



Cancer Exercise Specialist® HANDBOOK



Module Four

By Andrea Leonard
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13th Edition

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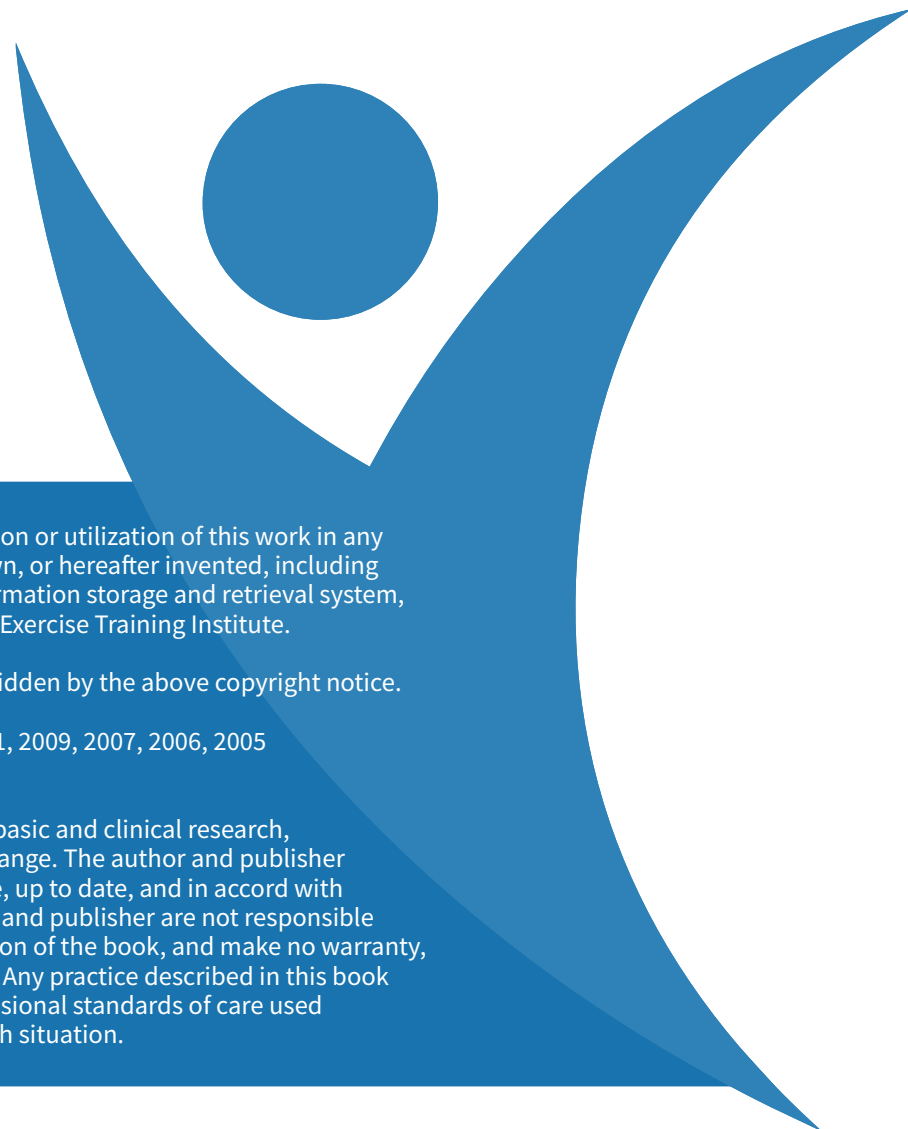
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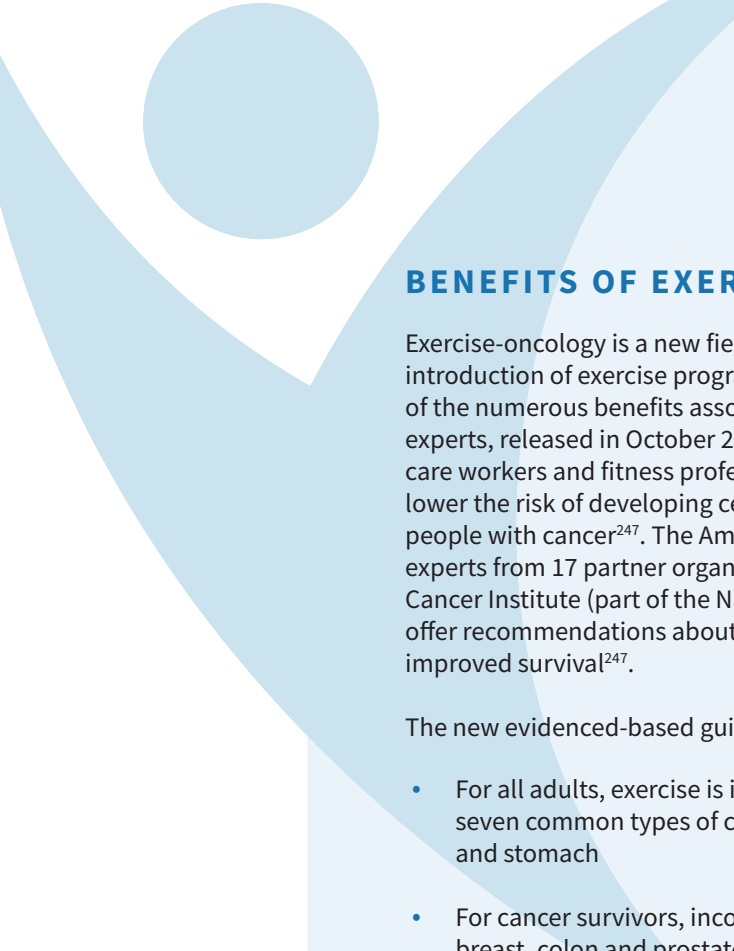
CHAPTER ONE

BENEFITS OF EXERCISE

Objective: to understand the benefits of exercise in preventing cancer, during treatment, and during recovery and how it can:

- Decrease risk of future cancers
- Minimize treatment side-effects
- Help clients return to their previous level of fitness, or better

Goal: to understand each of these phases and use them as a catalyst for working with the medical professionals and becoming the “next step” in the healthcare continuum.



BENEFITS OF EXERCISE IN PREVENTING CANCER

Exercise-oncology is a new field of cancer care with the goal of the appropriate and rationale introduction of exercise programs into the overall management of cancer patients to take advantage of the numerous benefits associated with physical activity²⁵⁰. New guidance from exercise oncology experts, released in October 2019, recommend systematic use of an “exercise prescription” by health care workers and fitness professionals in designing and delivering exercise programs that aim to lower the risk of developing certain cancers and best meet the needs, preferences and abilities of people with cancer²⁴⁷. The American College of Sports Medicine (ACSM) convened the roundtable of experts from 17 partner organizations, which included the American Cancer Society and the National Cancer Institute (part of the National Institutes of Health), to review the latest scientific evidence and offer recommendations about the benefits of exercise for prevention, treatment, recovery and improved survival²⁴⁷.

The new evidenced-based guidance and recommendations include²⁴⁷:

- For all adults, exercise is important for cancer prevention and specifically lowers risk of seven common types of cancer: colon, breast, endometrial, kidney, bladder, esophageal and stomach
- For cancer survivors, incorporating exercise helps improve survival after a diagnosis of breast, colon and prostate cancer
- Exercising during and after cancer treatment improves fatigue, anxiety, depression, physical function, quality of life and does not exacerbate lymphedema
- Continue research that will drive the integration of exercise into the standard of care for cancer
- Translate into practice the increasingly robust evidence base about the positive effects of exercise for cancer patients

Health care and fitness professionals should use the new recommendations when creating exercise programs for cancer patients and survivors. This includes formally and systematically using custom exercise prescriptions that best meet the needs, preferences and abilities of individuals living with and beyond cancer²⁴⁷.

Exercise has many proven health benefits for both preventing disease and promoting health and well-being¹⁸¹. There is substantial evidence that suggests increasing physical activity, including structured exercise programs, is associated with lower rates of certain cancers¹⁸¹. In particular, there is evidence that high levels of physical activity can work to prevent colon cancer^{89,93}. Cancers of the breast, prostate, lung, and uterus have also been linked to exercise-related prevention^{89,93}.

According to the American Cancer Society Guidelines, cancer survivors should engage in regular physical activity, avoid inactivity and return to daily activities as soon as possible after diagnosis. It is recommended to do at least 150 minutes of cardiovascular exercise weekly, with at least two days of strength training. Cancer treatment and certain medical issues may inhibit the ability to exercise and may increase the risk of exercise-related injuries and adverse effects²⁴⁸. It is critical the exercise professional understands all of the acute and chronic side-effects of cancer surgery and treatment so that they can customize exercise programming that will be safe and effective for the patient at all stages of treatment and recovery.

Although researchers discovered evidence that exercise hinders tumor growth in animal models as early as 1938, the first human clinical trials in the field were slow to follow and did not occur until the 1980s²⁵². Since 2010, the number of studies concerning the role that exercise plays in the health of cancer survivors has increased by 281%, with greater than 900 randomized, controlled trials indicating a clear benefit having been published within the last decade²⁵². International consensus guideline panels conclude compelling evidence exists to support the statement that exercise is inversely associated with the primary incidence of many forms of cancer²⁴⁹.

The best method of introducing exercise into the lifestyle of patients is a matter to be addressed. The most effective behavioral interventions to achieve long-term changes in a patient's lifestyle must be defined, bearing in mind that cancer diagnosis and treatment are "learning moments" in which patients are willing to change their daily activities to improve their health²⁵⁰. Modern technology offers multiple delivery methods from FitBits and health "apps" to social groups and ZOOM exercise sessions. These provide motivation, camaraderie, variety, and safety for those who have a compromised immune system.

A new study found that the equivalent of 2.5 to 5 hours of moderate-intensity activity per week (or 1.25 to 2.5 hours of vigorous activity) provided a significant benefit. The study was published December 26, 2019 in the *Journal of Clinical Oncology*²⁵⁰. The study found that getting recommended amounts of activity (7.5 – 15 MET hours per week, which equates to 2.5 – 5 hours of moderate-intensity activity or 1.25 – 2.5 hours of vigorous activity) significantly lowered the risk for 7 of the 15 cancer types studied: colon, breast, endometrial, kidney, multiple myeloma, liver, and non-Hodgkin lymphoma. Getting more MET hours was associated with an even greater reduction in risk for some of the cancer types²⁵⁰.



Specifically, physical activity was linked with:

- An 8% lower risk of colon cancer in men for 7.5 MET hours per week and a 14% lower risk for 15 MET hours per week
- A 6% lower risk of breast cancer in women for 7.5 MET hours per week and a 10% lower risk for 15 MET hours per week
- A 10% lower risk of endometrial cancer in women for 7.5 MET hours per week and an 18% lower risk for 15 MET hours per week
- An 11% lower risk of kidney cancer for 7.5 MET hours per week and a 17% lower risk for 15 MET hours per week
- A 14% lower risk of multiple myeloma for 7.5 MET hours per week and a 19% lower risk for 15 MET hours per week
- An 18% lower risk of liver cancer for 7.5 MET hours per week and a 27% lower risk for 15 MET hours per week
- An 11% lower risk of non-Hodgkin lymphoma in women for 7.5 MET hours per week and an 18% lower risk for 15 MET hours per week

In a 2019 study by *Rikki A Cannioto, PhD, EdD, Alan Hutson, PhD, Shruti Dighe, MBBS, William McCann, BS, Susan E McCann, PhD, Gary R Zirpoli, PhD, William Barlow, PhD, Kara M Kelly, MD, Carol A DeNysschen, PhD, Dawn L Hershman, MD, Joseph M Unger, PhD, Halle C F Moore, MD, James A Stewart, MD, Claudine Isaacs, MD, Timothy J Hobday, MD, Muhammad Salim, MD, Gabriel N Hortobagyi, MD, Julie R Gralow, MD, Kathy S Albain, MD, G Thomas Budd, MD, Christine B Ambrosone, PhD, Physical Activity Before, During, and After Chemotherapy for High-Risk Breast Cancer: Relationships With Survival, JNCI: Journal of the National Cancer Institute* - 1340 patients enrolled in the Diet, Exercise, Lifestyle and Cancer Prognosis (DELCaP) Study, a prospective study of lifestyle and prognosis ancillary to a SWOG clinical trial (S0221). Activity before diagnosis, during treatment, and at 1-year and 2-year intervals after enrollment was collected. Patients were categorized according to the Physical Activity Guidelines for Americans as meeting the minimum guidelines (yes/no) and incrementally as inactive, low active, moderately active (meeting the guidelines), or high active. The authors concluded that meeting the minimum guidelines for physical activity both before diagnosis and after treatment appears to be associated with statistically significantly reduced hazards of recurrence and mortality among breast cancer patients²⁵¹.

When considering activity from all time points, including during treatment, lower volumes of regular activity were associated with similar overall survival advantages as meeting and exceeding the guidelines²⁵¹.

A 2019 study by [Javier S. Morales, Elena Santana-Sosa, Alejandro Santos-Lozano, Antonio Baño-Rodrigo, Pedro L. Valenzuela, Cecilia Rincón-Castaneda, David Fernández-Moreno, Marta González Vicent, Marta Pérez-Somarriba, Luis Madero, Alvaro Lassaletta, Carmen Fiuza-Luces, and Alejandro Lucia](#) - *Inhospital Exercise Benefits in Childhood Cancer: A Prospective Cohort Study* - 2019 September 4, concluded that supervised in hospital exercise intervention is safe and plays a cardioprotective role, at least in the short term, in children with cancer, also reducing hospitalization time, and therefore alleviating the economic burden.



A 2019 study by [Ferioli M, Zauli G, Maiorano P, Milani D, Mirandola P, and Neri LM](#) - *Role of physical exercise in the regulation of epigenetic mechanisms in inflammation, cancer, neurodegenerative diseases, and aging process* - 2019 Feb 14. doi: 10.1002/jcp.28304. [Epub ahead of print], confirms that the modulation of epigenetic processes by physical exercise positively influences prevention, development, and the course of inflammatory and cancer diseases, as well as neurodegenerative illnesses.

Three studies by Jeffrey Meyerhardt, MD, MPH, clinical director of Dana-Farber's Gastrointestinal Cancer Center and Douglas Gray Woodruff Chair in Colorectal Cancer Research, concluded that physical activity after a **colorectal cancer** diagnosis is also linked to a lower risk of recurrence and increased overall survival.

One study included a large cohort of men with a history of nonmetastatic colorectal cancer. The more they exercised, the lower their risk of dying from colorectal cancer or any other cause. A second study by [Jeffrey A. Meyerhardt, Candyce H. Kroenke, Carla M. Prado, Marilyn L. Kwan, Adrienne Castillo, Erin Weltzien, Elizabeth M. Cespedes, Jingjie Xiao, and Bette J. Caan](#) - *Association of Weight Change after Colorectal Cancer Diagnosis and Outcomes in the Kaiser Permanente Northern California Population* - involved patients with stage III colon cancer who had undergone surgery and were receiving chemotherapy. For patients who were recurrence-free six months after completing chemotherapy, higher levels of physical activity were linked to a lower risk of cancer recurrence and mortality.

A third study by [Meyerhardt JA, Giovannucci EL, Holmes MD, Chan AT, Chan JA, Colditz GA, and Fuchs CS](#) - *Physical activity and survival after colorectal cancer diagnosis*, *J Clin Oncol.* 2006 Aug 1; 24(22):3527-34. Epub 2006 Jul 5 - involving women with stage I to III colorectal cancer, showed that women who were the most physically active had significantly reduced odds of recurrence and death from any cause than patients who were more sedentary.

Kidney cancer risk is increased among those who are overweight. The reason for this is unknown. A January 2019 study - *The influence of obesity-related factors in the etiology of renal cell carcinoma (RCC)* - in PLOS Medicine, confirms the long-suspected role of obesity as a risk factor for developing renal cell carcinoma (RCC) and identifies several specific obesity-related factors. 10,784 RCC patients and 20,406 control participants were included, and the markers included obesity measures, blood pressure, lipids, type 2 diabetes, insulin and glucose, which were initially identified as instrumental variables. This study used an alternative methodology commonly referred to as mendelian randomization, which allows researchers to test for a causal effect from observational data in the presence of confounding factors.

In a study by *Lauby-Secretan B, Scoccianti C, Loomis D, et al. Body Fatness and Cancer--Viewpoint of the IARC Working Group. New England Journal of Medicine 2016; 375(8):794-798*, the International Agency for Research on Cancer (IARC), based in Lyon, France, convened a working group to reassess the preventive effects of weight control on cancer risk. For cancers of the **colon, rectum, gastric cardia, liver, gallbladder, pancreas, and kidney and for esophageal adenocarcinoma**, significant associations between BMI and cancer risk were reported, with positive dose-response relationships. Relative risks from meta-analyses or pooled analyses were 1.2 to 1.5 for overweight and 1.5 to 1.8 for obesity with respect to cancers of the colon, gastric cardia, liver, gallbladder, pancreas, and kidney; the relative risk for esophageal adenocarcinoma was up to 4.8 for a BMI of 40 or more.

Positive associations were observed between adult BMI and postmenopausal **breast cancer** in numerous studies (relative risk, approximately 1.1 per 5 BMI units), particularly for estrogen-receptor-positive tumors. Waist circumference and body-weight gain in adulthood were positively associated with the risk of postmenopausal breast cancer⁴. For premenopausal breast cancer, consistent inverse associations were observed between BMI and risk¹⁵¹.

The association between BMI and **endometrial cancer** was particularly pronounced for type 1 endometrial cancer¹⁵¹. There was a strong dose-response relationship, with relative risks of approximately 1.5 for overweight, 2.5 for class 1 obesity, 4.5 for class 2 obesity, and 7.1 for class 3 obesity¹⁵¹. A modest positive association was observed for epithelial ovarian cancer, with a relative risk of 1.1¹⁵¹.

For **multiple myeloma**, the available data showed positive associations with adult BMI, with relative risks of approximately 1.2 for overweight, 1.2 for class 1 obesity, and 1.5 for class 2 or 3 obesity¹⁵¹. On the basis of several cohort or case-control studies, a positive association was observed between BMI and the risk of **meningioma** and **thyroid cancer**¹⁵¹.

In a study by *Joy Shi, Lindsay C. Kobayashi, Anne Grundy, Harriet Richardson, Sandip K. SenGupta, Caroline A. Lohrisch, John J. Spinelli, and Kristan J. Aronson - Lifetime moderate-to-vigorous physical activity and ER/PR/HER-defined post-menopausal breast cancer risk - Breast Cancer Research and Treatment, August 2017, Volume 165, Issue 1, pp 201-213*, authors conducted an assessment of vigorous physical activity (MVPA) in leisure-time, household, and occupational domains across the total lifetime and in four age periods with breast cancer risk, as defined by estrogen receptor (ER)/progesterone receptor (PR) status and ER/PR/human epidermal growth factor-2 (HER2) status, among post-menopausal women.

Data was collected from 692 women with incident breast cancer and 644 controls in the Canadian Breast Cancer Study, a case-control study of women aged 40-80 years in British Columbia and Ontario. Total lifetime leisure-time MVPA was associated with reduced risk of **ER-/PR- breast cancer** in a dose-response fashion. In contrast, total lifetime household MVPA was associated with reduced risk of ER+ and/or PR+ breast cancer. When further stratified by HER2 status, the effect of leisure-time MVPA appeared confined to HER2- breast cancers, and the effect of household MVPA did not differ according to HER2 status. Similar trends were observed when stratified by age period.

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 effect¹⁵¹. Currently, scientists are studying the biological impact that exercise has on the risk of cancer. Some of the methods that are being studied include¹⁵¹:

- 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 much physical activity is required to prevent cancer. We know that exercise can help prevent obesity, which is related to some types of cancers¹⁵¹. It can also change the body's hormone levels, which might also have a favorable effect¹⁵¹. 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 carcinogens¹⁵¹. Additionally, those who engage in a high level of physical activity are much less likely to smoke cigarettes, the single largest contributor to cancer¹⁵¹.

BENEFITS OF EXERCISE DURING TREATMENT

Starting or maintaining an exercise program after cancer diagnosis results in clients 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*¹²³. Courneya says "Cancer diagnosis and its treatments are often associated with negative side effects that diminish the quality of life¹²³. Overall, studies have consistently demonstrated that physical exercise following cancer diagnosis has a positive effect on the quality of life."¹²³

In a growing body of research that has investigated exercise in cancer patients, dramatic improvements in physiologic and psychological functioning have been documented in patients participating in exercise programs^{31, 23, 151}. Evidence of the benefits of exercise for cancer survivors in areas of psychological and quality of life (QOL) outcomes, cancer related fatigue, physical functioning, body weight and composition, muscle strength and endurance, immune function, and cardiovascular fitness have been reported^{31, 23, 151}. Exercise may also alleviate symptoms that interfere with daily life of cancer patients and survivors such as lack of appetite, diarrhea, paresthesia, constipation, physical fatigue, mental fatigue, treatment related fatigue, muscle pain, arthralgia and other pain, depression, anxiety and insomnia according to the following studies: *Winningham ML, MacVicar MG, Bondoc M, Anderson JI, Minton JP. Effect of aerobic exercise on body weight and composition in patients with breast cancer on adjuvant chemotherapy. Oncol Nurs Forum. 1989;16:683–9. Courneya KS, Friedenreich CM, Sela RA, Quinney HA, Rhodes RE, Handman M. The group psychotherapy and home-based physical exercise (Group-Hope) trial in cancer survivors: Physical fitness and quality of life outcomes. Psychooncology. 2003;12:357–74. Andersen C, Adamsen L, Moeller T, Midtgaard J, Quist M, Tveteraas A, et al. The effect of a multidimensional exercise programme on symptoms and side effects in cancer patients undergoing chemotherapy, The use of semi-structural diaries. Eur J Oncol Nurs. 2006;10:247–62.*

In addition, various studies mention increased stamina, functional capacity, and strength, improved self-esteem, self-confidence, treatment tolerance, satisfaction with life, and decreased pain ²⁵. 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 ²⁵. The specific exercise “dose” (frequency, intensity, and duration of sessions) needed to improve physical and psychological functioning in cancer clients probably differs according to specific treatment, cancer type, and individual response to treatment ²⁵. 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 ^{106,143}. This makes it even more important to exercise regularly, but it may be important to do so under medical supervision ^{106,143}.

Most people with **lung cancer** are unaware of the benefits of regular exercise, yet new data show it can significantly reduce fatigue and improve well-being ⁹¹. Results of two studies presented at the ESMO 2018 Congress in Munich, underline the value of exercise, including in patients with advanced or metastatic lung cancer ⁹¹.

In the first study, *Abstract 1777P_PR 'Identifying barriers to physical activity in patients with lung cancer: an Australian pilot study'*. Annals of Oncology, Volume 29 Supplement 8 October 2018, over half (54%) of patients with advanced cancer who completed an exercise survey at a cancer center in Queensland, Australia, were unaware of the benefits of exercise and only 22% achieved healthy activity levels, as recommended by the World Health Organization (WHO). Nearly nine out of 10 patients in the survey had advanced lung cancer, and at least six out of 10 respondents said they did not exercise because of fatigue or shortness of breath. Over half named low mood, lack of motivation, pain and side effects of treatment as barriers to exercising. "Exercise benefits everyone, not just those who are well, and too few people are aware that gentle aerobic exercise and strength training should be as much a part of treating advanced lung cancer as anti-tumor therapy," said Dr. Quan Tran, Medical Oncologist at the Cancer Care Centre, St Stephen's Hospital, Urraween, Australia.

In a second study, *Abstract 1480P_PR 'Effects of physical exercise in non-operable lung cancer patients undergoing palliative treatment'*. Annals of Oncology, Volume 29 Supplement 8 October 2018, of 227 patients with advanced or metastatic lung cancer, those who did regular easy aerobic and muscle strengthening exercises improved their symptom scores by approximately 10% during chemotherapy. "This is the first time that patients undergoing palliative care for lung cancer have been shown to benefit from exercise. Patients who exercised also felt more independent and needed less help with daily activities, and our research suggested that they may be able to have more and longer chemotherapy which, in turn, may result in better tumor control," explained Dr. Joachim Wiskemann, Exercise Physiologist and Sports Psychologist, National Center for Tumor Diseases (NCT) and Heidelberg University Hospital, Heidelberg, Germany. Wiskemann estimated that 50-60% of patients with advanced lung cancer are willing and able to exercise and recommends adapting the nature and setting for exercise to individual needs ¹⁸⁴. He also stressed the importance of coordinated care with good commitment from oncologists and cancer nurses and a specific individual responsible for counselling and delivery of tailored exercise programs for patients ¹⁸⁴.

