

Examining Yoga as a Complementary Treatment for Conventional Cancer Care

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Table of Contents

Part I: Background and Literature Review

1. Abstract..... 4

2. Introduction..... 5-6

3. Background Information..... 6-9

 3.1. Complementary and Alternative Medicine (CAM)..... 6

 3.2. Principles of yoga..... 6-8

 3.3. Yoga in modern medicine..... 8-9

4. Exploration of Yoga Therapy..... 9-23

 4.1. Yoga Therapy Definitions..... 9-11

 4.2. Applying Yoga Therapy to Cancer Care..... 11-13

 4.3. Yoga for Breast Cancer Patients..... 14-23

 4.3.1. Modified Hatha, Restorative Yoga, and Tibetan Yoga Programs..... 14-21

 4.3.2. Methods and Results..... 21-23

5. Discussion..... 23-26

 5.1. M.D Anderson Cancer Center grant..... 23-25

 5.2. Part I Summary..... 25-26

Part II: Interventions in Practice

1. Yoga Impact Teacher Training..... 27-31

 1.1 Training Curriculum..... 29-31

2. Home Practice Series..... 31-39

 2.1 Finding Balance with the Elements..... 34-39

 2.1.1 Earth Element..... 35-36

2.1.2 Fire Element..... 36

2.1.3 Water Element..... 36-37

2.1.4 Class Components..... 37-39

4. Conclusion..... 39-40

5. References..... 41-43

6. Appendix A: Earth Element Practice..... 44-48

7. Appendix B: Water Element Practice..... 49-54

8. Appendix C: Fire Element Practice..... 55-60

9. Appendix D: Anatomy of Upper Body..... 61

10. Appendix E: Yoga for Survivors..... 62-66

Abstract

The purpose of this paper is to explore the role of Complementary and Alternative Medicine (CAM) in standard medical care, specifically in cancer populations. Yoga, a mind-body practice, is one of the most common modalities of CAM therapy used in the United States. Both healthy individuals and diverse patient populations utilize the fundamental practices of yoga. Yoga therapy, a broad based term used to define yoga in the medical context, helps to characterize this complementary treatment method. Three research studies highlighting the potentiality of yoga as an intervention program for women with breast cancer will be examined in this paper. Current research being conducted at the University of Texas M.D Anderson Cancer Center will also be featured in this paper. Following a detailed review of existing literature and a yoga teacher training program, this paper will conclude with an originally designed yoga class series that can be completed by women with breast cancer in their homes. In sum, the information featured in this paper will be the catalyst for future research and investigation into this unique therapy modality.

Keywords: yoga, cancer, complementary and alternative medicine (CAM)

Examining Yoga as a Complementary Treatment for Conventional Cancer Care

Introduction

Each year in the United States more than 192,000 women are diagnosed with breast cancer. In general, cancer is a term used to describe diseases in which abnormal cells divide, multiply, and invade other tissues of the body without control. Breast cancer forms in the tissue of the breast, usually the ducts (tubes that carry milk to the nipple) and lobules (glands that make milk) (NIH Publication no. 09-1556, 2009). Receiving a breast cancer diagnosis and undergoing conventional treatments such as chemotherapy are associated with high emotional distress and lowered psychological and physical quality of life. Extensively documented quality of life (QOL) outcomes of breast cancer patients indicate that impairments in physical, emotional, social, and spiritual well-being affect both newly diagnosed and long-term survivors (Moadel, 2007, p. 4387).

Many patients with cancer turn to complementary and alternative medicine (CAM) techniques and practices to help manage their symptoms. Rates of CAM usage within women with breast cancer are high, ranging between 70%-80% (Matthews, 2009, p. 555). Mind-body therapies, a type of CAM, are defined by the National Center for Complementary and Alternative Medicine as “interventions designed to facilitate the mind’s capacity to affect bodily functions and symptoms” (NCCAM Publication No D412, 2009). Yoga is a mind-body practice in CAM that originates in ancient Indian philosophy. The various styles of yoga used by people for health purposes typically combine physical postures, breathing techniques, and meditation or relaxation (NCCAM, 2009). Recently, a number of studies investigating yoga as a complementary intervention for various populations of cancer patients have emerged in academic and medical journals. These emerging studies on yoga for cancer patients discuss the use of several different

styles of yoga (Smith, 2009, 465-475). Exploring a particular style such as restorative yoga (RY), a gentle type of yoga focusing on relaxation and awareness of breath, may prove to be beneficial for individuals who are undergoing and/or recovering from conventional cancer treatment. Other styles commonly used to address cancer-related symptoms include Tibetan yoga and modified hatha yoga. All three of these styles feature different variations on the practice of yoga, offering benefits for both patient populations and healthy individuals. Overall, this up-and-coming research field is paving the way for the eventual implementation of yoga therapy into standard treatment for cancer care.

Background Information

Complementary and Alternative Medicine (CAM)

Complementary and Alternative Medicine (CAM) is “a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine” (NCCAM Publication No. D412, 2009). “Complementary medicine” refers to the use of CAM together with conventional medicine while “Alternative medicine” refers to use of CAM in place of conventional medicine. CAM practices are grouped into broad categories that include: natural products, mind-body medicine, and manipulative and body-based practices. Mind-body medicine aims to combine interactions between the brain, mind, body, and behavior in order to use the mind to affect physical functioning and promote health. Different types of mind-body practices include meditation, acupuncture, and yoga (NCCAM, 2009).

Principles of Yoga

The word “yoga” comes from the Sanskrit (the classical language of India) word *Yuj*, which means “yoke or union”. Yoga is the union of the individual self with the universal self or more generally, the union between the mind and the body. Practiced for thousands of years, yoga is

one of six branches of classical Indian philosophy. Two thousand years ago the Indian sage Patanjali combined the various philosophies and methodologies of yoga into 196 aphorisms called “The Yoga Sutras”, defining the modern practice of yoga. The *Sutras* outline eight limbs or foundations of yoga practice that serve as spiritual and practical guidelines: yama (ethical standards, restraints), niyama (observance, self discipline), asanas (physical postures), pranayama (breathing exercises), prayatnaha (control of the senses), dharana (concentration), dhyana (contemplation, meditation), Samadhi (higher consciousness) (Bower, 2005, pg.166, Canda, 2012). In the United States, numerous schools of yoga incorporate these eight limbs into practices that vary in technique and style. Although the limbs are traditionally viewed as interrelated parts, modern yoga practices generally incorporate the use of asana, pranayama, and meditation into group classes and individual home practices. In general, yoga is a highly coordinated practice that seeks to link the breath with a series of movements and postures while incorporating elements of meditation and relaxation throughout the practice.

