TAKING CONTROL

A BREAST CANCER
SURVIVOR'S GUIDE
TO RECOVERY

CETI
Cancer Exercise Training Institute

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This book offers guidance on how to begin an exercise program after diagnosis of breast cancer. The information in this book is not meant to replace appropriate medical care. The authors have consulted medical experts in the field of cancer and exercise, reviewed the scientific literature, and used every means possible to ensure that the information presented is accurate and up-to-date at the time of publication. It is important to note that new research may alter or invalidate some of the information presented in this book.

Although the many benefits of regular exercise are well documented, the author makes no guarantees or representations regarding ***"TAKING CONTROL- A BREAST CANCER SURVIVOR'S GUIDE TO RECOVERY"*** *and its' materials, including, but not limited to accuracy, completeness, currency, reliability, merchantability, fitness for a particular purpose, or results that will be achieved from this program. Results are individual and may vary.*

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PREFACE

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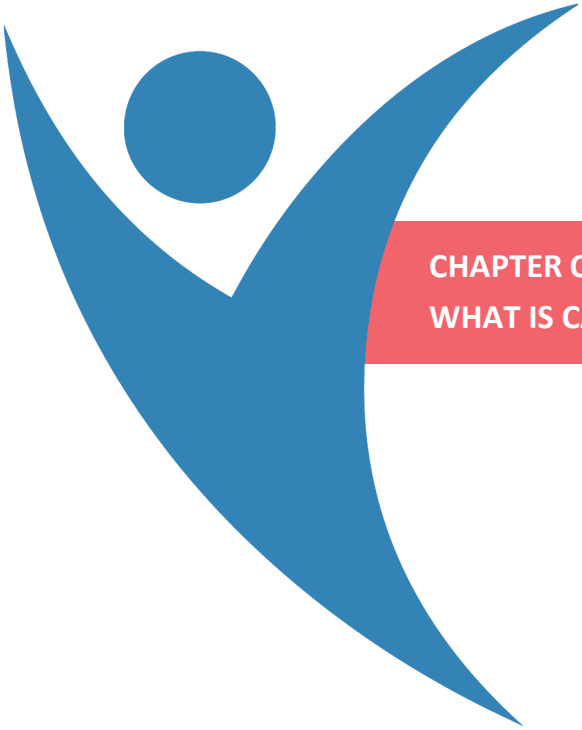


CHAPTER ONE
WHAT IS CANCER?

WHAT IS CANCER?

The term “cancer” refers to a group of diseases in which abnormal (malignant) cells divide and form additional abnormal cells without any order or control. In normal tissues, the rates of new cell growth and old cell death are kept in balance. In cancer this balance is disrupted. This disruption can result from uncontrolled cell growth or loss of a cells’ ability to undergo “apoptosis.” “Apoptosis,” or “cell suicide,” is the mechanism by which old or damaged cells normally self-destruct. The problem with these malignant cells is that they are unable to perform the functions that they were designed for – such as to replace worn-out cells or repair damaged cells – and they continue to grow and multiply without constraint. The normal cells do not respond appropriately to the body’s signals to divide only when needed and to stop when the need is fulfilled. In other words, these cells can be thought of as taking on a life of their own. The gradual increase in the number of growing cells creates a growing mass of tissue called a “tumor,” or “neoplasm.” If the rate of cell division is relatively rapid, and no “suicide” signals are in place to trigger cell death, the tumor will grow quickly in size; if the cells divide more slowly, tumor growth with be slower. Regardless of the growth rate, tumors ultimately increase in size because new cells are being produced in greater numbers than needed.

The cells can invade and destroy healthy tissue and can spread and grow in other areas of the body through two mechanisms: invasion and metastasis. Invasion refers to the direct migration and penetration by cancer cells into neighboring tissues. Metastasis refers to the ability of cancer cells to penetrate into lymphatic and blood vessels, circulate through the bloodstream, and then invade normal tissues elsewhere in the body.

DEVIATION FROM NORMAL CELL GROWTH

Cancer tissue has a distinctive appearance when viewed under a microscope. Pathologists will look for a large number of dividing cells, variation in nuclear size and shape, variation in cell size and shape, loss of normal tissue organization, and a poorly defined tumor boundary. Sometimes pathologists will detect a condition known as "hyperplasia." This refers to tissue growth based on an excessive rate of cell division, leading to a larger than usual number of cells. Everything else in the cells' structure seems to remain normal and potentially reversible. Hyperplasia can be a normal tissue response to an irritating stimulus, for example a callus that forms on your hand when you begin playing tennis on a regular basis. Another non-cancerous condition is called "dysplasia." This, too, is an abnormal type of cell proliferation characterized by loss of normal tissue arrangement and cell structure. Often times these cells will revert back to normal behavior, but occasionally, they gradually become malignant. These areas are usually closely monitored by a professional in case they need treatment. The most severe cases of dysplasia are sometimes referred to as "carcinoma in situ." This term refers to an uncontrolled growth of cells that remains in its original location. It does, however, have the potential to develop into an invasive malignancy and, is therefore, usually removed surgically when possible.

Lastly, there is invasive cancer. Unlike carcinoma in situ, this cancer has spread beyond its' original location and has begun to infiltrate into other, previously healthy, tissue. These tumors tend to grow more quickly, spread to other organs more frequently, and be less responsive to therapy. These cancers are surgically removed when possible and often accompanied by radiation and/or chemotherapy to kill any cancerous cells that have spread outside of the tumor.

WHAT CAUSES CANCER?

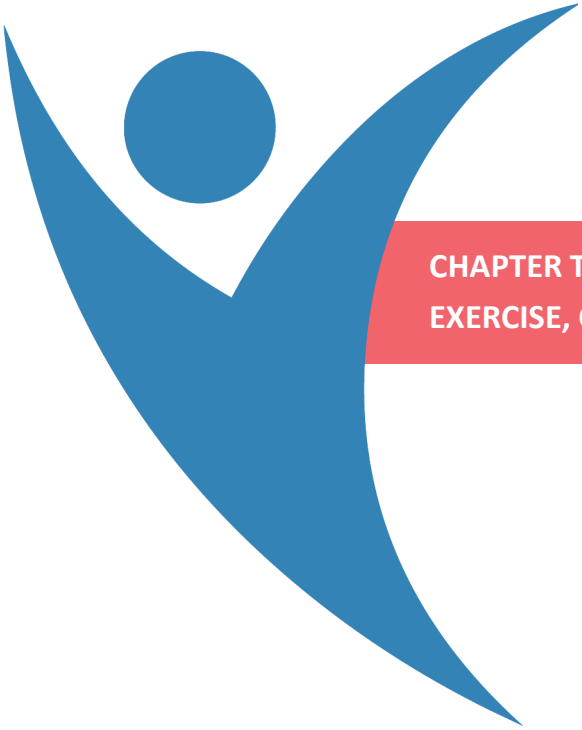
Cancer is often perceived as a disease that strikes for no apparent reason because there are many unproven theories. Scientists don't know all of the reasons however, many have been identified. Besides heredity, scientific studies point to three main categories of factors that contribute the development of cancer: chemicals (e.g., from smoking, diet, inhalation…), radiation (e.g., x-rays, ultraviolet, radioactive chemicals…), and viruses or bacteria (e.g., Human Papillomavirus, Epstein Barr Virus, hepatitis B…) Chemicals and radiation that are capable of causing cancer are known as "carcinogens." Carcinogens initiate a series of genetic alterations or mutations and encourage cell proliferation. This usually doesn't happen overnight. Sometimes several decades can pass between exposure to a carcinogen and the onset of cancer. Since exposure to carcinogens is responsible for triggering most cancers, we can reduce our risk by taking steps to avoid such agents whenever possible. The use of tobacco products has been implicated in one out of every three cancer deaths. To spite the Surgeon Generals' repeated warnings as well as the fact that smoking is the largest single cause of death from cancer, the tobacco industry continues to thrive. Avoiding tobacco products, cigarettes, cigars, and chewing tobacco, is the single most effective lifestyle decision you can make in an effort to prevent cancer.

Although it is usually not life-threatening, skin cancer caused by exposure to sunlight is the most frequently observed type of cancer. Most of us don't take skin cancer very seriously because it is often easy to cure. Melanoma, a more serious form of skin cancer also associated with sun exposure, is potentially lethal. Once again, we choose to ignore the repeated and ever-present warnings to stay out of the sun and continue to bask in the suns' glory for hours on end.

Risk of skin cancer can be greatly reduced by wearing clothing to shield the skin from ultraviolet radiation, wearing protective sunscreen, or by avoiding direct sun exposure altogether. Actions can also be taken to avoid exposure to some of the viruses that are associated with cancers. The most common of which is the human papillomavirus (HPV), which is involved in the transmission of cervical cancer. "Safe sex," including limiting exposure to multiple sex partners, is the best way to prevent this virus which is sexually transmitted. Many carcinogens have become "occupational" hazards to those who come in contact with them on a regular basis. These include arsenic, asbestos, benzene, chromium, leather dust, naphthylamine, radon, soots, tars, oils, vinyl chloride, and wood dust. Workers who are exposed to these chemicals have a higher incidence of cancer.

Although a persons' chance of developing cancer at some point in his/her lifetime is almost twice as great today as it was fifty years ago, cancer is still not considered an epidemic. The increase in identifiable cancer cases is due largely in part to increased life span because cancer is more prevalent among older people.

Cancer cells come in all different shapes and sizes and are classified by their aggressiveness. Cancer cells that essentially resemble their non-cancerous counterparts and can still perform some of their normal functions are described as well *differentiated.* On the flip side, the cells that are identified by their disorganized structure and their ability to divide rapidly and chaotically are known *as poorly differentiated cells.* A tumor that remains confined to its' original, or *primary* location, is referred to as *localized.* There are two ways that a cancer can spread; it can grow straight through the primary organ and directly into adjacent tissue (referred to as a *local extension or regional disease),* or in *metastatic cancer,* a colony of malignant cells can break away and ride the circulatory system to nearby lymph nodes or a distant organ where it forms *a secondary cancer..* Sometimes, despite batteries of tests, a *metastatic* tumor is diagnosed, but no primary tumor is found. When this happens, the cancer is declared a *cancer of unknown primary origin.*



CHAPTER TWO
EXERCISE, CANCER, & YOU

WHY SHOULD I EXERCISE?

This book is designed to help you start an exercise program following cancer surgery and/or treatment. As with any exercise program, *you must get approval from your doctor before you begin.* ***"TAKING CONTROL- A BREAST CANCER SURVIVOR'S GUIDE TO RECOVERY"*** will show you how you can exercise, at various levels of difficulty, in the comfort of your own home, athletic club, or office. Although we will make suggestions as to how long, how often, and what intensity you should exercise, it important that you don't push yourself too hard, too fast. Go at your own pace.

The key is consistency and persistence. Even on the days you don't feel like exercising, and you will have them, push yourself to try and do something. If you are unable to do your workout in its entirety, that's okay. It will all add up. Set realistic goals around treatment days. If you know that two days following chemotherapy is when you crash and burn, plan on exercising the two days prior and taking a day or two off when you don't feel well. Below you will find a list of some of the many reasons you should exercise both during and after cancer surgery and/or treatment.

PHYSIOLOGICAL BENEFITS OF EXERCISE

- Improved cardiovascular endurance and stamina
  - Stronger heart and lungs
  - critical following chemotherapy and radiation which can damage the heart and lungs
- Increased muscular strength and endurance
- Increased lean muscle mass
  - less body fat
  - decreased risk of lymphedema
  - decreased risk of Type II diabetes which can be exacerbated by chemotherapy
  - decreased risk of other cancers
  - counters muscle loss
  - increased metabolic rate (burn more calories in a 24-hr. period)
  - decreased risk of obesity
  - decreased risk of osteoporosis
- Increased high-density lipoprotein (HDL) – the "good" cholesterol
- Decreased risk of diseases such as coronary artery disease, hypertension, and high cholesterol
- Increased range of motion, mobility, and functional fitness
  - better posture
  - less joint and muscle pain and inflammation
  - ability to perform activities of daily living

PSYCHOLOGICAL BENEFITS OF EXERCISE

- Psychological Benefits of Exercise
- Decreased stress and tension
- Improved self-esteem and self-confidence
- Better body-image
- Increased ability to cope with stressors
- Increased ability to concentrate (can help with "Chemo-brain" – short term memory loss)
- Reduced anxiety and depression

OTHER BENEFITS OF EXERCISE

- Improved treatment tolerance
  - less nausea
  - less fatigue
- Improved sleep patterns
  - more energy during the day
  - less depression and fewer mood swings

By now you are all too familiar with the definition of cancer; a disease in which abnormal cells divide and form additional cells without any order or control. The cancerous cells are unable to perform the functions that they were designed for and continue to grow and multiply out of control. Healthy cells respond to the body's signals to divide when needed and to stop when that need is fulfilled. Cancer cells are rebels; they have taken on a life of their own. When millions of these cells have divided and grown in one place, a tumor is formed. These rebel cells invade and destroy healthy tissue and, by infiltrating the lymphatic system, can grow and spread to other areas of the body.