Dr. Martijn Stuiver, Associate Professor of Functional Recovery from Cancer and its Treatment at the Amsterdam University of Applied Sciences, the Netherlands, pointed out that the Clinical Oncology Society of Australia already recommends that exercise should be part of standard cancer care ⁹² and he stresses the importance of greater awareness of the benefits of exercise, including in advanced cancer. "Physical fitness is a key factor in determining whether patients can start treatment and maintain dosing. Exercise may therefore become a primary adjuvant therapy to improve fitness so that patients are in the best possible shape to start or continue treatment and tolerate toxicities of other therapies."

BENEFITS OF EXERCISE DURING RECOVERY FROM SURGERY AND TREATMENT

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, clients can 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 clients 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 clients 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 your clients may still be suffering from fatigue long after their 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^{100,143}. 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 clients to focus on range of motion for their arms and shoulders. The hydrostatic pressure generates a compressive effect on the body that may also help to reduce swelling from lymphedema. This is highly recommended for breast cancer clients, particularly those who have undergone an axillary node dissection^{129,144}.

Swimming should not be limited only to breast cancer clients, however, for it has benefits for everyone. Swimming may even have a "leg-up" on cardio workouts in that it has built-in strength training benefits and works several muscle groups at once. Those clients suffering from arthritis will want to make sure the water is at least eighty degrees¹⁸⁵. If your client has a catheter or feeding tube or compromised immune system (chemotherapy/splenectomy/radiation) they should avoid public swimming pools, hot tubs, lake, or ocean water and other exposures that may cause infections¹⁸⁷. For those undergoing radiation treatment, chlorine may irritate the skin over the treatment area¹⁸⁶. A disinfected private swimming pool can provide a viable option¹⁸⁷.

In 2019 researchers from the American College of Sports Medicine (ACSM) reviewed hundreds of epidemiologic studies on the link between physical activity and both cancer risk and cancer mortality. The analysis of the findings by a panel of experts representing 17 partner organizations, including ASCO, the American Cancer Society, and the National Cancer Institute, resulted in new exercise recommendations for cancer prevention and improved quality of life for cancer survivors²⁵⁴.

There is strong evidence for an association between highest vs lowest physical activity levels and a relative-risk reduction of between 10% and 20% for seven malignancies (bladder, breast, colon, endometrial, esophageal, renal, and gastric cancers)²⁵⁴. The report also found that greater amounts of physical activity, including vigorous aerobic exercise for 75 to 150 minutes per week, were associated with a relative-risk reduction of between 40% and 50% in mortality from breast, colorectal, and prostate cancers²⁵⁴.

A systematic literature search was performed on PubMed to identify original articles that evaluated the effects of an exercise program to alleviate treatment-related side effects in cancer patients undergoing radiation therapy (RT). Twenty-nine studies were included in this study. The findings show that exercise training is beneficial during active RT and appears to be an effective and crucial component to counteract the side effects induced by RT²⁵⁵. In view of the value of exercise during RT to manage treatment-related side effects, exercise programmes should be incorporated as a routine part of cancer patient care during RT, similar to cardiac and pulmonary rehabilitation²⁵⁵. Exercise prescription should be individualized depending on the patient's characteristics, cancer type, treatment prescribed and related toxicities. A tailored approach is needed throughout intervention, according to progress and to the evolution of the patient's medical status²⁵⁵.

Cardiorespiratory fitness is an independent risk factor for cardiovascular disease and shortened life expectancy in breast cancer survivors. A randomized controlled trial was designed for patients with a physically inactive lifestyle prediagnosis and concurrently referred to adjuvant chemotherapy²⁵⁶. The trial conducted by *Tom Møller, Christina Andersen, Christian Lillelund, Kira Bloomquist, Karl Bang Christensen, Bent Ejlersen, Malgorzata Tuxen, Peter Oturai, Ulla Breitenstein, Cecilie Kolind, Pernille Travis, Tina Bjerg, Mikael Rørth & Lis Adamsen* was designed for patients with a physically inactive lifestyle prediagnosis and concurrently referred to adjuvant chemotherapy.

The 2019 study showed that beneficial effects could be obtained from a supervised intensive, hospital-based exercise program, but also from a less demanding pedometer exercise intervention under guidance and counselling from trained health professionals²⁵⁶. Both interventions were effective in supporting formerly inactive breast cancer patients in sustaining physical activities during and following adjuvant treatment. Restored Corticotropin Releasing Factor (CRF) at follow-up and metabolic indicators showed an improved health profile and subsequently a decline in cardiovascular risk²⁵⁶.

In 2018 the Clinical Oncology Society of Australia (COSA) issued formal guidelines recommending exercise as part of cancer treatment, for all cancer patients. Lead author, clinical researcher, exercise physiologist, and chair of the COSA Exercise Cancer guidelines committee, Dr. Prue Cormie states: *“If we could turn the benefits of exercise into a pill it would be demanded by patients, prescribed by every cancer specialist and subsidized by government. It would be seen as a major breakthrough in cancer treatment.”*

In a 2018 analysis of 61 clinical trials of women with all stages of breast cancer, those who underwent an exercise program during treatment had significantly improved quality of life, fitness, energy, and strength, as well as significantly less anxiety, depression, and lower body mass index and waist circumference compared with the regular care groups²⁵⁷. The analysis was conducted by *Singh B, Spence RR, Steele ML, Sandler CX, Peake JM, Hayes SC. A Systematic Review and Meta-Analysis of the Safety, Feasibility, and Effect of Exercise in Women with Stage II+ Breast Cancer* and the findings support the safety, feasibility, and effects of exercise for those with stage II+ breast cancer, suggesting that national and international exercise guidelines appear generalizable to women with local, regional, and distant breast cancer²⁵⁷.

PEACE: an organizational model for examining when and how physical exercise may affect the cancer experience. [Adapted from Courneya K.S, Friedenreich C.M.2], suggests that physical activity may help cancer survivors live longer by reducing the risk of cancer recurrence or slowing cancer progression and reducing the risk of other life-threatening diseases including second primary cancers. The results generally show that the higher physical activity is associated with lower rate of breast and colon cancer recurrences, cancer specific mortality and all causes of mortality.

Exercise during treatment for **breast or colon cancer** has multiple benefits, including reduced fatigue and improved ability to remain physically active over the long term, according to a study presented at the February 2018 Cancer Survivorship Symposium. Anne M. May, PhD, of University Medical Center Utrecht in the Netherlands - “It is well known that exercise during chemotherapy can lessen treatment-related side effects, such as fatigue, pain and nausea.” The Dutch PACT study¹⁸⁸ investigated whether exercise during chemotherapy can reduce treatment-related side effects. Following surgery for stage I-III breast or colon cancer, study participants were randomly assigned to participate in an 18-week supervised exercise program or receive usual care while they were receiving chemotherapy (about 70% of patients also received radiation therapy)¹⁸⁸. The exercise intervention involved 60 minutes of combined moderate-to high-intensity aerobic and strength training twice a week under the supervision of a physical therapist, plus 30 minutes of home-based physical activity three days a week. Researchers previously reported that the exercise program was effective in the short-term – patients who exercised during treatment had less fatigue than those who did not¹⁸⁸.

Four years later, researchers surveyed 128 of the study participants (110 with breast cancer and 18 with colon cancer) to determine if the exercise intervention had long-term benefits. After four years, patients in the exercise group reported engaging in moderate-to-vigorous physical activity, such as cycling or jogging, 90 minutes a day, on average, whereas those in the usual care group reported 70 minutes of moderate-to-vigorous physical activity per day¹⁸⁸. There was also a trend of lower physical fatigue in the exercise group compared to the usual care group, but the difference was not statistically significant¹⁸⁸.

CHAPTER TWO

CANCER-RELATED PAIN

Objective: to understand the different types of cancer related pain and how they can be treated with traditional and alternative methods.

- What are the different types of cancer-related pain?
- What is the difference between acute and chronic pain?
- Are they currently experiencing any side effects of treatment?
- What are the traditional and alternative methods of pain control?
- What is drug tolerance?

Goal: to tailor exercises and exercise intensity to minimize pain and to provide a safe environment for clients.

Not all people with cancer experience pain and not all cancers produce pain equally. Some cancers, even when advanced, may not produce pain at all⁸⁹. Cancers involving bone, either directly or through the spread of the disease are usually associated with pain when advanced⁸⁹. 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 cope¹⁰⁷. Pain may be acute or chronic¹⁰⁷. 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 pain¹⁰⁷. 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 pain¹⁰⁷.

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 life¹⁰⁷. Not all people will be able to tolerate their drug treatment. Some people are allergic to certain medications¹⁰⁷. Some will eventually develop side effects from the medications¹⁰⁷. Some will tolerate one specific drug in a class of drugs, but not tolerate others in the same class¹⁰⁷. Some people may not be able to tolerate any of the drugs within a particular class¹⁰⁷. World Health Organization (WHO) guidelines suggest that doctors try a particular drug in its class to see if the patient will indeed tolerate it⁹². The dosage is then increased until the patient gets either pain relief or intolerable side effects⁹². Before abandoning that class of drugs entirely, another drug in that class will be tried⁹². Sometimes the side effects can be managed with other treatments before discontinuing therapy⁹².

TYPES OF CANCER RELATED PAIN:

- **Nociceptive pain** - also known as somatic pain, is caused by damage to tissue. It is often described as sharp, aching, or throbbing pain. Most of the pains we experience in everyday life – the pains from cuts and bruises, broken bones, or surgery – fall into this category of pain. It is often due to a cancer growing larger, cancer that has spread to the bones, muscles or joints, or a blockage of an organ or blood vessels. This type of pain responds well to most narcotic therapies.
- **Neuropathic pain** - occurs when there is actual nerve damage. It may be caused by a tumor pressing on a nerve or a group of nerves, damage by chemotherapy drugs, surgery or radiation, or the direct invasion of cancers into the nervous tissue. Neuropathic pain is often unresponsive or resistant to narcotic therapies. Often times, this type of pain will require greater doses of narcotics than those used to control somatic pain. This pain is often described as a burning sensation, shooting, sharp, electrical, or lightening-like. When pain is caused by a tumor pressing on a nerve, radiation and/or chemotherapy may be used to shrink the size of the tumor. Surgery is then used to remove the tumor, hopefully removing the source of the problem and lessening the pain associated with it.
- **Incident pain** - occurs when a patient moves or changes positions. Narcotics work well when the patient is lying down quietly, but the pain increases when they change positions. Treatment for incident pain is generally a nerve block which destroys the nerves causing the pain and is an invasive therapy that requires a pain specialist to administer it.
- **Phantom pain** - may occur if you have had an arm or a leg removed by surgery. You may still feel pain or other unusual or unpleasant sensations as if they were coming from the absent (phantom) limb. Doctors are not exactly sure why this occurs, but phantom limb pain is real; it is not "in your mind." This pain can also occur if you have had a breast removed - you may have a sensation in the site of the missing breast. No single pain relief method controls phantom pain in all clients all of the time. Many methods are used to treat this type of pain, including pain medicine, physical therapy, antidepressant medications, and transcutaneous nerve stimulation⁹².

Pain is often made worse by intense worry and fear⁹². Clients are overwhelmed by their own fear of dying, suffering, possible deformity, financial devastation, and isolation⁹². It is not uncommon for a cancer patient to interpret new pain as the spread of the disease or impending death⁹². Support from family and friends is critical to help the patient to not feel alone and desperate. Non-drug treatments are now widely used to help manage cancer pain. There are many techniques that are used alone or with medicine. Some clients find that they are able to take a lower dose of medicine with such techniques.

The following are alternative methods for pain control:

- Exercise
- Relaxation / meditation
- Imagery / visualization
- Hypnosis
- Transcutaneous nerve stimulation
- Acupuncture / acupressure
- Massage
- Talking with clergy or other spiritual advisors
- Music

MEDICINES USED TO RELIEVE PAIN

- **Non-opioids** - are used for mild to moderate pain and include acetaminophen and nonsteroidal anti-inflammatory drugs (NSAID's), such as aspirin and ibuprofen. These can be bought over-the-counter (without a prescription). Acetaminophen relieves pain in a similar way to NSAID's but does not reduce inflammation as well. Moderate amounts of alcohol can produce liver damage in people taking acetaminophen¹⁹⁰. Acetaminophen can also cover up a fever which may be a sign of infection and need to be treated. The most common side effect from NSAID's is stomach upset or indigestion, especially in older clients. NSAID's may also slow blood clotting, especially if you are undergoing chemotherapy¹⁹⁰. Certain conditions may be made worse by NSAID's or any product containing NSAID's¹⁹⁰.

In general, NSAID's should be avoided by people who:

- Are allergic to aspirin
- Are on chemotherapeutic drugs
- Are on steroid medications
- Have stomach ulcers or history of ulcers, gout, or bleeding disorders
- Are taking prescription medications for arthritis
- Are taking oral medications for diabetes
- Have kidney problems
- Will have surgery within a week
- Are taking blood-thinning medications

- **Opioids** - are used for moderate to severe pain and are also known as narcotics. Opioids are similar to natural substances (endorphins) produced by the body to control pain. Morphine, fentanyl, hydromorphone, oxycodone, and codeine are all included in this category of pain killers. Non-opioids are generally used in conjunction with these drugs to relieve pain.
- **Adjuvant medications** - are not usually labeled as pain relievers but do relieve pain. These include:
 - Steroids
 - Antidepressant
 - Antihistamines
 - Sedatives
 - Anticonvulsive medications

PAIN MEDICATION INTOLERANCE AND ROAD BLOCKS

People who use opioid painkillers for months or years often develop a tolerance to the drugs (they need higher doses of the medication to achieve the same results)¹⁸⁹. As your body gets used to a certain dose, you need more of a dose to get the same "effect." Your liver starts to process the medication more efficiently while your brain requires more of the medication to achieve the same physiological effects¹⁸⁹. If you are on the same pain medication for months/ years, the necessary dose may increase 5-10 times from the original dose¹⁸⁹.

The following is a list of road blocks to pain control:

- Allergies
- Nausea
- Vomiting
- Constipation
- Sedation
- Difficulty in urinating
- Hallucinations
- Tolerance



CHAPTER THREE

MENTAL AND PHYSICAL FATIGUE

Objective: to understand the effect of severe fatigue on both the mind and body and to design an exercise and physical activity program for your client that will:

- Increase their energy
- Decrease stress & anxiety
- Improve sleep
- Improve self-confidence & self-esteem

Goal: to determine the proper exercise frequency, intensity, and duration for a client based on what their immediate energy limitations might be.

Fatigue, feeling tired and lacking energy, is the most common side effect reported by cancer clients. The exact cause is not always known. It can be due to the disease, chemotherapy, radiation, surgery, low blood counts, lack of sleep, pain, stress, poor appetite, along with many other factors. Fatigue from cancer feels different than fatigue of everyday life and levels of fatigue vary from one person to another. Clients with cancer have described it as a total lack of energy and have used words such as worn out, drained, and wiped out to describe their fatigue. It is not always relieved by rest and may last for months after treatment has ended. Severe fatigue gradually goes away as the tumor responds to treatment.

MENTAL FATIGUE

Mental fatigue is noted by many clients with cancer in their inability to concentrate and focus. This is often referred to as “attentional” or “mental” fatigue. When you consider the many changes in ones’ life that are associated with cancer, it’s not hard to understand the demand for a great deal of mental exertion. It is estimated that cancer-related fatigue affects 76% of clients undergoing therapy. As if dealing with the cancer diagnosis is not enough to deal with in and of itself, these demands can place a patient at high risk for developing mental fatigue. It is necessary for the individual with cancer to focus on the reality of cancer and what it means to them and their loved ones. The focus can become overwhelming and the amount of energy it takes to deal with the emotions can be absolutely draining. Individuals are trying to process critical information about the disease at a time when emotions are already high. They are faced with a complete overhaul of their life as they know it. The demands may eventually exceed capacity.

At this point, mental fatigue may result in loss of concentration. It may become increasingly difficult to perform normal everyday tasks including self-care. This may affect a clients’ quality of life due to their inability to perform normal activities that add meaning to their lives. For those with small children to take care of, this altered state of mind becomes even more frustrating. Clients often describe not being able to think clearly, forgetfulness, and difficulty in learning. The ensuing mental fatigue can lead the patient to feel that things are out of control. They become scared and feel helpless. They may become impatient and irritable causing a strain on their personal relationships.



Some ways to conserve mental energy include:

- Reduce time constraints and pressures
- Prioritize and save energy for the most important things
- Break large tasks into smaller, easier to achieve goals
- Make reminder lists of things that must be done
- Keep things simple and free of distractions
- Take short naps or breaks, rather than one long rest period

Restoring mental energy is just as important as conserving it. To do so a patient should be able to choose activities that are interesting and will not allow them to get bored. They should be something enjoyable, other than the normal everyday routine. Activities like gardening, watching wildlife, watching fire in a fireplace, and playing with a pet can be very soothing.

PHYSICAL FATIGUE

During cancer treatment, the body uses a lot of energy healing itself. In addition to the mental fatigue from trips to receive treatment and stress related to the illness, the effects of treatment on normal cells all may contribute to physical fatigue ²¹. After a few weeks of cancer treatment most people will begin to feel tired. The level of tiredness will vary from one person to another. Generally, feelings of weakness will gradually go away after the treatment is finished. It is important during therapy not to try and do too much. Clients should not expect themselves to do what they usually would. More sleep at night and more rest during the day will be essential.

The way clients adapt to their treatment varies from person to person. Some may continue to work a full-time job, while others will take several weeks off during treatment. Some people may choose to cut their hours back but enjoy the camaraderie of their work environment. This is one time where the patient should not feel bad about asking family and friends to help with daily chores, shopping, housework, and even driving. Driving can be somewhat dangerous due to mental weariness that may accompany treatment. Chemotherapy can reduce the bone marrow's ability to make red blood cells ²¹. Red blood cells transport oxygen to all parts of the body. If there are too few red blood cells, body tissues don't receive enough oxygen to do their job. This condition is known as anemia. Anemia can also be the result of an iron deficiency. Anemia is a common complication of cancer treatments ²¹. Although it is seldom life-threatening, anemia can make clients feel very weak and tired all of the time and has a severe impact on their quality of life.

It is estimated that most clients with cancer will develop anemia at some point during the course of their disease and treatments ²¹. Additional symptoms include chills, dizziness, loss of appetite, inability to concentrate, chest pain, elevated heart rate and/or shortness of breath. Their doctor should be checking their blood cell count often during treatment. It is possible that if their red blood cell count falls too low, that they may need a blood transfusion ²¹. This is only done in severe, chronic cases ²¹. Transfusions can lead to additional complications such as fever, allergic disorders, infections, and suppression of the immune system. This is only seen in about 20% of the cases ²¹. There are medications that stimulate red blood cell production that can be used as alternatives to a blood transfusion.

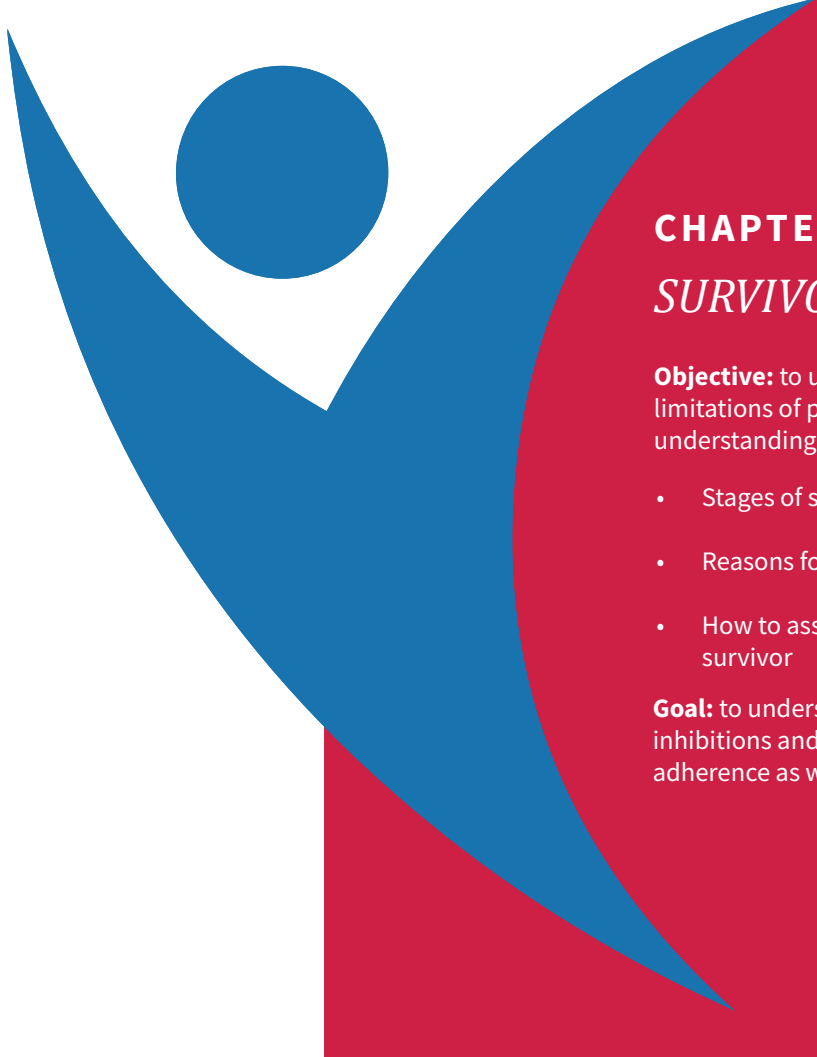
Some ways to conserve physical energy include:

- Get plenty of rest, including naps during the day
- Limit daily activities to only the most important and necessary things
- Ask family and friends to help with shopping, cooking, housework, and taking care of the children
- Encourage a healthy, well balanced diet and recommend the help of a registered dietician
- When getting up from sitting or lying position, move slowly; this will help prevent dizziness and the possibility of falling.
- Try easier or shorter versions of activities

Exercise should be simple – walking in a natural environment, or slow, static stretching to soft music are good choices and should be encouraged 3-4 times per week for 20-30 minutes. Clients should be encouraged to find a time to exercise that works best for them. Pain and fatigue can change from day to day or even hour to hour. Encourage them to keep track of their energy level to see if there is a pattern on what is the best time for them to exercise.

Clients should not be pushed to participate when they do not feel up to it.





CHAPTER FOUR

SURVIVORSHIP

Objective: to understand the potential psychological and physiological limitations of participating in an exercise program and to gain an understanding of:

- Stages of survivorship
- Reasons for increased numbers of survivors
- How to assist your client on their journey from patient to survivor

Goal: to understand how to help your client overcome their fear and inhibitions and create customized programming that will promote adherence as well as a sense of joy and accomplishment.

DEFINITION OF SURVIVORSHIP

Cancer isn't always a matter of life and death anymore – today, an increasing number of people are living with cancer as a chronic condition. “Survivorship” is used to describe a patient who is disease-free after the completion of their treatment; or it can be used to describe the process of living with, through, and beyond cancer. Technically cancer survivorship begins at diagnosis and includes people who continue to have treatment to either reduce the risk of recurrence or to manage chronic disease.

Those with metastatic cancer may not feel that the “survivor” label applies to them since they continue to live with and battle cancer every day. Worldwide, there were an estimated 19.3 million cases and 10 million cancer deaths in 2020 (including non-melanoma skin cancers), with one in four men and one in five women developing the disease, and one in eight men and one in eleven women dying from it²⁵⁸. In addition, there were 50 million persons living with cancer in 2020 who were diagnosed within the last 5 years²⁵⁸. Half of the new cancer cases and cancer deaths in the world occur in Asia. The predicted global cancer burden by 2040 is expected to exceed 27 million new cancer cases per year, a 50% increase on the estimated 19.3 million cancers in 2020, with the greatest increase in countries with low or medium Human Development Index²⁵⁸. China, with the largest population size in the region and worldwide (1.4 billion inhabitants, representing 19% of the global population in 2018), has the greatest global proportion of new cases (4.3 million cases, 24% of the total) and deaths (2.9 million deaths, 30%)²⁵⁸. Northern America is second in terms of new cases (2.4 million, 13%), and fourth for cancer deaths (0.7 million, 7%)²⁵⁸. Close to one fourth of all new cases globally (4.2 million) and one fifth of deaths (1.9 million) occur in Europe, despite the region representing less than one tenth of the global population²⁵⁸.