Currently many styles of yoga are practiced in the United States including but not limited to Hatha, Iyengar, Ashtanga, Vini, Kundalini, and Bikram. Each approach or interpretation of the principles of yoga represents a distinct intervention method, just as cognitive behavioral and interpersonal therapies differ in approaches to psychotherapy. It is important to note the unique nature of this CAM mind-body practice. Each style of yoga approaches the philosophy of union between the mind and body with different components and practice techniques. The term yoga is often mistakenly oversimplified in terms of how it is classified in Western culture. It is important to note that each tradition grounds itself in the fundamental principles of yoga. Throughout this paper qualifying terms will be used (e.g. Hatha yoga, Iyengar Yoga, and Tibetan yoga) to

appropriately apply the term “yoga” when examining the similarities and differences between each style.

Yoga in Modern Medicine

Many medical centers offer yoga and other mind-body therapies as part of their integrative medicine departments. However, yoga is not necessarily prescribed or viewed the same way as conventional medications or treatment options. Only in the past few decades has Western medicine begun to accept the powerful role yogic practices have in affecting psychological, behavioral, physiological, and biological processes (Chaoul, 2009, p.160). Current clinical research is attempting to prove the legitimacy of these claims by providing medical practitioners with enough evidence to justify its application in standard medical care (Smith, 2009, pg.465-475).

Yoga is believed to have numerous beneficial effects on both physical and emotional health. The importance of the mind, emotions, and behavior and their subsequent ability to influence our health and healing are foundational aspects of traditional Chinese, Tibetan, Indian, and many other holistic medical traditions around the world. According to the 2007 National Health Interview Survey (NHIS), which included a comprehensive survey of CAM use by Americans, yoga is one of the top 10 CAM modalities used. More than 13 million adults and 1.5 million children used yoga in the previous year (NIH Publication no. 09-1556, 2009). Yoga interventions have been studied to investigate the proposed benefits in both healthy individuals and those with various health conditions. The effects of yoga have been explored in a number of patient populations, including individuals with asthma, cardiac conditions, arthritis, multiple sclerosis, epilepsy, depression, diabetes, pain disorders, gastrointestinal disorders, and addictions

(among others) (Bower, 2005, p.166). Later in this paper, the benefits of yoga will be discussed in relation to patients with cancer.

Research suggests that the benefits of yoga include: increased muscular strength, flexibility, range of motion, energy, relaxation, and sense of well-being, decreased pain, improved sleep quality, stress reduction, and control over physiological parameters (NCCAM Publication No D412, 2009). In Australia, 59 patients with moderate to severe asthma were involved in a randomized, controlled trial of yoga intervention therapy (Bower, 2005, pg. 167). At post intervention, the yoga group demonstrated significant improvements in fatigue and mood, as well as positive changes in airway responsiveness. Another recent trial compared the effects of yoga and aerobic exercise among 57 patients with multiple sclerosis. Significant improvements in fatigue were observed in the intervention group members who participated in a modified version of Iyengar yoga (Bower, 2005, pg.167). The specific intervention program and yoga styles given to patients differ depending on the condition or disease. Ongoing pilot studies and academic research is taking place across disciplines to prove the effectiveness of implementing yoga programs into treatment regimens for different patient populations.

Exploration of Yoga Therapy

Yoga Therapy Definitions

Yoga Therapy is a difficult term to define due to the complexity of the practice, and also in part because the tradition and discipline of yoga is approached in several different ways. According to the International Association of Yoga Therapists (IAYT), yoga therapy is “the process of empowering individuals to progress toward improved health and well-being through the application of the philosophy and practice of Yoga” (IAYT, 2011). This all-encompassing definition addresses the general process of yoga therapy and does not discuss any specific details

about the practice. For the purposes of covering the complex nature of yoga therapy, this definition serves as a useful guide for practitioners and instructors. In addition to this definition, Gary Kraftsow, Founder of the American Viniyoga Institute, notes that yoga therapy is “the adaptation and application of yoga techniques and practices to help individuals facing health challenges at any level manage their condition, reduce symptoms, restore balance, increase vitality, and improve attitude” (IAYT, 2011). Taking elements of the first description, Kraftsow expands on the definition to include specific health-related symptoms that yoga therapy attempts to address. Both definitions cited here provide an overview of the broad spectrum of yoga techniques and specific styles used in yoga therapy.

In general, yoga therapy enables the student to move slowly and safely into modified postures that focus initially on relaxing the body and breathing fully. Furthermore, yoga therapy helps patients develop awareness of sensations in their body and thoughts in their mind. Yoga therapists modify the practice of yoga to meet the needs of individuals with specific or persistent health problems that are often not addressed in a traditional class setting. The adjustments include modified postures, stimulating breathing techniques, extended meditation, and specific postures geared toward active relaxation of the body. Programs of yoga therapy are self-empowering, allowing practitioners to implement a personalized practice that addresses the multi-dimensional aspects of their illness (IAYT, 2011).

Depending on the needs of the students and expertise of the instructor, yoga therapy can include fundamental elements from styles including modified Hatha, restorative yoga, and Tibetan yoga. For the purposes of this paper, the application of these three styles will be analyzed and discussed in detail. This analysis will provide a better understanding of how yoga can specifically be applied to populations of women with breast cancer. The details of each

intervention program will be discussed later in the paper. However, to further understand the application of these intervention programs in various patient populations, basic information about the use of yoga for cancer care will be explained.

Applying Yoga to Cancer Care

Receiving a cancer diagnosis and undergoing conventional treatment is associated with high levels of emotional stress and lowered psychological and physical quality of life (Smith, 2009, p. 465). When treating an aggressive disease like cancer, doctors can often forget about the patient's well being as a whole and only manage the biomedical aspects of the disease. In the past two decades scientific research has emerged to provide support for a complementary form of treatment that addresses all aspects of the patients healing process. As an addition to conventional treatment, yoga aids in holistic healing of a patient, providing both physical and psychological benefits. In a recent report from the Institute of Medicine "*Cancer Care for the Whole Patient*" (IOM, 2008), experts state that:

Cancer care today often provides state-of-the-science biomedical treatment, but fails to address the psychological and social (psychosocial) problems associated with the illness. These problems—including... anxiety, depression or other emotional problems...—cause additional suffering, weaken adherence to prescribed treatments, and threaten patients' return to health.