Why does this happen? What causes normal cell growth to go awry? There are no definitive answers to these questions; however, scientists do know that the DNA (genetic code) of these cancerous cells has in some way been damaged. Not all cells that have been damaged turn into cancer, however. there are several ways that this can happen; factors outside the body can cause damage to normal DNA, damaged DNA is inherited, or a mistake is made in the normal cell division process. Unfortunately, we cannot choose our ancestors and are, therefore, stuck with their "bad" genes. Nor are we in control of our cell division process. We can, however, control some of the environmental influences that may lead to cell damage and possibly cancer.

Here are a few examples of ways you can protect yourself:

- Consume organic fruits and vegetables that have not been sprayed with pesticide
- Consume grass fed beef and poultry that has not been injected with hormones and antibiotics
- Drink organic milk, or better yet, coconut, almond or rice milk
- Wear an ear piece when talking on a cellular phone
- Don't live near power lines
- Don't consume artificial sweeteners
- Eat a diet low in sugar
- Don't stand in front of a microwave when cooking your food
- Protect yourself from the sun's harmful rays
- Don't smoke cigarettes, cigars, or pipes
- Don't chew tobacco

There is no definitive correlation with many of the above listed suggestions; however, an ounce of prevention is a good idea when it comes to cancer. Although you have already been diagnosed with cancer, these tips can help you to prevent future incidences of cancer as well as a number of other undesirable disease.

There are many methods for treating cancer. These include surgery, chemotherapy, radiation, hormonal therapy, bone marrow and stem cell transplants, etc. In order to damage or kill cancer cells, these methods have to be lethal. Because of this, normal cells are bound to be affected as well. The results can vary from mental and physical fatigue all the way to diabetes, osteoporosis, peripheral neuropathy, and damage to the heart and lungs.

One of the main concerns we have is on the identification and prevention of lymphedema. If you have had lymph nodes removed surgically, or irradiated, this will be of concern to you. In chapter 5 we will go into detail about lymphedema. If you already have lymphedema you, too, will also find guidelines in chapter 5.

CHAPTER THREE
BENEFITS OF EXERCISE

BENEFITS OF EXERCISE IN PREVENTING CANCER

In 1996, the first Surgeon General's report on physical activity and health was published, including the currently accepted public health recommendations for physical activity for general health, 20 minutes of moderate intensity activity - such as brisk walking - on most days of the week. This recommendation has been adopted by the American Cancer Society and is included in the current recommendations from the American Cancer Society in preventing cancer. Exercise has many proven health benefits for both preventing disease and promoting health and wellbeing. There is substantial evidence that suggests that increasing physical activity, including structured exercise programs, is associated with lower rates of certain cancers. In particular, there is evidence that high levels of physical activity can work to prevent colon cancer. Cancers of the breast, prostate, lung, and uterus have also been linked to exercise-related prevention. in a large-scale study of 17,148 Harvard alumni, men who burned as few as 500 calories a week in exercise - the equivalent of an hour's worth of brisk walking or less than ten minutes of waking a day - had death rates 15-20 percent lower than men who were almost completely sedentary.

Men who burned 2,000 calories a week (about four hours of brisk walking per week) had about 35 percent lower cancer mortality. The researchers concluded that the more exercise you get, the lower your risk of premature death from cancer or heart disease. The Harvard study also found that the risk of colon cancer, the second leading cause of cancer-related death in the U.S., was dramatically reduced by exercise. Prostate cancer is the most common cancer affecting men today. In the Harvard study, alumni who expended greater than 4,000 calories per week (equivalent to about eight hours of brisk walking) were at a reduced risk of developing prostate cancer compared to their inactive counterparts.

According to the American Cancer Society, for the great majority of Americans who do not smoke cigarettes, dietary choices and physical activity are the most important modifiable determinants of cancer risk.

Evidence suggests that one third of the more than 500,000 cancer deaths that occur in the United States each year can be attributed to diet and physical activity habits, with another third due to cigarette smoking.

While the diet and activity are intended to reduce overall cancer risk, certain dietary and physical activity habits affect specific cancer sites. This following section summarizes the relation of diet and physical activity factors to specific common cancers in the United States:

There are relatively few studies on physical activity and **lung cancer** prevention. The available data suggest that physically active individuals have a lower risk of lung cancer; however, it is difficult to completely account for cigarette smoking.

Kidney cancer risk is increased among those who are overweight. The reason for this is unknown. The best nutritional advice to lower risk for kidney cancer is to avoid becoming overweight according to a 2000 study by *Chow WH, Gridley G, Fraumeni JF, et al. Obesity, hypertension, and the risk of kidney cancer in men. New England Journal of Medicine 2000; 343: 1305-1311.*

A 1997 study by Slattery ML, Edwards SL, Ma KN, et al.: Physical Activity and Colon Cancer: A public health perspective. Ann Epedemiol 1997; 7: 137-145, suggests that there is a lower risk of **colon cancer** among those who are moderately active on a regular basis, and increasing evidence suggests that more vigorous activity may have an even greater benefit in reducing the risk of colon cancer. Although the data are sparse, it appears that 30-60 min/day of moderate to vigorous-intensity physical activity is needed to decrease risk. There is a dose-response relationship, with risk declining further at higher levels of physical activity. It is also clear that physical activity is not associated with the risk of developing rectal cancer.

In a 1999 study by Michaud DS, Spiegelman D, Clinton SK, et al. Fluid intake and the risk of bladder cancer in men. New England Journal of Medicine 1999; 340; 1390-1397, the major risk factors for **bladder cancer** are tobacco smoking and exposure to certain industrial chemicals. Limited evidence suggests that drinking more fluids may lower the risk of bladder cancer, as may eating more vegetables.

In a 1996 study by Marshall JR, Boyle P. Nutrition and oral cancer. Cancer Causes Control 1996; 7: 101-112, tobacco (including cigarettes, chewing tobacco, and snuff) and alcohol, alone, but especially when used together, increase the risk for **cancers of the mouth and esophagus.** Obesity increases the risk for adenocarcinoma occurring in the lower esophagus and at the junction of the esophagus and stomach, likely due to the increased acid reflux from abdominal obesity. Eating recommended amounts of vegetables and fruits probably reduces the risk of **oral and esophageal cancers.** At the present time, the best advice to reduce the risk of oral and esophageal cancers is to avoid all forms of tobacco, restrict alcohol consumption, avoid obesity, and eat at least five servings of vegetables and fruits each day.

Substantial evidence indicates that tobacco smoking, adult-onset diabetes, and impaired glucose tolerance increase the risk for **pancreatic cancer,** according to a *1998 study by Calle EE, Murphy TK, Rodriguez C, et al. Diabetes mellitus and pancreatic cancer mortality in a prospective cohort of United States adults. Cancer Causes Control 1998; 9: 403-410. Also, in a 2001 study by Michaud DS, Giovanucci E, Willett WC, et al. Physical activity, obesity, height, and the risk of pancreatic cancer. JAMA 2001; 286: 921-929,* has also shown that obesity and physical inactivity (both factors strongly linked to abnormal glucose metabolism) are associated with elevated pancreatic cancer risk, and that fruit and vegetable intake is associated with reduced risk.

Several studies have found high consumption of red meat and dairy products to be associated with increased risk of **prostate cancer** according to a 2001 study by *Kolonel LN. Nutrition and prostate cancer. In: CoulstonAM, RockCL, and MonsenER. Nutrition and the prevention of disease. San Diego, CA: Academic Press; 2001:373-386.* There is also evidence that a high calcium intake, primarily through supplements, is associated with increased risk for more aggressive types of prostate cancer according to a 1998 study *by Giovanucci E, Rimm EB, Wolk A, et al. Calcium and fructose intake in relation to prostate cancer. Cancer Res 1998; 58: 442447.* Other studies suggest that diets high in certain vegetables (including tomatoes, beans, and other legumes) are associated with decreased risk. Current evidence for these associations is limited, however. The possibility that specific nutrients in foods, notably vitamin E, selenium, and lycopene, may protect against prostate cancer is under active investigation. At the present time, the best advice to reduce the risk of prostate cancer is to limit intake of animal-based products, especially red meats and high-fat dairy products; and eat five or more servings of vegetables and fruits each day. For prostate cancer, the data are inconsistent regarding whether physical activity plays any role in the prevention of this cancer.

The incidence of **stomach cancer** continues to decrease worldwide, especially in the United States. Year-round consumption of fresh foods made possible by refrigeration, and other improvements in food preservation methods have likely helped to reduce the rate of stomach cancer, as has concomitant reduction in the prevalence of chronic stomach infections by the bacterium Helicobacter pylori. At the present time, the best advice to reduce the risk of stomach cancer is to eat at least five servings of vegetables and fruits daily according to a 1996 study by *Kono S, Hiorhata T. Nutrition and stomach cancer. Cancer Causes Control 1996; 7: 41-55.*

According to a 1998 study by *Smith-Warner SA, Speigelman D, Yaun SS, et al. Alcohol and Breast Cancer in Women: a pooled analysis of cohort studies. JAMA. 1998; 27:535-540 suggests* that at the present time, the best nutritional advice to reduce the risk of **breast cancer** is to engage in vigorous physical activity at least four hours a week, avoid or limit intake of alcoholic beverages to no more than one drink per day, and minimize lifetime weight gain through the combination of caloric restriction and regular physical activity.

According to a 1996 study by *Hill HA, Austin H. Nutrition and endometrial cancer. Cancer Causes Control 1996; 7: 19-32,* shows consistently that obesity and the use of hormone replacement therapy after menopause, increase cancer risk. The association with overweight is thought to result from the increase in estrogen levels that occurs among postmenopausal women who are overweight. Consumption of vegetables and fruits may decrease risk of **endometrial cancer.** At the present time, the best advice to reduce the risk of endometrial cancer is to maintain a healthful weight through diet and regular physical activity, and eat at least five servings of vegetables and fruits each day

For women, a history of moderate, recreational exercise is associated with reduced risk of breast, uterine, cervical, and ovarian cancers, although not all studies have shown this effect. Currently, scientists are studying the biological impact that exercise has on the risk of cancer. Some of the methods that are being studied include:

- Maintenance of a healthy body weight and overall amounts of body fat.
- Maintenance of low levels of fat in and around the abdomen.
- Maintenance of the biological system that regulates blood sugar levels.
- Control of some tumor growth factors.
- Suppression of 'prostaglandins' (hormone-like substances that are released in greater quantities by tumor cells).
- Improved immune function, including increased levels of Natural Killer cells.
- Reduced symptoms of mild to moderate anxiety and depression (which may improve immune function and overall physiologic functioning).
- Increased levels of free radical scavengers to assist the body in preventing DNA damage

It is not clear exactly how high amounts of physical activity work to prevent cancer. We know that exercise can help prevent obesity, which is related to some types of cancers. It can also change the body's hormone levels, which might also have a favorable effect. Exercise, by speeding up metabolism, is generally believed to speed up the passage of ingested foods through the colon – thus reducing the amount of time the colon mucosal lining is in contact with possible carcinogens. Additionally, those who engage in a high level of physical activity are much less likely to smoke cigarettes, the single largest contributor to cancer.

Starting or maintaining an exercise program after cancer diagnosis results in patients who are stronger both mentally and physically, concludes a statistical analysis of 24 studies. Kerry Courneya of the University of Alberta, Canada led the research, which is published in the Annals of Behavioral Medicine. Courneya says "Cancer diagnosis and its' treatments are often associated with negative side effects that diminish the quality of life. Overall, studies have consistently demonstrated that physical exercise following cancer diagnosis has a positive effect on the quality of life." The various studies mention increased stamina, increased functional capacity, strength, self-esteem, improved treatment tolerance, and satisfaction with life, and decreased pain. Psychological changes, including a decrease in total mood disturbances, decrease in depression, and fewer problems sleeping were noted between the exercise and non-exercise groups.

It has also been noted that increased physical activity has been associated with less fatigue during and after chemotherapy and radiation. The specific exercise "dose" (frequency, intensity, and duration of sessions) needed to improve physical and psychological functioning in cancer patients probably differs according to specific treatment, cancer type, and individual response to treatment. Some forms of cancer treatment, particularly those that are used to treat childhood cancers, have been found to have long-term negative effects on the heart and lungs. This makes it even more important to exercise regularly, but it may important to do so under medical supervision. Fatigue is the number one side effect of cancer treatment affecting 76% of patients undergoing treatment. Cancer fatigue is not like every day fatigue that one experiences due to lack of sleep, stress, overextending oneself etc. This type of fatigue is not usually relieved by rest and can have a negative effect on one's quality of life. There are many things that may lead to fatigue, but one thing is certain; exercise reduces fatigue. Research has demonstrated that beginning or maintaining an exercise program during cancer treatment can have a positive effect on combating fatigue.