The improvement in survival rates for many cancers may be attributed to:

- Improved identification of cancers through screening, such as mammography for breast cancer, the prostate specific antigen (PSA) test for prostate cancer, the Pap test for cervical cancer, and colonoscopy for colorectal cancer
- Improvements in treatment
- More effective treatment of side effects
- The development of new treatments, such as targeted therapies

THE TURNING POINT IN CANCER CARE

The Commission on Cancer (CoC), a program of the American College of Surgeons (ACoS), recognizes cancer care programs for their commitment to providing comprehensive, high-quality, and multidisciplinary patient centered care. The CoC is a consortium of professional organizations dedicated to improving survival and quality of life for cancer patients through standard-setting, prevention, research, education, and the monitoring of comprehensive quality care²⁵⁹.

There are approximately 1,500 CoC-accredited cancer programs in the U.S. and Puerto Rico. CoC accreditation encourages hospitals, treatment centers, and other facilities to improve their quality of care through various cancer-related programs and activities. The responsibility is upon the cancer program to appropriately care for patients and develop criteria relative to the cancer program's available resources and experience.

Policies and procedures are in place to guide referral to appropriate rehabilitation care services on-site or by referral. Rehabilitation care is patient-centered care that optimizes patient functional status and quality of life through preventive, restorative, supportive, and palliative interventions²⁵⁹.

Types of rehabilitative care services may include, but are not limited to²⁵⁹:

- Screening, diagnosis, and management of physical dysfunction, impairments, and disabilities
- Interventions to manage identified functional impairments and disabilities
- Screening, diagnosis, and management of pain and non-pain symptoms
- Screening, diagnosis, and management of cognitive function
- Lymphedema management
- Physical activity recommendations during and after treatment
- Vocational rehabilitation

The cancer committee oversees the development and implementation of a survivorship program directed at meeting the needs of cancer patients treated with curative intent²⁵⁹.

Services utilized by the survivorship program may include, but are not limited to²⁵⁹:

- Survivorship care plans
- Screening programs for cancer recurrence
- Screening for new cancers
- Seminars for survivors
- Rehabilitation services
- Nutritional services
- Psychological support & psychiatric services
- Support groups and services
- Formalized referrals to experts in cardiology, pulmonary services, sexual dysfunction, fertility counseling
- Financial support services
- Physical activity programs

THE JOURNEY FROM PATIENT TO SURVIVOR

At the end of active treatment, many survivors often have mixed emotions that range from relief that their treatment is over to anxiety about the future¹⁹⁴. After treatment, the "safety net" of regular, frequent contact with their health care team ends, leaving some survivors to feel alone and scared, in the absence of this source of support¹⁹⁴.

Although some cancer survivors recover with a renewed sense of life and purpose, others may have physical problems, psychological problems, sexual problems, and fertility concerns (based on their age and health/fitness level prior to treatment)¹⁹⁴. Those who have gone through cancer treatment describe the first few months as a time of change¹⁹⁴. It's not really about getting back to normal, but really it is establishing what their "new" normal looks like. People often say that life has new meaning or that they look at things differently¹⁹⁴. Their new "normal" may include making changes in the way they eat, the things they do, and their sources of support (emotional and financial).

Fear that the cancer will return (recurrence) is common among most cancer survivors¹⁹⁴. It may lead a person to worry over common physical problems, such as a headaches, coughs, and joint pain/stiffness. This is of particular importance to the Cancer Exercise Specialist. It is difficult to know what is "normal," and what needs to be reported to the doctor. Always err on the side of caution by suggesting your client visit their doctor if something is a concern, but make sure to keep it "light" and not to be an alarmist. Although many cancer survivors describe feeling scared and nervous about routine follow-up visits and tests, worrying that their cancer will come back, these feelings may ease with time¹⁹⁴.

When active treatment is over, some survivors need different types of support than they had before¹⁹⁴. Some friends may become closer, while others distance themselves. Families can become overprotective or may have exhausted their ability to be supportive. Relationship problems that may have been ignored before cancer can surface. The entire family is changed by the cancer experience in ways they may not be aware of.

When treatment ends, your client may expect life to return to the way it was before they were diagnosed with cancer. But it can take a long time to recover physically and emotionally. For some, the fear is so strong that they no longer enjoy life, sleep well, eat well, or even go to follow-up visits.

As time goes by, many survivors report that they think about their cancer less often. However, even years after treatment, some events may cause you to become worried¹⁹⁴. Follow-up visits, symptoms similar to the ones you had before, the illness of a family member, or the anniversary of the date you were diagnosed can trigger concern.

They may have scars on their body, loss of a body part or limb, weight changes, they may not be able to do some of the things they did before, chronic pain, and emotional scars from the entire cancer "process." While you will inevitably become close to your client, it is important for you to be able to "wash your hands" at the end of each session so that you are not left feeling sad, burdened, overwhelmed, etc. You will be a pillar of support for your cancer survivor client, perhaps a friend and confidant as well, but try not to play doctor or therapist. Suggest a support group or an individual therapist that your client can join or visit with.

In general, survivors usually return to the doctor every 3 to 4 months during the first 2 to 3 years following treatment, and once or twice a year thereafter¹⁹⁴. At these visits, their doctor will discuss any side effects of treatment (those that are apparent as well as those that are not) and make sure the cancer has not metastasized to another part of their body.

GETTING BACK TO NORMAL

With a risk of more than one in three of getting cancer over a lifetime ³¹, each of us is likely to experience cancer, or know someone who has survived cancer. The transition from active treatment to post-treatment care is critical to long-term health ¹⁹⁴.

Returning to a regular work schedule is a sign of getting back to a normal routine and lifestyle. Many people with cancer who took time off for treatment return to work afterwards, while many others may have worked throughout treatment, and others may not be able to return to work because of the effects of the cancer or its treatment. Most people need their job and the health insurance it provides.

Many cancer survivors will worry that stress may have contributed to their illness ^{87,94,97,194}. While the exact cause of many cancers is still unknown, we do know that stress can cause other health problems and possibly contribute to cancer as well ^{87,94,97,194}. Finding ways to reduce or control the stress in their life is of the utmost importance.

It is natural for someone to feel angry, tense, or even sad ^{87,94,97,194}. For most people, these feelings go away or lessen over time, but some people's emotions can become more severe and erratic. Exercise can play an important role in minimizing depression, but some may need to see their doctor for medication or therapy.

You may want to suggest some Complementary and Alternative Medicine (CAM) options with your client. They can include a variety of different healing approaches that are often used to prevent illness, reduce stress, prevent or reduce side effects and symptoms, or control or cure disease. This type of treatment is called "complementary" because it is used in addition to treatments prescribed by a doctor. It is imperative that your client discuss these options with their doctor prior to embarking on them (even if they are through with treatment). When a method is used instead of treatments prescribed by a doctor, it is called "alternative." Some common alternative methods include visualization, relaxation, acupressure, acupuncture, massage, homeopathy (naturopathic medicine), vitamins and herbal products, psychotherapy, prayer, yoga, and other forms of exercise.

RESOURCES

The following programs or organizations provide helpful follow-up care guidelines for some cancers. You may want to share them with your clients:

Cancer.Net - American Society of Clinical Oncology has a series of follow-up care guidelines focused on breast and colorectal cancer. They can be viewed at www.cancer.net/patient/survivorship

Children's Oncology Group Long-Term Follow-up Guidelines - Children's Oncology Group offers long-term follow-up guidelines for survivors of childhood, adolescent, and young adult cancers at www.survivorshipguidelines.org

Journey Forward - Journey Forward is a program centered on its Survivorship Care Plan. By using an online Care Plan Builder, the oncologist creates a full medical summary and recommendations for follow-up care to be shared with clients and their primary care providers. It was created by the National Coalition for Cancer Survivorship, UCLA Cancer Survivorship Center, Genentech, and WellPoint, Inc. Go to www.journeyforward.org

Life After Cancer Care - M.D. Anderson's Cancer Center Web site lists follow-up guidelines for 15 different disease sites at www.mdanderson.org/survivorship, and click on "Follow-up Medical Care."

Livestrong Care Plan - developed by Livestrong and the University of Pennsylvania, the Livestrong Care Plan gives individuals a specific survivor care plan, based on the information they enter the online program. Hosted at UP's Web site, view at www.livestrongcareplan.org

Cancer Hope Network - Cancer Hope Network matches cancer clients or family members with trained volunteer cancer survivors who themselves, have undergone and recovered from a similar cancer experience. www.cancerhopenetwork.org

Cancer Care - Cancer Care provides telephone, online and face-to-face counseling, support groups, education, publications and financial and co-payment assistance. Professional oncology social workers offer personalized care, and all of their services are free of charge. www.cancercare.org

Cancer Support Community - CSC's focus is to ensure that all people impacted by cancer are empowered by knowledge, strengthened by action, and sustained by community. www.cancercommunity.org

Walking Miracles Family Foundation - WMFF is a 501c3 non-profit that helps families and survivors of childhood adolescent and young adult cancer in WV

CHAPTER FIVE

THE PSYCHOLOGY OF FITNESS

Objective: to understand the psychological impact of cancer surgery and treatment on the patients' psyche and to learn how to overcome some of the many roadblocks of participating in an exercise program. This will help you to:

- Increase adherence
- Educate clients on living a life to prevent & manage cancer
- Gain an understanding of how fitness is respected as front and center for both physical and emotional/psychological health

Goal: to design an exercise program that the client will love, embrace, and adhere to. This is especially important if the person is deconditioned and is reluctant to participate in a fitness program.

LOW SELF-ESTEEM

During and after cancer surgery and treatment, many cancer patients have an altered physical appearance and severe fatigue, regardless of how fit they were prior to diagnosis and treatment¹⁹⁴. Cancer strips them of everything. They feel they no longer have control over their body and that it has miserably failed them. Exercise can help them to regain some of what they have lost and begin to feel that the cancer is not controlling their happiness anymore.

The person who was an avid athlete, or even someone who exercised a few times a week at the gym, may be severely depressed by their limited ability to perform their normal activities. As a newly diagnosed cancer patient, or as a cancer survivor, they will face barriers that they had not experienced prior to being diagnosed with cancer.

Not only is their energy severely depleted, but they may feel that at their current level of fitness, they will not get any “results,” and use that as an excuse not to participate. Both men and women may lose their hair from chemotherapy and have sexual dysfunction and possibly infertility that may leave them feeling very vulnerable and undesirable.

The last thing they want to do is go to a health club full of healthy, fit, and energetic people with a head of hair.

FEAR OF INJURY/PAIN

After undergoing painful surgeries, reconstructive procedures, possibly suffering with radiation burns, contending with bone and joint pain from various treatments, among other things, many patients find themselves unwilling, or at the very least, reluctant to resume or begin an exercise program. For those that have gone to physical therapy, or possibly tried to exercise on their own at their regular gym, they may have winced from pain while performing a certain movement and became “paralyzed” with the fear that they may be injuring themselves. At this point they decide they should allow more time for their recovery and talk themselves out of participating. Having a trained Cancer Exercise Specialist to safely guide them through an individualized exercise program has a very soothing effect on the majority of patients. While there may still be some apprehension, they feel “safe” under your supervision. Make sure that you take baby steps with your client, ensuring that they are pain-free and that there are no negative side-effects from the chosen exercises.

“FITTING IN”

When working one-on-one with a client, you may be able to choose a quiet section of the gym, or even an empty exercise studio. This may help your client to feel more comfortable when they either begin, or resume, their exercise program for the first time after treatment ends. Typically, you will not need fancy equipment initially because your focus will be on range of motion, correcting postural deviations, and functional fitness. Alternatively, you may want to offer to train them in the comfort of their own home. This can be especially beneficial if their blood counts are low and their immune system is compromised. Even though their home is a “safe-zone,” remember that if you are sick, or around sick people, you should cancel your appointment for the benefit of your client. You will also need to have individual liability insurance to protect yourself when working outside of a health club, or as an independent contractor.

Cancer patients often take great comfort in being surrounded by others who have shared the same experiences as they have. For women with breast cancer, for example, the knowledge that their changed physical appearance is a common issue in the group, and there is no need to hide their illness or explain why their physical performance is so limited, can be incredibly helpful in keeping them interested in participation. The class does not need to be cancer-specific, but it can certainly make it easier to facilitate and may result in a better individual outcome for the participants.

Our first task is to develop a plan for exercise programming that will enable the individual, or class, to experience success. This may include identifying people in their social networks or families that will encourage them to exercise. Make sure that you are constantly supervising the individuals in the class, ensuring good form and safety. When you need to “correct” someone’s form, try to go over to them individually and “gently” instruct them on the proper way to perform the given exercise.

Set realistic goals with your client(s). This will help them to stay on track with their exercise program and/or keep them coming back to class. The goals should be measurable and attainable in a relatively short period of time. If you set unrealistic and unachievable goals, your client/class participants may end up getting discouraged and losing interest in participating. Try to avoid weight loss as a goal because hormonal therapies can make it a very difficult and self-defeating goal. Focus on their energy, the way their clothes fit, how strong they are becoming, etc.

It’s important that we verbally praise their accomplishments, however small they may seem! This will help to increase their confidence; something that is invaluable for the cancer patient trying to take control of their life and body! The accomplishment may be as simple as being able to walk their hand all the way up a wall that they were not able to do two months ago. Perhaps it’s increasing the speed on a treadmill, increasing the amount of time they are able to exercise for, sleeping better at night, losing weight, gaining muscle, whatever! It’s all progress and it’s all noteworthy! This is also how you get client referrals from the medical professionals. Your clients’ success and testimonials are priceless!

These testimonials are from anonymous cancer survivors participating in a regular exercise program:

The biopsy has come back, and you have cancer. That was the message on my phone. I was in the middle of participating in a team building event for my group at work when at lunch, I saw that I had a message. I dropped the phone.

The prior 2 months were full of various tests, that started from my yearly check up with my primary doctor, to make sure I could get an update prescription for my allergy medication. As part of her regular practice, I had a blood sample taken to do the various cholesterol and blood sugar tests. My doctor also suggested I have my PSA levels tested, as I just turned 50.

I was not worried, as I did not have any history of prostate cancer in my family, even though most men get it later in life. I just had turned 50 and was deep into planning on opening up a brewery and tasting room. I had been laid off three times in the past 10 years, and I was tired of working the daily corporate grind. Over the past twenty years, I had been home brewing beer, growing from a basic Mr. Beer kit to all grain brewing and building my own keg cooler. I had won a number of awards for my beer. This was also the beginning of the craft beer era, and a couple of breweries had opened in Charlotte. I thought that I could turn my hobby into a true passion and a retirement plan. I spent 5 years researching, talking, taking classes, putting a business and marketing plan, as well as looking for the perfect location. We just had signed the lease for the old firehouse in downtown Waxhaw, a small town south of Charlotte, and were in the process of working with a bank to get an SBA loan. Then the phone call came.

The night after my appointment with my primary physician, she called with the results. My cholesterol was a bit high, as well as the blood sugar, but the thing she was worried was that my PSA was high. She told me about a couple of reasons why it could be high, as well as telling me that this could be an indication of cancer. I was taken back a bit of her just casually bringing up that fact. She wanted to have it checked out and made an appointment with a urologist that she had worked with in the past. A week later I went to the appointment with the urologist, who told me that he was not that concerned about the high PSA but wanted to do one more blood sample to test. He then took me into the examination room and checked my prostate. He thought it was in the proper size and shape in his initial test, but to be very sure, he would have to do a biopsy, and told me the details. Basically, it would involve the use of a special device that was spring activated. After numbing the area, the device would be inserted along with a small camera, and 12 samples would be taken.

I was really not mentally ready to go through that and wanted to see what the blood test would say. My wife and I did research on the possible false positives that a PSA test could have, but all the reports that we read all said the same thing. Have the biopsy to make sure. The blood test came back, again high. I made the appointment to have the biopsy done. The night before the biopsy procedure, I had to take medication to make sure any infections did not occur during or after the procedure.

The day of the biopsy came, and I was a bit nervous. What did not help the situation was that the urologist had 3 medical students in the room to observe the procedure. Nothing like having your ass on view for an audience. The biopsy was uncomfortable. After the camera and the tool were inserted, the urologist maneuvered the tool and hit a button. I could hear and feel the sound of the spring and the sharp pain as the head of the tool took a sample of my prostate. He took 12 samples in all. I gingerly got off the table and got dressed in the bathroom. The urologist warned me that there would be some blood with any stool, but that should last a little while, but if it did not, to contact him.

I got home, and yes, I did have a bloody stool, but nothing more. Everything was healing properly. Two days later, I got the call that my biopsy samples had cancer. In speaking with the urologist, 5 samples were cancerous, and told me I had 3 options:

- 1. Speak to a surgeon, who could remove it**
- 2. Speak to an oncologist, to see if radiation treatment was possible**
- 3. Do nothing, but have a yearly biopsy to see how it was progressing**

I sat down hard on the floor as he told me the options. I could not get past the point that I was just diagnosed with cancer. I thanked the urologist, and immediately called my wife. She broke down in tears. I told her that I was not interested in doing nothing, letting cancer course through my body, so I really wanted it out. We made appointments with the surgeon and the oncologist.

These testimonials are from anonymous cancer survivors participating in a regular exercise program:

The surgeon was a very nice southern older man, who had the most experience with the DaVinci robot in the south. He outlined how it would work. There would be 5 small incisions made in the abdomen, to allow the arms of the robot to be able to get access to the prostate. A sixth incision would be made for the assistant on the procedure to be able to move various organs around to make way for the robot arms. I would be in the hospital overnight, then home to recovery for at least 4 weeks.

My wife and I then went to the radiation oncologist. He was a much younger man who laid out the procedure, basically placing small metal capsules with a radioactive element on the prostate, which would in theory kill the cancer radiation. But a side effect was that it could possibly cause a secondary cancer, and surgeons were very reluctant to do a prostate removal that had been seeded with radiation. There was another issue that he brought up; I was too young. I was very surprised about that, not hearing that phrase since I was in high school! But his meaning was that most of his patients were 65 and older, and they only had a 15-year record of radiation treatment. Getting it at 50, I would be 65 and would be in a bit of unknown territory.

My brilliant wife asked him a question. If you had just been diagnosed with prostate cancer, what would you do? He did not even hesitate. He told us that he would have it removed, and thereby not have any future issues that could be even more serious than the initial cancerous prostate. I called the surgeon that afternoon and made the appointment for the surgery. What made all of this so very frustrating was that every doctor I spoke with had the same reaction-you are too young to have prostate cancer. Oh, like I planned it like this. Yeah, right.

Once I went thru all of this, I had to call my dad and my brother, to tell them now you have to have your PSA levels checked on a yearly basis, because now you have a relative that had prostate cancer. And I had to sit down with my two sons to tell them that they need to start getting their PSA tests earlier, as I had it. One thing the surgeon had mentioned in passing was that he was thankful I was younger and a bit in shape. Most of his procedures with the DaVinci robot were done on older men, that had layers of fat to cut through, making the procedure take longer and add another level of risk to the entire operation. That struck me.

I had two months before the operation, and I looked at myself. My cholesterol was high as well as my blood sugar. I obviously had put on a couple of pounds as I got older, and I did not exercise properly. I needed to make a change. The first thing I did was drop ice cream out of my diet. I am an ice cream hound and can dig thru a Ben and Jerry's Carmel Sutra pint in minutes. That was one area that was contributing to all my body problems. Then I got my bike out. I had not ridden it in years, but it was time to get back on it. I started off with only a couple of miles, to get the body used to it again. Then I was up to 25 miles every other day in about a week. The legs were slowly getting back into shape and getting their tone back to them. My breathing was getting better as well, as I was no longer heaving at the end of a ride. I also started to see some definition in my abdomen as well. My wife complimented on how I looked. I started weights, but not the usual kettle or hand weights. I used something more challenging: kegs.

Draft beer comes in two size kegs: sixtels or halves. Sixtels are the thinner kegs, also called torpedo kegs. They hold about 40 pints in each weighing about 45 pounds or so. Halves are thicker and weigh about 240 pounds. In working to open my brewery, I worked one a week at the Oskar Blues Brewery, and I found that lifting sixtels in the cold room was an incredible exercise for my upper body. The repetition was easy to work with as well. After about a month, I was able to pick up a half and move it to a rack. With all of this, I was able to drop 30 pounds in 2 months, so that when it was time for the operation, there was no body fat in my abdomen for the surgeon to cut through. He was very thankful.

The surgery went very well, and I woke up in recovery, still on pain killers. I saw the incision marks all plastered up with a wound patch that would allow for the incisions to breathe and to heal. After a night at the hospital where I got no sleep (getting woken every two hours to have my vitals read. Really, how are we supposed to rest when you keep waking us up). I was able to take some steps hours after my procedure. My surgeon checked in on me, told us that everything went exactly to plan, and said that thanks to the shape I was in made things so much easier to work with, and would help with my healing as well.

These testimonials are from anonymous cancer survivors participating in a regular exercise program:

I had a catheter for about a week, to help keep the new connection from my bladder to my urinary track in place while it healed. I was able to slowly move about the house and take the steps. I was anxious to be able to do more, and to get the catheter removed. A week later, I was back at the surgeon's offices and had one of the nurses remove the catheter. Wow, that was one of the weirdest feelings I have ever had as it was removed. I started to walk, slowly at first and for small distances. I had to let the body heal naturally.

I got a notice about the annual 24 Hours of Booty bike event at the end of July. It is an annual event that rides a 3-mile loop around the Queens College in Charlotte. Thousands of riders join up, raising thousands of dollars every year, and it goes on for 24 hours. Two months after my surgery, I was cleared by my surgeon to be able to ride the bike again! And I got on it to get ready. I was able to raise over \$6,000 for my ride and was able to ride about 75 miles that night.

That was 4 years ago. Since then, we have opened the brewery, and have become sponsors of the 24 Hour of Booty ride for the past 3 years. I have been healthy and continue to do my unusual exercise routine. I do indulge in an occasional Ben and Jerry's, but that is down to only twice a year. We also work with the Pints and Prostates group, that tries to inform men about getting your PSA levels checked early, through talking to them at taprooms and over a beer.

A postscript on my prostate. 2 weeks after the operation, my surgeon contacted me about the biopsy they did on my prostate. They found that 25% of it had a very aggressive cancer, and in weeks, it would have taken over all of it, and moved on into the rest of the body. It was found in time and dealt with quickly. I continue to exercise and continue to tell others my age to get your PSA levels checked on a yearly basis. It is only a blood test.

Neil G – Prostate Cancer Survivor – Brewery Owner

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 – Cancer Exercise Specialist

These testimonials are from anonymous cancer survivors participating in a regular exercise program:

In December of 2016 I was diagnosed with invasive lobular carcinoma. My doctor's voice on the phone was not exactly warm and comforting but sounded like he could have been reading from a script. Do they have scripts for things like this? "It's cancer." No softening the blow here! Just stating facts, ma'am. OK, so now what? He rattled off something about finding a breast surgeon and I felt myself jot down a name.

Immediately, I called a friend who had just been through her own cancer adventure. She was the first to jump on my amazing support team, recommending both a surgeon and an oncologist. "You'll want to line them both up before anything else," she advised, and I did just that. She said she'd be with me every step of the way, and she was. Cancer has a nasty way of storming into your life, disrupting plans and reminding you that you're maybe not all that invincible. I was in great shape for a 62-year old girl, working as a personal trainer and 'walking the walk.' Wasn't I doing everything right? Was I a fraud? Will I be able to keep working? What about working out?

I'll be a really ugly bald girl. Nice time for vanity, right? Mostly I worried that I would be dead by Tuesday. I have no idea why I picked that day. My husband informed my siblings and the few other family members that I allowed him to. Why ruin everyone's Christmas? I couldn't talk. I could only cry.

December had already presented my family with wildfires that destroyed my brother's house while he was here for Thanksgiving. He lost everything but the clothes in his pack and his truck. My daughter-in-law lost her mom to a long illness the day after my diagnosis. Now this. When adversity strikes, I tend to get busy. I needed to learn as much as possible about my diagnosis, treatment options, side effects, prognosis and whether there was a genetic link.

My mom died of breast cancer in 2002. None of us knew that she was suffering so much until the day she died at home and the paramedic examining her asked my sister if she knew how long she had it. Her breasts were eaten away and black with necrotic tissue. Her mattress looked like a murder scene because she had lost so much blood. We were in total shock. I was not about to go down that road, leaving my kids to find me like that. By the end of December, I met with my medical team.

The surgeon laid out my options and suggested that I receive chemo in an attempt to shrink my tumor, making a lumpectomy more possible. Removing it at its current size from my small breasts would leave me deformed. A few days later I met my oncologist. Both my husband and I loved this guy! He completely supported my desire to stay as active as possible during treatments, saying that because I was in great shape to start with, I would handle chemo well and continuing to stay that way would only help. Having received encouragement to keep exercising, I had to learn how much and what kinds would be safe. Somewhere on line I read that I should find and work with a qualified trainer but had no idea where or how to do that. A search produced no one close enough in my area so I decided to educate myself, starting with ACSM's Guide to Exercise and Cancer Survivorship. A little light reading.