Emerging research proves that mind-body interventions appear to address several of the issues mentioned in this report (Chaoul, 2010). Thus, the mind-body connection created through intervention programs such as yoga therapy is a crucial aspect of integrative oncology. Cancer specific research suggests that when incorporated into traditional cancer care, mind-body practices like yoga can help improve quality of life, mood, sleep quality, physical functioning, and overall well-being (Chaoul, 2010, p.153).

Results from research studies indicate that programs involving variations of “gentle” poses, stretching, breathing, and meditation based stress reduction techniques are highly effective interventions for a wide range of cancer patients and survivors (Chaoul, 2010, p.152). Several studies include patients with different diagnoses (e.g. lymphoma, breast, and prostate), stages of disease, and treatment status (e.g. on vs. off treatment) (Smith, 2009, p.466). Across the range of yoga therapy approaches used, programs generally include physical postures that are accessible for patients with functional limitations (Bower, 2005, p.170). By modifying a gentle form of exercise, yoga provides a healing pathway that addresses physical, emotional, and psychological challenges that coincide with cancer treatment.

One study in particular examined the effect of an intensive yoga program in modulating psychological and physiological stress (Banerjee, 2007, pg. 242). For patients undergoing radiotherapy treatments, DNA damage to “peripheral blood lymphocytes” (PBLs) is common. PBLs are a type of white blood cell that circulates in the blood rather than being localized in an organ (Banerjee, 2007, pg. 243). Subsequently, DNA damage and its ability to self-repair have been linked to increased levels of stress in populations of breast cancer patients undergoing radiation treatment. Lead researcher Birendranath Banerjee and nine other researchers assessed the effect of an intensive yoga program on both psychological parameters (e.g. Hospital Anxiety and Depression Scale and Perceived Stress Scale) and radiation-induced DNA damage in the PBLs. In the end, these researchers speculated that the reduced DNA damage in the intervention group (yoga group) as compared to the control group might be linked to lower psychological stress. In sum, this study was one of the first to present preliminary data to support the influence of yoga intervention programs in reducing stress on the molecular level (Banerjee, 2007, pg. 249).

To further discuss the potential benefits of yoga therapy programs, an evidence-based review of yoga for cancer evaluated ten studies that incorporated yoga as an intervention for psychological symptoms in cancer patients (Smith, 2008, p. 465-475). A number of positive outcomes resulted from these studies specifically in measures of sleep, quality of life, and levels of stress. Improvements in mood were also noted in five of the six randomized controlled trials examined (Smith, 2008, p.473). For example, a study performed by Culos-Reed *et al.* (which will be discussed in further detail later on) found statistical trends toward improvements in mood among cancer patients who underwent a seven-week yoga program (Culos-Reed, 2006). Another study by Moadel *et al.* (2007) found that yoga interventions might vary in their effects on psychological adjustment, depending on the patients' treatment status (Smith, 2009, p.473). A study featuring a Yoga Awareness Program for women with metastatic breast cancer, a terminal form of cancer, found that yoga significantly boosted energy and helped the women accept their condition (Carson, 2007, p.25). This evidence-based review provides additional details supporting the use of yoga for cancer populations in terms of psychological benefits.

It is important to note that procedural limitations including small sample size, lack of or inactive control groups, and some inadequacies in statistical analysis render these trials preliminary evidence. However, the emerging research on the application of yoga intervention programs for cancer patients indicates that concrete medical evidence will continue to surface in support of this type of treatment option. More on promising research studies will be discussed in a later section in regards to the M.D Anderson Cancer Centers' 2011 grant from the National Cancer Institute. Most recently, yoga has been investigated as a viable complementary treatment option for various cancer populations, specifically breast cancer patients.

Yoga for Breast Cancer Patients

Examining yoga therapy in relation to a specific cancer population facilitates a detailed discussion about the components of the intervention program. Three styles of yoga commonly used by researchers in this field include modified hatha yoga, restorative yoga, and Tibetan yoga. This section will introduce each study's individual method, briefly describe the yoga program, examine the results, and assess the overall limitations (i.e. areas suggested for further research). After examining the individual studies, similarities and differences will be drawn from each program to further understand the complexities of yoga therapy. Unified under the term yoga, each style features its own unique origins, practice, and applicability to yoga therapy programs.

In the 2006 edition of the *Psycho-Oncology Journal*, Nicole Culos-Reed and her colleagues aimed their pilot study toward examining the physical and psychological benefits of a 7-week yoga program for breast cancer survivors, using a modified version of hatha yoga. In the 2009 edition of the *Psycho-Oncology Journal*, Suzanne C. Danhauer and her colleagues attempted to determine the feasibility of implementing a restorative yoga (RY) intervention for women with breast cancer while also examining the group differences in self-reported emotional, health-related quality of life, and overall symptom outcomes (Danhauer, 2009). In a third study, Lorenzo Cohen and his colleagues published one of several pilot studies out of the M.D Anderson Cancer Center that focused on yoga intervention programs for women with breast cancer using Tibetan yoga practices. Analyzing these three studies establishes a framework for understanding previous applications of yoga for breast cancer survivors in the medical research community. However, it is important to note that the three studies cited in this paper are only a sample of the available literature on this subject. Although several program elements are alike, each individual program provides important details that advance the discussion on implementing mind-body therapies into conventional care for cancer patients.

Modified Hatha

Primary researcher Nicole Culos-Reed and her colleagues (Culos-Reed, 2006, p.891-897) published their pilot study of yoga from breast cancer survivors in the 2006 edition of *Psycho-Oncology Journal*. Their primary goal was to assess changes in physical and psychological variables over time, comparing intervention vs. control participants. Eligible participants included cancer survivors (18 years and older) who were not currently undergoing active treatment and had no additional health concerns. Participants were also required to be a minimum of three months post-treatment. Assessments measured quality of life, symptoms of stress, mood, physical activity and fitness, and general psychological outcomes. Little demographic differences were seen in participants, who were 95% female, approximately 50 years old, and 56 months from the time of diagnosis. Eligible participants (n=38) were randomized into either the intervention group (n=20) or the waitlist control group (n=18). Intervention group members participated in a 75-minute, 7 week modified Hatha yoga program. Both groups completed assessments before and after the yoga program.