After cancer surgery exercise plays an invaluable role in helping one return to the strength and fitness level that was maintained prior to surgery. In many cases, due to lack of physical activity prior to surgery, patients are able to reach new heights in strength, flexibility, and cardiovascular conditioning. There are certain postural implications that often arise after mastectomy and lymph node dissection that are often compounded by reconstruction and radiation. After years of working with cancer survivors, we declare with certainty, that most of these issues can be dramatically improved upon if not entirely corrected, through the proper combination of stretching and strengthening. Anytime there is an amputation, it will ultimately result in some type of muscle imbalance. These issues will not correct themselves. Unfortunately, even patients who undergo physical therapy are released long before they are fully recovered, leaving the patient to go it alone in determining how to resume normal activities. In addition, when patients receive radiation to a particular area, there is bound to be some tightness, perhaps even scar tissue, where they received treatment. This can cause tightening in that area, and depending on where it is, can also contribute to many postural deviations. These postural imbalances are notable in most people due to everyday circumstances i.e.; working at a computer all day, holding a phone between your ear and your shoulder, sitting at a desk all day, holding a baby on one hip etc… Not only are they compounded by the surgery and radiation, but they can create a chain reaction, leading to neck, back, hip, knee, and even ankle pain.

A thorough postural assessment can determine what areas need to be stretched to relieve tightness and spasm and which need to be strengthened to create a counter balance. Let's not forget about the many benefits of cardiovascular conditioning. Many of you may still be suffering from fatigue long after your treatment has ended. Cardiovascular training, biking, walking, running, etc., will produce endorphins that will give them much needed energy. Unfortunately, chemotherapy and radiation can have a detrimental effect on the heart and lungs. The good news is that both can be strengthened through a regular cardiovascular exercise program. Swimming can provide an excellent source of relief for tight muscles without putting excessive strain on them. The buoyancy of the water allows for a wonderful workout that allows you to focus on range of motion for your arms and shoulders. This is highly recommended for breast cancer patients, particularly those who have undergone an axillary node dissection. Swimming should not be limited only to breast cancer patients, however, for it has benefits for everyone. Those clients suffering from arthritis will want to make sure the water is at least eighty-four degrees.

Strength training is a very important component of an exercise program, however, without a proper assessment, it can create more problems than it can prevent. Proper attention must be paid to not only your goals, but your bodies' needs. This can be accomplished by conducting a postural evaluation to look for muscle imbalances that may lead to degeneration of the joints over time. It is critical to determine which muscles are shortened, or overly tight, so that proper attention can be paid to stretching those muscles first. This will help you to regain normal range of motion and functioning. If you begin strength training before addressing the muscular imbalance, it can lead to a greater imbalance and degeneration. Done properly however, strength training can lead to an increase in lean muscle mass which will not only give a desirable physical appearance, it can help to prevent obesity and osteoporosis. Obesity is the fastest growing health problem in the United States. Obesity is not only associated with other diseases, it has a huge emotional impact as well. There is distinct connection between obesity and Type II diabetes. This is of particular concern when dealing with cancer patients. Following chemotherapy and certain hormonal therapies, many cancer patients find themselves gaining weight. Many were over their ideal weight to begin with are now struggling with a serious weight problem in addition to their cancer diagnosis. Obesity is not only connected to Type II diabetes, it is also thought to be associated with certain types of cancer, yet another compelling reason to start exercising, eating right, and losing weight.

For those of you who have undergone a lymph node dissection, or radiation to the lymph nodes and vessels, you are now at risk for lymphedema. Lymphedema is the swelling of an area do to damage to, radiation, or removal of lymph nodes and vessels. It is usually a permanent and irreversible condition that is both painful and disfiguring. Having an excess amount of body fat can actually increase your risk for lymphedema because the fatty tissue retains fluid. Both men and women who are undergoing hormonal therapy are at risk for osteoporosis. This risk is magnified if you have also undergone chemotherapy. In addition to osteoporosis, men may also experience a loss in lean muscle tissue over time. The good news is that strength training can help to reduce body fat by increasing lean muscle mass, increase bone density and prevent osteoporosis, and prevent and/or manage Type II diabetes.

In summary, the benefits of strength training:

- Increase lean muscle mass; better physical appearance, higher metabolism, less body fat
- VReduces the risk of Type II diabetes and lymphedema by reducing the amount of body fat
- Reduces the risk of osteoporosis by increasing bone mass

Aerobic training is exercise that places a stress on the cardiorespiratory system. Any form of activity can be used; walking, biking, basketball, strength training, etc. All forms of exercise must utilize the cardiorespiratory system to either sustain and recuperate from the activity. Many people who have undergone chemotherapy and radiation may have damage and scarring of the heart and/or lungs. Aerobic exercise can help to strengthen the heart and lungs, minimizing the amount of damage they will sustain. As with strength training, aerobic exercise helps one to maintain their ideal body weight thereby reducing the risk for diabetes, future cancers associated with obesity, heart disease, high blood pressure, high cholesterol, and lymphedema. It is critical to perform a warm-up to prepare the body for physical activity. There are two types of warm-ups; general and specific. A general warm-up consists of movements that are not specific to the activity to be performed. A specific warm-up more closely imitates movements form the actual activity. NASM suggests that the cardiorespiratory portion of a warm-up should be five to ten minutes long at a low-to-moderate intensity. On a scale of 1-10, 1 being bed rest and 10 being all out exertion, aim for a five! If you don't have an exercise machine, climb stairs, march in place, walk around the block, shoot some hoops, etc. If you would like to continue to do your aerobic exercise beyond five to ten minutes, go ahead and increase the intensity. Try pushing yourself to a 6 OR 7 on that scale of 1-10. Remember that this is general advice.

If you have a heart condition, high blood pressure, have had a stroke, or any other special consideration, please consult your doctor for specific recommendations. Additionally, if you have had lymph nodes removed or had radiation to lymph nodes or lymphatic vessels, you must not allow yourself to overheat. Overheating will increase your circulation and can lead to the onset of lymphedema. If you already have lymphedema, the same rule applies because it can worsen your condition. If you have not been exercising regularly, begin with 10-20 minutes of aerobic activity three times a week. Gradually increase the time (duration) and number of workouts (frequency) to meet your goals.

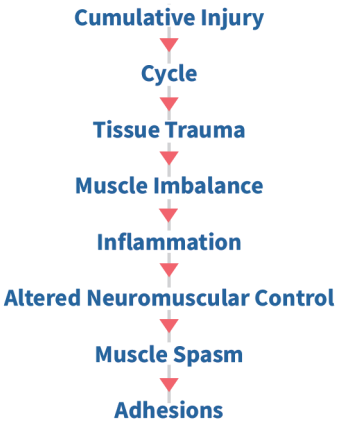
Once you have completed your warm-up, it will be time to stretch. Specific stretches will be outlined for each type of cancer and particular surgeries.

In summary, the benefits of aerobic training:

- Increase lean muscle mass; better physical appearance, higher metabolism, less body fat
- Reduces the risk of Type II diabetes and lymphedema by reducing the amount of body fat
- Reduce the risk of heart disease, high blood pressure, and high cholesterol

Flexibility is overlooked by most of us. Lack of flexibility may lead to long-term joint degeneration, overuse injuries, and muscle imbalances. By definition, flexibility is the extensibility (ability to lengthen) of all soft tissues that allow a joint to move within it's full range of motion. Your muscular, skeletal, and nervous system make up your kinetic chain. Your kinetic chain must be aligned properly to prevent patterns of joint dysfunction. When things are not properly aligned, it is known as postural distortion. Postural distortion leads to decreased neuromuscular efficiency and tissue overload. In layman's terms, injury! Your primary goal needs to be to maintain homeostasis of your kinetic chain. Imagine a chain link fence. Your dog scurries his way underneath the fence for years. You think nothing of it. Gradually the fence becomes distorted; some of the links are squashed together, the metal is buckling, there is a big gap in the bottom, it's structural integrity is weakened. Now imagine the same thing happening to your spine. It may not be noticeable now, but over the course of time it, too, will deteriorate and weaken. Muscle imbalances may be caused by cause a variety of external and internal influences; poor posture, emotional stress, repetitive movements (tennis, golf, bowling, etc.), cumulative trauma, poor training technique and form, lack of core (abdominals and low back) strength, and lack of neuromuscular control. Following surgery and radiation, there is usually a foreseeable amount of scar tissue and, in some cases, adhesions that can bind the joint and inhibit movement. This would fall under the trauma category.

Under each type of cancer and their respective surgeries, I will address particular postural and kinetic chain concerns and how to correct them. If these issues are not corrected, you will find yourself stuck in a cumulative injury cycle. When there is a dysfunction in the connective tissues of the kinetic chain, the body views it as an injury. As a result, the body will initiate the repair process. It looks like this:



Remember that although beneficial in many ways, strength training creates trauma to the tissue which will then lead to inflammation. The bodies' protective mechanism will increase muscle tension and cause a muscle spasm. As a result of

In summary, benefits of flexibility training:

- Increase range of motion in joint movements
- Injury prevention
- May help to prevent arthritis and other degenerative joint disorders
- Eliminates neck, shoulder, back, hip, knee, ankle, and other associated pains

Functional fitness is the ability to perform one's activities of daily living free of pain and with a relative degree of ease. Most of us take this one for granted, at least until it's gone! Every day we awake from bed, use the bathroom, take a shower (wash your hair and body), brush your teeth, blow dry your hair, put on your underwear, put on your clothes, put on and tie your shoes, etc. Did it ever occur to you that if you had an injury, or a muscle imbalance, it could become relatively impossible to perform one of these otherwise mundane tasks? Well, it's true! In a perfect world we would sit up straight in our chairs, walk with our shoulders back, not carry a heavy briefcase or bag on one shoulder, bend our knees when we bend to pick something up, and so on and so on. Unfortunately, because we live in a less-than-perfect world, most of us have not practiced these methods of self-preservation and are now experiencing the aftermath of our poor decisions; pain.

You may have been suffering with chronic neck and back pain for years, or you may be new to this game and just beginning to get aches and pains. In either case, flexibility training is the answer for you. Believe it or not, most of these nagging aches and pains are reversible with proper corrective training. Corrective training is a balance of strength training and flexibility training that is customized to meet your particular needs. Following your personal assessment, you will be able to identify the areas that need stretching as well as those that need strengthening. There are several different types of stretching; self-myofacial release, static stretching, and dynamic stretches. Each of these methods is described below.

SELF-MYOFACIAL RELEASE:

Using a foam roller, you apply gentle pressure to an adhesion or "knot" for 20-30 seconds. The force that is applied stimulates a relaxation response. This technique is recommended prior to static stretching, as well as during the cool down. Do not use this on any area in which you have had lymph nodes removed or irradiated, as this may increase your risk for lymphedema.

STATIC STRETCHING:

This is the most popular form of stretching. In this method you passively take a muscle to the point of tension and hold it there for 15-30 seconds. This will stimulate a relaxation response. This method should be used following self-myofacial release and as part of a cool down.

DYNAMIC STRETCHING:

Dynamic stretching uses the force produced by a muscle, along with the body's momentum, to take a joint to the full available range of motion. Rather than hold a stretch for 15-30 seconds, one can perform a set of ten repetitions of dynamic stretches. This is a more advanced method of stretching that can also be used as a warm-up prior to activity. It is recommended that you have good levels of flexibility, core stability, and balance capabilities prior to engaging in a dynamic stretching program.

In summary, benefits of functional training:

- Improve your ability to perform Activities of Daily Living
- Improve ambulation
- Increased independence

CHAPTER FOUR
BEGINNING AN EXERCISE PROGRAM

Ready, set, **EXERCISE!** It's time to take the first step toward getting back your strength, stamina, and self-esteem. *Before you begin this or any other exercise program it is imperative that you have your doctor's permission.* You have undergone intensive medical treatment and your doctor must decide if you are physically ready to begin and, if not, what limitations he/she will place upon you.

The goals of your exercise program are as follows:

- Return to your pre-treatment energy level (or better)
- Increase you range of motion
- Strengthen your core muscles (abs and back) to help prevent back injury and hernia
- Improve your posture and correct muscle imbalances that lead to degenerative joint disorders
- Increase your functional fitness level allowing you to perform activities of daily living without pain
- Improve your quality of life by helping you achieve new heights in physical and mental conditioning

You will want to fill out the at-home-assessment, beginning on page 29, for your records and as a baseline to look for improvement in future assessments. Follow the procedures as outlined and write down your results.

1.

Fill in the date, time of day, age, weight, and height section

2.

In order to get an accurate resting heart rate (pulse), you will want to sit quietly for five minutes prior to taking your heart rate. You should not have any caffeinated products within two hours of taking your resting heart rate as it will elevate it. You can find your heart rate by locating our pulse on the carotid artery of your neck or the radial artery of your wrist. Don't press too hard. Beginning with zero, count the number of beats for one minute. Record this number on your assessment sheet. Generally speaking, the lower the resting heart rate, the better condition you're in. If you are taking blood pressure medication, it may give a false reading. You may get a reading of 60 beats per minute, but that is because of the medication, not because you are conditioned.

3.

Shoulder range-of-motion measurements should be taken by anyone who has had a mastectomy and/or lymph node dissection, or anyone who has injured their shoulder in the past. To determine your shoulder range of motion you will want to follow the directions on the assessment sheet and record the answer that best applies to you. If you find that you have severe limitations on one side compared to the other, you should consult your doctor for evaluation and possible referral to a physical therapist.