I learned about treatments, short and long-term side effects and gained insight into causes and nutrition strategies. But HOW do I exercise? How many reps are too many? What about weights? Cardio? How do I stay active in real life? You can read all you want, but until you actually go through, or care for someone going through chemotherapy you may not completely grasp the effects it can have on you. During my sixteen-week course of treatment with first, Adriamycin, and then Taxol, my body went on a wild roller coaster ride of appetite loss and then fierce regain, fatigue followed by crazy energy and body aches I'd never experienced before. Weird things like runny nose and watery eyes. Surprising changes in smell and tastes. Tingling in my fingers and deep bone pain; lots of fun stuff.

My own experience taught me how much I could handle. I had no choice but to slow my cardio pace. My brain wanted to run sprint intervals, especially the day after Taxol when I felt like Wonder Woman, but my body had other ideas. I found myself getting winded a lot sooner during conditioning workouts and started to worry about Adriamycin and cardiomyopathy. Still, just walking on the treadmill somehow increased my energy and took my mind off what I was going through. I had my tunes playing and my body moving. It was awesome! As far as weight training went, I was working with a great trainer who pushed me just enough (as if I needed pushing - LOL) helping me retain strength, flexibility and power. I think I was able to deadlift more during chemo than I have recently. Hmmmm....better work on that!

These testimonials are from anonymous cancer survivors participating in a regular exercise program:

Other people at the gym offered encouragement and told their own cancer stories. I started to feel that, if I could let others see me live through this, staying active and strong, maybe, just maybe, I could help them be less afraid. Maybe I could help them learn how to prevent cancer in the first place or thrive afterwards. That's when the Cancer Exercise Training Institute caught my interest. Here was a program that not only taught me about the disease and its many forms, but also about HOW to exercise before, during and after treatments, including surgeries. WOW! At first, I wanted to educate myself for my own benefit, but soon came to realize how important it could be to help other survivors and their caregivers.

Anyway, back to the cancer experience.... Chemo did indeed shrink my tumor but not enough that its removal wouldn't leave my breast deformed, and the presence of abnormal cells in the other breast made the decision to have both of them removed easier. Reconstruction was another story. Again, after a lot of research and talking with my three sisters, one thought stood out to me. The only advantage I saw to reconstructing my breasts would be looking normal to other people. My husband was concerned that, if he should die, I would feel weird about not having breasts and maybe remarrying. Sweet thought, but not enough. If someone doesn't love me the way I am, that's their problem. Also, I hate wearing a bra. Going flat means no bra. EVER. Decision made.

About two weeks before surgery, the doctor handed me a pile of preparation instructions. One sheet listed a couple exercises to strengthen my core so I could get out of bed without using my arms after bilateral mastectomy. Come on, do they really expect someone to develop those capabilities in TWO WEEKS? Thankfully, I'd been working on that for a long time. Score one for core and power training. Surgery day stripped away whatever dignity I had managed to hold on to. No wig, but I could wear my crazy chemo hat. No makeup. No jewelry. No deodorant or nail polishes. No underwear. Not even my cozy alpaca socks. Just that gown, opened in the front, please. They covered me with heated blankets, though. Sweet!

When I came to, my hubby was waiting with food, which I didn't eat. He says I was loopy, but I don't remember. What I DO remember, and maybe this is just me, but ZERO pain. They had removed both of my breasts and I felt NO PAIN. Not that day, not the days after. I took one Tylenol because I thought I was supposed to. Zero pain. Go figure. Was that because of exercise? Could be... They took both breasts, along with one lymph node on the right side and five on the left "because they were all clustered together." What? There was no cancer in the nodes, and they got it all when removing the breasts. I was released on Wednesday and was back at the gym on Friday; just walking, but it felt great!

A few days later, the weather was beautiful; perfect for a long walk. I put on my wig-hat combo, tucked the surgical drains into my hoodie pocket and set out down the street. Hilariously not one, but two trucks went by, the drivers whistling some sort of approval. Oh, my Lord! Here I was, bald, breast-less, leaking surgical fluids and they're cat-calling! Laughed all the way home! About a week later a nurse took out a third of the staples and stitches and told me I could return to normal activities. Were they aware what my normal activities were? Probably not. When it was time to remove the second third, the area was swollen, and I was told to tone it down a bit.

By this time, I had learned through my own research, what this lymphedema thing is all about. I still don't understand why they downplay it so much, telling me my risk is so low I really don't have to worry about it. Well, I do worry! Thankfully, I know what precautions to take and what to look for.

So, a year and a half out, my hair is back. I'm keeping it super short and embracing the gray. There are two long dark scars where my breasts used to be, but I don't regret my decision to go flat. It just seems like less of a hassle to me. Maybe I'll have them covered with pretty tattoos, but I really don't care that much. I'm thankful for not having to receive radiation, wanting to get this whole thing behind me as quickly as possible and get on with living. Every ache and pain has me wondering if cancer has returned, but I'm told that will ease over time. They say that blessings come in strange wrappings. Could cancer have been a blessing? I've met amazing, dedicated people and inspiring survivors. I've learned lessons that would have been impossible any other way. I've experienced outpourings of love and support from people who previously were strangers and am hoping to pay it forward through all I've come to know as a survivor and as a Cancer Exercise Specialist.

**Cindy S. – Breast Cancer Survivor
– Cancer Exercise Specialist**

These testimonials are from anonymous cancer survivors participating in a regular exercise program:

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 Sandbells 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 mindset 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
– Cancer Exercise Specialist**

These testimonials are from anonymous cancer survivors participating in a regular exercise program:

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

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 motto - "Be your best when your best is needed!"

Tara F. – Breast Cancer Survivor
– Cancer Exercise Specialist

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
– Cancer Exercise Specialist

These testimonials are from anonymous cancer survivors participating in a regular exercise program:

I was diagnosed with Breast Cancer at the age of 45 and was in my ideal career as a Personal Trainer. Being healthy & fit was always something I was passionate about. Another one of my passions is helping others achieve greatness and become the best versions of themselves.

In May 2017 I had been experiencing 6 days of non-stop high blood pressure and anxiety feelings and couldn't figure out why since I wasn't stressed about anything other than these feelings. I worked out daily for years, ate healthy, had no health problems and was always a positive person. The only thing that came to mind was maybe I was becoming pre-menopausal and my hormones must have been out of whack. After a routine women's wellness exam, blood work including my hormones, a mammogram, MRI and biopsy, I was diagnosed with Breast Cancer. The words came across my Bluetooth in my car from the radiologist and my primary and I was in complete denial.

With the advice from my surgeon, we did an oncotype test to see the rate of recurrence. My cancer was 90% estrogen driven and 40% progesterone driven which had me thinking about all the hormones in our food, being on birth control growing up and the 3 in vitro fertilization cycles I had gone through to conceive my daughter. My rate of return came back very high and I had told myself that was my determining factor to have a double mastectomy to reduce the likelihood of going through this again. I had no idea what to expect as far as my mental, emotional or physical well-being through all of this, but I did now that I was the only one in charge of those emotions.

Emotionally and mentally I kept to myself. After being diagnosed, I didn't really talk to many people about it or my decision-making process except my immediate family and a close friend. At the end of the day, the decision was mine. It was my life, my body and my journey. Although I have been an athlete my whole life and was currently a personal trainer, I was lucky enough to only count the number of injuries I had had throughout life on one hand so knowing that my life was going to change permanently both physically and mentally, I knew I needed to learn as much as I could about my abilities after my surgery (which ended up being multiple surgeries). How was I going to exercise? Did my doctors know what I really could or could not do? I remained in denial all the way to the morning of my surgery when I had a complete breakdown. Since my diagnosis my mentality had been, "If this is the problem, let's fix it and move on."

After several hours of surgery and hours and days of recovering, the reality set in, MY LIFE WAS CHANGED FOREVER! I had many choices. I could choose to let it bring me down and define me and become someone I had never been, negative and sedentary, or I could take it one day at a time and find a way to turn this into a positive. I was part of an organization called Functional Aging Institute and was certified as a Functional Aging Specialist. I remember seeing an email coming through about a webinar for becoming a Cancer Exercise Specialist and feeling like that was a sign. That was my calling. I am a firm believer that everything happens for a reason, good or bad. Sometimes you don't know why at the time, but it comes to you. I knew I had to take this course, if not just for me to heal properly but to help so many others diagnosed with cancer. I loved that I could do the course at my own pace but at any time I could reach out to Andrea Leonard for help with anything and she would always personally get back to me.

The program made such sense and really helped me understand the limitations and muscle strains throughout recovery and everyone's situation is different. I am so thankful that I had been in shape prior to my double mastectomy as it really helped my recovery time. As for my emotional and mental well-being, I journaled every day and focused a lot on how I could help others through this experience. I chose to take this unfortunate situation and turn it into an opportunity to help someone in a similar situation. This has become a new passion of mine, being a Cancer Exercise Specialist! Thank you, Andrea, for creating this program!

**Shannon B. – Breast Cancer Survivor
– Cancer Exercise Specialist**

These testimonials are from anonymous cancer survivors participating in a regular exercise program:

In June 2015 I was diagnosed with Triple Negative Breast Cancer, a particularly aggressive form of Breast Cancer. After many tests, scans, and lots of doctor visits, I quickly began an intense regimen of 20 weeks of chemotherapy, surgery, radiation, and lot and lots of follow-up. When I was going through chemo, my oncologist was very clear with me. Keep moving and you will actually feel LESS tired, LESS SICK. It sounds counter-intuitive, but it's true! I took her words to heart, and whether it was a walk with a friend, light exercise, or a gentle yoga class, I tried to move as much as I could throughout treatment. Exercise helped combat my side effects, made me feel less anxious, and gave me both emotional and physical energy. It also made me feel more normal.

During this time, I also ran into an old friend – at my local cancer support center – and realized that she was also going through chemo. We started meeting up once a week to walk together. We would walk, and talk, and support each other. It was so helpful to have someone that I had committed to – someone who GOT IT - otherwise many of those days I might have stayed in bed instead of walking – and to share concerns, experiences, to give and get advice, and to simply be there with one another through a difficult time. We were, essentially, walking support buddies.

And then, when I was done with treatment, I attended a whole host of seminars on various topics – The emotions of survivorship, how to combat Chemo-Brain, wellness, nutrition, mindfulness, and more. Do you know that every single one of them recommended exercise? I also learned how much bone density and muscle mass we lose during treatment, and that really got me motivated! I've made exercise a priority for myself ever since, and it has really helped me recover and get my strength back. My own exercise routine includes cardio-strength exercises classes, barre, power and vinyasa yoga, lots of walking, and even a little running occasionally. Since breast cancer, I've run a few 5k races and even an 8k race in November!

Women with cancer need help to get moving, and I wanted to give back, so I recently co-founded a new non-profit, 2Unstoppable, to encourage and support exercise for women who have had a cancer diagnosis. Learn more at www.2unstoppable.org.

Michelle S. – Breast Cancer Survivor
– Co-founder of 2Unstoppable

I was diagnosed with breast cancer in 2016 at 33. Prior to my diagnoses I tried to stay as active as possible. I would hike or lift weights. Because I had double mastectomy, I was limited as far as to what I can do. I couldn't do my weight lifting which I loved but I wanted to stay active because "bad heat" runs in my family and I was warned about possibility of chemo cardio toxicity.

I had 2 chemotherapy protocols 4AC and then, 12taxol with 17 herceptin and perjeta (which they can affect heart - especially ejection fraction). During first four rounds I would go for a hike/walk 4–10 miles depending on a trail. Nothing crazy uphill just even ground with slight elevation. During taxol/herceptin/perjeta I did lot of stationary biking. I would ride 30 minutes to one hour depending how the day would go. My oncologist always told me to stay as active as possible.

Because I stayed active, I had no issues with delaying my treatment, my ejection fraction never went down, and I was able to finish my treatment strong. My radiation therapist always asked me if am tired because radiation may also affect the way we feel. I was never tired; my treatment was at 8 a.m. and my team was impressed how much energy I had.

It is hard for some people to understand that even during treatment exercise is a key. It gave me energy and I was able to continue with my treatments and kept my heart strong.

Izabella G
– Breast Cancer Survivor

These testimonials are from anonymous cancer survivors participating in a regular exercise program:

I was diagnosed with Stage 2 breast cancer in 2006 at the age 35 when I had my baseline mammogram. I had a mastectomy and underwent 5 months of chemotherapy and a year of Herceptin treatments. Since then I have had an elective mastectomy and bilateral reconstruction. I kept my motivation during treatment not only by thinking about my family but also with the mantra – “Fake It Til You Make It” and telling myself that I was too much of a control freak to let cancer run my life.

I now advocate to create awareness about breast cancer in young women and the importance of exercise in preventing reoccurrence. I also work part-time as an instructor/personal trainer for the YMCA’s cancer survivorship exercise programs.

I volunteer with Relay for Life and assist in peer reviews of breast cancer grant applications for the US Department of Defense. I also come from a family of breast cancer survivors including my grandmother who was diagnosed a year before me, at the age of 95 and again at 98.

I have participated in the Komen Race for the Cure since it began in Boise in honor of my aunts. I now race not only to celebrate my aunts, my grandma and myself but to help ensure that my daughter is not the fourth generation to become a cancer warrior.

Jennifer P. – Breast Cancer Survivor

CHAPTER SIX

CANCER TREATMENT & WEIGHT MANAGEMENT

Objective: to learn how to manage weight gain or loss during and after cancer treatment and gain an understanding of:

- How excess weight leads to other diseases
- How to safely gain weight
- Exercise as a critical component of weight management
- General exercise recommendations

Goal: to be able to provide our clients with evidence-based information on exercise and nutrition for cancer patients and survivors.

WEIGHT GAIN AFTER A BREAST CANCER DIAGNOSIS

Research has shown that nearly two-thirds of women who receive chemotherapy gain weight²⁶¹. In addition to the direct effects of the chemotherapy and associated medications on weight gain, in one study, up to 66% of patients reported that they ate to minimize symptoms of nausea, which may be another way that chemotherapy may lead to weight gain²⁶⁴.

Nearly 80% of people who are diagnosed with breast cancer will experience weight gain²⁶¹, reported to range between two pounds and 18 pounds. Some evidence suggests that pre-menopausal women who gain weight have a 1.5 fold increase risk of cancer recurrence²⁶². Other studies have shown that some types of treatment, such as anastrozole (Arimidex®), are less effective at treating breast cancer in patients who are obese²⁶³.

A large new study finds that women who lost weight after age 50 and kept it off had a lower risk of breast cancer than women whose weight remained stable, helping answer a vexing question in cancer prevention. The reduction in risk increased with the amount of weight lost and was specific to women not using postmenopausal hormones²⁶⁰.

Breast cancer patients with metabolic syndrome (weight gain, elevated glucose, and insulin resistance undergoing chemotherapy were found to have an overall poor response to treatment and those patients who specifically had high blood glucose levels were noted to have increased rates of disease progression²⁶⁵. Prospective data from Italy in patients undergoing surgery and chemotherapy for breast cancer has shown an increase in tumor recurrence in patients with high fasting blood glucose level, low high-density lipoprotein levels, hypertriglyceridemia, large waist circumference, and hypertension²⁶⁶.

LIFE STAGE MATTERS FOR BREAST CANCER

The influence of obesity on breast cancer risk varies by life-stage. Adiposity before menopause is inversely associated with risk, whereas adiposity during the postmenopausal years is positively associated with risk^{267, 268}.

A recent study published in the International Journal of Cancer, has found that women who gain weight from early adulthood are at a reduced risk of developing breast cancer before they reach menopause. The analyses included 628,463 women, whose median age at recruitment was 39.4 years and who were followed for a median of 10.1 years from recruitment during which 10,886 breast cancer cases (8,509 invasive) were diagnosed²⁶⁹.

The study revealed that gaining around 20 pounds or more of weight from early adulthood resulted in a lower risk of developing breast cancer before menopause²⁶⁹.

Weight gain between the age ranges of 18-24 years and 45-54 years reduced the risk of breast cancer by 4% for every 10 pounds. Researchers also found that gaining weight during the age of 35-44 years had no effect on the chances of a woman developing breast cancer before menopause²⁶⁹.

WEIGHT GAIN AFTER A CANCER DIAGNOSIS

In cancer survivors, weight gain may lead to the development of other diseases as well as lower cancer-related survival and overall survival. Additionally, cancer survivors are at greater risk for developing second cancers as well as other diseases, such as heart disease and diabetes. It is well documented that heart disease and diabetes are clearly linked to weight gain.

Certain cancer treatments may alter the clients' body composition. Studies show that people with breast cancer, prostate cancer, non-small cell lung cancer, and acute lymphoblastic leukemia, who undergo chemotherapy, hormone therapy, or radiation therapy to the head, show unfavorable changes in their body composition. Their body fat increases and their lean muscle decreases. While their weight may not fluctuate dramatically on the scale, because of the increase in body fat, it is very likely that they will go up a size or two in their clothing.

The most important factors for weight gain in cancer clients seem to be the decrease in physical activity and the resulting lower basal metabolic rate. For those that can tolerate food, and have a propensity for over-eating, this will be a factor as well. In order to maintain their current body weight, clients should reduce their normal calorie intake and/or increase exercise, such as resistance training, that helps build muscle. Unfortunately, depending on the type of treatment, as well as the age and lifestyle of the individual, options may be somewhat limited. This is where the Cancer Exercise Specialist can make recommendations for the frequency, intensity, and duration of the exercises; as well as which are best suited for the individual client.

WEIGHT LOSS - CANCER CACHEXIA

Cancer anorexia and cachexia syndrome (CACS) is a complex syndrome characterized by a progressive loss of appetite and muscle mass that cannot be fully reversed by nutritional support alone and that leads to functional impairment²⁷⁰. People with early stage cancers don't usually get cachexia. Up to 8 out of 10 people with advanced cancer (80%) develop some degree of cachexia²⁷⁵.

CACS can be present in 40–80% of cancer patients depending on the tumor type, it is linked to poor quality of life and is a strong predictor of survival. CACS most often affects patients with cancers of the upper gastrointestinal tract, including the esophagus, stomach, and pancreas. This syndrome can be due to the cancer itself or, paradoxically, to side effects of the chemo/radiation therapy used for its treatment²⁷¹⁻²⁷³.

Drastic losses of body mass may lead to electrolyte imbalances that affect levels of potassium, magnesium, and sodium. This may lead to:

- Reduced strength
- Increased fatigue and weakness
- Numbness
- Tingling
- Involuntary twitching
- Pain

STAGES OF CANCER CACHEXIA

There are three stages of cachexia:

- **Precachexia** – weight loss of less than 5% of body weight.
- **Cachexia** – weight loss greater than 5% of body weight
- **Refractory Cachexia** – refers to patients with cachexia whose cancer treatments are no longer working and have a life expectancy of less than 3 months

The risk of progression depends on factors such as cancer type, stage, food intake, presence of systemic inflammation, inactivity, lack of response or complications to anticancer therapy, and/or sequela of surgery²⁷⁶.

The most common sign of cachexia is a drastic weight loss (greater than 10% of total body weight) including fatty tissue and lean muscle mass²⁷⁴. Symptoms include loss of appetite (no desire to eat), lack of any sense of taste, weakness, fatigue, electrolyte imbalance, anemia, and immunosuppression. Cachectic patients have worse outcomes with surgery, chemotherapy, and radiation therapy²⁷⁴.

Cachexia is much different than general weight loss. It can't be fully reversed even when the patient is able to eat. Tube feeding is not usually effective either.

ASCO convened an Expert Panel to review the evidence and formulate recommendations. PubMed and the Cochrane Library were searched for randomized controlled trials (RCTs) and systematic reviews of RCTs published from 1966 through October 17, 2019²⁷⁶.

Results of the study:

- Dietary counseling, with or without oral nutritional supplements, was reported to increase body weight in some trials
- Pharmacologic interventions associated with improvements in appetite and/or body weight include progesterone analogs and corticosteroids

Recommendations:

- Dietary counseling with advice for the management of cachexia
- Enteral feeding tubes and parenteral nutrition should not be used routinely
- No specific pharmacological intervention can be recommended. Progesterone analogs and short-term (weeks) corticosteroids may be used to improve appetite and/or improve weight gain.

The current body of research examining cancer cachexia suggests that a multimodal intervention, which encompasses exercise, nutritional, and pharmacological strategies, will likely be required to combat the condition²⁷⁷.

While exercise has generally shown to benefit the cancer patient, it is currently not established if similar benefits can be achieved in a cancer patient CACS with a limited work capacity²⁷⁷.

GENERAL RECOMMENDATIONS FOR WEIGHT CONTROL

Cancer clients are not alone in the never-ending struggle to reach and maintain their ideal body weight. It becomes even more of a priority, however, because a healthy body composition is associated with cancer prevention, more effective cancer treatment, the prevention of type II diabetes and heart disease, improved overall health and survival, increased ability to perform activities of daily living, and better quality of life.

It is easy to gain weight in a society that boasts “super-size” portions, “all you can eat buffets,” and a “more is better” mentality. Making good choices requires discipline and self-control, but also being an educated consumer.

According to the Mayo Clinic, there is some evidence that consuming large amounts of sugar is associated with an increased risk of certain cancers, including esophageal cancer. Eating too much sugar can also lead to weight gain and increase the risk of obesity and diabetes, which may increase the risk of cancer. More research is needed to understand the relationship between sugar in the diet and cancer. All cells, including cancer cells, depend on blood sugar (glucose) for energy. A diet high in sugar doesn't make cancer cells grow faster. Nor does depriving cancer cells of sugar cause them to grow more slowly. This theory may be based on a misunderstanding of positron emission tomography (PET) scans, which use a small amount of radioactive tracer (typically a form of glucose). All tissues in the body absorb some of this tracer, but cancer cells absorb greater amounts. For this reason, some people have concluded that cancer cells grow faster on sugar but there is no hard evidence that this is true.

Here are some tips for making better choices:

- Follow a schedule - don't skip meals or snacks
- Choose foods with lower calorie content, such as vegetables, fruits, whole grains, and soups. Some of these foods also help a person feel "full" faster due to their high fiber content.
- Limit foods and beverages that are high in sugar and fat. Drink plenty of water (which will also produce the feeling of fullness without the added calories).
- Balance the calories from foods and beverages with the number of calories burned through physical activity. 3500 calories equal one pound. Therefore, eating a piece of cake that is 600 calories will require 600 calories of physical activity in order to burn it off. If the daily caloric intake exceeds the daily caloric expenditure, weight gain will occur.
- Increase levels of physical activity. Clients that are suffering from extreme fatigue and other treatment side-effects should try to do some form of physical activity every day; even if it's just a five-minute walk. For clients who were sedentary prior to their diagnosis, even a slight increase in physical activity will show marked improvement. On the other hand, those who were very active prior to treatment will probably be frustrated with their inability to perform at the level they have become accustomed to. It will be imperative for them to reduce their caloric intake in accordance with the reduction in physical activity in order to maintain their weight.
- If the scale does not show a marked change, but their lean muscle to body fat ratio improves, that is still a step in the right direction.





CHAPTER SEVEN

ALCOHOL AND CANCER RISK

Objective: to understand the link between alcohol consumption and cancer risk, and become familiar with:

- The percentage of alcohol in various spirits
- Alcohol as a risk factor for cancer
- Alcohol and its role in weight gain

Goal: to be able to provide your clients with evidence-based information on the role that alcohol consumption may play in weight management and an increased cancer risk.

WHAT IS ALCOHOL?

Alcohol is a legal, sedative drug which changes the way we feel. Pure alcohol is a colorless, odorless and inflammable fluid that does not contain any nutrients for the body. Alcohol is the common term for ethanol or ethyl alcohol, a chemical substance found in beer, wine, and liquor, as well as in some medicines, mouthwashes, household products, and essential oils.