Influenced by the Iyengar tradition and the study of kinesiology, this modified version of hatha yoga emphasizes the adaptation of traditional yoga postures (asanas) for people who are particularly stiff, immobile, injured, ill, or under extreme stress (Culos-Reed, 2006, p.892). This particular program focused on enabling participants to move slowly and safely through modified asanas in order to bring awareness to the body and breath. As the sessions progressed, students ideally would build enough strength, flexibility, and balance to move toward to the full version of the postures while remaining relaxed and aware of bodily sensations. The fixed schedule featured: 0-10 minutes- gentle breathing, laying supine with legs flexed at the hip and supported by a wall; 10-60 minutes- a series of 6-10 modified asanas comprised of gentle stretching and

strengthening exercises that target specific groups of muscles, tendons, and ligaments within the participants pain free zone; 60-75 minutes- savasana or relaxation pose (p.893). In general, hatha yoga focuses on using the breath as a vehicle for the asanas, as the student moves into each posture attention is drawn to both the breath and the internal physical sensations it creates.

Results from this pilot study show significant differences between the intervention and control group at post-intervention only in psychosocial variables (i.e. global quality of life, emotional function, and gastrointestinal symptoms). Although all participants showed some physical fitness improvements over time, there were no significant differences in physical improvements favoring the yoga group (p.897). The findings from this study suggest that yoga has a significant potential and should be further explored as a beneficial physical activity option for cancer survivors. Due to the relatively small sample size, short duration of the program, and overall limited type of participants, this initial pilot study merits additional research with greater depth and variability. It provides the groundwork for future research studies to investigate the suggested benefits in a larger and more diverse sample size.

Restorative Yoga

The pilot study focusing on restorative yoga (RY) techniques was published in the 2009 edition of the *Psycho-Oncology journal* by seven authors, including lead researcher Suzanna C. Danhauer (Danhauer, 2009, p.360-368). In general, this program echoes several elements of Culos-Reed's study on the modified hatha program while at the same time providing greater detail into its methods and results. Eligible women included those who were: (1) at least 18 years old; (2) diagnosed with breast cancer (any stage); (3) 2 to 24 months post-primary treatment (surgery) following initial diagnosis and/or had a recurrence of breast cancer within the past 24 months (regardless of treatment status); (4) physically able to attend RY classes; (5) able to

understand English; and (6) free of medical contraindications reported by their physician.

Researchers recruited a sample of 44 participants (mean age= 55.8 years) with little between group differences in demographic, clinical, or yoga related data (p.362). Data collection was completed during the pre and post intervention questionnaires. Participants were equally randomized into either a RY group or a waitlist control group. The RY group participated in 10 weekly 75-minute RY classes taught by a certified National Yoga Alliance instructor. The waitlist control group completed questionnaires at the same intervals as the women in the RY group.

The intervention group participated in a RY program based on the Integral Yoga tradition, featuring postures, deep relaxation, breathing practices, and meditation. Specific yoga postures were drawn from the RY practice, which is described as “active relaxation”. This gentle type of yoga specifically focuses on postures supported by props (e.g. yoga blocks, blankets, and bolsters) with an emphasis on breathing and relaxation. The guiding principle of yoga “ahimsa” (non-violence) was also emphasized during this program. Reinforcing the notion of being gentle to one’s body and self, this principle made clear to the participants that they should not practice any pose that caused or exacerbated discomfort. Postures were modified based on the participants’ needs. Specific poses featured in this program included: leg stretch (Janu Sirsasana), seated twist (Ardha Matsyendrasana variation), and seated side bend (seated Parighasana). In all poses, the teacher assisted participants’ in adjusting props to create maximum comfort and relaxation. The participants were reminded to notice their breath and to breathe slowly and deeply through each movement.

Revisiting the study’s goals to determine the feasibility of implementing a RY intervention for women with breast cancer and to examine group differences in self-reported

emotional, health related quality of life, and symptom outcomes, researchers found that group differences favoring the yoga group were seen for mental health, depression, positive affect, and spirituality. The yoga group demonstrated a significant within-group improvement in fatigue, negative affect, and emotional well-being (p.366). Additionally, the results from this study indicate that a RY intervention is feasible for and desired by women with breast cancer. Limitations for this study include a small sample size, multiple statistical comparisons, an inactive waitlist group, a heterogeneous group of women with similar treatment statuses, and lastly a non-demographically diverse group (majority of women were white with relatively high socioeconomic status). Difficulties with adherence rates and recruitment were also seen, primarily because of distance from the intervention site and lack of response to the recruitment letter. Nonetheless, the results of this study provide evidence for the program's feasibility as well as support for a variety of emotional benefits from a RY program for women with breast cancer. Researchers suggested narrowing the sample to determine when an RY intervention may be most useful (i.e. during or post treatment), examining benefits of RY in patients with various types of cancer, and incorporating theoretical frameworks to enhance adherence and strengthen participant outcomes.

Tibetan Yoga

In general, most forms of yoga practiced in the West primarily stem from Indian tradition (including the two types discussed above: modified hatha and restorative yoga). A less common practice originates from the yogic traditions of Tibet, which are known best for their meditative techniques. This particular study, done by researchers at the M.D Anderson Cancer Center, was the first published research to document the implementation of traditional Tibetan yoga techniques in a specific cancer population (Chaoul, 2009, p. 144-175). Two Tibetan practices,

Tsa lung and Trul knor, emphasize the release of physical, energetic, and mental obstacles to allow breath to flow throughout all levels of the body, energy, and mind. Practiced for centuries by Tibetan monks and lay practitioners, the practices utilize imagery and exercises that are not physically demanding. Lead researchers Lorenzo Cohen and Alejandro Chaoul believe that this particular style of yoga is most beneficial for cancer patients who are undergoing and recovering from chemotherapy because the movements are gentle and simple, emphasizing the basic principles of controlled breathing, visualization, and mindfulness techniques.

The actual yoga program consisted of four main components: (1) breathing exercises, (2) meditative concentration, (3) *tsa-lung* sitting yogic postures, and (4) *trul-khor* yogic postures with more physical movement. The breathing exercises helped manage the mental obstacles, calming the mind and regulating breath in preparation for the movement-based practice. During the meditative concentration, participants were instructed to use calmness and self-observation to guide the breath in clearing away the obstacles of the mind. They also learned simple meditative techniques that incorporated sound and visualization. After clearing out mental obstacles, participants moved into the physical portion of class. The *tsa-lung* exercises built on the learned meditative concentration and breathing exercises by incorporating five simple, seated movements that focused on different points on the body called chakras (located at the head, neck, chest, lower abdomen, and perineum). Moving into the fourth component of class, five movements from the *trul khor* were introduced to participants. Using the same meditative techniques from each of the previous sections, participants were instructed to move through another set of simple, invigorating movements. All four components were done either sitting on a cushion or sitting in a chair (Chaoul, 2009, p.160-161). This seated position is used to emphasize the connection between the breath and meditative elements of the practice.