The postural assessment is to look for certain postural imbalances that may be the result of surgery and/or treatment, previous injury, or day-to-day ergonomics. When conducting your postural assessment, you will want to take your shoes off and march in place for a few seconds, with your eyes closed, in front of a full-length mirror. Stop, open your eyes, and try to stand as still as possible. You may have to repeat this step several times in order to write things down. The idea here is to be as natural as possible and not try to alter your posture in any way. The following is a list of criteria for perfect posture:

A. Head: your head should be erect and centered upon your shoulders. It should not just forward over your chest, or tilt to either side.

B. Chin: your chin should be level to the ground, not tilting up or down

C. Shoulders: your shoulders should be level. One should not be higher than the other or rounded forward. A tell-tale sign of rounded shoulders is when the palms of your hands face backward rather than facing the sides of your body.

D. Upper back: your upper back should have a slight natural curve to it, not an exaggerated hunchbacked appearance.

E. Shoulder blades: your shoulder blades should lie flat. If they protrude, it is known as “winged scapula.”

F. Lower back: your lower back should have a slight natural curve to it, not an exaggerated “sway back.” Try and find the front and back bones of your hip complex. It may be more challenging if you’re carrying extra weight in your abdominal area. Observe whether the front bone is lower or higher than the back bone and how many inches of variance there are. Hips should also appear level; one side should not be higher than the other

G. Knees: your knees should appear centered in the middle of your leg. They should not rotate toward the middle or outside of the leg.

H. Feet: your feet should point straight ahead. They should not turn inward, or outward. Also look at the sole of your foot. You should not roll out on the outside of your foot, or role inward on the inside of your foot.

5.

Girth measurements should be taken if your lymph nodes have been removed or irradiated. Use a tape measure to measure the size of the following areas and record them on your assessment sheet. You should take your measurements after every exercise session to monitor for swelling.

Axillary or Sentinel node (armpit) removal or radiation

- wrist fold
- ½ way between wrist fold and elbow crease
- elbow crease
- ½ way between top of arm and elbow crease

6.

Balance should be measured standing, with or without shoes. Stand with one knee bent and elevated and the opposite arm raised overhead. Try to hold this position for 30 seconds. Stand as tall as you can. Note whether you are shaky or stable and how long you are able to hold the position for each side. Record this information on your assessment sheet.

SELF-ASSESSMENT SHEET

Date: _____

Resting Heart Rate: _____

Age: _____

Weight: _____

Height: _____

SHOULDER RANGE OF MOTION MEASUREMENTS

FLEXION:

Raising my arm straight in front of me and up overhead (palm facing inward):

_____ my arm is parallel to the ground

_____ my arm is slightly higher than shoulder height

_____ my arm is pointing diagonally toward the ceiling

_____ my arm is pointing straight up toward the ceiling

EXTENSION:

Standing straight with my shoulders down (don't let them hike up to the ears, or round shoulders forward) my palm is facing my body and my arm is moving backward in straight line:

_____ my thumb reaches just to my buttocks

_____ my thumb reaches 45 degrees past my buttocks

ABDUCTION:

Standing straight with my back against the wall and shoulder and back of arm in contact with the wall, my palm is facing forward and I move my arm out to the side and towards my head (like "angels" in the snow):

_____ my arm is parallel to the ground

_____ my arm is pointing diagonally toward the ceiling

_____my arm is pointing straight up toward the ceiling

INTERNAL ROTATION:

Placing my hand behind my lower back with my palm facing away from my body. My hand is able to reach up to:

_____ my waist

_____ 3” above my waist

_____ my middle back (bottom of my shoulder blade)

EXTERNAL ROTATION:

My elbow is locked at my side with my arm pointing straight forward (perpendicular to body). My thumb is pointing to the ceiling with my palm facing inward. Rotating my arm backward and to the side:

_____ my hand is pointing diagonally toward the wall and my arm is at 45 degrees to my body

_____ my palm is facing completely forward, my arm is in line with my body at 90 degrees

_____ my arm is somewhere between 45-90 degrees

POSTURAL ASSESSMENT

You will want to stand in front of a full-length mirror with your shoes off. March in place with your eyes closed for a few seconds. Stop, open your eyes, and try to stay in that position. If you need to move in order to perform this assessment, repeat the marching with your eyes closed after you move.

1. My head appears to be _____extended over my chest _____ centered in the middle of

   my collarbone ____tilted right _____tilted left

2. My chin appears to be _____level _____tilted downward _____tilting upward

3. My shoulders appear to be _____in neutral _____rounded forward (palms facing body)

   _____the left is elevated

   _____ the right is elevated

4. My upper back appears to be _____ in neutral _____ slightly forward _____ hunched forward

5. My shoulder blades appear to be _____ flat _____right is protruding _____left is protruding

6. My lower back appears to be _____ flat _____slightly curved _____ swayback

7. My hips appear to be _____ level _____the right side appears to be elevated _____ the left side appears to be elevated

8. My knees appear to be _____ centered _____rotated toward the outside _____ rotated toward the inside

9. My feet appear to be _____ pointing straight forward _____ rotated toward the outside

   _____ rotated toward the inside

   _____ rolling inward _____ rolling outward_____flat

Girth Measurements in inches (only take measurements for areas where lymph nodes have been removed or irradiated)

AXILLARY (ARMPIT)

RIGHT SIDE:

_____ wrist fold _____1/2 way between wrist fold & elbow crease _____ elbow crease

_____1/2 way between top of arm & elbow crease

LEFT SIDE:

_____ wrist fold _____1/2 way between wrist fold & elbow crease _____ elbow crease

_____1/2 way between top of arm & elbow crease

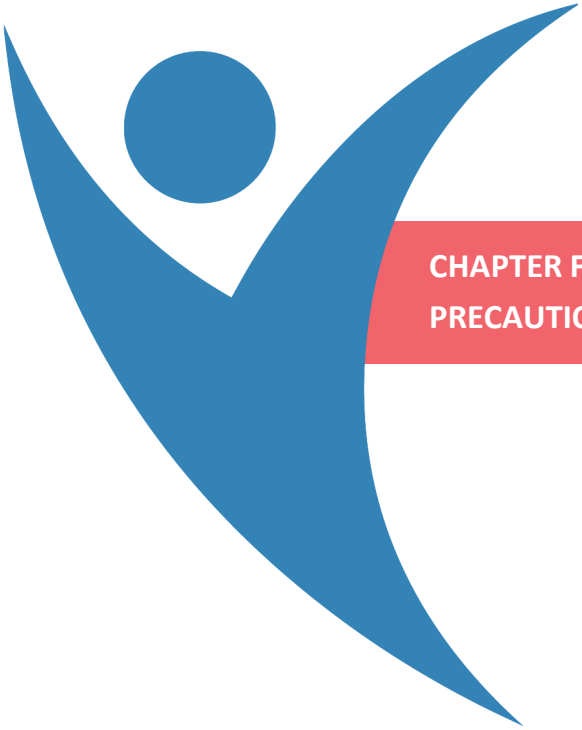
Whether you are currently undergoing treatment, or are several years out, you will benefit from the exercises in this book. In either case, ***it is essential that you get your doctor's permission,*** complete your self-assessment, and pace yourself according to your level of fitness and your energy level on any given day.

If you are a member of a health club, you may be interested in participating in a group class. The camaraderie and support is wonderful, however, it is easy to overexert in an effort to keep up with classmates. Make sure that you stay very well hydrated and don't overheat. If you have had axillary lymph nodes removed or irradiated, elevate your affected arm and open and close your fist periodically. You may be fortunate enough to find a class specifically designed for cancer patients.

The advantage is that the teacher will know your needs and, in many cases, can make recommendations during the class. The disadvantage is that most classes cater to beginning level exercisers and the class may be to novice for you. Another potential disadvantage is that there are many types of cancers, surgeries, and treatments, and everyone is put together in one class. In this situation, it is difficult to meet each person's needs. Remember that variety is key; try different classes until you find one that you like and are comfortable with and do your home-based program 2-3 times per week for optimal results. Most of all go at your own pace and have fun!

REMEMBER THE FOLLOWING POINTS WHEN PERFORMING ALL EXERCISES:

- Get your doctor's permission before beginning this or any exercise program
- Begin each exercise session with a five to ten-minute cardiovascular (aerobic) warm-up
- Following your warm-up, spend whatever time is necessary to do your recommended stretches
- DO NOT HOLD YOUR BREATH! Breathe smoothly and consistently while performing all exercises. Exhale on the exertion phase and inhale on the relaxation phase. If you have high blood pressure (even if you are being treated with medication) this is even more critical.
- When strength training with weights, or rubber resistance, always lower the resistance in a slow and controlled manner; never drop them down haphazardly.
- Proceed with caution and at your own pace. Too much weight (resistance), or too many repetitions (times you lift the weight), can overload the muscles and may cause lymphedema (upper body exercises could trigger upper extremity lymphedema whereas lower extremity exercises could trigger lower extremity lymphedema). It is very unlikely that you will get lymphedema from exercise if you take the necessary precautions as stated in chapter 5. Exercise can, in fact, help to prevent and/or manager lymphedema.
- If you notice any redness, swelling, or heat in the area were lymph nodes were removed or irradiated, consult your doctor immediately. If you can press your finger into the affected area and it holds the indentation, it may be stage 1 – "Pitting Edema." If caught early, it is usually reversible.
- Before each exercise session, take girth measurements in the areas where lymph nodes were removed or irradiated. Compare them to your self-assessment results. Always cool-down and stretch at the end of your workout session.



CHAPTER FIVE
PRECAUTIONS

The amount of lymphatic fluid that is transported through the affected areas is directly related to the amount of blood flow to those areas. Heavy lifting with the affected arm or leg, extreme climatic temperatures, extreme water temperatures when bathing, showering, or washing dishes, hot tubs, saunas, sunburn, and vigorous repetitive movements against resistance, all of which will increase blood and lymphatic flow to the affected area, should be avoided.

When a post-operative node dissection patient is fighting off an infection there will typically be an increase in lymphatic load as well as a decrease in transport capacity. Cellulitis and lymphangitis can inflame the lymphatic vessels, making them dysfunctional to transport lymphatic fluid. When you are traveling by airplane, it is important to wear a fitted sleeve or stocking due to pressure changes which allow fluid to pool in the extremities. Due to the lack of movement during flight, the vessels which normally pump the lymph towards the regional lymph nodes are working at a very low level.

Therefore, it is not only important to wear compression garments, but to move around the cabin whenever possible to prevent the pooling that can increase lymphatic load.

While each of these precautions, as well as those listed on the following pages, make perfect sense, there are several other factors that can also influence a potential lymphedema outcome. These include, but are not limited to, the number of lymph nodes that were removed from a given location, the extent of surgical disruption, the amount of lymphatic scarring from radiation, and the degree of obesity.

Lymphedema is swelling produced by an accumulation of lymph fluid in the tissue. For breast cancer patients, the swelling occurs in the arm of the affected side due to damage to the lymph vessels in the armpit area caused by the removal of the axillary lymph nodes or from radiation to that area. The job of the lymphatic vessels is to drain fluid from the tissue cells in the body, along with protein molecules, bacteria, cellular waste products, and other unusable matter. This protein-rich fluid, called lymph once it is in the lymphatic system, travels in one direction: toward the heart. It is transported through the lymphatic vessels to the lymph nodes, where it is filtered and cleansed before returning to the venous system and moving on to the heart. In the heart, the fluid is simply returned to the blood to be recirculated by the body. If the lymphatic system has been injured, as in the case of a lymph node dissection or radiotherapy (for all types of cancer), the lymph can become backed up.

If untreated, the backed-up fluid can provide a breeding ground for bacteria that can result in infection and can delay wound healing. A long-term accumulation of this fluid eventually results in thick and hardened tissues (fibrosis), which creates further resistance to draining the fluid from the limb. While lymphedema may not occur immediately after surgery, it can occur at any time during the rest of your life after cancer treatment. Sometimes extensive trauma can be the contributing factor while at other times it may be due to a bug bite, cat scratch, or burn. Radiotherapy also increases the chance of developing lymphedema. Radiotherapy is generally recommended to patients with a high risk of recurrence of cancer, such as those who have large, aggressive tumors. It is also recommended for those whose lymph nodes test positive for cancer cells or show an incidence of microscopic residual disease after surgery. In most cases when breast conserving surgery is per-

Lymphedema can only affect the arm where the nodes have been irradiated, not the overall immune system. After radiotherapy, the nodes become scarred and fibrotic, increasing the potential for blockage. Upwards of five percent of breast cancer patients are afflicted with lymphedema during their first year after surgery. The lifelong rate for affliction is between 30-40%. Although this example if pertaining to breast cancer and a axillary node dissection, it is important to remember that if you have undergone a lymph node dissection or radiation for any type of cancer, you are at risk for lymphedema in that part of your body. With proper education and care, lymphedema can be avoided, or, if it develops, kept well under control. Older individuals and those with poor nutrition face an increased risk, as do individuals with infections.