Alcohol Content in different kinds of Beer, Wine and Liquor

Beer:

- 3.5% Heineken Premium Light, Amstel Light
- 4% Guinness Black
- 4.2% Bud/Coors Light
- 4.4% Yuengling
- 4.6% Corona Extra
- 5% Coors/Budweiser/MGD/Stella Artois
- 5% Heineken
- 5.6% Sierra Nevada Pale Ale
- 8.4% Tripel Karmeliet (Belgium ale)
- 9% Dogfish Head 90 Minute IPA (Imperial IPA)

Wine:

- 5-6.5% Moscato d'Asti
- 7-8% German Riesling
- 10.5-12% Most American, Austrian and Australian Riesling
- 11.5-12.5% Lambrusco (sparkling red/rosé)
- 12-13% Most Pinot Grigio
- 12.5-13% Most Beaujolais
- 12.5-13% Most Sauvignon Blanc
- 13%-14% Most Pinot Noir and Red Bordeaux
- 13.5%-15% Malbec
- 13-14.5% Most Chardonnay
- 13.5-14.5% Most Cabernet Sauvignon, Sangiovese and French Syrah
- 14-15% Most Shiraz and American Syrah
- 14.5% Sauternes (sweet white dessert wine)
- 14-15.5% Most Zinfandel
- 14-15% Most Grenache
- 15% Muscat (sweet dessert wine)
- 15.9% Rombauer and Rancho Zabaco Zinfandel
- 16% Mollydooker Shiraz
- 17-21% Port, Madeira, Sherry, Other Fortified Dessert Wines
- 17-20% Sake



Hard Liquor

- 55-60% Cask strength whiskey/scotch
- 35-30% Gin
- 35-46% Vodka
- 40-46% Whiskey, Scotch, Rum, and Tequila

Alcoholic beverages are classified by the International Agency for Research on Cancer (IARC) as a Group 1 carcinogen¹⁹⁵. IARC classifies alcoholic beverage consumption as a cause of female breast, colorectum, larynx, liver, esophagus, oral cavity, and pharynx cancers; and as a probable cause of pancreatic cancer¹⁹⁵.

EVIDENCE OF THE LINK BETWEEN ALCOHOL CONSUMPTION AND CANCER RISK

In its Report on Carcinogens, the National Toxicology Program of the US Department of Health and Human Services lists consumption of alcoholic beverages as a known human carcinogen¹⁹⁶. The research shows a distinct correlation between the amount of alcohol a person drinks, and a higher risk of developing an alcohol-associated cancer¹⁹⁶. Based on a study by Andrew T. Kunzmann, Helen G. Coleman, Wen-Yi Huang, Sonja I. Berndt - The association of lifetime alcohol use with mortality and cancer risk in older adults: A cohort study – PLOS Medicine. Published: June 19, 2018, cancer incidence (excluding nonmelanoma skin cancer), and combined risk of cancer and death across categories of self-reported average lifetime alcohol intakes, with adjustment for potential confounders was calculated. During 836,740 person-years of follow-up (median 8.9 years), 9,599 deaths and 12,763 primary cancers occurred. Positive linear associations were observed between lifetime alcohol consumption and cancer-related mortality and total cancer incidence.

In November of 2017, The American Society of Clinical Oncology (ASCO) released a statement about alcohol and cancer risk stating: research has proven that alcohol is connected to more than 5% of cancer diagnoses around the world, including several types of head and neck cancers, esophageal cancer, liver cancer, breast cancer, and colon cancer¹⁹⁷.

Clear patterns have emerged between alcohol consumption and the development of the following types of cancer¹⁹⁷:

- **Head and neck cancer** - alcohol consumption is a major risk factor for certain head and neck cancers, particularly cancers of the oral cavity (excluding the lips), pharynx (throat), and larynx (voice box)¹⁹⁷. People who consume 50 or more grams of alcohol per day (approximately 3.5 or more drinks per day) have at least a two to three times greater risk of developing these cancers than nondrinkers¹⁹⁷. The risks of these cancers are substantially higher among persons who consume this amount of alcohol and use tobacco¹⁹⁷.
- **Esophageal cancer** - alcohol consumption is a major risk factor for a particular type of esophageal cancer called esophageal squamous cell carcinoma¹⁹⁷.
- **Liver cancer** - alcohol consumption is an independent risk factor for, and a primary cause of, liver cancer (hepatocellular carcinoma)¹⁹⁷. Chronic infection with hepatitis B virus and hepatitis C virus are the other major causes of liver cancer^{48,135,136}.
- **Breast cancer** - more than 100 epidemiologic studies have looked at the association between alcohol consumption and the risk of breast cancer in women^{55,59,63}. These studies have consistently found an increased risk of breast cancer associated with increasing alcohol intake^{55,59,63}. A meta-analysis which included a total of 58,000 women with breast cancer, showed that women who drank more than 45 grams of alcohol per day (3 drinks) had 1.5 times the risk of developing breast cancer as nondrinkers^{55,59,63}.
- **Colorectal cancer** - alcohol consumption is associated with a modestly increased risk of cancers of the colon and rectum^{50,51}. People who regularly drink 50 or more grams of alcohol per day (3.5 drinks) have 1.5 times the risk of developing colorectal cancer as nondrinkers or occasional drinkers^{50,51}.



HOW DOES ALCOHOL INCREASE THE RISK OF CANCER?

The risk of cancer associated with alcohol consumption is higher in tissues in closest contact on ingestion of alcohol, such as the oral cavity, pharynx and esophagus⁴⁹⁻⁵¹. This is explained by the fact that ethanol is a proven mutagen and in addition, metabolite of ethanol (acetaldehyde) produced in the liver is highly carcinogenic, thus explaining both local (mouth, throat, esophageal cancers) as well as distant (skin, liver, breast) cancers⁴⁹⁻⁵¹. Recent evidence suggests that the cytotoxic effect of ethanol on the cells lining the oral cavity, pharynx and esophagus activates the division of the stem cells located in deeper layers of the mucosa to replace the dead cells^{196,197}. Every time stem cells divide, they become exposed to unavoidable errors associated with cell division and become highly vulnerable to the genotoxic activity of DNA-damaging agents (e.g., acetaldehyde and tobacco carcinogens)^{196,197}. A study found that "the ADH1C*1 allele and genotype ADH1C*1/1 were significantly more frequent in patients with alcohol-related cancers"⁵⁰.

Alcohol may cause damage to body tissues by acting as an irritant, especially in the mouth and throat^{49-51,197}. Cells that are damaged may try to repair themselves, which could lead to DNA changes in the cells that can be a step toward cancer^{49-51,197}. In the colon and rectum, bacteria can convert alcohol into large amounts of acetaldehyde; a chemical that has been shown to cause cancer in lab animals^{49-51,197}.

Alcohol damages the liver, leading to inflammation and scarring⁴⁸⁻⁵¹. As liver cells try to repair the damage, they can end up with mistakes in their DNA, which could lead to cancer⁴⁸⁻⁵¹. Alcohol can act as a solvent, helping other harmful chemicals, such as those in tobacco smoke, enter the cells lining the upper digestive tract more easily⁴⁸⁻⁵¹. This could explain why smoking and drinking is much more likely to cause cancers in the mouth or throat than either one by itself.

Alcohol use can lower the body's ability to absorb folate from foods (cells in the body need Folate to stay healthy)^{48-51,197}. This is a bigger issue in heavy drinkers who often do not get enough nutrients, folate included, in their diet^{48-51,197}. Low folate levels may play a role in the risk of breast and colorectal cancers^{48-51,197}.

Alcohol can raise body levels of estrogen (a hormone important in the growth and development of breast tissue) and can affect a woman's risk of **breast cancer**^{48-51,197}.

In a study by *Jasmine A. McDonald, PhD, Abhishek Goyal, MD, MPH, and Mary Beth Terry, PhD - Alcohol Intake and Breast Cancer Risk: Weighing the Overall Evidence - Curr Breast Cancer Rep. 2013 Sep; 5(3): 10.1007/s12609-013-0114-z. doi: 10.1007/s12609-013-0114-z*, authors conclude that alcohol consumption is associated with a modest increase in breast cancer risk. This association has been consistently found in case-control and cohort studies, reducing the likelihood that it could be explained by selection or information biases. Effect modification of this relationship by the ADH1C genotype, and the associations between alcohol use and higher breast density, provide further evidence in support of a causal effect. Although the majority of the studies to date do not support increased breast cancer risk with higher alcohol use in women at high risk of breast cancer, prospective studies are needed to rule out biases. Although the literature is relatively scant, studies also do not suggest that alcohol affects breast cancer recurrence or survival. Thus, until prospective data become available for women across the spectrum of breast cancer risk, the best evidence suggests that higher risk women are not at increased risk from moderate alcohol consumption.

In another study by *Allen NE, Beral V, Casabonne D, et al. (March 2009). "Moderate alcohol intake and cancer incidence in women". Journal of the National Cancer Institute*, women drinking an average of two units of alcohol per day have an 8% higher risk of developing breast cancer than women who drink an average of one unit of alcohol per day. The study concluded that for every additional drink regularly consumed per day, the incidence of breast cancer increases by 11 per 1000. Approximately 6% (between 3.2% and 8.8%) of breast cancers reported in the UK each year could be prevented if drinking was reduced to a very low level (i.e. less than 1 unit/week), according to The Committee on Carcinogenicity of Chemicals in Food Consumer Products and the Environment (COC)¹⁹⁸. Moderate to heavy consumption of alcoholic beverages (at least three to four drinks per week) is associated with a 1.3-fold increased risk of the recurrence of breast cancer^{197,198}. Furthermore, consumption of alcohol at any quantity is associated with significantly increased risk of relapse in breast cancer survivors^{197,198}.

A World Cancer Research Fund panel finds the evidence "convincing" that alcoholic drinks increase the risk of **colorectal cancer** in men at consumption levels above 30 grams of absolute alcohol daily¹⁹⁵. The National Cancer Institute states, "Heavy alcohol use may also increase the risk of colorectal cancer."^{182,192}. A 2011 meta-analysis found that alcohol consumption was associated with an increased risk of colorectal cancer^{49-51,97,197,198}.

The National Institute on Alcohol Abuse and Alcoholism (NIAAA) reports that "Prolonged, heavy drinking has been associated in many cases with primary **liver cancer**." ^{28,50,51}. However it is liver cirrhosis, whether caused by alcohol or another factor, that is thought to induce the cancer ^{50,51}. In the United States, liver cancer is relatively uncommon, afflicting approximately 2 people per 100,000, but excessive alcohol consumption is linked to as many as 36% of these cases by some investigators ^{31,50,51}. "Overall, 61% of **hepatocellular carcinoma** (HCC) were attributable to HCV [hepatitis C virus], 13% to HBV [hepatitis B virus], and 18% to heavy alcohol drinking." ^{27,48,135}. A study in the province of Brescia, northern Italy concluded, "On the basis of population attributable risks (AR), heavy alcohol intake seems to be the single most relevant cause of HCC in this area (AR: 45%), followed by HCV (AR: 36%), and HBV (AR: 22%) infection." ⁴⁸

A study by *Weiderpass E, Ye W, Tamimi R, et al. (1 August 2001). "Alcoholism and risk for cancer of the cervix uteri, vagina, and vulva". *Cancer Epidemiology, Biomarkers & Prevention*. 10 (8): 899–901*, concluded that alcoholic women are at high risk for cancer of the **vagina**.

ALCOHOL USE DURING AND AFTER CANCER TREATMENT

The American Cancer Society states that alcohol use during cancer treatment can contribute to the development of new cancers ¹⁹⁹. Even in very small amounts alcohol can irritate, and sometimes make worse, mouth sores caused by chemotherapy ¹⁹⁹. Alcohol can also interact with some drugs used during cancer treatment, which might increase the risk of harmful side effects ¹⁹⁹. Your client should speak to their doctor about the possible contraindications with their personal treatment plan.

Alcohol is nothing but wasted calories, adding extra calories to the diet, which can contribute to weight gain in some people.

Many of your clients will be struggling with weight gain during and after their treatment has ended, and alcohol will only serve to make the problem worse. One serving of alcohol on average contains 100-150 calories, so even a moderate amount of 3 drinks a day can contribute 300+ calories. Mixed drinks that add juice, tonic, or syrups will further drive up calories, increasing the risk of weight gain over time. In addition, being overweight is known to increase the risks of many types of cancer so we should encourage food and drink with high nutritional value as you will read about in the next section.

CHAPTER EIGHT

CONQUERING CANCER WITH NUTRITION

Objective: to gain an understanding of lifestyle choices that affect daily health and the long-term risk of developing cancer, and:

- Importance of “cooking hygiene” for immunocompromised clients
- Primary nutrition goals for someone living with cancer
- Choosing nutrient-dense and cancer-fighting foods
- Reducing pesticide exposure
- Detoxification with foods and spices

Goal: to be able to provide your clients with GENERAL nutrition and guidelines after they have COMPLETED cancer treatment. There are many contraindications to cancer treatment with certain foods and spices and it is ESSENTIAL that clients who are undergoing treatment seek the advice of a registered dietitian who specializes in oncology.

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There's no longer a question that a good diet is essential for optimal health. We know that the foods we eat, and our lifestyle affect our health. Food, nutrition and physical activity are crucial to our general health and well-being. The same way that our lifestyle choices affect our daily health, it also affects our long-term risk of developing diseases such as cancer. There have been scores of scientific research validating the association of poor dietary choices and the onset of degenerative diseases including cancer. As a matter of fact, according to The American Institute for Cancer Research, it is estimated that between 60 and 70 percent of all cancers have been directly linked to our daily dietary and lifestyle habits. On the other side of the coin, according to the Institute, we can achieve dramatic reductions in our cancer risk by making small adjustments to our daily dietary choices. A significant body of evidence has demonstrated that certain foods, for example, can offer benefits to people already afflicted with cancer either because they help to treat the condition, bolster immune response or because they can potentiate the effectiveness of other conventional or integrative therapies.

Because certain types of cancer treatments can cause immunocompromization, and make people susceptible to infection, food handling and safety is a legitimate concern. All cooking surfaces and utensils should be thoroughly cleaned; this includes sponges that come in contact with raw meat and raw eggs. Eggs and meat should be cooked thoroughly, and all foods should be promptly stored in the refrigerator to minimize bacterial growth. When eating at a restaurant during treatment, avoid foods that are likely to be contaminated with bacteria; undercooked meats, salad bar items, and sushi.

PRIMARY NUTRITIONAL GOALS

There are three main nutritional goals for someone living with cancer. They are 1) to maintain a healthy bodyweight; 2) to select a nutritional plan that will supply the body with fuel and nutrients for repair and healing and aid in the body's ability to eliminate toxins; and 3) to prevent recurrence of the cancer and the development of the second malignancy. While it may be overwhelming to administer radical alterations in food choices, it's got to be understood that if one refuses to make substantive modifications in their lifestyle, everything will stay the same; hence, one's cancer risk and the potential for recurrence will remain unaltered.

THE GLOBAL POPULATION IS GETTING FATTER

According to the World Health Organization (WHO), overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. A crude population measure of obesity is the body mass index (BMI), a person's weight (in kilograms) divided by the square of his or her height (in meters). A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight. Within the overweight population, 600 million adults and 150 million children have body mass index numbers above 30. In the UK, being overweight/obese is the biggest cause

of cancer after smoking, according to Cancer Research UK. According to the Centers for Disease Control (CDC), overweight/obesity account for 40% of all cancers in the United States. About 2.2 billion people around the world are either overweight or obese, and it is leading to health problems and a rising number of deaths, according to The Global Burden of Disease Study. About 2,300 researchers from 133 countries collaborated on the report, which was funded by the Bill and Melinda Gates Foundation and overseen by the Institute for Health Metrics and Evaluation at the University of Washington. The United States had the highest percentage of obese children and young adults at nearly 13 percent, but Egypt had the highest number of adults at 35 percent. Bangladesh had the lowest rates of obese children, and Vietnam the lowest number of adults - in both cases the percentage hovers around 1 percent. The frequency of obesity has doubled in more than 70 countries since 1980, the study said.

Researchers predicted that at the current rise in the incidence of obesity, cancer rates would also escalate. The premise is that being significantly overweight and inactive produces dramatic hormonal and metabolic changes that create the optimum environment for the onset and proliferation of cancer cells. Simply put, the secret to effective and sustained weight control is a five-part process.

1.

Move toward a plant-based diet

- consuming mineral rich foods fulfill the body's need for nutrients and provides lower calorie and higher fiber foods that usually reduce unhealthy cravings

2.

Watch your portion sizes -

condition yourself to eat only when you're hungry and only as much as your body requires. Pausing after each forkful to take a couple of deep breaths will enhance portion consciousness.

3.

Keep physically active -

exercise burns calories, regulates metabolism, relieves stress and may reduce the urge to eat

4.

Go slowly -

crash diets, skipping meals and excessive exercise are usually short-lived and fail 97 percent of the time. A carefully planned program of a gradual weight reduction, focusing on healthy eating and exercising will provide sustained results.

5.

Learn to control our response to life's stresses -

this may play a major role in weight maintenance and uncontrolled cravings and bingeing. It is the regrets of the past and the fears of the future that proliferate much of our unresolved stress. Learning to live in the present can often have a dramatic effect on our ability to reduce stress in our lives.

Achieving and maintaining a healthy body weight is an essential component of cancer prevention and treatment. Gradually reducing body fat and keeping it off is a strong step in the direction to help protect against cancer and assist in its treatment. Although every cancer patient requires an individual nutritional and therapeutic protocol, there are some important general guidelines which may give the body the best chance of preventing or recovering from cancer or other debilitating degenerative diseases.

1. EAT YOUR GREENS, REDS, ORANGES, YELLOWS AND PURPLES

A diet rich in fruits and vegetables is the best bet for preventing cancer. That fact has been supported and endorsed by the U.S. government agencies and by virtually every major medical organization, including the American Cancer Society. Selecting foods of different colors – red, orange, yellow, green and purple – you’ll be getting a full spectrum of compounds that contribute to optimal health and have the greatest potential to protect and possibly even reverse catastrophic diseases like cancer.

The American Institute for Cancer Research reports, “if the only change people made was to eat at least five servings of fruits and vegetables each day, cancer rates could drop by at least 20 percent.” Eating fruit and vegetables are our most natural and absorbable source of vitamins and minerals. This should be our primary sources of these nutrients. Synthetic pills that are produced in a laboratory cannot replace the vitality that real food can offer. These plant-based whole foods containing natural substances are called phytochemicals.

These phytochemicals have demonstrated the potential to modulate cancer development. There are many biologically plausible reasons why consumption of plant foods might slow or prevent the appearance of cancer. These include the presence in plant foods of such potentially anticarcinogenic substances as carotenoids, chlorophyll, flavonoids, indole, isothiocyanate, polyphenolic compounds, protease inhibitors, sulfides, and terpenes. Many experts refer to these compounds as chemo preventers to emphasize their potent anti-cancer effects. While these powerful phytochemicals work in harmony with antioxidants like vitamin C, vitamin E and selenium, they offer even considerably greater protection against cancer.

The specific mechanisms of action of most phytochemicals in cancer prevention are not yet clear, but they appear to be varied. Considering the large number and variety of dietary phytochemicals, their interactive effects on cancer risk may be extremely difficult to assess. Phytochemicals can inhibit carcinogenesis by inhibiting certain cancer-causing enzymes, curtail the mutation of DNA, suppress the abnormal proliferation of early cancerous lesions, and inhibit certain properties of the cancer cell.

Optimally, we should consume at least ten servings of fruits and vegetables each day. Choose a variety of colors of produce to get the most benefit. An orange with breakfast, apple for mid-morning snack, tossed salad and mixed fruit for lunch, raw veggies for an afternoon snack, two types of vegetables for supper and a late-night banana add up to ten.

2. CONSUME THE FATS THAT HEAL

There is indisputable evidence that a diet rich in saturated fats and cholesterol have been linked to cancer. Both the American Cancer Society and the National Cancer Institute recommend a diet that supplies less than 30 percent of dietary calories from fat. Just as important, however, is the type of fat consumed. Along with decreasing total fat intake, it is important to increase the intake of omega-3 fatty acids.

Cancer scientists continue to find cancer-fighting potential in omega-3 fatty acids. Omega-3s are the type of polyunsaturated fat found mainly in fatty fish like salmon and, to a lesser extent, in certain vegetables, nuts, seeds and oils. Human and laboratory studies show evidence that omega-3s may lower cancer risk.

W. Elaine Hardman, Ph.D., a researcher at the Pennington Biomedical Research Center of Louisiana State University explains, “Populations in countries that consume high amounts of omega-3 fatty acids from fish have lower incidences of breast, prostate and colon cancer than in countries that consume less Omega-3s.” In laboratory studies funded by the American Institute for Cancer Research, Hardman has found that supplementing the diet with omega-3s can reduce occurrence of tumors.

Omega-3s may also help cancer therapy’s effectiveness. In other laboratory studies, Dr. Hardman found that adding fish oil to the diet can slow tumor growth, help chemotherapy drugs work more effectively and reduce side effects from other cancer treatments.

Unlike fish oil which is high in omega-3 polyunsaturated fatty acids, fats that are high in omega-6 polyunsaturated fatty acids (like corn oil), can proliferate the growth of tumors. Using a chemical carcinogen-induced cancer model, researchers found that a high intake of fish oil significantly lowered the cancer incidence in animal studies as compared to animals fed either low fat diets or diets high in corn oil. By implanting human tumors into immune-deficient mice, researchers have found that a high fish oil diet can slow tumor growth. These results suggest that fish oil can be used for both prevention and treatment of cancer.

Although there is no clear mechanism to explain fish oil's significant anti-cancer effects, researchers have uncovered several potential models of action:

- Alteration of cell membrane composition. After ingestion, fish oil is easily incorporated into cell membranes (especially tumor cells) which change the cell membrane composition. This alteration will change the cell's response to growth factor, hormones, antibodies, etc.
- Inhibition of prostaglandin production. Prostaglandins can stimulate tumor cell growth. Fish oil can inhibit the enzyme responsible for prostaglandin synthesis called prostaglandin synthase. After a high intake of fish oil, prostaglandin (especially in the tumor cells) is decreased significantly, which in turn slows tumor growth.
- Fish oil can enhance immune system stimulation
- Hormone profile changes, which may provide important benefits for hormone-related cancers like breast cancer
- Tumor cell toxicity, probably by causing lipid peroxidation (or oxidative deterioration) in the tumor cells

One of the big concerns in cancer treatment is metastasis, the process by which tumor cells spread from the primary location to distant parts of the body. Metastasis is increased by a high intake of omega-6 fatty acids (e.g., corn oil), but is inhibited by fish oil. Using an immune deficient mouse implanted with human breast cancer, researchers found that feeding a high fish oil diet (23%) to the mice significantly reduced human breast cancer cell metastasis to the regional lymph nodes and lungs. This indicates the significant beneficial effects of fish oil supplementation in cancer treatment.

Researchers at Allie M. Lee Cancer Research Laboratory at the University of Nevada, Reno, first declared that fish oil supplementation may be of benefit in cancer chemotherapy. By using a human breast cancer model, they found that feeding the animals a high fish oil diet both slowed the tumor growth and increased the tumor responsiveness to chemotherapy drugs by altering the drug activating systems. They also found that a high fish oil diet can significantly protect the host animals against the toxicity of chemotherapy drugs.

3. REDUCE THE EXPOSURE TO PESTICIDES

In the United States, more than 1.2 billion pounds of pesticides and herbicides are sprayed or added to food crops every year. Exposure to these chemicals damages the body's detoxification mechanisms, thereby increasing the risk of getting cancer and other serious diseases.

Let's think about the seriousness of this situation. Farmers in this country live a fairly healthy diet compared to those living in metropolitan areas. They have constant access to fresh fruit and vegetables, they breathe clean air, get plenty of exercise, they have a lower rate of cigarette smoking and significantly less alcohol and drug dependency. Yet studies indicate that farmers have a higher risk of developing leukemias, lymphomas and cancers of the stomach, prostate, brain and skin.

There is also significant evidence that there is a correlation between exposure to pesticides and the risk of non-Hodgkin's lymphoma. This blood cancer currently accounts for about 3 percent of all cancers diagnosed in the United States. As we have recently seen in the Monsanto Roundup Lawsuit, weed killer has been designated as a probable human carcinogen by the World Health Organization (WHO). Farmers, farm workers, landscapers and gardeners who use Roundup or other glyphosate products are at risk for developing non-Hodgkin lymphoma and other forms of cancer. In 1985, the Environmental Protection Agency (EPA) classified glyphosate as a Group C chemical, determining that glyphosate was possibly carcinogenic to humans. This finding was based on early animal studies, which showed increased incidence of cancer in mice exposed to glyphosate. In 1991, however, after heavy lobbying by Monsanto, the EPA re-evaluated the animal data and re-classified glyphosate as a Group E chemical, indicating that there was no evidence that glyphosate herbicides like Roundup causes cancer in humans. This re-classification occurred shortly before Monsanto's launch of Roundup Ready seeds and set the stage for what would become a \$6 billion a year product for Monsanto.