In the second of two pilot studies focusing on the use of Tibetan yoga (TY) for specific cancer populations, Lorenzo Cohen and his colleagues at the M.D Anderson Cancer Center (Chaoul, 2009, p. 152) examined the benefits of a seven-week TY program for women with breast cancer. Their general hypotheses were that those assigned to the TY program would demonstrate improvements in psychological adjustment and lower levels of fatigue and sleep disturbances, in comparison to the control group. Eligible participants consisted of women with stage I-III breast cancer who were undergoing treatment (radio or chemotherapy) or who underwent treatment less than one year prior to enrollment in the study. Researchers recruited 59 women into the study, randomizing them into either the yoga group or a wait list control group. The TY program explained above was used in the seven weekly sessions offered to the intervention group participants. After each session, participants were provided with printed materials to assist their individual home practice (which was encouraged once a day) and to prepare them for the next session.

Results from this study indicate no statistically significant group differences for the measures of psychological adjustment or fatigue (p. 162). However, participants in the yoga group recorded in their post intervention assessments decreases in overall sleep disturbances as well as improvements in subjective sleep quality, sleep latency, and sleep duration. Although the statistical evidence is limited, this particular study is notable because of its use of a TY program for breast cancer patients. Limitations noted in the two previous studies correspond with those seen in this particular research study. This pilot study highlights the beginning stages of medical research supporting the beneficial health effects of yoga programs (specifically TY programs) for cancer patients. As a whole, the extensive research being conducted by Cohen and the M.D

Anderson Cancer Center on the application of yoga for cancer care continues to grow and gain support in the medical community.

Combining methods and results.

In comparing the information above, there are several similarities and differences between the three studies that are worth noting. Referring back to the general definition of yoga therapy (IAYT, 2011), “the process of empowering individuals to progress toward improved health and well-being through the application of the philosophy and practice of yoga,” it is clear that the ultimate goal of these three studies was to improve the health and well being of women with breast cancer. The three studies outlined above act as building blocks for an emerging field of research that seeks to statistically support the suggested benefits that a yoga program could offer cancer patients. Under the influences of the two Eastern Asian yogic traditions, the unique programs offer insight into methods for applying this type of mind-body therapy to cancer care.

Similarities between the three studies include: sample size, type of participant (women with breast cancer), variables, and general yogic techniques. All participant assessments were taken pre and post intervention. At the beginning of each study, the eligible participants were equally randomized into either an intervention or control group. Researchers cited few within group differences; participants were generally white women in their mid-50s with a stage two or three breast cancer diagnosis. All three interventions focused on the coordination of the breath and movement, using the breath to create awareness and relaxation. Variations of modified and simple asanas (postures) were also used in each of the studies. In addition to the similar intervention methods, the results from each study generally highlighted comparable limitations and suggested benefits.

In terms of differences, the yoga programs varied in terms of the type of yoga program used (e.g. modified Hatha, restorative, or Tibetan yoga), the length of intervention, and the specific results found. Each program featured a unique focal point and different stylistic elements. The modified Hatha program focused on building strength to complete the full physical posture as well as focusing on the use of breath to guide the flow of movement. The restorative yoga program emphasized active relaxation, and the yogic principle of “ahimsa” or nonviolence toward ones body. The RY program also focused on the utilization of various props to provide patient specific modifications. Lastly, the Tibetan yoga program used a style of yoga that focused largely on the meditative components of a yoga practice. The four main components of this program are all supported by the use of one’s mind to create desired sensations in the body. Both the modified yoga program and Tibetan yoga program lasted seven weeks, while the RY program lasted ten weeks. Results varied in relation to the studies’ hypothesized outcomes versus the actual outcomes. Overall, the RY and Tibetan yoga programs yielded the greatest number of positive outcomes from their studies’ assessments.

In general, the conclusions of each study indicate that any prescribed practice of yoga therapy provides preliminary evidence for the application of yoga in standard cancer care. At the end of each study, researchers indicated the feasibility of yoga programs for cancer patients and implied that further research is needed to support the necessity of these programs in standard cancer care. It is clear the researchers are investigating several styles of yoga to determine which program is the most effective for cancer populations in general. Although each program provides important information about the positive effects of yoga therapy, no study offers an overall best practice for this type of intervention program. As mentioned in a previous section, research out

of the University of Texas M.D Anderson Cancer Center currently leads the way in the development of standardized guidelines in this area of complementary medicine.

Discussion

M.D Anderson Cancer Center and Cohen

In their ongoing attempt to scientifically prove the beneficial impact of mind-body interventions, The University of Texas M.D Anderson Cancer Centers was recently awarded a \$4.5 million grant from the National Cancer Institute to study the effectiveness of incorporating yoga into treatment programs for women with breast cancer. For over ten years, the M.D Anderson Cancer Center has been conducting scientific research to understand the benefits of yoga practices in people with cancer (“M.D Anderson Receives Grant”, 2011). Lorenzo Cohen, Ph.D., professor and director of the Integrative Medicine Program at M.D Anderson, currently leads the way in conducting scientific research on the incorporation of mind-body interventions for breast cancer populations. “Research has shown that yoga and other types of mind-body practices, incorporated into the standard of care, can help improve patient outcomes, particularly quality-of-life,” said Cohen, the study’s principal investigator. “However, none have become standard of care, or are on the clinical care pathway for cancer patients. This funding will allow us to definitively determine the benefit of incorporating yoga into treatment plan for women with breast cancer.” The research is being done in collaboration with the Vivekananda Yoga Anusandhana Samsthana (VYASA), a yoga research foundation and university in Bangalore, India (2011).