Removal of the nodes and damage to the area prevent the lymph fluid in the arm from draining properly, allowing it to accumulate in the tissue by restricting pathways and causing back-up. It has been well documented that the development of lymphedema after breast cancer surgery and radiotherapy is related to the extent of the lymph node dissection, the extent of the breast surgery, and whether radiotherapy is given to the axilla. When breast conservation surgery is performed without radiotherapy or an axillary node dissection, there is no incidence of lymphedema. If lymphedema goes untreated, it can result in decreased arm function, decreased range of motion in the arm and shoulder, decreased finger function and numbness in the hand, and swelling of the entire arm, hand, and fingers. In addition, this damage may result in pain and tightness in the area as the lymph vessels close up, tighten, and sometimes snap.

Guarding against infection is extremely important because the affected arm will be more susceptible to infection than the uninfected arm, and infection can cause increased swelling. If you notice any signs of infection, contact your doctor immediately. These signs include swelling, fever, or skin that is red, tender, warm, persistently itchy or blotchy. There art three categories for grading lymphedema; grade one, two, and three. In grade one, when the skin is pressed the pressure will leave a pit that takes some time to fill back in. This is referred to as pitting edema. Sometimes the swelling can be reduced by elevating the limb for a few hours. There is little or no fibrosis at this stage, so it is usually reversible. In grade two, when the swollen area is pressed, it does not pit, and the swelling is not reduced very much by elevation. If left untreated, the tissue of the limb gradually hardens and becomes fibrotic. In grade three, the lymphedema is often referred to as elephantiasis. It occurs almost exclusively in the legs after progressive, long-term, and untreated lymphedema.

At this stage there may be gross changes to the skin. There may even be some leakage of fluid through the tissue in the affected area, especially if there is a cut or sore. While lymphedema will respond to treatment, at this stage it is rarely reversible.

Lymphedema is a very serious condition and should not be taken lightly. It frequently results in complications, such as lymphangitis (a bacterial infection of the lymphatic system), skin changes, fibrosis, and infection. There are even a few life-threatening complications, although rare, such as the development of a rare type of cancer, lymphangiosarcoma, in the affected area. This can occur in patients with long-term, untreated, or improperly treated lymphedema. Unfortunately, this condition requires immediate amputation. Lymphedema may worsen with time if it is not attended to. It can become disabling by stiffening the joints or making the limbs heavy and may cause significant cosmetic deformities.

Using compression bandages

Compression bandages apply external pressure to a swollen limb. When swelling has persisted in an area, the tissue loses some of its' elasticity and does not return to its' original position and shape, even when the fluid decreases. The bandages support the skin and underlying blood vessels. Bandaging usually starts with gauze tape at the fingers and then continues with a series of different sized short-stretch bandages around the hand, progressing up the arm to within a short distance of the shoulder. The number of bandages used depends on the size of the arm and how effectively the compression is achieved. Many therapists recommend wearing the bandages while sleeping, as well as anytime that you are engaging in physical activity or exercising.

In addition to bandaging, most patients should be fitted with a compression sleeve that is worn during the day time. The garments are not designed to reduce swelling, however, but to maintain the size of the limb and prevent swelling from increasing. Some patients will use a sleeve when flying on an airplane in order to reduce their chances of getting lymphedema due to the changes in cabin pressure.

One of the most important, and often over looked component of exercise is breathing. Not only does breathing allow precious oxygen to be circulated through the bloodstream, but it is also effective for moving fluid through a gentle pumping action of the abdominal muscles. The fluid is pumped through the central lymphatic vessel in the chest cavity, stimulating the flow of lymph. When you breathe in, using your abdominal muscles, the pressure in the chest cavity changes, because the belly breath moves your diaphragm. When you exhale, the pressure changes once again. This back-and-forth alternation in the pressure acts like a pump on the large lymphatic trunk that runs up through the chest cavity and drains into the venous system of the neck.

Here's how; sit in an upright position. Take a deep breath through your nose and exhale through your mouth, flattening your belly and squeezing out every last bit of air. Emptying the lungs completely and removing all of the stale air from the bottom of the lungs automatically stimulates a diaphragmatic breath. Breathe in through your nose and notice how your belly expands. Repeat the sequence again. Let the air out through your mouth, making sure your belly flattens. Try another one or two breaths this way. If you get light-headed, try to slow down your inhalation, and pause before breathing in again. It is not necessary to breath with a giant breath – just one that goes to the bottom of your lungs, while your chest remains still. Imagine a balloon in your stomach that inflates when you inhale and deflates when you exhale.

Everyone knows the benefits of exercise for seemingly healthy individuals, but they carry even more a punch for those suffering from lymphedema. Generally speaking, those who exercise have a lower percentage of body fat. Keeping body fat in check can actually help to prevent lymphedema. Fat can be a special problem with an impaired lymphatic system. Fat is deposited in the interstitial tissue and can make it more difficult for the fluid to pass through and into the lymph vessels. The lymphatic system is stimulated by the pumping action of the blood vessels, as well as the pumping action of muscles, so anything one does to improve their circulatory system will be helpful for the lymphatic system. A good exercise goal, for aerobic activity, is thirty minutes three or four times a week. Choose an exercise that will allow you to mildly increase your heart rate without "overdoing" it. It is important that you wear your support garment (if one has been prescribed for you) or bandage while exercising. Bandages increase pressure against the skin during exercise. The pressure, coupled with the contraction of your muscles, encourages the lymph to move. Exercise, in and of itself, will help to pump the muscles, improve circulation, and move lymph from congested areas into an area where it can drain more efficiently. It is important to start out very slowly with few repetitions and wait until the next day to see how the affected limb has responded. You can gradually increase your repetitions, based on what the limb will tolerate. Take your time and use good form and posture.

Warning signs to stop exercising:

- When you have a fever
- If you experience chest pain
- If you experience sudden shortness of breath or unusual fatigue
- When you have recurring leg pain or cramps
- If you experience an acute onset of nausea during exercise
- If you feel disoriented or confused
- When you have had recent bone, back, or neck pain that is not relieved with rest
- If you have an irregular heartbeat

STAGE 0 (LATENT)

A subclinical stage where swelling is not evident despite impaired lymph transport. Patients may complain of tightness of the skin or heaviness even though there is no swelling seen.

STAGE 1 (MILD) -

When you awake in the morning, your arm may be a normal size. The tissue is still in a "pitting stage" (when pressed by a finger the area indents and holds the indentation). This is called “Pitting Edema.”

STAGE 2 (MODERATE) -

The tissue does not "pit" (when pressed by a finger the tissue bounces back without leaving an indentation). The tissue has a spongy consistency.

STAGE 3 (SEVERE) -

The tissue at this stage is hard (fibrotic) and will be unresponsive to the touch. The **swelling is irreversible** and the limb is **very large and swollen.**

POSSIBLE INFECTIONS -

Infections are possible at any stage of lymphedema but occurrence becomes greater as stages progress. A swollen limb, left untreated, becomes hard (fibrotic) and full of lymph fluid which is high in protein and a perfect medium for bacteria and infections

PRECAUTIONS TO AVOID UPPER EXTREMITY LYMPHEDEMA

- Avoid insect bites, burns, skin irritants, hangnails, and torn cuticles
- Avoid tight fitting jewelry on the affected arm or hand
- Wear loose fitting clothing on arms, chest, and shoulders
- Don't overheat – avoid saunas, whirl-pools, steam rooms, hot baths, and sun bathing
- Don't receive shots, have blood drawn, or have blood pressure taken on affected arm
- Remember that tennis, racquetball, golf, and bowling are all considered risky sports
- Keep the at-risk arm(s) spotlessly clean and use lotion after bathing
- Avoid repetitive movements such as scrubbing, pushing, or pulling, with the at-risk arm
- Avoid heavy lifting with the affected or at-risk arm
- Use an electric razor when shaving neck armpits
- Wear a compression sleeve when flying

LYMPH DRAINAGE EXERCISES FOR UPPER EXTREMITY LYMPHEDEMA

Prior to beginning these exercises, you should start with a five-minute aerobic warm-up to get the juices flowing. As you begin each of the following exercises make sure to take several deep abdominal breaths (as were described earlier).

PELVIC TILT – lie on your back with your knees bent and feet flat on the floor. Tilt your hips so that you are able to press the small of your back against the floor. Pause for several seconds then release the contraction. Repeat five times.

MODIFIED SIT-UP – lie on your back with your knees bent and feet flat on the floor. Perform a pelvic tilt, pressing the small of your back to the floor. Keep your neck in neutral and your chin pointing to the ceiling. As you exhale, lift up your chest and shoulders, pausing when you feel your abdominal muscles tighten up. Slowly lower yourself back to starting position (trying not to rest between repetitions). Repeat as many times as you can comfortably.

NECK STRETCHES – begin by standing or sitting erect. Exhale and turn your head slowly to the right, looking over your shoulder. Inhale as you return to center. Repeat this to the left. Next, tilt your head to the right, allowing your chin to drop toward your shoulder. Maintain this position for five seconds, breathing regularly. Slowly bring your head back to center. Repeat this to the left. Finally, tilt your head to the right, allowing your ear to drop toward your shoulder. Maintain this position for five seconds, breathing regularly. Slowly bring your head back to center. Repeat this to the left.

SHOULDER SHRUGS – shrug both shoulders, lifting them towards your ears as you inhale. Exhale, and return to a relaxed position. Next, exhale and press your shoulders down as far as possible, pause. Inhale and return to the relaxed position.

SHOULDER ROLLS – lift your shoulders up to your ears then rotate your shoulders back and down, making a smooth, continuous motion. Repeat several times. Repeat in the other direction.

ISOMETRIC SHOULDER BLADE SQUEEZE – bend your elbows to a right angle, parallel to the floor. Exhale and pull them towards the center of your back, squeezing the shoulder blades together. Pause. Inhale and return to starting position. Repeat 8-12 times.

ISOMETRIC CHEST PRESS – place the palms of your hands together, with their elbows bent and arms parallel to the floor at shoulder level. Exhale and push your hands firmly together. Pause. Inhale and relax. Repeat 8-12 times.

SHOULDER CIRCLES – hold your arms at shoulder height, parallel to the floor, with your palms facing down. Exhale and rotate your arms so that your palms are facing upward. Inhale and return palms to starting position. Repeat 8-12 times.

WRIST CIRCLES – rotate your fists in small circles, isolating the movement to the wrist only. Rotate 8-12 times in one direction, then in the other.

WRIST FLEXION AND EXTENSION – bend your wrist towards you, then away from you, isolating the movement to the wrist only. Repeat 8-12 times

FIST CLENCH – open your hands and stretch your fingers, spreading them apart. Then slowly clench each hand to make a fist. Hold for five seconds, breathing regularly. Relax.

CHEMOTHERAPY -

One of the long-term side-effects of chemotherapy is Osteoporosis. Osteoporosis is a decrease in bone mass resulting in thinner, more porous bone.

Osteoporosis can lead to a higher risk of fractures or broken bones. Regular strength training exercises can help to increase bone density, thereby fending off osteoporosis. If you are a man or woman undergoing hormonal therapy and/or you have had your thyroid removed, this will increase your risk of getting osteoporosis. It is important to limit caffeine, tobacco, alcohol and carbonated beverages since these substances may reduce bone mass.

Certain chemotherapy drugs can damage the pancreas and impair its ability to make insulin. But for this reason, these drugs are rarely used. Several factors can cause a rise in blood sugar during chemotherapy. Individuals who already have higher than normal blood sugar levels — but not high enough for a diagnosis of diabetes — or who have a tendency for diabetes before a cancer diagnosis may have further increases in blood sugar. This may be due to the illness or to stress or a decrease in physical activity resulting from the illness.
Other drugs used to treat cancer may also cause increases in blood sugar levels. These include steroids, which interfere with the function of insulin in the body. Steroids also cause increased appetite and weight gain, which can contribute to diabetes.

Lastly, prolonged chemotherapy treatments can lead to damage and the heart and lungs. A regular cardiovascular exercise program will help to strengthen the heart and lungs, minimizing chemotherapy's unwanted side-effects.

HORMONAL THERAPY -

Both men and women undergoing hormonal therapy to halt the production of estrogen or testosterone will be at risk for osteoporosis. Osteoporosis is a decrease in bone mass resulting in thinner, more porous bone. Osteoporosis can lead to a higher risk of fractures or broken bones. It will be essential for you to supplement with appropriate amounts of calcium or Fosamax, as prescribed by your doctor. Additionally, you will need to include weight bearing exercise (strength training) into your weekly routine. The weight bearing exercises will help to increase bone density and increase lean muscle mass. If you have had your thyroid removed or have undergone chemotherapy, this will increase your risk of getting osteoporosis. It is important to limit caffeine, tobacco, alcohol and carbonated beverages since these substances may reduce bone mass.