In 1991, Monsanto hired Craven Laboratories to perform various pesticide and herbicide studies, including studies for Roundup. Later that year, the owner of Craven Laboratories and three of its employees were indicted for fraudulent laboratory practices. In 1996, the New York Attorney General filed a Roundup lawsuit against Monsanto for falsely advertising the weed killer as being “safer than table salt” and “practically non-toxic” to mammals, birds and fish. The New York Attorney General alleged in the Roundup lawsuit that Monsanto was falsely telling farmers and agricultural workers that Roundup was non-toxic. On June 20, 2017, six individuals from Wisconsin, Illinois, California, New York, New Jersey, and Florida filed a class action lawsuit against Monsanto alleging the company falsely promoted Roundup as interfering with an enzyme found only in plants, but not “in people or pets.”

There are close to 1,000 cases nationwide claiming Monsanto’s Roundup product was directly responsible for people developing NHL and other forms of cancer. Cases are being heard in the California federal court and in the Missouri and Delaware state courts. The cases against Monsanto are strengthening as the evidence is now concrete. On April 17, 2018, the court held a Final Approval Hearing in relation to the Roundup cases. On May 25, 2018, a Memorandum and Order Granting Final Approval of the Class Settlement was issued. However, Monsanto appealed against this on June 14, 2018, which has resulted in a delay of payments. However, consequences and reverberations are already being felt. This is true not just for Monsanto, but also for all other companies that have used glyphosate in their products. Cheerios, a product manufactured by General Mills, for instance, also contains glyphosate. While few people had looked at the link between glyphosate in food and cancers, now that the Johnson verdict is in, they have started to come forward.

In August of 2018, Consumer Affairs reported that laboratory tests commissioned by the Environmental Working Group (EWG) found oat cereals, oatmeal, granola, and snack bars contain traces of the herbicide. The EWG report said glyphosate showed up in all but two of 45 samples of products made with conventionally grown oats. Nearly 75 percent of the samples in the study had glyphosate levels higher than what EWG scientists consider protective of children’s health. The chemical even showed up in several samples of organic oats.

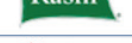
Anresco Laboratories in San Francisco, an FDA-registered food safety lab, recently conducted their own research to see whether glyphosate can be found in commonly consumed processed foods. And their tests revealed the worst. Previous research has shown that glyphosate or glyphosate residues of only 0.05 parts per billion (ppb) can cause damage to at least 4,000 genes, while 10 ppb may cause serious health effects, such as kidney and liver damage. Anresco’s results, however, indicated that some of the tested foods had up to 1,000 times that amount.

The testing and analysis were requested by Food Democracy Now! and The Detox Project, who bundled the results in a 29-page report called “[Glyphosate: UNSAFE ON ANY PLATE.](#)” According to the report, U.S. regulators currently allow a very high level of daily glyphosate residues in our food. The authors hope their report can serve as a strong wake-up call for all Americans to reconsider their consumption of some of their favorite processed foods.

Furthermore, Food Democracy Now! has called for a federal investigation into the damaging effects of glyphosate and the relationships between the industry and the regulators that allow these toxins to end up in our food chain.

Below you'll find an overview of common brand names and the amount of glyphosate that was found in some of their products, with General Mills Cheerios topping the list with an astonishing 1,125.3 ppb.

Glyphosate Food Testing Results: (in parts per billion – ppb)

General Mills		
	Original Cheerios	Glyphosate - 1,125.3 ppb AMPA - 26.4
	Honey Nut Cheerios	Glyphosate - 670.2 ppb AMPA - 14.5
	Wheaties	Glyphosate - 31.2 ppb
	Trix	Glyphosate - 9.9 ppb
	Gluten Free Bunny Cookies Cocoa & Vanilla	Glyphosate - 55.13* ppb
Kellogg's		
	Corn Flakes	Glyphosate - 78.9 ppb
	Raisin Bran	Glyphosate - 82.9 ppb
	Organic Promise**	Glyphosate - 24.9 ppb
	Special K	Glyphosate - 74.6 ppb
	Frosted Flakes	Glyphosate - 72.8 ppb
	Cheez-It (Original)	Glyphosate - 24.6 ppb
	Cheez-It (Whole Grain)	Glyphosate - 36.25* ppb
	Soft-Baked Cookies, Oatmeal Dark Chocolate	Glyphosate - 275.58* ppb
Nabisco		
	Ritz Crackers	Glyphosate - 270.24 ppb
	Triscuit	Glyphosate - 89.68 ppb
	Oreo Original	Glyphosate - 289.47* ppb

Food Democracy Now! Glyphosate: Unsafe on Any Plate

5

Chart source: Food Democracy Now! – Glyphosate: UNSAFE ON ANY PLATE.

While pesticides may increase risk, they are not necessarily the only factor involved. The presence of pesticides should not deter us from eating fruit and vegetables. As a matter of fact, the levels of pesticides are lower in these foods than in those found in animal fats, meat, cheese, whole milk and eggs. Additionally, the antioxidants found in fruits and vegetables are necessary to help the body deal with the pesticides.

Here are some recommendations to reduce exposure of pesticides:

- Don't over consume animal fats, non-organic eggs and conventional dairy products
- Buy organic products when possible
- Peel skin from outer layers (which also contain many nutrients) or wash produce thoroughly with a biodegradable cleanser, then rinse

4. AVOID FOODS THAT CREATE A "NUTRITIONAL DEBT"

Imagine that you just got a new job and, after completing your first 40-hour work week, your boss approaches you with some bad news. "The company isn't doing very well and we, unfortunately, don't have enough money to pay you." This is analogous to our refined, high calorie, low nutrient junk food diet. Our body must expend energy to digest food that offers little in return, robbing us of the vitamins, minerals, phytonutrients and enzymes that we need to perform all of our physiological functions optimally.

Beware of foods high in sugars, refined flours, excess sodium, artificial sweeteners, trans or hydrogenated fats, corn syrups and deep fried anything. Reach instead for the "good stuff." A diet high in nutrient dense foods will protect immune response, heighten energy production, enhance mood, and balance blood sugar and insulin levels, all of which may reduce our risk of developing cancer.

Some guidelines for making better nutritional choices include:

- Read labels. If sugar, partially-hydrogenated fat, salt or "enriched flour" is listed as one of the first several ingredients, don't buy it. If your foods are naturally rich in nutrients, they don't need to be enriched, salted, sweetened or hydrogenated. Look for grain products that contain 3 grams of fiber or more per serving.
- Be aware of ingredients such as sucrose, glucose, maltose, lactose, fructose, corn syrup or white grape juice concentrate, which indicates that sugars have been added
- Look for the percentage of fat calories to total calories, as well as the number of fats grams per serving. For every 5 grams of fat in a serving, you are eating the equivalent of one teaspoon of fat.

5. REDUCE ANIMAL PRODUCTS

One basic truth that seems to be confirmed from study to study is the fact the higher the intake of meat and other animal foods, the higher the cancer risk, especially for the major cancers, such as colon, breast, prostate and lung cancers.

According to noted naturopath Dr. Michael Murray, there are many reasons for this association. "Meat," Dr. Murray explains, "lacks the antioxidant and phytochemicals that protect us from cancer. At the same time, it contains lots of saturated fat and other potentially carcinogenic compounds - including pesticide residues, heterocyclic amines and polycyclic aromatic hydrocarbons, which form when meat is grilled, fried or broiled. The more well done the meat, the higher the level of amines."

While there is significant controversy, the actual risks associated with a diet high in animal products is associated with our demand for tender cuts of meat, which have compromised the nutritional value and safety of our animal food supply. Grain-fed cattle are tortured and restrained in tiny cubicles, injected with hormones and fed an unnatural grain and dairy diet. These measures have altered the fat composition of domestic cattle. Domestic beef contains primarily saturated fats and virtually no beneficial omega-3 fatty acids, while the fat of range-fed or wild animals contain more than five times the polyunsaturated fat per gram and has substantial amounts (about 4 percent) of omega-3 fatty acids.

Some sensible guidelines in choosing animal products include:

- Limit daily portions to about the size of the palm of your hand
- Avoid overcooked, charbroiled, deep-fried or overly-fatty meats
- Read labels and avoid meats preserved with nitrates, nitrites or msg
- Buy organic grass-fed, free-range poultry, beef, buffalo, ostrich or venison
- Only consume organic eggs from free-range chickens

6. SELECT FOODS AND SPICES THAT WILL HELP DETOXYFY THE BODY

The National Cancer Institute estimates that roughly one-third of all cancer deaths may be diet related. What you eat can hurt you, but it can also help you. Many of the common foods found in grocery stores or organic markets contain cancer-fighting properties, from the antioxidants that neutralize the damage caused by free radicals to the powerful phytochemicals that scientists are just beginning to explore. There isn't a single element in a particular food that does all the work. The best thing to do is eat a variety of foods.

The following foods have the ability to detoxify the body, help stave off cancer and some can even help inhibit cancer cell growth or reduce tumor size:

- **Apples** are a good source of fiber and vitamin C. Most of the antioxidant power they provide comes from phytochemicals including: Quercetin (a flavonoid that shows anti-inflammatory and antioxidant properties), other flavonoids including epicatechin, and in red apples, anthocyanins, and triterpenoids are found especially in apple peel.
- **Avocados** are rich in glutathione, a powerful antioxidant that attacks free radicals in the body by blocking intestinal absorption of certain fats. They also supply even more potassium than bananas and are a strong source of beta-carotene. Scientists also believe that avocados may also be useful in treating viral hepatitis (a cause of liver cancer), as well as other sources of liver damage.

- **Blueberries** are an excellent source of vitamins C & K, manganese, and a good source of dietary fiber. Blueberries are among the fruits highest in antioxidant power, largely due to their many phytochemicals including anthocyanins, catechins, quercetin, kaempferol, and other flavonoids, ellagitannins and ellagic acid, and pterostilbene and resveratrol.
- **Broccoli, green & red cabbage, kale, collard greens, brussel sprouts, rapini, and cauliflower** have a chemical component called indole-3-carbinol that can combat breast cancer by converting a cancer-promoting estrogen into a more protective variety. Broccoli, especially sprouts, also have the phytochemical sulforaphane, a product of glucoraphanin - believed to aid in preventing some types of cancer, like colon and rectal cancer. Sulforaphane induces the production of certain enzymes that can deactivate free radicals and carcinogens. The enzymes have been shown to inhibit the growth of tumors in laboratory animals. However, be aware that the Agriculture Department studied 71 types of broccoli plants and found a 30-fold difference in the amounts of glucoraphanin. It appears that the more bitter the broccoli, the more glucoraphanin it contains. Broccoli sprouts have been developed under the trade name BroccoSprouts that have a consistent level of sulforaphane - as much as 20 times higher than the levels found in mature heads of broccoli. Broccoli, brussels sprouts, cauliflower and rapini are all excellent sources of folate, a B vitamin, while Broccoli and Brussels sprouts are good sources of dietary fiber and rich in magnesium. Broccoli, Brussels sprouts and rapini contain carotenoids such as beta-carotene. Red cabbage and radishes supply anthocyanins. Other cruciferous vegetables provide different polyphenols, such as hydroxycinnamic acids, kaempferol and quercetin.
- **Carrots** contain a lot of beta carotene, which may help reduce a wide range of cancers including lung, mouth, throat, stomach, intestine, bladder, prostate and breast. A substance called falcarinol that is found in carrots has been found to reduce the risk of cancer, according to researchers at Danish Institute of Agricultural Sciences (DIAS). Kirsten Brandt, head of the research department, explained that isolated cancer cells grow more slowly when exposed to falcarinol. This substance is a polyacetylen, however, so it is important not to cook the carrots.
- **Cayenne (Red Pepper)** contains a chemical, capsaicin, which may neutralize certain cancer-causing substances (nitrosamines) and may help prevent cancers such as stomach cancer.

- **Cherries** are a good source of fiber and vitamin C, and they contain potassium. Tart cherries, but not sweet cherries or tart cherry juice, are also an excellent source of vitamin A. Cherries contain a variety of phytochemicals contributing both color and antioxidant activity: The fruit's dark red color comes from their high content of anthocyanins, which are antioxidants. Hydroxycinnamic acid and perillyl alcohol, a phytochemical from the monoterpene family, provide cherries' antioxidant power. Both sweet and tart cherries supply these antioxidant substances, though tart cherries contain more. The antioxidants in cherry juice and dried cherries (both unsweetened and sweetened) are similar to fresh cherries, according to available data. Frozen cherries' antioxidant content is somewhat lower. Canned cherries' decreases further but remains significant.
- **Coffee** varies with how the beans are grown and how you prepare it. Overall, coffee is a good source of the B vitamin riboflavin and is also a concentrated source of antioxidant phytochemicals. Coffee contains chlorogenic acid, an antioxidant compound that is the major phenol in coffee, Quinic acid, a phytochemical that contributes to the acidic taste of coffee, Cafestol and kahweol, compounds that are extracted from the beans' oil during brewing. Unfiltered coffee, such as French press or boiled coffee, contains these compounds, and N-methylpyridinium (NMP), created by roasting, may make the antioxidants more potent. Chlorogenic acid may be slightly lower in decaf coffee according to limited research, but it still contains plenty of phytochemicals. Lab studies suggest that instant may be lower in antioxidant potency than brewed coffee, though more research is needed.
- **Cranberries** are good sources of vitamin C and dietary fiber. They're very high in antioxidant power, most of which comes from phytochemicals: flavonoids, including anthocyanins, proanthocyanidins and flavonols, benzoic acid and hydroxycinnamic acid and ursolic acid.
- **Figs** apparently have a derivative of benzaldehyde. It has been reported that investigators at the Institute of Physical and Chemical Research in Tokyo say benzaldehyde is highly effective at shrinking tumors. Fig juice, additionally, is also a potent bacteria killer in test tube studies.
- **Flax** contains lignans, which may have an antioxidant effect and block or suppress cancerous changes. Flax is also high in omega-3 fatty acids, which are thought to protect against colon cancer and heart disease.
- **Garlic** has immune-enhancing allium compounds (diallyl sulfides) that appear to increase the activity of immune cells that fight cancer and indirectly help break down cancer causing substances. These substances also help block carcinogens from entering cells and slow tumor development. Diallyl sulfide, a component of garlic oil, has also been shown to render carcinogens in the liver inactive. Studies have linked garlic, as well as onions, leeks and chives to a lower risk of stomach and colon cancer. According to a report in the October 2000 issue of the American Journal of Clinical Nutrition, people who consume raw or cooked garlic regularly face about half the risk of stomach cancer and two-thirds the risk of colorectal cancer as people who eat little or none. Their studies didn't show garlic supplements had the same effect. It is believed garlic may help prevent stomach cancer because it has anti-bacterial effects against a bacterium, helicobacter pylori, found in the stomach and known to promote cancer there.
- **Grapefruits**, like oranges and other citrus fruits, contain monoterpenes, believed to help prevent cancer by sweeping carcinogens out of the body. Some studies show that grapefruit may inhibit the proliferation of breast-cancer cells in vitro. Grapefruits also contain beta-carotene and lycopene (pink and red varieties). **Grapefruit can interfere with the activity of some medicines, both prescription and non-prescription.**

- **Grapes, red** contain bioflavonoids, powerful antioxidants that work as cancer preventives. Grapes are also a rich source of resveratrol, which inhibits the enzymes that can stimulate cancer cell growth and suppress immune response. They also contain ellagic acid, a compound that blocks enzymes that are necessary for cancer cells - this appears to help slow the growth of tumors. Both grapes and grape juice are rich sources of **resveratrol**, a type of natural phytochemical that belongs to a much larger group of phytochemicals called **polyphenols**. The skin of the grape contains the most resveratrol, and red and purple grapes contain significantly more resveratrol than green grapes. Grape jam and raisins contain much smaller amounts of this phytochemical. Red wine also contains resveratrol. However, with AICR's second expert report noting convincing evidence that alcohol is associated with increased risk for cancers of the mouth, pharynx and larynx, esophagus, breast (pre- and postmenopausal) and colon and rectum (in men), wine is not a recommended source of resveratrol. Studies suggest that polyphenols in general and resveratrol possess potent antioxidant and anti-inflammatory properties. In laboratory studies, resveratrol prevented the kind of damage known to trigger the cancer process in cell, tissue and animal models. Other laboratory research points to resveratrol's ability to slow the growth of cancer cells and inhibit the formation of tumors in lymph, liver, stomach and breast cells. Resveratrol has also triggered the death of leukemic and colon cancer tumors. In one series of studies, resveratrol blocked the development of skin, breast and leukemia cancers at all three stages of the disease (initiation, promotion and progression).
- **Green tea** has been used since ancient times as both beverage and medicine. Both black and green teas contain numerous active ingredients, including polyphenols and flavonoids, which are potent antioxidants. One class of flavonoids called catechins has recently become the focus of widespread study for their anti-cancer potential. Tea is the best source of catechins in the human diet, and green tea contains about three times the quantity of catechins found in black tea. In laboratory studies, green tea has been shown to slow or completely prevent cancer development in colon, liver, breast and prostate cells. Other studies involving green tea have shown similar protective effects in tissues of the lung, skin and digestive tract. Studies that track the diets of human subjects over several years (particularly studies conducted in Asia, where green tea consumption is common) have also associated regular usage of green tea with lower risk for bladder, colon, stomach, pancreatic and esophageal cancers.
- **Kale** has indoles; nitrogen compounds which may help stop the conversion of certain lesions to cancerous cells in estrogen-sensitive tissues. In addition, isothiocyanates, phytochemicals found in kale, are thought to suppress tumor growth and block cancer-causing substances from reaching their targets.
- **Licorice root** has a chemical, glycyrrhizin that blocks a component of testosterone and, therefore, may help prevent the growth of prostate cancer. Excessive quantities of licorice, however, may cause high blood pressure.
- **Mushrooms** appear to help the body fight cancer and build the immune system - they include: Shiitake, maitake, reishi, Agaricus blazei Murill, and Coriolus Versicolor. These mushrooms contain polysaccharides, especially lentinan, powerful compounds that help in building immunity. They are a source of Beta Glucan. They also have a protein called lectin, which attacks cancerous cells and prevents them from multiplying. They also contain Thiopoline. These mushrooms can stimulate the production of interferon in the body.
- **Nuts** contain the antioxidants quercetin and campferol that may suppress the growth of cancers. Brazil nuts contain 80 micrograms of selenium, which is important for those with prostate cancer.
- **Oregano**, as reported in the Journal of Agriculture and Food Chemistry has the potential to destroy human cancer cells. Additionally, oregano has powerful antioxidant properties, due in large part to its rosmarinic acid (RA) content. Oregano oil increases oxygen levels in the blood, giving more energy, better athletic performance and mental clarity.
- **Papayas** have vitamin C that works as an antioxidant and may also reduce absorption of cancer-causing nitrosamines from the soil or processed foods. Papaya contains folacin (also known as folic acid), which has been shown to minimize cervical dysplasia and certain cancers.

- **Raspberries** contain many vitamins, minerals, plant compounds and antioxidants known as anthocyanins that may protect against cancer. According to a recent research study reported by Cancer Research 2001;61:6112-6119, rats fed diets of 5% to 10% black raspberries saw the number of esophageal tumors decrease by 43% to 62%. A diet containing 5% black raspberries was more effective than a diet containing 10% black raspberries. Research reported in the journal Nutrition and Cancer in May 2002 shows black raspberries may also thwart colon cancer. Black raspberries are rich in antioxidants, thought to have even more cancer-preventing properties than blueberries and strawberries.
- **Rosemary** may help increase the activity of detoxification enzymes. An extract of rosemary, termed carnosol, has inhibited the development of both breast and skin tumors in animals. We haven't found any studies done on humans. Rosemary can be used as a seasoning. It can also be consumed as a tea: Use 1 tsp. dried leaves per cup of hot water; steep for 15 minutes.
- **Seaweed and other sea vegetables** contain beta-carotene, protein, vitamin B12, fiber and chlorophyll, as well as chlorophyllones - important fatty acids that may help in the fight against breast cancer. Many sea vegetables also have high concentrations of the minerals: potassium, calcium, magnesium, iron and iodine.
- **Soy** is one of the few plant foods with all the amino acids your body needs to make protein. You may see claims on food packages linking soy protein to lower risk of coronary heart disease. Because soy contains estrogen-like compounds, there is fear that soy may raise risk of hormone-related cancers. Soy's possible effects on health are an active area of research. Soy foods are good sources of protein, and many are also good sources of fiber, potassium, magnesium, copper and manganese. Soy foods contain significant iron, but it's not clear how well our bodies absorb it. Soymilk, tofu made with calcium, and soybeans are good sources of calcium. Soy is also a good source of polyunsaturated fat, both the omega-6 (linoleic acid) and omega-3 (alpha-linolenic) types. Soy contains a variety of phytochemicals and active compounds: Isoflavones: a group of phytoestrogens that includes genistein, daidzein and glycitein, Saponins: studies suggest these compounds may lower blood cholesterol, protect against cancer and affect blood glucose levels, Phenolic Acids: this group of phytochemicals is being studied for their potential to stop cancer cells from spreading, Phytic Acid: commonly found in cereals and legumes, it can act as an antioxidant, Enzyme-regulating proteins: these include protease inhibitors and protein kinase inhibitors, and Sphingolipids: they seem to play a role in regulating cell growth, self-destruction of abnormal cells and progression of tumors.
- **Sweet potatoes** contain many anti-cancer properties, including beta-carotene, which may protect DNA in the cell nucleus from cancer-causing chemicals outside the nuclear membrane.
- **Tomatoes** contain lycopene, an antioxidant that attacks roaming oxygen molecules, known as free radicals that are suspected of triggering cancer. It appears that the hotter the weather, the more lycopene tomatoes produce. They also have vitamin C, an antioxidant which can prevent cellular damage that leads to cancer. Watermelons, carrots and red peppers also contain these substances, but in lesser quantities. It is concentrated by cooking tomatoes (tomato paste being the richest source). Scientists in Israel have shown that lycopene can kill mouth cancer cells. An increased intake of lycopene has already been linked to a reduced risk of breast, prostate, pancreas and colorectal cancer. (Note: Recent studies indicate that for proper absorption, the body also needs some oil along with lycopene.)

- **Tumeric** (*curcuma longa*), a member of the ginger family, is believed to have medicinal properties because it inhibits production of the inflammation-related enzyme cyclooxygenase 2 (COX-2), levels of which are abnormally high in certain inflammatory diseases and cancers, especially bowel and colon cancer. In fact, a pharmaceutical company, Phytopharm, in the UK, hopes to introduce a natural product, P54 that contains certain volatile oils, which greatly increase the potency of the turmeric spice.
- **Turnips** are said to contain glucose molecules which is a cancer fighting compound.
- **Walnuts** - black walnuts are American natives, but English walnuts have become one of the most popular nuts in the United States. Although all nuts fit into a cancerpreventive diet, walnuts are most studied for cancer. They contain the omega-3 fat – alpha-linolenic acid, which can make walnuts more susceptible to becoming rancid. That's why you won't find them in most commercial nut mixes. Walnuts contain high amounts of polyphenols, phytochemicals that have antioxidant properties. They also contain a broad range of other potentially protective compounds: phytosterols, plant compounds known to help lower blood cholesterol that are under study for their potential antioxidant and anti-inflammatory effects in the body. They also contain melatonin, a hormone and antioxidant. Walnuts are an excellent source of copper and manganese, and a good source of magnesium.
- **Water** is essential for life. The average amount of water in the body is about 10 gallons. We need to drink at least 48 ounces of water per day to replace the water that is lost through urination, sweat and breathing. Pure water is a universal detoxifier. In the body, it helps to remove waste materials and clear out toxins. It also helps carry oxygen and nutrients to all cells. Maintaining proper body hydration provides a foundation for both health and wellness.

- **Whole grains** are good sources of fiber and magnesium and provide some protein. Individual whole grains vary; several types are also good sources of manganese, thiamin, niacin, vitamin B-6 and/or selenium. A variety of healthful compounds in whole grains combine to make these foods high in potential anti-cancer activity. Phytic acid, present in grains and legumes, is being studied in the prevention of cancer and protease inhibitors may prevent cancer cells from spreading.
- **Winter squash** are excellent sources of vitamin A, good sources of vitamin C and dietary fiber. They are also a good way to get potassium. Winter squash, including pumpkins, are rich in carotenoids, including beta-carotene and alpha-carotene: these carotenoids can act as antioxidants. Also, our bodies convert these to vitamin A, a nutrient important for immune function and maintaining healthy cells among other roles. They also contain lutein and zeaxanthin: these yellow pigmented carotenoids help protect eye health by filtering high-energy ultraviolet rays that can damage our eyes' lens and retina. They act as antioxidants here and possibly elsewhere in our bodies.