Cohen and his colleagues previously conducted two studies examining yoga programs for populations of breast cancer patients, labeled Phase I and Phase II respectively. Elements of Phase I were discussed in the previous section of this paper on Tibetan Yoga programs for breast

cancer patients. For the first time in this area of research, Phase II discussed the benefits of yoga for cancer patients in comparison to an active control group that participated in simple, generic stretching. Cohen notes that (2011, p. 2) “the combination of mind and body practices that are part of yoga clearly have tremendous potential to help patients manage the psychosocial and physical distress associated with treatment and life after cancer, beyond the benefits of simple stretching.” The yoga groups reported improvements in physical function compared to the control groups who engaged in simple stretching and/or those who did not participate in the program at all. According to Cohen, improvements in physical function included basic everyday activities such as walking up a flight of stairs or around the block, and carrying a bag of groceries. In addition to improvements in everyday functioning, participants in the yoga group reported improved sleep patterns, reduced fatigue levels, and lowered stress hormone levels.

Building on results from Phase I and II, the Phase III study will enroll 600 women with stage I-III breast cancer, all of whom are undergoing radiation treatments at M.D Anderson Cancer Center (2011). The study will place the women into three randomized groups: yoga (YG), stretching/relaxation (STR), and waitlist control (WLC). Participants in both the yoga and stretching groups will attend sessions three days a week throughout their six weeks of radiation therapy. Participants will self-report quality of life aspects, including physical function, mental health, and fatigue levels. In addition to reporting their sleep quality, patients also will wear an activity watch monitor that objectively monitors the restfulness of their sleep. Lastly, the study will assess cortisol levels (stress hormone levels) in the patients. This is particularly important because higher stress hormone levels throughout the day have been linked to worse outcomes in breast cancer (“M.D Anderson Receives Grant”, 2011).

The secondary aim of Phase III is concerned with addressing the application and feasibility of yoga intervention programs for cancer patients. The details of this portion of the study include cost efficiency analysis for the hospital and health care use costs in general, as well as examining work productivity of patients. Cohen stresses (2011):

In this age of health care reform, it's very important to determine the cost savings, not only to the hospital, but to also to women's lives and their ability to engage in their work in a productive fashion, whether that's the work of being a mother and running a household or working outside the home, said Cohen. By including such data as cost-effectiveness analyses, we may be able to change the standard of care the way women with breast cancer are treated in this country.

Examining all aspects of the projected costs will help determine whether or not implementing yoga intervention programs in hospitals is feasible for both the facilities and patients. By combining these two aims, Cohen and his colleagues have the potential to define the role of yoga in the medical community as a standard component to conventional treatment. As the third phase of their study progresses, it will be important to see how the new results compare to the information found in previous studies.

Receiving a sizable grant from the National Institute of Cancer is yet another step toward proving the critical role yoga can play in transforming traditional treatment for cancer worldwide.

Part I Summary

The purpose of the first section of this paper was to outline the ways in which mind-body therapies can be applied to modern medicine. In describing the basic elements of CAM and yoga, a greater understanding has been gained about the proposed benefits of these therapies. Recent research suggests that yoga therapy practices can help manage symptoms associated with various illnesses including asthma, multiple sclerosis, and cancer. More specifically, yoga therapy can be applied to various cancer populations to provide improvements in mood, sleep quality, stress

levels, and overall quality of life outcomes. Three notable research studies used the fundamental principles of yoga in intervention programs that incorporated styles such as modified hatha yoga, restorative yoga, and Tibetan yoga. Results from each study cite improvements in several psychological and quality of life outcomes in women with breast cancer. Lorenzo Cohen and the M.D Anderson Cancer Center currently lead the way in this research field, as they continue to investigate the application and feasibility of a yoga program using an active control group. Their ultimate goal is to definitively determine the necessity of incorporating yoga therapy programs into standard cancer care worldwide. The evidence-based research presented here is the foundation for the following section of this paper.

Part II: Interventions in Practice

The purpose of the second half of this paper is to provide information about yoga intervention programs in practice. First, this section will outline the curriculum used in the Yoga Impact 220-Hour teacher-training program. As a non-profit outreach program, Yoga Impact seeks to provide trainings and yoga programs for underserved populations in communities across the country. The information and skills gained from this training will be the foundation for the final portion of this paper. After reviewing the program’s philosophy and describing the training curriculum used by Yoga Impact, this paper will conclude with a detailed description of three originally-designed yoga classes. This series of yoga classes will serve as a home practice for women with breast cancer who are interested in exploring the benefits of this therapy in the comfort and convenience of their homes. The description of each class will include extensive detail relating to the specific class components, special considerations and modifications necessary for this population. In sum, this original home practice series will provide another avenue for exploring the benefits of a yoga practice for women with breast cancer. The purpose of this section is to illustrate existing best practices and present a new technique for approaching this type of therapy modality, the at-home practice.

Yoga Impact Teacher Training

Yoga Impact (YI) is a non-profit outreach program that “seeks to empower volunteers, yoga studios, and local organizations to reach marginalized populations and empower those individuals to embrace yoga practice as a critical piece of a healthy lifestyle” (Candea, 2012). Founded in 2008 by Nancy Candea, Yoga Impact aims to take yoga outside of the studio and bring it into the community, reaching populations that would not traditionally have access to the benefits of this practice. On a larger scale, YI works to create better communities by sharing skill

sets and practices that empower individuals to promote overall health and well-being. Outreach programs sponsored by YI include classes and workshops at the following locations: Morris County Jail (NJ), Interfaith Homeless Shelter (Morristown, NJ), Special Olympics (Lawrenceville, NJ), Boulder County Jail (CO), SPAN Women's Shelter (Boulder, CO), and Youth Service Initiative (Boulder, CO) (Candea, 2012). This list does not include other community classes and workshops that are offered as free services in the above communities. As the program continues to expand, YI plans to continue its empowering work and reach more communities each year.

Through trainings and workshops, YI trains and empowers volunteers to bring the fundamental tools of a yoga practice to specific populations in their respective communities. The trainings are designed to inspire volunteers to engage in community development and selfless service. In Colorado and New Jersey, Candea and a team of other yoga instructors collaborate to design training curriculums that foster individual growth and prepare students to teach yoga in their communities. A yoga teacher training with YI is about learning critical thinking skills and challenging trainees to know the populations they are serving. According to Candea, "you can't just teach routines", you need to understand the needs of your students and invent ways to make them successful in your class (Interview, 8 March 2013). In addition to the basic 200 hour trainings, YI offers advanced level trainings in: Yoga for War Veterans and Active Troops, Yoga for Trauma and Addiction, Yoga for Cancer, Hands-on Assisting, Therapeutic Yoga for the Spine, Introduction to Ayurveda, and Yoga for Children and Teens. The education programs sponsored by YI are designed to teach trainees how to bring the practice of yoga to diverse populations in the community. The goal of these unique trainings is to empower volunteers to be leaders in their communities, through their selfless service and yoga instruction. Each 200-hour

training program is designed in conjunction with the Yoga Alliance requirements, an international association and registry that requires training programs to meet a set of minimum standards for instruction. Yoga Alliance promotes the need for “competent, safe instruction and rigorous standards for professional training” (yogalliance.org). After completing a set of extensive requirements, YI trainees exit the program with a certification that is recognized by professional institutions worldwide.