Another undesirable side-effect of hormonal therapy is instant menopause for women, and menopausal-like symptoms for men. Aside from increasing the risk for osteoporosis in men and women, men may also lose lean muscle mass over prolonged periods. Many of you will also find yourselves gaining in excess of twenty pounds. Not only does this put more strain on your heart and lungs, it also increases your risk of diabetes if you have undergone chemotherapy. A balanced program consisting of strength training to increase lean muscle and bone mass, and cardiovascular training to reduce body fat and strengthen your heart and lungs, is going to be a necessary part of your life.

DEHYDRATION -

Cancer treatment can increase the amount of fluid a person needs to flush the bladder and kidneys. Signs of dehydration include weakness, dizziness, decreased urination, thirst, headache, and possible fever. These symptoms can occur quickly if you lose fluid due to diarrhea, vomiting, or fever. An intake of 48-64 ounces (6-8 eight ounce glasses) of fluid per day is recommended. These fluids should be non-alcoholic and caffeine free since both substances tend to increase fluid loss. Remember, "fluid" does not just mean water. Broth, juice, fruit drinks, Jell-O, water ice, milk, Ensure, and decaf teas all count as fluid. However, in most cases it's almost impossible for an individual to take enough fluids to make up for the fluid loss that occurs with the diarrhea.

That's one of the reasons it's such an important medical problem and why patients end up in the hospital receiving intravenous fluids. If unchecked, severe dehydration, loss of potassium, and in the extreme even death, can occur if this is not appropriately addressed. It is important to **not exercise** within 24-36 hours of vomiting or diarrhea to allow yourself ample time to re-hydrate yourself.

LOW BLOOD COUNTS / IMMUNOCOMPROMIZATION -

The primary cause of low white blood cell counts (neutropenia) is chemotherapy, radiation, bone marrow & stem cell transplants. Because chemotherapy cannot differentiate between cancer cells and normal cells, healthy cells are also killed, including white blood cells which work to protect us from infection. When these white blood cells are destroyed, patients become vulnerable to infection. Proper hygiene at this time is critical because even a minor case of the flu can become life-threatening.

Avoid going to places where there will be a lot of people; gym, movie theater, grocery store, and definitely avoid airplanes! If you have to be around other people, don't share towels or drinking glasses, wash your hands regularly, and avoid kissing anyone who is sick. The risk of lowered blood cell counts varies according to the type of cancer, dosage, and schedule of treatment you receive. You have a higher risk if you are 70 years or older, have an already compromised immune system, and/or have had previous chemotherapy or radiation.

Some of the symptoms to look for are:

- Fever greater than 100.4 degrees
- Chills/sweating
- Sore throat or cough
- Mouth ulcers
- Diarrhea or burning sensation during urination
- Redness, pain, or swelling around a wound or sore

During treatment your doctor will be closely monitoring your white blood cell count as well as other indicators for signs of a compromised immune system. Your white blood cell count will typically reach its lowest point 10-14 days after chemotherapy.
Fatigue - can result from surgery

FATIGUE -

Can result from surgery and radiation oncology. Cancer and cancer treatment can also disrupt your eating or sleeping habits, both of which may result in fatigue. Fatigue in people with cancer may have other causes. Tumors can cause fatigue directly or indirectly by forming toxic substances in the body that interfere with normal cell functions. Medication, lack of exercise, or pre-existing physical or psychological conditions can cause fatigue. Fatigue is a common symptom associated with chemotherapy, radiation, surgery, and anemia. Fatigue from chemotherapy affects most patients, lasting for one to two weeks following treatment, then decreasing gradually.

Chemotherapy can lower the number of red cells in your blood, which carry oxygen throughout your body and give you energy. Having fewer red blood cells means that your body gets "out of breath" when you do something even mildly strenuous. Fatigue as a result of radiation oncology affects almost all patients and may worsen during the course of your treatment, peaking at four to six weeks. In order to heal itself, the body uses a lot of energy during radiation oncology. The additive effects of stress related to your illness, daily trips for treatment, and the effects of radiation on normal cells all may contribute to fatigue.

Fatigue usually lessens after your therapy is completed, although not all patients return to their normal levels of energy. Fatigue is a problem following surgery, but fatigue from surgery improves with time. It can be worse, however, when it is combined with the fatigue caused by other cancer treatments. Fatigue from cancer surgery can last for weeks or months and may be caused by anxiety from surgical preparation and pre-surgical testing. Pain after surgery, the effects of anesthesia, sedatives, or analgesics may also cause fatigue. Anemia is a major factor in cancer-related fatigue and quality of life in people with cancer. It may be caused by the cancer itself or by cancer treatments, or it may be related to other physiological changes.

It is a feeling of severe tiredness and is experienced by people who have surgery, radiation, chemotherapy and, other forms of cancer treatment. Fatigue is the most common side-effect of cancer treatment and is reported by approximately 76% of all patients. Fatigue related to cancer treatment is different from everyday fatigue. It can appear suddenly and be overwhelming. It is not always relieved by rest and can last after treatment ends. Cancer treatment-related fatigue can affect many aspects of your life, but there are some practical measures you can try that may help to relieve your fatigue.

Different people experience different symptoms. People with cancer treatment-related fatigue describe feeling weak, sleepy, drowsy, weary, confused or impatient. It is probably due to a range of problems related to your cancer and your cancer treatment, including having a low blood count, sleep disruption, feeling stressed and not eating properly.

- Fatigue can affect how you think as well as how you feel
- You may need more sleep
- You may experience physical, emotional and/or mental exhaustion
- Your body, especially your arms and legs, may feel heavy
- You may have less desire to do normal activities like eating or shopping
- You may find it hard to concentrate or think clearly
- It may affect your ability to perform activities of daily living
- It may affect your quality of life

Moderate exercise has been found to relieve fatigue symptoms in both healthy people and those with cancer. Light to moderate exercise, as recommended by your physician, physical therapist, or cancer exercise specialist, can gently energize you and increase function. The type of exercise we're talking about differs from casual, everyday activity, in that an exercise program is a controlled activity used to maintain energy and minimize fatigue. An exercise program should be tailored to the individual according to age, gender, and physical and medical conditions. Exercises should involve rhythmic and repetitive movement of large muscle groups (such as walking, cycling, or swimming).

BLISTERS/BURNS –

A common side effect of radiation therapy is skin irritation in the area of the body that is being treated. The skin reaction can range from mild redness and dryness (similar to a sunburn) to severe peeling of the skin in some patients. The majority of skin reactions to radiation therapy go away a few weeks after treatment is completed. In some cases, the treated skin will remain slightly darker than it was before, and it may continue to be more sensitive to sun exposure. It is important to notify your physician when your skin becomes irritated because redness and dryness can eventually progress to peeling with oozing of fluid in the area. Radiation can have a detrimental effect on your lymphatic system, making you more prone to lymphedema. An open wound is a perfect medium for bacteria and can lead to an infection which may in turn lead to lymphedema Your doctor or nurse can suggest measures to relieve your discomfort and possibly minimize further irritation as well as risk of lymphedema.

There are effective topical medications for treatment of radiation induced skin irritation, as well as a number of precautions that may minimize skin irritation during radiation therapy, such as:

- Keep the treated area dry and free from irritation
- Wash the skin in the treatment area only with mild soaps
- Use a mild shampoo, such as baby shampoo, if the head is being treated
- When using a towel, pat the area dry instead of rubbing
- If you must shave in the treated area, use an electric razor to prevent cuts
- Avoid using shaving lotions or scented creams
- Do not use perfumes, deodorants, or makeup in the treated area
- Avoid using heating pads or ice packs on the skin in the treated area
- Wear loose-fitting clothing that does not rub on the skin in the treated area
- Avoid harsh fabrics over the treatment area
- Avoid sun exposure in the treated area
- Do not swim in salt water, lakes, swimming pools, or ponds
- Always report any discomforts or concerns to your nurse or doctor
- Check with your nurse or physician regarding the use of creams or lotions
- Unless necessary, do not use adhesive tape, including band aids and paper tape on the treated area
- Breast cancer patients should not use deodorant if the axilla is in the treatment field. Create your own non-irritating deodorant: 1/4 cup baking soda and 1/4 cup of corn starch mixed together and applied with cotton balls.

*When exercising, it is important to make sure that your wound is clean and bandaged. Don't put pressure on the area by laying on it or pressing it against an exercise machine.

CANCER RELATED PAIN -

Not all people with cancer experience pain and not all cancers produce pain equally. Some cancers, even when advanced, may not produce pain at all. Cancers involving bone, either directly or through the spread of the disease are usually associated with pain when advanced. Pain can have a terrible effect on one's quality of life and ability to function. It can lead to depression, irritability, withdrawal from social activity, anger, loss of sleep, loss of appetite, and an inability to cope. Pain may be acute or chronic. Acute pain is severe and lasts a relatively short time. It is usually a signal that the body is being injured in some way, and the pain generally disappears when the injury heals.

Chronic or persistent pain may range from mild to severe, and it is present to some degree for long periods of time. Some people with chronic pain that is controlled by medicine can have breakthrough pain. This occurs when moderate to severe pain "breaks through" or is felt for a short time. It may occur several times a day, even when the proper dose of medicine is given for chronic or persistent pain. Fortunately, pain can usually be controlled. Doctors, nurses, and all other members of the health care team are concerned with treating and controlling pain. Ongoing assessment of the types of pain that develop and change during the course of the cancer and its' treatment are essential to prescribing appropriate pain treatments. If pain is present, it can be caused by several factors, including those that have nothing to do with cancer. It is imperative that the cancer patient alerts the doctor immediately about any pain that they have. If cancer pain is left unattended, it can affect the patient's ability to work and participate in normal activities, as well as their quality of life.

Not all people will be able to tolerate their drug treatment. Some people are allergic to certain medications. Some will eventually develop side effects from the medications. Some will tolerate one specific drug in a class of drugs, but not tolerate others in the same class. Some people may not be able to tolerate any of the drugs within a particular class. World Health Organization guidelines suggest that doctors try a particular drug in its' class to see if the patient will indeed tolerate it. The dosage is then increased until the patient gets either pain relief or intolerable side effects. Before abandoning that class of drugs entirely, another drug in that class will be tried. Sometimes the side effects can be managed with other treatments before discontinuing therapy.

If you are currently taking narcotics for pain, it is not advisable to exercise while under the influence of such drugs. Side effects of such drugs include dizziness, light-headedness, blurred vision, and nausea. It would be inadvisable to participate in any type of exercise under such circumstances.

Some alternate methods of pain control include the following:

- Exercise
- Relaxation / Meditation
- Imagery / Visualization
- Hypnosis
- Transcutaneous nerve stimulation
- Accupuncture / Accupressure
- Massage
- Talking with clergy or other spiritual advisors
- Music

CHAPTER SIX
EXERCISE PROGRAMMING

If you turned straight to this chapter to begin exercising, you missed some important information. Before you do any of these exercises, you should, at the very least, do the following:

- Obtain permission to exercise from your doctor
- Read the lymphedema section on pages 35-41
- Review warning signs to stop exercising 38-39
- Review points to remember when performing all exercises 32-33
- Complete the at-home physical assessment on page 29-31

The best thing, of course, would be for you to read the beginning of the book in its entirety. The information will help you to understand the relationship between your breast cancer treatment and your exercise program.

While the exercises presented in this book are only designed to help you correct muscle imbalances and range of motion limitations following surgery and treatment, they will be wonderful preparation for more advanced exercise programming. You can contact me at: 561-254-0229 and coachshannonburrows@gmail.com for a comprehensive assessment and individualized exercise programming.

Please refer back to your shoulder range of motion measurements on pg. 29-30. Under Flexion, if you checked any of the following:

_____ my arm is parallel to the ground

_____ my arm is slightly higher than shoulder height

_____ my arm is pointing diagonally toward the ceiling

Please perform any of the following exercises at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

ADD THREE FLEXION EXERCISES

Please refer back to your shoulder range of motion measurements on pg. 29-30. Under Extension, if you checked the following:

_____ my thumb reaches just to my buttocks

Please perform any of the following exercises at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

ADD THREE EXTENSION EXERCISES

Please refer back to your shoulder range of motion measurements on pg. 29-30. Under Abduction, if you checked the following:

_____ my arm is parallel to the ground

_____ my arm is pointing diagonally toward the ceiling

Please perform any of the following exercises at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

ADD THREE ABDUCTION EXERCISES

Please refer back to your shoulder range of motion measurements on pg. 29-30. Under Internal Rotation, if you checked the following:

_____ my waist

_____ 3" above my waist

Please perform any of the following exercises at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

ADD THREE IR EXERCISES

Please refer back to your shoulder range of motion measurements on pg. 29-30. Under External Rotation, if you checked the following:

_____ my hand is pointing diagonally toward the wall and my arm is at 45 degrees to my body

_____ my arm is somewhere between 45-90 degrees

Please perform any of the following exercises at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

ADD THREE ER EXERCISES

Please refer back to your postural assessment on pg. 30-31. Under #1, if you checked off extended over my chest, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Place a pillow or rolled-up towel beneath your head so that your neck is in "neutral". Keep your knees bent and arms resting by your sides. Gently press the back of your head into the pillow or towel and hold for 3-5 seconds. Make sure that you are not holding your breath. Begin by performing 3-5 repetitions and add more as you feel comfortable.

