraction and Retraction, will stretch and strengthen each of the muscles mentioned above.

In addition, you will engage your Pilates “powerhouse,” or core, which consists of four muscles. These are the transverse abdominis, multifidus, pelvic floor, and diaphragm.

The transverse abdominis (Figure 5) acts like a corset around the trunk to draw in the abdominal muscles. It is the deepest layer of abdominals. When it contracts, it acts with the multifidus muscle (Figure 5) in the back to stabilize the trunk. The multifidi are small muscles on either side of the spine. The function of the pelvic floor (Figure 5) is to hold the contents of the abdomen against gravity, including the flow of urine and feces. The pelvic floor works in conjunction with the diaphragm. Interestingly, when you activate the transverse abdominis for all your Pilates exercises, your pelvic floor is engaged. It can be difficult to feel when these muscles are being used. Next time when you urinate, try to stop the flow of urine. When you do this, you activate the pelvic floor. When you use the adductor muscles (muscles in the inner thigh) to squeeze a ball between the knees, you can help to wake up these muscles. As we get older, with certain medical conditions, or after pregnancy, the pelvic floor tends to lose strength and endurance, causing bladder control problems.

Finally, the diaphragm (Figure 5) is the primary muscle of respiration. It too works in conjunction with your transverse abdominis. Pilates breathing is sometimes called rib cage breathing, as the rib cage and chest expands three dimensionally (to the front, sides, and back) stretching the tight pectoralis major. Pilates breathing helps to facilitate movement, improves your lung capacity, and focuses the mind.

These four muscles all connect to the spine and foster spinal stability. Learning to activate your core will help to stabilize your spine when lifting, walking, running, or jumping. It will also help prevent abdominal weakness after TRAM flap breast reconstruction surgery, which can lead to
back problems and impair your ability to move your trunk forward, such as when bending to tie your shoelaces.

Working these four muscles will also help to improve your posture. Good posture allows you to start from a position of strength. After breast cancer surgery, you may tend to position the affected arm (or arms) next to your side like a broken wing. Your back may round from the tightness and pain in the breast and axillary region where lymph nodes were removed. Opening up the chest and straightening the back through Pilates is important to restore breath, flexibility, and back and shoulder flexibility. In addition, proper posture can help you avoid other problems down the road. For example, a slouched posture puts a lot of pressure on the discs of the lower back. Imagine what is happening to your body after eight hours of working while seated in this posture!

Pilates teaches you to develop and use core strength rather than using more superficial muscles. This allows the shoulders to relax, the neck and head to move more easily, and relieves stress on the hips, legs, and feet. It takes stress off of the compressed organs and improves circulation.
How to Use This Book

This book includes stretches to help you get warmed up for Pilates and four different Pilates programs. Each program is divided into three phases. Phase 1 exercises will help improve your range of motion. Phases 2 and 3 are designed to improve your strength and endurance. Progressing through each phase in order will help you to safely advance and meet new challenges. Listen to your body. If treatment concerns or side effects prevent you from moving beyond Phase 1 of the program you choose, that’s OK. Side effects from chemotherapy can be especially debilitating, so be sure to pace yourself and rest when needed.

Part II: Stretches: These stretches focus on the shoulders and neck, which is often tight after surgery and can contribute to loss of motion in the shoulders. Take a warm shower and do these stretches at the beginning of your exercise time as well as at the end.

Part III: Mat Pilates: If you are able to transition onto a mat, then this program is for you. Lying down on a mat in supine will help you relax and feel your muscles against the floor.

Part IV: TRAM or DIEP Flap Program: If you’ve had breast cancer reconstruction surgery using the abdominals, this progressive program is designed for you.

Part V: Chair Pilates: If you cannot get down on a mat yet or are unsteady on your feet, begin with this program.

Part IV: Standing Pilates: A more challenging program for those who would like to increase weight-bearing exercise and improve balance.

Pick a section that is most applicable to your situation and with which you feel most comfortable. For example, if you cannot get down to the floor or have difficulty flexing your trunk, then chair Pilates will work for you. If you would like to build and maintain healthy bones through weight-bearing exercise (any activity you do while on your feet and legs that works your muscles and bones against gravity) and do not have peripheral neuropathy or numbness in your feet, then standing Pilates is an excellent option.

Remember to be kind to yourself and listen to your body. Start gradually and remember that pain is a sign that you are working too hard.
On a scale from one to ten, you should feel that you are working between a three and five, with one being very mild discomfort and ten being pain such as when giving childbirth. You might feel some mild discomfort, but you should not feel pain. Breathing deeply with the Pilates breathing will help you move through more difficult movements. You should feel a mild stretch, but always work in a “pain free” zone. In the beginning, you might only be able to do three to four exercises, and that’s OK. This book is not intended to overwhelm you but to provide choices! Gradually increase the number of exercises as your strength and endurance returns.

Do the exercises every day or as often as you are able each week. The more consistent and frequent you are with your exercise, the better you will feel.