Training Curriculum

In August 2012, the Yoga Impact 220-hour teacher training started in Boulder, CO. Nancy Candeia (YI founder, E-RYT-500, CYT, and CPT), Michelle Anderson (CYT), and Shanti Medina (CPT, CYT) are the lead teachers for this training.¹ The training is structured with two weeklong intensives, once a month workshops, weekly yoga classes, semi-private instruction, homework, a practicum, and a daily personal practice/study. Throughout the course of this training, participants are given the tools that allow them to inspire personal growth within themselves and their future clients. Over the course of 10 months, participants are taught the following information: the fundamentals (strength, flexibility, sun salutations, nutrition), teaching methodology (studio asana, restorative yoga, chair yoga, sequencing, language, the business of yoga, hands-on adjustments), anatomy, physiology, neuromuscular sculpting (how science applies to postures, injury avoidance, illness, stress and mental focus), and ancient yoga traditions (history of yoga and Ayurveda). Most importantly, this training is geared toward the adaptation of yoga asana and practice techniques for underserved populations. Specifically, this training features an additional 20-hour certification in yoga for trauma and addiction.

Throughout the training, traditional yoga asanas are instructed in a way that includes techniques

¹ E-RYT: Experienced Registered Yoga Teachers, CYT: Certified Yoga Teacher, CPT: Certified Personal Training

and insights for adapting these physical postures to the needs of individuals with trauma, illness, addiction, and at risk children and youth (Candea, 2012).

An important component of this training is the development of a daily home practice that includes asana (postures), pranayama (breathing techniques), and meditation. In order to continue growing as a yoga student and be prepared to instruct clients about yoga techniques and philosophy, each participant in the training is required to complete a yoga practice at home. With this, participants learn to rely on their own knowledge and experience, tailoring each practice to their daily individual needs. This practice and self-discipline is preparation for the challenges that a teacher might encounter when entering a new yoga studio or community space. An essential trait of any instructor is the ability to understand the needs of each student and adapt the practice accordingly. When working with underserved populations, a teacher should expect to encounter individuals who need modifications and props in several of the traditional postures.

In addition to learning the fundamentals of teaching yoga to students both inside and outside of the yoga studio, each trainee is also expected to design several lesson plans with a specific population focus. In each of these lessons, the trainee must include the following class components: introduction/centering, asana (postures), savasana (final relaxation posture), pranayama and/or meditation. The following section of this paper will include a detailed outline of three classes based on this framework. Before explaining each class, we must understand the methodology behind structuring a yoga practice. When designing a yoga class it is critical that the above elements are included to ensure a well-rounded, safe, and fulfilling practice for each student. In developing the asana portion of the class, special considerations and modifications should be taken into account for each of the postures included in the practice. As a part of the teacher training and certification process, each trainee is required to create five detailed lesson

plans that contain information about each class component. Specifically, a lesson plan includes time estimates, instructions for each pose, transitions, logic for choosing each posture, modifications, and general notes about the connections to the class theme and breath work.

Home Practice Series

The specific population that this paper will address in the following lesson plans is women with breast cancer. This home practice series is comprised of three yoga classes that can be completed in a quiet space that is suitable and available to the student. Although many medical centers and treatment facilities are beginning to offer complementary services such as yoga, there are often several factors that prevent women from attending. Many women may not be able to go to a class because of time constraints, job commitments, cost of classes, lack of child care, intimidation or fear of being unable to participate fully, or the lack of yoga programs in their treatment facility. It is not uncommon for special populations, such as women with breast cancer, to feel intimidated by a yoga class because of assumptions that surround this type of physical and spiritual practice. Creating a home practice series opens up the practice of yoga to anyone who is interested in exploring its benefits. Practicing at home is a way to experience the benefits of yoga on your own, without fees or scheduling constraints. Building a strong foundation at home allows the student to grow, self-motivate, and practice yoga in a private setting. Regardless of physical, financial, or time constraints, a home practice affords everyone the opportunity to practice yoga.

Before outlining the specifics of each class we note that there are several considerations a yoga instructor must account for when working with someone who is undergoing conventional medical treatment for breast cancer. Conventional treatment for breast cancer can often leave a women feeling emotionally and physically traumatized. In order to implement a successful yoga

intervention program, it is important to understand the physical and psychological effects of treatment. Traditional treatment for breast cancer can include one or more of the following: surgery (lumpectomy or mastectomy and possibly of lymph node dissection), radiation, chemotherapy, and hormonal therapy (NIH, 2009). If the original cancer cells are fueled by estrogen, hormonal treatment is prescribed for a number of years to reduce the amount of estrogen in a women's body. However, hormonal therapy can have ongoing side effects, such as hot flashes, mood swings, difficulty sleeping, sexual side effects, and joint stiffness (Blank, 2003). Additionally, it is also not uncommon for chemotherapy treatments to cause premenopausal women to go into menopause.

Physical consequences of treatment are often related to the arm and chest. Commonly affected muscles include the pectoralis major and minor, latissimus dorsi, serratus anterior, and subscapularis (Nett, 2012).² A mastectomy with lymph node dissection often results in very tight pectoralis major and minor muscles in addition to tightness in all muscles that intersect the armpit. Range of motion and strength in the arms and chest can significantly decrease both initially after surgery and for many years to follow. Loss of sensation and awareness in the affected side is also a common side effect of surgery. Other physical consequences to consider are tightness in the intercostal muscles of the front and side ribcage as well as tightness in the pectoralis muscle (any muscle that connects the front walls of the chest with the bones of the upper arm and shoulder) (Blank, 2003)³. Lymphedema, swelling due to a blockage in the lymph passages, is also a common side effect of surgeries that include lymph node dissection.

Lymphedema occurs in 10-15% of patients who undergo a mastectomy that includes removal of

² See Figure 1 in Appendix D for diagram of upper body muscles.

³ See Appendix D for more details about the pectoralis muscle

underarm lymph tissue (Dugdale, 2012). When lymphatic drainage of the arm passes through the armpit, it causes the arm to become swollen and painful.