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #1, if you checked off tilted right/left, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Sit upright with your right arm bent behind your back and right shoulder depressed. Take your left hand on your right ear and gently tilt your head to the side without allowing your right shoulder to elevate. Hold for 20-30 seconds. Make sure that you are not holding your breath. Repeat on each

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #2, if you checked off tilting upward, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Sit upright with your hands gently placed on the back of your head. Tuck your chin to your chest and let the weight of your hands provide a gentle stretch in the back of your neck. Hold for 20-30 seconds. Make sure that you are not holding your breath.

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #3, if you checked off rounded forward, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Sit or stand with a neutral pelvis (belly-button drawn towards spine), head in alignment (lined up over shoulders and chine in neutral) and arms reaching behind your back. Gently pull backwards until you feel a gentle stretching sensation across your chest. Hold for 20-30 seconds. Make sure that you are not holding your breath. If this is too challenging try the modified version as pictured.

REPLACE PICTURES

Please refer back to your postural assessment on pg. 30-31. Under #4, if you checked off slightly or hunched forward, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Sit or stand with a neutral pelvis (belly-button drawn towards spine), head in alignment (lined up over shoulders and chin in neutral) and arms reaching behind your back. Bend elbows and squeeze back and together; as if squeezing a tennis ball between your shoulder blades. Hold for 3-5 seconds. Make sure that you are not holding your breath. Begin by performing 3-5 repetitions and add more as you feel comfortable.

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #5, if you checked off right/left is protruding, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Lie on back with knees bent and arms reaching straight toward the ceiling (palms facing each other). Without lifting your head off of the ground, raise shoulders off of the ground and reach finger tips toward the ceiling. Pause and then slowly lower back. Begin by performing 6-8 repetitions and add more as you feel comfortable.

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #6, if you checked off my lower back appears to be flat, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Lie on your back with one knee bent and the other leg raised toward the ceiling. Grasp behind your knees (use a towel if you need assistance) and gently pull backwards until you feel a gentle stretching sensation behind your knee and on the back of your leg. Hold for 20-30 seconds. Make sure that you are not holding your breath. Repeat on both sides.

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #6, if you checked off my lower back appears swayback, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Lie over the BOSU® Balance Trainer with your head comfortably on the center of the dome with both knees bent and feet flat on the floor. Make sure that your knees are lined up directly over your ankles and that your feet are pointing forward. Contract your glutes and push your hips up toward the ceiling. Hold for 3-5 seconds. Make sure that you are not holding your breath. Begin by performing 3-5 repetitions and add more as you feel com-

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #7, if you checked off the right/left side of my hip appears to be elevated, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Sit back on your knees with your arms stretched out over an exercise ball (only go as far as you can with no pain). Shift your weight to the right side of your heels and reach your arms (the ball) toward the left. You should feel a gentle stretching sensation throughout the lower right side of your back. Hold for 20-30 seconds. May sure that you are not holding your breath. Repeat on both sides.

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #8, if you checked off my knees appear to be rotated toward the outside, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Lie on your back with both knees bent and feet flat on the floor. Arms should be by your side, palms down. Make sure that your knees are lined up directly over your ankles and that your feet are pointing forward. Place a pillow between your knees and squeeze your thighs together as you also contract your glutes and push your hips up toward the ceiling. Hold for 3-5 seconds. Make sure that you are not holding your breath. Begin by performing

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #8, if you checked off my knees appear to be rotated toward the inside, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Lie on your side with knees bent and feet together like a clam. Prop your head up with your hand or with pillows so that you are comfortable. Keeping your feet together, elevate upper leg. Pause. Slowly return to start. Begin by performing 10-12 repetitions and add more as you feel comfortable.

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #9, if you checked off my feet appear to be rotated toward the outside, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Stand on the edge of a step. (make sure that you have a rail to hold onto for support). Drop the heel of your right foot off of the edge of the step and press it towards the ground. Hold for 20-30 seconds. Make sure that you are not holding your breath. Repeat on both sides.

REPLACE PICTURE

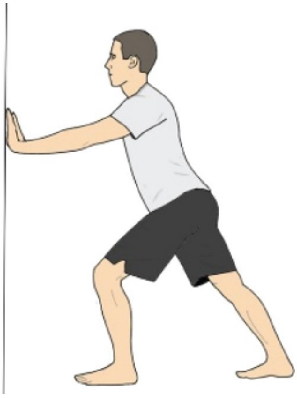
Please refer back to your postural assessment on pg. 30-31. Under #9, if you checked off my feet appear to be rotated toward the inside, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Stand on the edge of a step with your left foot parallel to the step itself. Keeping the left knee slightly bent, allow the right foot to hang off of the step. Elevate your right hip and pause at the top. As you lower your hip, allow the right foot to drop below the step again. Make sure that you are not holding your breath. Begin by performing 6-8 repetitions and add more as you feel comfortable. Repeat on both sides.

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #9, if you checked off my feet appear to be rolling inward, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Stand about two feet away from the wall with arms extended. Bend the right knee slightly as you extend the left leg, pushing the left heel into the ground until you feel a stretch through the calve and achilles (above the ankle posteriorly). Hold for 20-30 seconds. Make sure that you are not holding your breath. Repeat on both sides.



REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #9, if you checked off my feet appear to be rolling outward, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Stand on left leg, keeping a slight bend in the knee, while you bend the right leg and grasp the ankle. Contract your right glute while gently pushing your hip forward until you feel a stretch through the front of the thigh. Hold for 20-30 seconds. Make sure that you are not holding your breath. Repeat on both sides.

REPLACE PICTURE

Please refer back to your postural assessment on pg. 30-31. Under #9, if you checked off my feet appear to be flat, please perform the following exercise at least three times per week. Make sure to work within your comfort zone and avoid anything more than a mild discomfort.

Stand with your arms stretched out against wall for balance. Rise up on to the tips of your toes and pause 1-3 seconds. Make sure that you are not holding your breath. Begin by performing 3-5 repetitions and add more as you feel comfortable.

REPLACE PICTURE

CHAPTER SEVEN
READY-SET-GO

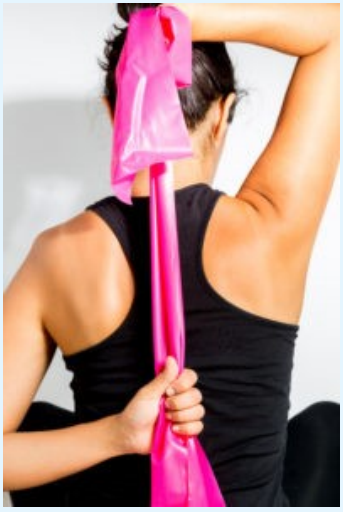
Whether you are currently undergoing treatment, or are several years out, you will benefit from the advice in this book. In either case, **it is essential that you get your doctor's permission** and pace yourself according to your level of fitness and your energy level on any given day.

If you are a member of a health club, you may be interested in participating in a group class. The camaraderie and support is wonderful, however, it is easy to over-exert in an effort to keep up with class-mates. Make sure that you stay very well hydrated and don't overheat. You may be fortunate enough to find a class specifically designed for cancer patients. The advantage is that the teacher will know your needs and, in many cases, can make recommendations during the class. The disadvantage is that most classes cater to beginning level exercisers and the class may be too novice for you. Another potential disadvantage is that there are many types of cancers, surgeries, and treatments, and everyone is put together in one class. In this situation, it is difficult to meet each person's needs. Remember that variety is key; try different classes until you find one that you like and are comfortable with and do your home-based program 2-3 times per week for optimal results. Most of all go at your own pace and have fun!

Remember the following points when performing all exercises:

- Get your doctor's permission before beginning this or any exercise program
- Begin each exercise session with a five to ten-minute cardiovascular (aerobic) warm-up
- Following your warm-up, perform your lymphatic drainage exercises
- DO NOT HOLD YOUR BREATH! Breathe smoothly and consistently while performing all exercises. Exhale on the exertion phase and inhale on the relaxation phase. If you have high blood pressure (even if you are being treated with medication) this is even more critical.
- When strength training with weights, or rubber resistance, always lower the resistance in a slow and controlled manner; never drop them down haphazardly.
- Proceed with caution and at your own pace. Too much weight (resistance), or too many repetitions (times you lift the weight), can overload the muscles and may increase your risk for, or worsen lymphedema. Exercise can, in fact, help to prevent and/or manage lymphedema. There is no "magi number" here. You must start with the lightest amount of resistance possible and work your way up incrementally as your body allows for it. If at any point following a workout you notice selling in the affected area, it may be an indication that you have overloaded the limb. Consult your doctor first if you have not already been diagnosed with lymphedema. On your next workout, you will need to go back to the resistance you were using prior to your last workout and see how it goes. There is no exact science here unfortunately. This truly is a bit of trial and error. I can help you determine the appropriate variables that will keep your exercise program both safe and effective.

- When strength training with rubber resistance, never wrap the band around your affected limb. If you are at risk for lower extremity lymphedema, you must protect both legs.
- If you notice any redness, swelling, or heat in the area were lymph nodes were removed or irradiated, consult your doctor immediately. If you can press your finger into the affected area and it holds the indentation, it may be stage 1 – "Pitting Edema." If caught early, it is *usually* reversible.
- Always cool-down and stretch at the end of your workout session



CHAPTER EIGHT
CHOSING A CANCER EXERCISE SPECIALIST

-Andrea Leonard

In 1995, after my mother's second diagnosis with breast cancer, she asked me if I would help her through her recovery. Following her initial mastectomy in 1981, she was never told about lymphedema, never told to move her affected arm following surgery, and ended up with a frozen shoulder, permanent nerve damage and chronic pain. She dreaded the thought of having to relive that misery.

I had only been a personal trainer for five years but had the good fortune of training her breast surgeon, Dr. Katherine Alley. I remember asking Dr. Alley if she thought it would be a good idea to write a book on exercises for breast cancer survivors. She thought it was a brilliant idea and agreed to help me orchestrate the compilation of information. We were joined by Dr. Theodore Tsangaris, Jr. of Georgetown University Medical Center, Dr. Shawna Willey of the George Washington Hospital Medical Center, and a team of other medical and fitness professionals. The book was published by Harvard Common Press in 2000 and is entitled "Essential Exercises for Breast Cancer Survivors."

Shortly thereafter I realized the need to help ALL cancer patients. There were millions of people suffering needlessly in the aftermath of cancer surgery and treatment and I could not help each and every one of them! In 2004 I founded the Cancer Exercise Training Institute. My mission was, and still is, to educate health and fitness professionals to EMPOWER cancer patients and survivors. My life's mission is to have a credentialed Cancer Exercise Specialist in every city, state, province, and country worldwide. I have trained nearly 10,000 Cancer Exercise Specialists

Each of these individuals has studied a 500+-page manual, participated in a live workshop or watched many hours of power point and video lectures, and completed an incredibly difficult 125-question exam with a score of 80% or better. To ensure the ongoing competency of the Cancer Exercise Training Institute's Cancer Exercise Specialists, they are required to re-test and re-qualify every two years with updated material. There are no other organizations in the industry that have such stringent requirements.

Do not compromise your health, safety, and well-being by working with an underqualified fitness professional. There are no cookie-cutter workouts that can be used for each and every cancer patient. Every patient has their own story and their own response to surgery and treatment. It takes a specially trained individual who is educated, patient, and empathetic to take the proper steps necessary to create YOUR CUSTOMIZED exercise program.

INSPIRING TESTIMONIALS

I remember that day so vividly…the day that I got the call with my diagnosis. To say that I was shocked would be an understatement. I was 42, in the best shape of my life and I had cancer. I was diagnosed with grade 3 DCIS and LCIS in my left breast. Because of the aggressive nature of my grade of cancer, and that my cancer was estrogen and progesterone receptor positive, I chose to undergo a bilateral, nipple-sparing, mastectomy with reconstruction.

Two weeks after my mastectomy I started physical therapy. I was so anxious to get back to my training. The PT that I worked with specialized in lymphedema treatment. I went to see him prior to my mastectomy to take baseline measurements. These measurements are used in the post-surgery follow-up appointment to check for lymphedema when lymph nodes are removed. At my next appointment he was truly amazed at how fast I was healing. He made a comment that I'll never forget. In his many years of practice, he hadn't seen someone bounce back that quickly!

I attribute this 100% to my active, fit lifestyle and healthy diet going into treatment. Don't wait for sickness to focus on wellness! I only attended two therapy sessions before he graduated me to doing workouts on my own. I did what my body would allow to bounce back, primarily walking for cardio, mobility work and slowly incorporating strength training back into my program.

I had a total of three surgeries, two being reconstructive over the course of a year and a half. Recovery wasn't always easy, and my workouts were definitely challenging with the new physical changes, but fitness was my saving grace in times of pain and frustration. The benefits of fitness go so much further than physical progress. Staying active and focusing on health also helped me with the mental struggle of dealing with cancer treatment.