**BECOME A
NATURAL NUTRITION
COACH® NNC**

- Are you interested in *natural nutrition* that nourishes your body?
- Do you like the concept of eating a cleaner, healthier, whole foods diet?
- Would you like to connect with your clients on a deeper level?
- Add Nutrition Consulting to your new or existing Fitness, Health, or Coaching practice to increase your revenue?
- You would like to bring meaningful and long-lasting change to your clients overall health and well-being, with a total mind/body approach.

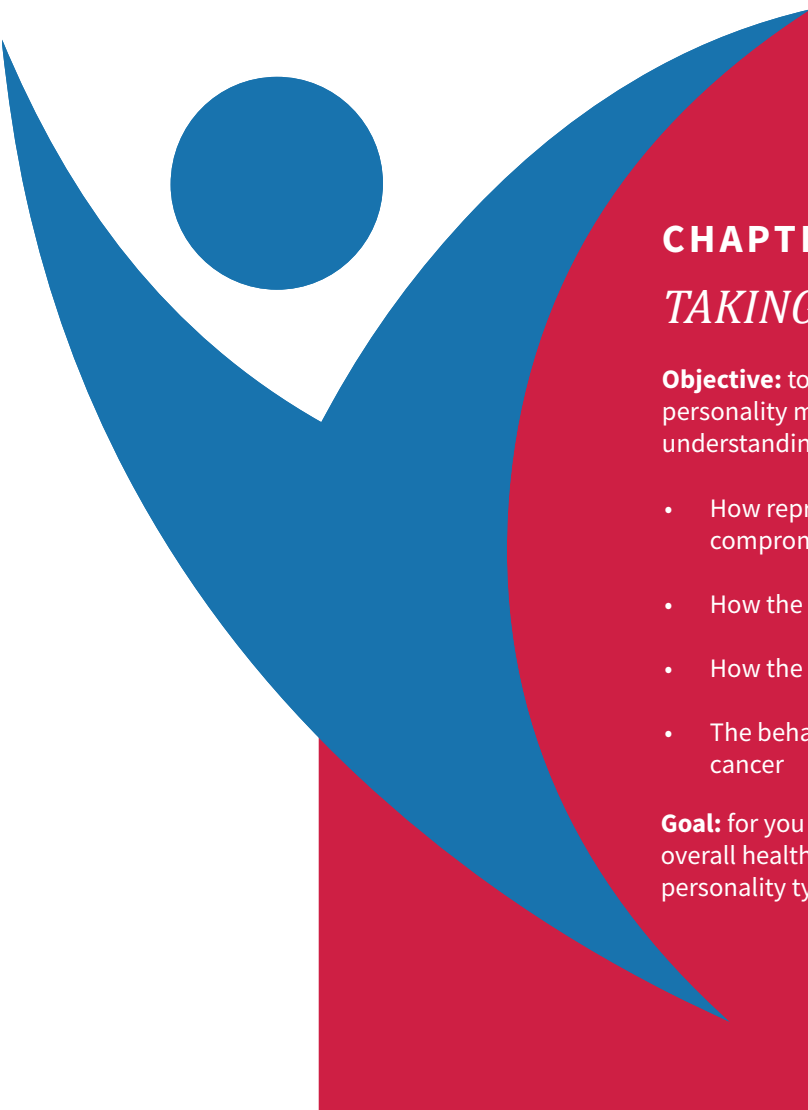
Visit **ceti.teachable.com** for more information!

SUPPLEMENTAL INSURANCE FOR PREVENTING CANCER

Dietary supplements are secondary to a sound diet plan because we can't guarantee that even the best diet offers the optimum nutrients our bodies need. Depleted soils, environmental toxins, impure water, physical demands and psychological stresses heighten our nutritional requirements.

The following few supplements are some of the key recommendations which may significantly reduce the risk of cancer:

- **A food-based, multiple vitamin and mineral**, especially one that offers adequate levels of anti-oxidants, serves as insurance against major nutrient deficiencies. Being food-based, they generally include important phytonutrients and detoxifying enzymes. Additionally, having a natural food base enhances its absorbability.
- **Green drinks** are made by drying the juice from one or more of several plants. As these plants are typically 90% water, the usual serving (1/2 ounce or 20 capsules) of the green powder roughly equals one serving of a green vegetable. An extra serving of green vegetable each day doesn't sound like much, but on average, we Americans eat only two servings per day. As mentioned above, according to the National Cancer Institute, even a small increase in vegetable intake would reduce the risk of ovarian cancer, for instance, by about 20%. Chlorophyll is the substance all green drinks have in common.
- **Chlorophyll** structure is almost identical to hemoglobin, except chlorophyll has a magnesium atom where hemoglobin has an iron atom. Our bodies require magnesium to utilize the energy we obtain from our food, and chlorophyll from plants is an important dietary source of this essential mineral. The plants most often used to make green drinks are two single-cell organisms, chlorella and spirulina, and the young leaves of alfalfa, barley or wheat. Besides being rich sources of magnesium, these plants supply reasonable amounts of protein, vitamin E, and essential fatty acids such as gamma linolenic acid, an essential fatty acid that is hard to obtain in the typical American diet. Just as it is prudent to consume a varied diet, it is sensible to use a mixture of the dried greens. A wide variety of other foods are often mixed in with several of green foods, which is okay if the greens are the main ingredient. In addition to known nutrients, chlorella also has something called Chlorella Growth Factor that may aid in human tissue repair. Researchers have also described complex sugars in chlorella that are 100 and 1,000 times more powerful than those currently used clinically for cancer immunotherapy. These complex sugars appear to be cell-to-cell messenger chemicals that stimulate white cells. It is less expensive and tastier, no doubt, to acquire nutrients from whole foods, but if your lifestyle makes it prohibitively difficult to eat as you should, we are fortunate that in America another option exists.
- **Probiotics** or beneficial bacteria can alter certain enzymes that turn procarcinogens into carcinogenic agents. The "bad" bacteria that secrete these destructive enzymes include clostridium and certain bacteroides, among others. Obviously, the more dangerous enzymes that are present in our gastrointestinal tract, the greater our risk harboring cancer-causing substances. The ability of these active super strains of beneficial bacteria that can neutralize these harmful enzymes is one of the most important contributions to cancer prevention. The immune system's workload is further complicated by the need to cleanse the body of an increasing number of extraneous pollutants and contaminants found in the environment and the food chain. Overloaded with work, the immune system needs all the help it can get from our friendly bacteria. When disease-causing agents can permeate the intestinal walls and enter the bloodstream, the immune system must spring into action. If strong colonies of friendly bacteria line the intestinal tract in full force, these harmful microorganisms will not be able to get through, thus lightening the already heavy workload of the immune system. Through scientific research, it has been determined that friendly bacteria can reduce the threat of potential cancer-causing agents in the body and increase the body's immune system to transform these agents into inactive carcinogens. Some cancer risk factors are under our control, especially diet. Supplementing the diet with probiotics, in addition to healthy dietary choices, is one way to help lower our risk of getting cancer. Additional supplements should be recommended, by your healthcare practitioner, on a case-by-case basis. The information contained in this chapter is for educational purposes only and should not be deemed medical advice. These ideas are not intended to replace the advice of a qualified healthcare practitioner. Neither the authors of this book or the publisher shall be liable or responsible for any loss, injury or damage allegedly arising from any information or suggestions in this book.



CHAPTER NINE

TAKING CONTROL OF YOUR EMOTIONS

Objective: to understand how repressed emotions and a Type-C personality may increase one's risk of cancer. You will gain an understanding of:

- How repressed emotions, particularly anger, may compromise the immune system
- How the body can heal itself
- How the mind and body work together to fight “dis-ease”
- The behaviors of patients who have successfully fought cancer

Goal: for you to understand the critical role that emotions play in our overall health and well-being and ways to help transform the Type-C personality type.

TAKING CONTROL OF YOUR LIFE AND HEALTH IS ESSENTIAL FOR THE HEALING PROCESS

We all know that cancer can be caused by genetic mutations, environmental toxins, bacteria, viruses, or cellular breakdown. We know to avoid sugar and alcohol, exercise more, don't use artificial sweeteners, etc. Western medicine, however, does not look at the entire person; body, mind, and spirit which plays a pivotal role in the breakdown of the immune system as well as the body's ability to heal itself. We must learn to manage stress, deal with repressed emotions, resentment, and anger, and forgive ourselves and others.

In order to begin the healing/fighting process we must take an active role in our own health. This involves making significant changes in our lives and acquiring a mental toughness that will allow us to overcome whatever resistance might be encountered. Change is difficult, but we need to take a serious look at our past habits (eating, sleeping, drinking, stress management, etc.) and ask ourselves if these could have contributed to our bodies' "dis-ease." Dis-ease does not have to be cancer. It can be constant colds, fatigue, lethargy, food allergies, etc.

We have been trained to take our doctor's word as gospel; afraid to ask questions or second-guess their expertise. In Western medicine doctors usually give us standard tests to either establish or rule-out a disease or pathology and we are then treated with pills or surgery to cure what ails us. We are considered to be 'annoying' if we ask too many questions or, God forbid, want to try an alternative therapy. Of course, this does not apply to all medical doctors, but I think we can all relate to this situation. I have seen this recently with my mom's oncologist who told her not to exercise and when she asked about second opinions or alternative treatments, he became indifferent with her.

The body has an amazing power to heal itself if we give it the means to do so. Most of us are familiar with type A & B personality types, but have you ever heard of Type-C? Type-C personality-types have a psychological disposition whereby they seem quiet and thoughtful but are in fact frustrated and angry^{87,200}. A person with a typical Type-C personality appears to lack emotions, does not usually assert themselves, and wants to pacify others^{87,200}. According to Dr. Lydia Temoshok, Director of The Behavioral Medicine Program, Biotechnology Institute - University of Maryland Medical School and Co-Author, The Type C Connection: The Mind-Body Link to Cancer and Your Health, Type-C personality types are "Out of touch with their primary needs and emotions, they look to others for signals on how to think, feel and act." Dr. Temoshok uncovered a profound relationship between repressed emotions and the depression of the immune system which, of course, is our first line of defense against cancer^{87,200}. We all have stress in our lives; it is how we handle that stress that is the determining factor of the state of our health and immune system. **In Dr. Temoshok's studies, she found that the patients she evaluated exhibited most or all of the following behaviors^{87,200}:**

- They did not express emotion and were often unaware of any feelings of anger; past or present
- They tended to not experience or express any other negative emotions such as fear, anxiety, or sadness
- They were patient, unassertive, cooperative, and appeasing with work, social and family relationships and also compliant with external authority
- They were overly concerned with meeting others' needs and insufficiently engaged in meeting their own needs. They were often self-sacrificing to an extreme.

She also observed and scientifically verified the following facts^{87,200}:

- Patients who were more emotionally expressive had thinner tumors, more slowly dividing cancer cells, and a much higher number of lymphocytes (immune cells) invading the tumor
- Patients who were less emotionally expressive had thicker tumors, more rapidly dividing cancer cells, with far fewer lymphocytes invading the tumor

It's very easy to blame ourselves for illness... If only I would have exercised more, eaten better, not gotten so upset over every little thing, avoid alcohol, etc. Many people are truly ill-advised, or completely uneducated, about the proper way to take care of themselves. Then of course, you have those that either think they are invincible or just don't care. Placing blame is not going to help their situation. Those with Type-C personality types are already prone to self-blame and guilt ^{87,200}. By helping patients recognize the traits and coping mechanisms that they probably developed as children, we may be able to help them to transform their lives on many levels.

Dr. Temoshok explains the difference between repression (unconscious and unaware) and suppression (knowledge of the anger, but choosing not to express it), which is generally not as destructive to the immune system ^{87,200}. She says that repression of the emotion of anger is a primary psychological defense mechanism with cancer patients ^{87,200}. If we can help people to simply "accept" the way things are, it can actually become a positive force in one's life to help facilitate external and internal change ^{87,200}.

The key is to express it appropriately and allow it to be released; not dealing with anger and frustration allows it to fester within ourselves, eating away at us over time ^{87,200}. Dr. Temoshok states "We must evaluate the contribution that factors such as forgiveness may have on health, both across the board and for those already afflicted with serious and chronic life-threatening conditions ^{87,200}. Some people will need to take time to process and express old angers and resentments, while some, will be able to leap directly into forgiveness and release." ^{87,200}

Temoshok's book also outlines theories and processes to shift Type-C behavior patterns ^{87,200}. She calls it "Type C: Transformation for Recovery." **The basics of the Type-C transformation process include nine goals tailored specifically for cancer patients** ^{87,200}:

- To develop awareness of your needs
- To discover your inner guide
- To reframe your ideas about your feelings
- To learn the skills of emotional expression with doctors, nurses, friends & family members
- To take charge of your medical care
- To get the social support you need
- To secure your legitimate rights
- To work through hopelessness
- To cultivate fighting spirit

One of the original and most highly-regarded pioneers in the field of integrative cancer treatment, Dr. Douglas Brodie, author of *Understanding the Cancer Personality and Its Importance in Healing*, has treated thousands of cancer patients over the course of 28 years ⁸⁷. He observed that there were certain personality traits and stressors that were consistently present in these patients ⁸⁷. Typical of the cancer-susceptible personality is the long-standing tendency to suppress "toxic emotions," particularly anger ⁸⁷. Usually starting in childhood, this individual has held in his/her hostility and other unacceptable emotions. A commonality between these patients is that they have feelings of rejection by one or both parents ⁸⁷. Whether or not these feelings are legitimate, it is the patients' perception of rejection that matters, and this results in detachment and resentment with the "rejecting" parent or parents, followed later in life by a similar lack of closeness with spouses and others with whom close relationships would normally develop ⁸⁷. Many people at higher risk for cancer are fraught with feelings of loneliness and isolation as a result of a lack of affection and acceptance earlier in life, even if this is merely their own perception ⁸⁷. These people have an unusual need for approval and acceptance ⁸⁷. They tend to be people-pleasers and develop a very high sensitivity to the needs of others while denying their own emotional needs ⁸⁷.

It is absolutely essential that cancer patients reject the notion that death from cancer is inevitable, and the belief that conventional medicine offers the only hope for survival⁸⁷. Dr. Brody offers the following success factors that are consistent features or attributes distinguishing the successful cancer survivors from those who are less successful. **The successful cancer patients, by and large, are those who are⁸⁷:**

- 
1. Willing and able to reverse a stressful lifestyle, to reduce heavy obligations, burdens and anxieties, and who learn to say "No" to those who would lay burdens upon them
 2. Aware of the critical importance of spiritual growth and having faith in God or their concept of a Higher Power
 3. Ready and eager to take charge of their own health care, to study in depth the various alternatives, and to make dietary and other changes in their physical lifestyle
 4. Able to reject the idea that the diagnosis of cancer automatically means death and that conventional treatment offers the only hope
 5. Willing to accept responsibility for the behavioral factors which led to the disease, to submit to self-assessment, and to make the necessary adjustments and corrections to eliminate these factors
 6. Prepare to abandon destructive and "toxic" emotions such as fear, anger, resentment, guilt and self-pity, replacing these with such positive emotions as hope, love, forgiveness, gentleness, confidence and faith
 7. Able to overcome inhibitions, particularly learned restraints which may have prevented full sexual gratification, allowing guiltless and total fulfillment

"The surviving cancer patient has a healthy skepticism of the conventional approach to cancer, and questions all of the premises of that approach. He/she is eager to study in depth all treatment modalities without prejudice, then to follow the chosen course or courses with dedication, discipline and common sense." – Dr. Douglas Brody

CHAPTER TEN

WORKING WITH THE MEDICAL COMMUNITY

Objective: to assist you in bridging the gap and becoming the next step in the healthcare continuum. You will gain an understanding of:

- How to set up meetings with medical professionals
- How to get free publicity
- How to build a relationship with medical professionals and get referrals
- How to position yourself as a local expert in oncology exercise

Goal: to create a network of health and fitness professionals that work together to ensure the best outcome for cancer patients and survivors.

As Cancer Exercise Specialists, we want to become the next step in the health care continuum. This means that we need to gain the respect of the health care providers, so they feel comfortable referring their clients to us for care. If you want to establish a new cancer recovery program independently or as part of your facility, you must create an awareness amongst your medical community. Once the medical professionals in your area recognize the need for such invaluable services, they will be more likely to “get on board” and give you referrals. You must be able to communicate the benefits of your program and explain how the cancer clients/survivors will benefit from participating in such a program. Our goal as Cancer Exercise Specialists is to solve a problem; help cancer clients/survivors who are suffering from the side-effects of surgery and treatment, take control of their lives and their bodies through exercise.

You may offer to conduct in-office assessments of the physician’s patient’s pre- and post-surgery/treatment, in order to have a baseline of information from which to begin to set initial goals. In some cases, the physician may let you use their office at no cost to you as a service to their clients. In other cases, they may want a monthly fee or percentage. A question that is commonly asked is *will insurance pay for my services?* Currently the answer is **NO**. However, if you work out of a doctor or therapists office you *may* be able to get your assessment covered following the physician’s examination of the patient. There are funds available in the form of grants from organizations such as *Susan G. Komen (Race for the Cure)*. These funds may be used to offset the cost of your program to cancer clients/survivors who may not be able to otherwise afford such services. Having a convenient and comfortable setting, along with financial assistance of any kind, will certainly help to draw clients/survivors to your location.

A medical facility or hospital may stand a better chance of getting insurance reimbursement for the patient, however, many survivors find exercising in the location that they were told they had cancer, lost a part of their body, and/or received treatment an unappealing. Many survivors want to start fresh. They want to disassociate themselves from any reminders of their cancer “experience.” The most successful ventures that I have seen in the twenty-three years I have been working with cancer clients, are when a health club or exercise facility “team-up” with a hospital or medical facility. For example, if St. Johns’ Hospital (in-house program that focuses on education, general conditioning, and physical, occupational, and speech therapy) “partners” with the local YMCA (offers group exercise classes; Yoga, Pilates, Aquatics, Chi Gong, Tai Chi, and personal training). The clients are segued from one institution to the other without falling through the cracks. The fitness professionals automatically become the next step in the healthcare continuum by communication with the previous care provider. Most importantly, the clients don’t fall through the proverbial cracks!

Physicians are by no means the only professionals that you can offer your services to. There are many ancillary services that are offered to cancer clients/survivors from nutritionists, naturopathic physicians, prosthesis and wig fitters, to physical, occupational, and speech therapists. By collaborating with these other professionals, *you can jointly offer a broader range of services* to the cancer patient/survivor.

It is beneficial to reach out to the community as well, seeing as most people are affected by cancer either directly, or indirectly. There are many ways in which you can gain free advertising and publicity to make the public aware of your status as a Cancer Exercise Specialist.

The following ideas require a minimal investment of time and money:

- **Breakfast/lunch meetings**

- Call the office manager to set up a time that you can meet with the doctor and/or staff to introduce yourself and your program - tell them you’ll bring coffee & bagels or sandwiches (based on the time of day you’re meeting).
- Prepare for your meeting; figure out a ten-minute effective presentation. Bring brochures and business cards that outline your program and its benefits. *Don’t skimp on the quality of your presentation materials in order to save a few bucks.* Sadly, you will be judged not only on your knowledge, but on your presentation. Regardless of the talent and intelligence of a professional, if one pulls up in a Mercedes and one in a Ford, the one in the Mercedes is perceived as more successful. If you have a limited budget, choose one piece (brochure, business cards, etc.) and use high quality paper and printing. When your budget allows, you can add to your repertoire.
- Make sure you know what you are talking about before you take this step! I can’t emphasize this one enough. If you go in unprepared and lack the confidence it takes to “win-over” the person that you are seeking to get referrals from, you have just wasted both of your time. You would be better off to become familiar with the information in this handbook and hold off on setting up appointments until that time.

- **Support groups**

- Get online and look up cancer support groups in your area. There is a support group for every type of cancer, age group, gender, race, etc. If you have the time and inclination, you could be presenting to one or two a day.
 - Call the director and offer to come in and give a complimentary 10-15 presentation on exercise programming for that particular type of cancer.
 - Prepare your presentation and bring brochures and business cards that outline your program and its benefits.
-

- **Online directory**

- When you pass the CES examination, you will be added to our online international CES directory. You will be able to add your information (name, city, state, email address, and phone number).
 - Make sure to update us if your contact information changes so we can change it in our database.
 - This is a free resource to advertise you as a CES and will lead to potential referrals from clients. We are constantly working to improve our website performance and placement in the search engines to bring more exposure to CETI and you!
-

- **CETI Mastermind Membership**

- This exclusive community is for allied health professionals who have completed the CETI coursework, or are currently completing the program. We provide valuable support and a platform for collaboration while allowing you to think “bigger”, gain new perspectives, get honest feedback, advice, and brainstorming, tap into the experience of others, all while sharpening your business and personal skills.
 - Gain confidence in your decision-making abilities, talk through problems, find inspiration and answers, increase follow-through, add accountability and real progress in your business and personal life, and establish new habits like other highly successful people.
-

- **Personal Business Coaching**

Individualized business coaching with CETI President and Founder, Andrea Leonard. You will receive an email within 24 hours that includes a coaching questionnaire for you to complete as well as to schedule your appointment.

What Can Individualized Business Coaching Do For You?

- Help you to establish yourself as the “LOCAL” authority on cancer recovery and exercise.
 - Grow your business in less time with less aggravation.
 - Help you to avoid making costly mistakes in both time and money.
 - Provide you with specific tasks to keep you focused and motivated.
 - Help you to take the steps necessary for you to fulfill you “calling” as a CES.
 - Teach you how to position yourself as the next step in the healthcare continuum and receive medical referrals.
 - Teach you how to market individual or group training.
 - Most importantly, help you to create your niche and separate you from the thousands of other personal trainers, yoga and Pilates instructors, and group exercise instructors in your geographic area.
-

- **Publish your own book**

- Become the local expert
 - Purchase one of CETI’s pre-written books that we customize for you
 - You own it, print it, and distribute it
 - Use for promotion or direct sale
-

- **Media - newspaper, television, and radio**

- Contact all the local radio and television stations as well as the local newspapers. Magazines are a bit more difficult, but certainly worth a try. Let them know about who you are, your extensive training in the area of cancer and exercise, and that you are one of the few (perhaps the first) in your area to provide such services.

- Re-create the press release in this book to be representative of you and your program. Send it out to all local radio and television stations as well as the local newspapers. Be persistent and don't be afraid to send it more than once!

Remember that human interest stories and information about participants that you may already be working with, will often gain you attention and attract new clients to you.

- **Always have your client/patient complete the appropriate paperwork** and make sure that you complete a thorough assessment of them as well as keep daily notes as to any problems, aches, pains, or progress that you may be aware of.

- Health History
- Liability Release
- Medical Clearance Form

-
- **Follow up by keeping Doc's in the "loop."** Make them feel like they are still part of the team and that you value their opinion when it comes to their clients' health. It will help you to earn their trust as well as future referrals. Keep your letters short and sweet and to the point. They do not have time to read a novel. Just highlight the areas of improvement. Trust me, your client/patient will be singing your praises as well. The combination will serve you well.

- Initial assessment and introduction
 - Re-evaluation
 - Logo items to keep you on their mind: coffee mugs, magnets, t-shirts, calendars, etc.
-

- You should **always maintain the utmost professionalism** and have materials that you can leave with the medical professionals for review or distribution.

- Brochures
- Business cards
- Flyers
- Gifts with your logo - these are great but can be quite spendy. Pens and magnets are cheap and easy, but don't have much of a "shelf-life." The items listed below have a broad price range. My favorite is the lymphedema first aid kit. You can purchase a number of small nylon or plastic coin purse key chain. Fill them with Band-Aids, bacitracin, and antiseptic wipes. On the outside have your logo and contact information screen printed. On one side you may even decide to print a few of the lymphedema precautions that are listed in the lymphedema chapter. Because this is an item of "value," the doctor is likely to give it to their clients (much more so than a pen or magnet)! They know that this will benefit their patient if they get bit by a bug, stung, or cut. Therefore, they will be glad to assist you in passing them along to their clients.

- T-shirts
 - Water bottles
 - Towels
 - Calendars
 - Coffee mugs
 - Lymphedema first aid kits
-

DETAILS ABOUT MAKING CONTACT WITH THE MEDICAL PROFESSIONALS

THE LIST

As a Cancer Exercise Specialist, you will naturally want to network with the medical professionals in your community. It will be essential that you educate them about your credentials in order to earn their trust. Some medical professionals will be reluctant to refer to you initially because they are responsible for their clients' care and they don't know you or your skill level. I suggest that you begin with your personal circle of influence:

- Primary care doctor
- Integrative medicine doctor
- Naturopathic doctor
- Gynecologist/Obstetrician
- Dentist
- Surgeons, Doctors, Physical, Occupational, or Speech therapists that you may have used in the past

Start by creating a list of your own circle of influence and then expand it to include your clients, family, and friends' doctors, nurses, physical therapists, oncologists etc....