Getting started

- Establish a quiet place for your practice. However, music or other calming audio, such as from an app, can be used if it soothes you.
- Make sure you have enough room to place a bath towel or a yoga or Pilates mat down on the floor to cushion the spine and lower back.
- Wear loose, comfortable clothes so you can move freely.
- Mat Pilates is usually performed barefoot, without shoes or socks. However, hard soled shoes may be worn when performing chair or standing Pilates.

You do not need to buy a lot of expensive equipment to do Pilates. Some props you can easily find around your home, such as a towels, pillows, dowels, or poles. Before buying weights, start with soup cans or filled plastic water bottles from the pantry. As your strength returns, you may find the following props useful:

- Pilates mat or bath towel. Note: a Pilates mat is thicker than a yoga mat.
- Pad, small pillow, towel, block, or other bolster to place under your head to position the neck correctly, under hips when lying prone, or to protect the breast area after reconstruction.
- Bed pillow to be placed behind back if needed during chair Pilates.
- Resistance band
- Hand weights (1–2 pounds)
- Weighted balls
Magic Circle

Dowel or pole (an umbrella can be used as an alternative)

Medium-sized playground ball (7–9" in diameter)

Large-sized therapy ball (size depends on your height; 55–65 cm in diameter is appropriate for people 5'1"–5'8" tall)

Additional tips

1. Stretch before and after Pilates or take a warm shower to warm up the body.

2. Review the Pilates principles so that you understand what is important to do in each exercise.

3. Read the directions for each exercise carefully, note any props that may be required, and perform the modifications if needed.

4. Concentrate on a few exercises at a time and try to master those before moving on to more difficult exercises.

5. If an exercise is too difficult or painful, please ask a rehabilitation therapist or Pilates instructor for help, decrease the repetitions, lower the affected arm, or eliminate the exercise. You may experience a gentle pulling the first few weeks before the incisions have healed. Always breathe deeply while performing the exercises, and do not rush through them.

Always consult with your physician or health care provider before beginning an exercise program. Stop exercise and contact your doctor if you have any of the following symptoms both during or after exercise, especially when undergoing chemotherapy:

- disorientation
- dizziness
- blurred vision or fainting
- a sudden onset of nausea or vomiting
- unusual or sudden shortness of breath
- irregular heart beat
- palpitations or chest pain
- leg/calf pain
- muscle cramps
- sudden onset of muscular weakness or fatigue

This is a sample from PILATES FOR BREAST CANCER SURVIVORS: A GUIDE TO RECOVERY, HEALING, AND WELLNESS

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6. Do a few exercises two to three times each day to build up your strength and endurance.

7. Always alternate the exercises that focus on the arms with exercises that emphasize the legs to prevent arm fatigue, and rest when needed.

8. Once your range of motion goals have been achieved and you feel comfortable performing the Phase 1 exercises, try the Phase 2 and then the Phase 3 exercises to get stronger. If you are at risk for lymphedema (lymph node removal and/or radiation treatment), you should wear a sleeve and a gauntlet (glove) when performing resistance exercises using weights and/or bands, especially during Phase 2 or Phase 3.

9. Always remember to breathe by inhaling through the nose and exhaling through the mouth.

10. Drink plenty of water to stay hydrated.

11. It usually takes at least four weeks to establish a habit. Be patient, and keep doing your exercises.

The Pilates Principles

These principles guide each Pilates exercise to ensure that they are done correctly and safely. In Pilates, less is more. The emphasis is on a correct starting position with proper execution of the exercises. There is no wasted movement in Pilates. No more than five to eight repetitions are completed (except for the Hundreds). Breathing during each exercise is very important.

Concentrate on the correct movement patterns first and then add Pilates breathing.

If you’ve never done Pilates before, this may sound like a lot to think about. If possible, we recommend working with someone who is trained in Pilates first to get you on the right track.

1) Breathing

Breathing oxygenates the blood and connects the mind and body. It is the link between the sympathetic “fight or flight” and the parasympathetic “calming” nervous system. Breathing during Pilates will enhance your relaxation, improve your focus, and help to activate your muscles. Each breath is used to initiate and support movement in Pilates. You’ll want to connect your breath to every Pilates movement. For the purpose of this book, this means inhaling to prepare for the exercise and then
exhaling with each movement. However, this can vary from one exercise to another.

Pilates breathing is called “rib cage breathing” or costal breathing because the rib cage expands as you inhale and knits together as you exhale.

Inhale through the nose as if to smell the roses. Place your fingers on your rib cage and feel your rib cage expand.

Exhale through pursed lips as if to blow out candles, drawing the belly in toward your spine. This activates the transverse abdominis muscle. The deeper the exhalation, the more this muscle is activated. Activation of this muscle should feel very gentle, as it is more like a subtle tightening of the abdomen. The lower back and pelvis should remain still. Buttocks and thighs should stay relaxed.

Coordinating the breath with the movement is the goal. This may be difficult at first, but please stay with it. If you get confused, don’t hold your breath—keep breathing!

2) Concentration
You must place intentional focus on every movement. You will feel each exercise more if you close your eyes once you become more familiar with the movements. After surgery, you may lose the ability to feel if your muscles are working properly. Closing your eyes will help in this process, allowing you to listen to your body and refocus your mind upon proper body movement.