Exactly one year after my breast cancer diagnosis I competed at the Masters Nationals Olympic Weightlifting competition in Savannah, Georgia. Even though I didn't place, it was my way of giving the middle finger to cancer and not giving up on my body. Now I chose to focus on honoring my body with nourishing foods and working on getting stronger in a sport that I really love. Fitness will always be a non-negotiable part of my everyday life. Before I was diagnosed, I was working as a trainer at a local gym and my whole life revolved around fitness and nutrition. My cancer experience motivated me to add certifications to help other cancer fighters and survivors. Fitness might not have prevented my illness, but it had a tremendous impact on managing it and getting back to good health.

Amee L. – Breast cancer survivor

I went to my family doctor in June 2016 with a nagging little unproductive cough that I attributed to allergies. After a failed antibiotic attempt an x-ray was performed which showed fluid in my left lung. An analysis of the fluid revealed cancer cells. I vividly remember going to the pulmonary doctor assuming I had pneumonia or bronchitis or some weird allergy only to be floored with a stage 4 lung cancer diagnosis.

I never smoked or worked in hazardous environments and owning my own personal training business, Beach Better Bodies since the early 1990's, I was always in good if not great shape. Stage 4 with cancer cells in both lungs as well as various bones in my body. It's true, if you have lungs you CAN get lung cancer. My family has a history of cancer with both parents, my grandmother and older sister succumbing to cancer. One of my sisters is a breast cancer survivor.

Further testing proved that the cancer was a genetic disorder and following 2 weeks of radiation for my bones, I was started on Tarceva as a daily oral chemo targeted therapy. Scans after 3 months showed I was getting worse; the drug wasn't working. I had lost my appetite, energy, 25 pounds and had barely any drive or motivation at all. This just wasn't me and my wife and sons worried at Thanksgiving fearing this may very well be a quick end of the fight and I may not make it to Christmas. I continued to train clients in my gym but often needed to lie on the floor following the sessions to gather enough strength for the 10-minute drive home.

My doctors always told me to stay strong, eat right keep working out that my physical condition would only help my fight. I tried but had very little energy. While continuing to struggle through training clients I hadn't myself worked out in a several days, actually weeks. My doctor told me if plan A doesn't work, we go to plan B, Plan C, we keep fighting. Further testing showed I had the T790M mutation and began Tagrisso daily oral chemo treatments on Dec 5, 2016.

On Dec 6, 2016, just one day after starting Tagrisso, I felt pretty good and decided to workout myself in the gym. I did whatever my body would allow me to do while working with free weights and machines, TRX® equipment, the Lebert Equalizers, resistance bands and Sand bells to rebuild my body and strength, both mentally and physically. I have trained 5 days a week since that day, gaining back my weight my energy my appetite my drive and my life. I am in better shape and stronger in the gym today than I have been in years.

Researching lung cancer was dismal, the 50% survival rate was 9 months; with less than a 4% survival rate for 5 years. I chose to quit looking and start writing my own history. Part of that new history involves raising awareness and using my skills and position to give back and make a difference by becoming certified as a Cancer Exercise Specialist through CETI and develop a program specifically designed to help other cancer patients. I'm currently in discussions with my local hospital system to initiate fitness classes for cancer patients and their caregivers. It's time to give back and lead sessions to help others who may not be in the same shape as me but could use some fitness, both mentally and physically, as together, we battle our cancers.

Today I feel perfectly fine and my mind-set is that I'm going to beat this. Even if it hasn't happened before, there's no reason I can't beat it with all our medical advances. With my plant- based diet and consistent workout regimen, I WILL beat this.

My license plate, "WIN DAY," shows my philosophy that I share with whoever will listen to "win the day." Win the day. Don't give up. Make history. Some days you may not win, but you CAN wake up and win tomorrow.

Frank M – Lung cancer survivor

My name is Tara & I was diagnosed with stage 3 lobular carcinoma Nov 5, 2014. Cancer attempted to take away my life, but it failed. With 10/10 lymph nodes involved I run a very good chance of battling this bastard again. I'll be ready, just as I was before.

As a personal trainer I had unknowingly been preparing for this diagnosis. My body was strong. I won't lie, it did mess with my emotions. But before long, I mastered that as well. Its' difficult to not feel responsible. That maybe something you did brought this into your world. I initially wanted to hide but decided to confront it. I taught large group fitness classes at the time & I was connected to so many of them. So, one night I stood in the middle of my class & told them. It was almost a relief. 1st thing I got to take away from cancer!

After my mastectomy I started stretching right away. I wouldn't recommend that to everyone, but I knew my body. .

Chemo started a month later. I was told that my cancer was very aggressive. Range of motion is very important to me.

At the beginning exercising was no different than it had ever been for me. I was no longer "allowed" to work at the recreation center, but I still continued to train friends & a few clients in the safety of my private studio attached to my house. The day of chemo became almost something to look forward to. It was a social event followed by lunch & a serious walk. A personal trainer & good friend of mine who was diagnosed within one week of me was on the same schedule as I was. We sweet talked our oncologist. But that is a totally another story! In my mind I could visualize my heart pumping the chemo to every corner of my body & crushing any hidden cancer cells. I have no doubts that those power walks aided in my success with the effects of the chemo, I took very few anti-nausea drugs.

As the chemo progressed, exercise became more of a challenge. I'll never forget the defeat I felt when I could no longer run. My oncologist looked at me with a half-smile & told me I was fortunate to have been able to run at all. But I didn't stop moving. The elliptical became my best friend. There were many days that I had to really push myself. I would literally slide off the couch, put on my runners & head into the studio. I used to tell my husband that I felt like a half a million bucks after I was done. On a side note, it's amazing how sweat runs off your head without hair! 2nd thing I took away from cancer!

Radiation & three more surgeries have brought me to today.

I gave up my recreation job to pursue my private studio more seriously. I started teaching a cancer exercise class after obtaining my certification. Life is good. If there is another battle, I will be even more prepared. My advice to other women going through treatment is to never stop looking forward. My advice to anyone is to be prepared for what could potentially be. My moto - “Be your best when your best is needed!

Tara F. – Breast cancer survivor

Diagnosis. Colon cancer. Stage 4. After a whole summer of wondering what was going in my stomach, a trip to the ER on the last weekend in August brought it all to light.

A couple of days later, I met with my local oncologist and she gave me her plan. Aggressive chemotherapy and possible surgery in the spring. And that is what happened. As of today, I will have completed twenty-three rounds of chemo plus recovery from an 11-hour surgery.

How? Why? Me? A pure athlete for most of my life. Took care of myself. Ate well. No tobacco. No drugs. No hard living. And I get cancer. Go figure. So, what do we do? Wrap ourselves in a blanket and hold your arm out and say, "drug me up and cure my cancer."

Sorry, it cannot work like that. You must take ownership of what is yours...bad as it is. Then make a plan and destroy it. Beat it like it owes you money.

I started out as a simple working guy. Twenty-two years behind the wheel of a school bus on the mountain roads of West Virginia. ACE Certified Personal Trainer & Strength Coach. RKC (Russian Kettlebell Challenge). I recently just completed/ passed one of my greatest accomplishments. The Cancer Exercise Specialist Advanced Qualification course through The Cancer Exercise Training Institute.

And we fight. We fight together. We are stronger together, especially when knowledge empowers us to overcome some of the worst things we can ever think of.

Civilize the mind. Make savage the body.

John F. – Colon cancer survivor

ABOUT THE AUTHORS

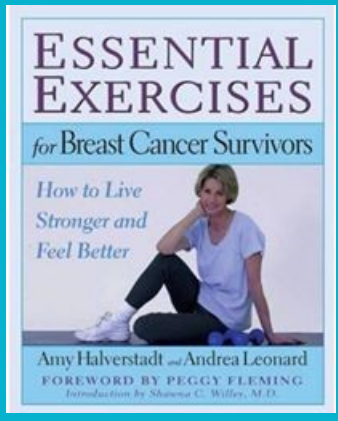
At the age of eighteen, I was diagnosed with thyroid cancer and underwent a complete thyroidectomy and radioactive iodine treatment. Following her surgery, I was challenged with a new, sluggish metabolism, and weight gain. It was through my own personal struggles to regain my previous energy level and physique that I decided to become a personal trainer. I wanted to be able to help others, like myself, who struggled with the same issues of weight gain and poor self-esteem. I graduated from the University of MD in 1990 with a degree in Criminal Justice, but quickly realized that I was in the wrong profession. I avidly pursued a career as a personal trainer.

I began training in 1992 and worked at the National Capital YMCA in Washington, D.C. She quickly worked my way up to Director of Personal Training and ran the department for several years. While working at the YMCA, I started Leading Edge Fitness and EMPOWER- Energizing, Mobilizing, Post-Operative Workout Enhancing Recovery. While training the "movers and shakers" on Capitol Hill, my mom was diagnosed, for the second time, with breast cancer. I watched my mother struggle through the trauma of multiple surgeries, reconstruction, a frozen shoulder, and addiction to narcotics in order to cope with the pain associated with her surgeries.

Inspired by my mother, I along with a medical advisory board from Washington D.C.'s premier medical centers, set out to write "Essential Exercises for Breast Cancer Survivors."

The goal was to help the millions of men and women, like my mother, to gain back their strength, range of motion, and self-esteem (among other things), following breast cancer surgery and treatment. The book was published by Harvard Common Press in 2000. Shortly thereafter, I founded The Breast Cancer Survivor's Foundation, a 501c3 public charity—to better the lives of cancer survivors and their families.

Realizing that I was limited to helping a certain number of clients per week, I founded The Cancer Exercise Training Institute in 2004 and developed the Cancer Exercise Specialist® and Breast Cancer Recovery BOSU(R) Specialist™ Advanced Qualifications for health and fitness professionals. Through this program I have been able to pass on my knowledge, and enable health and fitness professionals around the world, to work safely and confidently with



cancer patients.

Through CETI's Advanced Qualification live workshops and home study, participants learn about twenty-six types of cancer and pediatrics, their surgeries, treatments, lymphedema identification, prevention, and treatment, reconstructive procedures, contraindications, side-effects and so much more. Following a comprehensive examination, attendees are awarded the *Cancer Exercise Specialist® and/or Breast Cancer Recovery BOSU® Specialist™ Advanced Qualifications.*

I have presented the Cancer Exercise Specialist Workshop across the U.S., Singapore, and Canada and have been a guest speaker at IDEA World, CPTN Personal Training Conference, IRHSA, TSI Summit, Medical Fitness Tour, Kaiser Permanente Thriving with Cancer Conference, Winona State University – Survivors Unite, McHenry Community College, New York Institute of Technology, OHSU School of Nursing, Edwards Hospital, Georgetown University Hospital, Suburban/Johns' Hopkins, Mennonite Cancer Foundation, South Georgia Medical Center, Cary Medical Center Lynchburg General Hospital, Chesapeake Regional Medical Center, Sibley Hospital, Memorial Hermann, Sandford Health System, Avera McKennan Prairie Cancer Center, Baptist Hospital East, Patricia Neal Rehab. Center, St. Mary's, Baptist Health System, Southeast Georgia Cancer Coalition, and Fort Bliss Army Installation.

I have written 17 books on the subject of cancer and exercise and am a sought after speaker and author. I have contributed to PFP Magazine, CURE magazine, ACE Certified, ACE Blog, NOU Magazine, Club Solutions Magazine, Bethesda Today, Capital Gazette, NASM's Training Edge Magazine, Lake Oswego Review, Portland Tribune, The Oregonian, The Tidings inHealthOhio Blog and News, Capital Style, The Examiner, The Washington Post, Dallas Morning News, 4Wholeness.com, SpecialFit, and has appeared in countless videos including the Heartflex Breast Cancer Recovery video

and been a regular fitness expert on AMNW.

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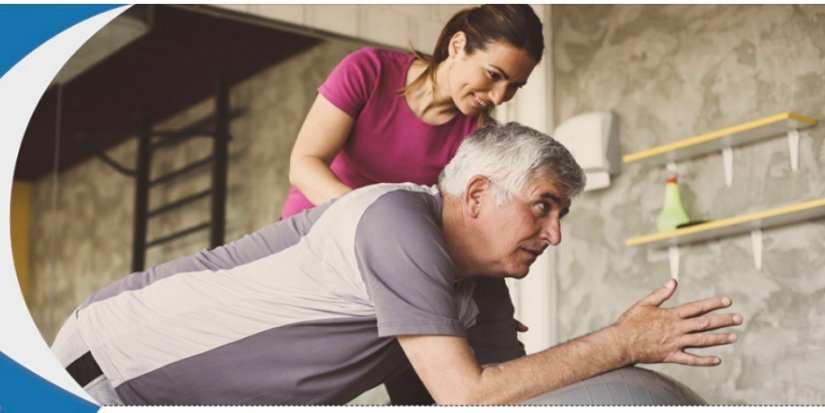

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- Correct muscle imbalances that can lead to pain & future joint degeneration
- Prevent, identify, & manage lymphedema
- Improved self-esteem & self-confidence

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Schedule your appointment with Andrea Leonard President/Founder of the Cancer Exercise Training Institute

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TAKING CONTROL

A BREAST CANCER
SURVIVOR'S GUIDE
TO RECOVERY

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