The professionals on this list will be more receptive to meeting or speaking with you because you are 'name-dropping.' I'm not suggesting that this is a sure thing, but it's a better place to start than cold calling.

THE LETTER

In the form section of this book you will find several different templates for introduction letters. Begin by sending a letter, along with your business card, to each of the people all on your list. They will be more likely to open the letter if you hand write the address on the envelope. Make a note of when each letter was mailed and follow-up with a phone call a week to ten days later. You will most likely speak to the receptionist or office manager. Introduce yourself and ask them if they received your letter. Let them know that you would like to come in before office hours or during lunch to meet with the medical professional whom you are trying to approach. It's always a good idea to let them know that you'll bring coffee and bagels, sandwiches, pizza, or whatever is suitable for that time of day.

THE MEETING

You only get one chance to make a first impression - don't blow it! Someone who considers their time VERY valuable has agreed to give you ten minutes of it. Although you may be fortunate enough to have more than ten minutes, assume that that's all you have to deliver your message. You should dress professionally in a nice warm-up suit or a logo shirt with a pair of slacks. Leave the shorts and baseball hats at home. You will want to bring some type of brochure or flyer with you along with a number of business cards. If you don't have it in your budget to have a graphic designer do your brochure, you can make a perfectly acceptable brochure on your desktop publishing program.

HERE ARE A FEW IDEAS OF THINGS THAT YOU MAY WANT TO INCLUDE:

BENEFITS OF WORKING WITH A CANCER EXERCISE SPECIALIST

- Reduce cancer pain and fatigue
 - Prevent, identify, and manage lymphedema
 - Increase shoulder range of motion and correct postural deviations following mastectomy and/or reconstruction
 - Improve treatment tolerance
 - Prevent and/or manage Osteoporosis, Diabetes, and damage to the heart and lungs following chemotherapy, radiation, and hormonal therapies
 - Return to pre-treatment levels of strength and fitness
-

INDIVIDUALIZED PROGRAMMING INCLUDES:

- Postural assessment to determine muscle imbalances that may cause pain and degeneration of the joints
 - Range of motion assessment to determine limitations in joint range of motion following cancer surgery/treatment
 - Balance and core stability assessment
 - Girth measurements to monitor for lymphedema
 - Flexibility assessment
 - Heart rate and blood pressure
 - Personalized program to correct imbalances and prevent future degeneration while helping you to return to your pre-treatment level of strength and fitness
-

CREDENTIALS

- Your name
 - Formal education or training
 - Certifications held (including Cancer Exercise Specialist)
 - Publications or television appearances
 - Associations
 - Testimonials - letters or quotes from clients or other medical professionals
-

FORMS

HEALTH HISTORY QUESTIONNAIRE

Last Name _____ First Name _____

Home Phone _____ Work Phone _____

Email Address _____

Home Address _____

In Case of Emergency Contact _____

Emergency Contact Phone # _____

Personal Physician _____

Physician's Phone # _____

Date of Birth _____ Age _____

The testing and evaluation process provides information on your current level of fitness, and for the development of an individual exercise program. The fitness assessment emphasizes cardiovascular and muscular fitness as well as flexibility, range of motion, core strength, and balance. In order to get a complete and appropriate individual assessment, it is imperative that you fill out this form completely and that you don't leave out any information that could influence your individual program.

Family history – check if any of your immediate family has had:

Heart Disease: ☐ Mom ☐ Dad ☐ Grandfather ☐ Grandmother ☐ Brother/sister

Stroke: ☐ Mom ☐ Dad ☐ Grandfather ☐ Grandmother ☐ Brother/sister

Diabetes: ☐ Mom ☐ Dad ☐ Grandfather ☐ Grandmother ☐ Brother/sister

High blood pressure: ☐ Mom ☐ Dad ☐ Grandfather ☐ Grandmother ☐ Brother/sister

High cholesterol: ☐ Mom ☐ Dad ☐ Grandfather ☐ Grandmother ☐ Brother/sister

Other conditions/comments:

If there was a documented case of heart disease, please check the age category when they first knew.

☐ Under 50 years of age

☐ Between 50-65 years of age

☐ Over 65 years of age

Have any relatives died suddenly, without prior warning or knowledge of heart disease?

☐ Yes ☐ No

If yes, who? _____ Age at time of death? _____

Personal history – check if you have had:

AIDS ☐ Anemia ☐ Arthritis ☐ Asthma ☐ Bronchitis or Emphysema ☐

Cancer ☐

If so, what kind? _____

Surgery (Type and Date) _____

Treatment (Type and Date) _____

Diabetes ☐ Epilepsy ☐ Gout ☐ Heart disease ☐

Heart murmur, skipped, or rapid beats ☐ High blood pressure ☐

High cholesterol ☐ Kidney disease ☐ Lung Disease ☐

Phlebitis ☐ Rheumatic Fever ☐ Stroke ☐ Thyroid problems ☐

Orthopedic injuries or chronic pain:

Neck ☐ L shoulder ☐ R shoulder ☐ Cervical spine ☐

Thoracic spine ☐ Lumbar spine ☐ L elbow ☐ R elbow ☐

L wrist ☐ R wrist ☐ L hip ☐ R hip ☐ L knee ☐ R knee ☐

L ankle ☐ R ankle ☐ other ☐

Please explain any that you have checked

Other conditions/comments

Medications

Are you currently taking any prescription medications? ☐ Yes ☐ No

If yes, what and how much?

Are you currently taking any over-the-counter medications or vitamins? ☐ Yes ☐ No

If yes, what and how much?

Health habits

Smoking history:

Do you smoke? ☐ Yes ☐ Quit ☐ Never

What do/did you smoke? ☐ Cigarettes ☐ Cigars ☐ Pipe ☐ E-cig

How much did/do you smoke a day?

How long have you been smoking? _____

If quit, when? _____

Exercise Habits

Do you engage in physical activity? ☐ Yes ☐ No

What kind?

How hard? ☐ Light ☐ Moderate ☐ Hard How often? _____

Did your past exercise habits differ from what you are doing now? ☐ Yes ☐ No

What kind of exercise did you do in the past?

How hard? ☐ Light ☐ Moderate ☐ Hard How often? _____

Is your occupation ☐ Sedentary ☐ Active ☐ Heavy work

Explain:

Do you experience discomfort, shortness of breath, or pain with exercise? ☐ Yes ☐ No

If yes, what type of exercise/symptoms?

Nutritional Behavior

Do you consider yourself overweight? ☐ Yes ☐ No

If yes, how long have you been overweight? _____

How many meals do you typically eat per day? _____

How often do you eat outside the home? _____ per week

How much of the following do you consume?

_____ cups of caffeinated coffee or tea per day

_____ glasses of caffeinated soda per day

_____ glasses of beer per day (12oz. = 1 unit)

_____ glasses of wine per day (4 oz. = 1 unit)

_____ glasses of liquor per day (1 1/2 oz. = 1 unit)

_____ units of alcohol per week (see above for unit equivalent)

Stress

Do you consider your day stressful? ☐ Yes ☐ No

What is the nature of your stress?

How many hours do you sleep a night? _____ Is your sleep sound? ☐ Yes ☐ No

Do you practice any form of meditation? ☐ Yes ☐ No

If so, what kind?

What is your preferred training schedule? (days/hours of availability)

PERSONAL ASSESMENT

Name _____

Date _____

RHR _____ RBP _____ Weight _____

Postural Assessment:

	Yes	No	Severe	Moderate	Minimal	Laterally	Medially
Forward Head							
Tilted Head							
Kyphosis							
Round Shoulder (L)							
Round Shoulder (R)							
Elevated Shoulder (L)							
Elevated Shoulder (R)							
Winged Scapula (L)							
Winged Scapula (R)							
Scoliosis							
Lordosis							

Hips Level							
Hip Elevated (L)							
Hip Elevated (R)							
Hips Anterior Tilt							
	Yes	No	Severe	Moderate	Minimal	Laterally	Medially
Hips Posterior Tilt							
Hips Rotated (L)							
Hips Rotated (R)							
Knee Rotated (L)							
Knee Rotated (R)							
Foot Everted (L)							
Foot Everted (R)							
Foot Inverted (L)							
Foot Inverted (R)							
Foot Supinated (L)							
Foot Supinated (R)							
Foot Pronated (L)							
Foot Pronated (R)							

ROM ASSESSMENT:

	Supine Left	Supine Right
Shoulder Flexion		
Shoulder Extension		
Shoulder Abduction		
Shoulder IR		
Shoulder ER		
Hip Flexion		
Hip Extension		
Hip Abduction		
Hip Adduction		
Knee Flexion		
Knee Extension		

GIRTH MEASUREMENTS:

	Right	Left
Neck		
Chest		
Waist		
Lower Abdomen		
Hips		
Upper Thigh		
Mid -Thigh		
Knee		
Calve		
Ankle		
Wrist		
Mid -Ulna		
Elbow		
Mid -humerus		

BALANCE ASSESSMENT:

	Yes	No
Excessive Shift of Pelvis		
Inability to Hold 15 Seconds		
Elevated Contralateral Shoulder		
Elevated Contralateral Hip		
Medial Rotation of the Femur		

MODIFIED THOMAS TEST:

	Slight	Moderate	Severe
Hip Flexor (L)			
Hip Flexor (R)			
Quadriceps (L)			
Quadriceps (R)			
ITB (L)			
ITB (R)			
Foot (L)			
Foot (R)			

TRENDELENBURG TEST:

	Yes	No
Left		
Right		

SQUAT TEST:

	Yes	No
Arms fall forward		
Arms bow out to side		
Knee Valgus (knock-kneed)		
Knee Varus (bow-legged)		
Heels lift up		

QUALITY OF LIFE QUESTIONNAIRE

1) How would you rate your overall satisfaction with life?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

2) How would you rate your current health and wellbeing?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

3) How often do you get sick or go to the doctor?

☐ once a week ☐ twice a month ☐ once a month ☐ once every six months
☐ once a year

4) How would you rate your past fitness level?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

5) How would you rate your current fitness level?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

6) How would you rate your perceived body image?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

7) How would you rate your current energy level?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

8) How would you rate your current ability to enjoy activities?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

9) How would you rate your current mobility?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

10) How would you rate your current level of pain?

☐ no pain ☐ manageable pain ☐ chronic pain ☐ unbearable pain

11) How would you rate your past eating habits?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

12) How would you rate your current eating habits?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

13) How would you rate your current ability to perform activities of daily living (bathing, grooming, dressing, cooking, cleaning...)?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

14) How would you rate your current ability to perform work-related tasks?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

15) How would you rate your sleep at night?

☐ poor ☐ below average ☐ good ☐ very good ☐ excellent

16) How would you rate your current mood?

☐ depressed ☐ mildly depressed ☐ content ☐ happy ☐ very happy

CONTRACT FOR PERSONAL FITNESS SERVICES FROM THE CANCER EXERCISE TRAINING INSTITUTE

Our goal at the Cancer Exercise Training Institute is to provide a client personalized fitness training including cardiovascular conditioning, weight training, flexibility, and range of motion, as well as postural deficiencies and corrections. The Cancer Exercise Training Institute is dedicated to the overall success of each client's personal health and fitness program.

1. **Payment** – payment for personal training services will be billed up front prior to the date of the first training session.
2. **Sessions** – each session will be one hour in length. Client agrees to be on time for each session. The session starts and ends when scheduled. If the client is late, the session will end as scheduled despite his/her lateness.

Once a session is scheduled between the client and Cancer Exercise Training Institute, it is the client's responsibility to either attend the scheduled session or provide Cancer Exercise Training Institute with at least twenty-four hours' notice of cancellation. If the client cancels within twenty-four hours of the session, the client shall be responsible for the session.

3. **Physician's Approval** – the client must fill out and submit the health history questionnaire form and medical clearance form along with this liability release and made part of the agreement together with any documents, reports, or other information provided by client's physician or doctor.

Cancer Exercise Training Institute has the right to refuse any session to a client at any time based upon his/her physical condition.

4. **Waiver** – the client is aware that Cancer Exercise Training Institute sessions include strength, flexibility, and aerobic exercise, which may be potentially hazardous activities. The client also acknowledges that these activities involve a risk of injury and death. Accordingly, the client voluntarily consents to participate in Cancer Exercise Training Institute sessions, and assumes the acknowledged risks involved.

The client hereby waives, release, and forever discharges Cancer Exercise Training Institute, its officers, agents, employees, representatives, and executors, from any and all responsibilities or liability from injuries or damages resulting from participation in a class. Client also agrees that Cancer Exercise Training Institute, its officers, agents, employees, representatives, and executors shall not be liable for any claim, demand, cause, or action of any kind whatsoever for, or on the account of death, personal injury, property loss, or damage resulting from participation in any session.

Client Signature

Date

MEDICAL CLEARANCE FORM

Dear Doctor:

_____ has applied for enrollment in the fitness testing and exercise programs at the Cancer Exercise Training Institute. The fitness testing program involves a submaximal test for cardiorespiratory fitness, sit and reach flexibility test, arm girth measurements, postural assessment, shoulder ROM test, muscular strength and muscular endurance tests. The exercise program is designed to start with basic stretching and flexibility exercises along with the use of light resistance to increase upper and lower body strength. The client is evaluated every six weeks to reassess their status and determine whether or not to advance them to the next level of difficulty. The program will take the client through various levels of increasing difficulty. All our trainers are certified by the Cancer Exercise Training Institute as a Cancer Exercise Specialist. Thus, they have undergone thorough and intensive training in working with the special needs of cancer survivors.

By completing the form below, however, you are not assuming any responsibility for our administration of the fitness testing and/or exercise programs. If you know of any medical or other reasons why participation in the fitness testing and/or exercise programs by the applicant would be unwise, please indicate so on this form. If you have any questions about the program, please don't hesitate to call us at:

REPORT OF PHYSICIAN

_____ I know of no reason why the applicant may not participate

_____ I believe the applicant can participate, but I urge caution because:

_____ The applicant should not engage in the following activities:

_____ I recommend that the applicant not participate.

Physician Signature _____

Date _____

Address _____

City, State and Zip _____

Phone _____

Medical Clearance Form – Page 2 of 2

This program is based, in part, on “Essential Exercises for Breast Cancer Survivors” and the EMPOWER Program, originally developed by CES professional and author Andrea Leonard with the following medical advisory board:

Dr. Theodore Tsangaris, Jr. - Former Chief of Breast Surgery at the Georgetown University Medical Center, Chief of Breast Surgery at Johns Hopkins Medical Center

Dr. Katherine Alley – Chief of Breast Surgery at Suburban Hospital

Dr. Shawna Willey – Former Chief of Breast Surgery at the George Washington University Medical Center, Chief of Breast Surgery at the Georgetown University Medical Center

Dr. Richard Flax – Breast Surgeon at the Columbia Hospital for Women

Jean Lynn, R.N. – Oncology Nurse, Mammocare Director at the George Washington University Medical Center

Rosalie Begun, P.T. – Physical Therapist at Begun Physical Therapy

Amy Halverstadt, M.S. – Exercise Physiologist, Co-author of “Essential Exercises for Breast Cancer Survivors.”

Andrea Leonard has been conducting the CES workshops nationwide since 1995. She is Coauthor of “Essential Exercises for Breast Cancer Survivors,” Founder and President of The Cancer Exercise Training Institute, PFP 2019 Personal Trainer of the Year, and a continuing education provider for ACE, AFAA, ISSA, NASM, NSCA, and YMCA. Andrea has been certified as a Special Populations expert by The Cooper Institute, as a Personal Trainer by the American Council on Exercise and The American College of Sports Medicine, as an Optimum Performance Trainer, Performance Enhancement Specialist, and Corrective Exercise Specialist by The National Academy of Sports Medicine, and as a Strength and Conditioning Coach by The National Sports Professionals Association. Andrea is on the board of advisors for the Medical Fitness Network, is an adjunct faculty advisor for the Medical Wellness Association, and is Chairman of the Board for the Medical Fitness Education Foundation.

The Cancer Exercise Training Institute is considered the “gold standard” of oncology exercise programs and has qualified more Cancer Exercise Specialists than any other organization worldwide.

SAMPLE PRESS RELEASE

Contact: Cancer Exercise Training Institute
3436 NE 21st Ave.
Portland, OR 97212
Contact: Andrea Leonard (503) 502-6776 for more information

MEDICAL AND FITNESS PROFESSIONALS NATIONWIDE HELP CANCER CLIENTS TO PREVENT AND REVERSE THE RAVAGES OF CANCER SURGERY AND TREATMENT

Andrea Leonard, CANCER SURVIVOR, Co-Author of “Essential Exercise for Breast Cancer Survivors,” Founder of the Breast Cancer Survivors Foundation and President of The Cancer Exercise Training Institute, has been conducting two-day Cancer and Exercise Workshops for health and fitness professionals nationwide since 2001. Students in her classes are naturopathic doctors, nurses, physical therapists, personal fitness trainers, and Yoga and Pilates instructors. Thanks to Andreas’ comprehensive Cancer Exercise Specialist Advanced Qualification, there are now thousands of professionals covering the United States, British Columbia, The Netherlands, Greece, Australia, Singapore, Israel, and Puerto Rico. The Cancer Exercise Specialist is truly a pioneer in the practice of cancer recovery and rehabilitation from the debilitating side-effects of cancer surgery and treatment. For more information on upcoming workshops you can visit the website at www.thecancerspecialist.com.

“This Advanced Qualification is to cancer, what Cardiac Rehabilitation has been for heart attack victims,” declares Andrea Leonard, Cancer Exercise Training Institute President, and herself a 35-year cancer survivor.

Following cancer surgery and treatment there are numerous physically debilitating side-effects that cancer clients have become accustomed to living with. We want to make it known that cancer survivors no longer have to accept the fact that they have limited range of motion, poor posture, neck and back pain, lymphedema, chronic fatigue etc., following their treatment. We have the answers and can help to reverse many, if not all, of the agonizing problems that chronically plague cancer survivors nationwide. In addition to the many public and private facilities that now have Cancer Exercise Specialists; we have certified professionals at Hospitals and hospital-based wellness facilities across the country.

“After 24 years in the fitness industry, I once again feel as I am making a difference in my clients’ lives. It’s so empowering to work with people that do NOT take every day for granted and are motivated to improve every aspect of their remaining time. As selfish as this may sound, I feel that I am getting as much if not more out of this than my clients.”

- Robert Reed III, Certified Personal Trainer & Cancer Exercise Specialist, San Antonio, TX

Sample Letter to Doctor When Working with their Patient

January 1, 2021

Dear Dr. Rubin,

My name is Andrea Leonard. I live in West Linn and am a Cancer Exercise Specialist. I am Coauthor of “Essential Exercises for Breast Cancer Survivors,” and president of The Cancer Exercise Training Institute. Today I had the good fortune of meeting with one of your breast cancer clients, Deborah Searfus. I conducted a comprehensive evaluation of Deborah’s ROM, arm girth measurements, and a postural assessment to determine muscle imbalances that exist prior to her mastectomy; so that we have a base for comparison later. Following her mastectomy, we will repeat this process. I have enclosed a pre-operative report for you, listing all of my findings along with a very brief synopsis of my intended exercise programming. She already has limited abduction in her right arm, possibly having something to do with the tumor location and depth. Flexion is also slightly limited. Her other measurements are within normal range. If you have any questions or concerns, or if I can be of assistance to any of your other clients, please don’t hesitate to contact me at (503) 502-6776.

If you would ever like to have coffee, I would love to be able to share more of what I do with you.

Respectfully,

Andrea Leonard

Sample Marketing Letter to Doctor

January 1, 2021

Dear Dr. Nakamura,

My name is Andrea Leonard and I am a Cancer Exercise Specialist residing in West Linn, OR. I wanted to take this opportunity to introduce myself and offer my services to your clients. I work individually with clients, helping to minimize the side effects of treatment, reverse postural and range of motion issues that arise from surgery and reconstruction, and focus on awareness and prevention of lymphedema. I have enclosed a recent article from the Oregonian which explains what I do and what my background is. The following is a summary of my qualifications:

- Continuing education provider from the American Council on Exercise and National Academy of Sports Medicine
- National presenter of Cancer and Exercise Specialist Workshop
- Co-author of “Essential Exercises for Breast Cancer Survivors”
- Author of “The Cancer and Exercise Handbook” (editions One through Ten)
- President of Leading-Edge Fitness
- President/Founder of The Cancer Exercise Training Institute
- B.A. University of MD, 1990
- Medical Fitness Network Advisory Board
- BOSU® Hedstrom Fitness Development Team
- Certified Personal Trainer, Conditioning Specialist, and Special Populations Expert:

I would welcome the opportunity to have coffee with you and answer any questions that you may have. I can also provide you at that time with references; if you would like to see them. I hope to have the opportunity to serve your clients in the near future.

In Health,

Andrea Leonard

Mary Jo:

- 33-year-old female
- Avid exerciser
- Right lumpectomy (3/2018)
- Radiation (finished 8/2018)
- Hormonal therapy

CASE STUDIES

SAMPLE ANSWER:

Because Mary Jo is only 33 years old, she is an avid exerciser, she will probably be depressed because she's not only dealing with a cancer diagnosis, but it will slow her down a great deal and she will have to work back to her previous level of fitness slowly and methodically.

Following the lumpectomy on her right side, I might expect that she will have some tightness in the chest wall (depending on how much was removed). This will be compounded by the radiation to that area. Therefore, she will probably have round shoulder syndrome from the tightness across her chest. If so, I will make sure that she does exercises to stretch and open up her chest (chest fly, door stretch), avoid pressing exercises like the chest press which will shorten the muscles even more, and focus on strengthening the back and shoulder stabilizers. Because she underwent radiation over a year ago, the side-effects and fatigue should have mostly subsided by now. She will, however, be predisposed to lymphedema in her right arm because of the radiation damage to the lymph vessels and nodes. Therefore, I will take her baseline measurements of both of her arms (using the left one for comparison) and at the beginning of each workout I will take measurements of her right arm and record them for comparison. If there is swelling of ½" or more, I will refer her to her doctor and require her to come back with a medical clearance. If the doctor prescribes a compression sleeve, I will require that she wear it for each workout. The radiation may have caused damage to her heart and lungs and I will make sure that she has the appropriate response to any aerobic activity that she does. If there is no noticeable, normal, improvement, I may have her consult with her doctor. Because she is currently on hormonal therapy, she will be thrown into instant menopause. This may add to her depression because she will not be able to have children and she will probably gain weight. The weight gain is another red flag for lymphedema because the adipose tissue retains more fluid and blocks lymphatic pathways. It will be very important to keep her weight under control through cardiovascular workouts and proper diet. I will refer her to a nutritionist who specializes in working with cancer clients, if her weight becomes an issue. She will experience all of the side effects that accompany menopause.

The program that I recommend for Mary Jo will be based on the findings from my assessment. I will focus on stretches for areas that appear tight and strengthening exercises for those muscles that are weak or opposite the tight muscles. Cardiovascular exercise will be a regular part of her activities. I will start her off slowly, even though she will want to jump right back in to her old exercise program. I will encourage her to go slowly because of the possibility of lymphedema. I will start with very light weights and only a few repetitions, and make sure there is no noticeable swelling following the workout. If she tolerates the workout, I will raise the weights and repetitions accordingly the next workout. If there appears to be some swelling, I will back off, reduce the intensity and duration and, if necessary, refer her to her doctor. I will assure her that she will be able to return to her old level of fitness in due time, but that she needs to be patient to avoid further complications.

John:

- 55-year-old male
- Weekend warrior exerciser
- Total thyroidectomy w/ node dissection (4/2020)
- Chemotherapy (currently undergoing)



Betty:

- 65-year-old female
- Sedentary
- Right modified radical w/ axillary node dissection (1/2020)
- Currently undergoing chemotherapy
- 30 lbs. overweight



Larry:

- 45-year-old male
- Marathon runner
- Radical retropubic prostatectomy with lymph node dissection (1/2018)
- Hormonal therapy (ongoing)
- Larry wants to resume marathon training



Charlene:

- 45-year-old female
- Moderate exerciser
- Bi-lateral modified radical (6/2019)
- Right axillary node dissection (6/2019)
- Finished chemotherapy (12/2019)
- Bi-lateral/contra-lateral abdominal TRAM (4/2020)
- Hormonal therapy



Emily:

- 34-year-old female
- Active
- Right modified radical with axillary node dissection (6/2017)
- Radiation to right side (finished 12/2017)
- Latissimus flap w/ implant (4/2018)
- Hormonal therapy



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