3) Control
To be in control means that you maintain the proper form, alignment, and effort during the exercise. You don’t want to throw your body around. If there is jerkiness, shaking, tightness, and/or pain you are not in control. You can limit the movement and make it smaller if necessary to regain control.

4) Centering
In Pilates, all movements come from the “powerhouse,” or core. These are the abdominal muscles that we described earlier. Learning to use

Using the rib cage breathing and working my abdominals elongated my rib cage, allowing for scar tissue management.

—Beth Mast
the powerhouse correctly will improve your posture, stabilize the spine, and improve your quality of movement. Thus, every exercise is an abdominal exercise. Each exercise incorporates the diaphragm, transverse abdominis, pelvic floor, and multifidus. Visualizing a corset around the waist will help you to activate these muscles.

5) Precision
Every exercise should be performed with precision and an emphasis upon proper form. Proper starting position and posture is crucial, as is performing the exercises slowly and without momentum.

6) Balanced Muscle Development
Everything that is done on one side of the body must also be done on the other side. For example, if you do an exercise with your right arm, you must also do it with your left.

7) Rhythm/Flow
All movements in Pilates are done with a sense of rhythm. The movements should be graceful and smooth.

8) Whole Body Movement
The whole body is engaged through breathing, engagement of the core, and use of the arms and legs (even though some exercises will not use the arms at all).

9) Relaxation
Breathing assists with the relaxation of muscles throughout the body. Unwanted tension should be released prior to beginning the exercises. You may work one body part and relax the others.

Advisories
If you are undergoing a breast implant expander program, please adhere to your physician’s guidelines for movement, only raise your arms to a point where they are in line with your shoulders (90°), and do not use weights or resistance bands until you have received your doctor’s clearance.

Anemia (low red blood cell count)
Anemia may affect your endurance. You may need to scale back your exercise.
Lower back issues or conditions such as spondylolisthesis, spinal stenosis and spinal arthritis

For these back issues as well as some disc injuries and sacroiliac joint dysfunctions, please consult with your health care provider before proceeding. Neutral spine may not be appropriate for you. Per your provider’s approval, an imprinted spine would be used instead for all exercises.

Lymphedema

If you have lymphedema, or are at risk, it is wise to work in conjunction with a lymphedema therapist to make sure that you are not progressing too aggressively. It may be recommended that you wear a sleeve and a gauntlet when exercising. Upper body movement should be limited to a few repetitions with little or no weight. Begin the exercises without weights so that you understand how to do them correctly. Some exercises such as Mermaid, Alternate Arm and Leg Lift, Cat Stretch, or Swan may be too rigorous for you at first because they place a lot of body weight on the upper extremities. The affected arm (which may be the nonworking arm) should be lowered to a position of comfort when performing side lying exercises. If side lying exercises are not comfortable, they should be eliminated. Weights and repetitions should not be increased at the same time, and exercises that incorporate just the upper body should be alternated with those that focus on the lower body.

Metastatic Cancer

If your cancer has metastasized to the hip or spine, many of the osteoporosis recommendations apply here. It is highly recommended that you perform the chair Pilates routine.

Neutropenia (low white blood cell count)

Neutropenia may affect your ability to fight infection, so if you have a fever above 100.4° F, exercise should be avoided.

Osteoporosis

Many survivors are at risk of osteoporosis as a result of premature menopause attributable to chemotherapy and aromatase inhibitors. Be sure that you have a baseline DEXA to determine your bone density and where you may have low bone density.

Osteoporosis in the spine is a contraindication (potential danger) in many of the Pilates exercises, given their emphasis upon spinal movement and bending of the spine forward. The chair program would be a good option for women with osteoporosis, and the standing Pilates program could be a good option as well, provided that you follow the instructions for safety.
If you have low bone density in the spine, do not lift your head off the floor when lying supine, turn your spine to the right or left or bend sideways to the right or left. Modify the exercises by keeping your head on the mat. You can still get a good core workout.

If you have osteoporosis in the hip, much of the side leg series should be modified with smaller movements or eliminated from your program.

**Peripheral neuropathy**

Peripheral neuropathy can cause numbness as well as weakness in the hands and feet. Be sure to check your feet daily since sensation in that area may have lessened. Use care while moving since Pilates is usually conducted with bare feet. You may want to wear shoes with nonslip soles for extra grip and traction to decrease your risk of falling when moving. Seated Pilates may be a good option for you. Standing Pilates may not be safe due to the possibility of impaired balance.

**Thrombocytopenia (low platelet count)**

Thrombocytopenia can result in increased risk of bruising and bleeding. Activities with a high risk of injury or falling should be avoided. The chair program would be an excellent option if you have this complication.

**Wrist or hand injuries**

Wrist or hand injuries may require modifications such as eliminating hand weights and bearing weight on your forearms instead of your wrists (Swan) or eliminating exercises that place maximum weight on the hands, such as Alternate Arm and Leg Lift or Cat Stretch. Fitness gloves, such as WAGs (Wrist Assured Gloves; www.wristassuredgloves.com) may help you.