The information cited here suggests that a yoga practice for this particular population should focus on stretching and strengthening many of the major muscle groups in the chest, arm and shoulder. Through a series of asanas and concentrated breath work, women affected by the consequences of cancer treatment can begin to release physical tension and manage psychological stress. Incorporating knowledge of human anatomy into a yoga sequence is essential to the student's safety and success in the class. Just as the diagnosis and treatment of cancer differs depending on the individual, so too does the yoga practice that one might implement to alleviate symptoms or side effects of treatment. Jaki Nett, an Iyengar yoga expert, suggests that a yoga practice should "bring as much balanced freedom of movement to the shoulder blade, collarbone, and humerus (the head of the arm bone)" (Nett, 2011). Retraining the shoulder girdle to move through a full range of motion also helps restore flexibility and movement in the upper body. Modifications and variations for each asana are intended to meet the needs of individuals based on physical ability and yoga experience.

To accommodate for the special needs of this population, asanas should focus on the following movements of the shoulder girdle: elevation, depression, protraction, and retraction. Each of these movements will increase range of motion and flexibility in area of the body that are negatively affected by conventional treatment. Elevation requires shrugging the shoulders upward, toward the ears while depression involves lowering the shoulders downward, away from the ears. Protraction is achieved by reaching forward as if you are grabbing something, moving the shoulder blades away from the spine. Retraction is the opposite of protraction, achieved by squeezing the shoulder blades together behind the back. An asana practice for breast cancer

survivors should also focus on all of the movements of the arm bone including: flexion, extension, medial rotation, lateral rotation, adduction, and abduction. Flexion occurs when arms are raised overhead while extension can be achieved by sweeping the arms straight behind the back. Medial rotation is an internal rotation of the arm bone and lateral rotation is an external rotation. Bringing the arms toward each other in front of the body is the movement of adduction. Lifting the arms away from the body at shoulder height is the movement of abduction (Nett, 2013). Each of the postures featured in the home practice series will include one or more of these movements.

Finding Inner Balance through the Elements

The tattwas, or elements, are an essential aspect of yoga therapy and Ayurveda, the science of Indian medicine (Sawaswati, 2012). Knowledge and awareness of the elements is a powerful way to restore balance within the body. The five elements in the Indian tradition are earth, water, fire, air, and space. The yoga classes presented here will focus on three of the five elements: earth, water, and fire. Using the elements as a framework for this three class series is an original way to structure a set of classes for women with breast cancer. Finding balance by attending to aspects of each element in the body has been cited by many yoga and Ayurveda practitioners as a means for obtaining optimal health and happiness (Sawaswati, 2012).

Each of the five elements represents a state of matter. Earth represents everything in nature that is solid; water is everything that is liquid; air is everything that is gas. Fire is the part of nature that transforms one state of matter into another. For example, fire transforms the solid state of water into liquid and then into its gaseous state (Sawaswati, 2012). Fire is highly regarded in yogic philosophy because of its ability to purify and control other states of matter. Each element is also responsible for different structures in the body. For example, earth forms

solid structures such as bones, flesh, skin, tissues, and hair. Water takes the form of bodily fluids such as blood, sweat, urine, etc. Fire forms hunger, thirst, and sleep (Supna, 2010). It is said that if any of the five elements are out of balance in the body, disease and suffering may occur.

Focusing on purifying and bringing the elements into harmony with one another is one way that yoga can help restore health and balance in the body. Amidst the unnaturalness and instability of conventional cancer treatment, a yoga practice that focuses on managing imbalances in the body can be highly effective. A brief discussion of the three elements as themes for this series of classes will help explain how these nature quantities can be applied to an actual yoga program.

The Earth element (Prithivi). The Earth element is located at the root of the human body in the pelvic floor. A yoga practice for balancing the Earth element should include postures and breathing techniques that focus on finding your center. The earth represents stability or the ability to “maintain structural integrity under stress” (Bobier, 2011). In yoga, the goal of an asana practice is to embody this structure and stability. By stabilizing the body, the mind is supported and able to become quiet and relaxed. Alignment is central to an earth element practice. In yoga postures, students are often instructed to “rise up”, “lift”, “stand tall”, and “root down”. These actions are consistent with the natural features of the earth; for example, the sun “rises up” in the horizon and the trees “stand tall” during the storm. Students, specifically women with breast cancer, can find the stability and calmness of the earth in their own bodies through concentrated breath and movement. With this, we draw our energy away from the instability of our minds and thoughts to focus on the stable aspects of our individual breath and our connection with the earth. One particular pose featured in this practice, tree pose (Vrkasana), encourages students to explore their roots while also challenging their balance. This pose prompts the student to engage their pelvic floor, find their center, and focus on stability. At the end of the practice, the student

is instructed to reflect on the characteristics of the earth (specifically the mountain). This element themed yoga practice will encourage women with breast cancer to discover a sense of stability in their minds and bodies during a time that is often unstable and uncertain.

The Fire element (Agni). The fire element is located in the middle of the torso at the seat of the digestive organs. A yoga practice designed to ignite the fire element is guided by themes of dynamic energy and power. Qualities of the fire element include transformation, intensity, and radiance. Fire is most commonly used as a way to purify the body and burn up impurities (Supna, 2011). It can be expressed as bringing about change through action. The fire element is experienced as the governor of digestion, appetite, thirst and sleep. A yoga practice with fire as its theme will feature a set of asanas that increases internal body temperature and moves the body in an energetic fashion. Increasing fire in the body can ignite the digestive tract and help alleviate the imbalances that are common side effects of treatments such as chemotherapy and radiation therapy. A balanced yoga sequence for this element should include both movement and stillness in order to sustainably build heat and harmonize with the other elements. The yoga practice in this series is focused on invigorating the student through flowing movements and dynamic twisting postures. Twisting is great way to stimulate the digestive tract, release toxins, and increase blood flow (Sawaswati, 2012). The meditative practice at the end of this class will also provide the student with the opportunity to connect with someone who provides a transformative light or source of energy in her life. Throughout this practice, it is important to emphasize compassion for the body and nourishment of the fire that resides inside oneself.

The Water element (Ap). The water element governs the pelvis and resides at the center of the pelvic floor (Martins, 2012). Qualities of the water element include softness, adaptability, fluidity, and power. It is expressed as deliberate movement and is embodied through the

technique of entering and leaving. Inherent to its nature is the concept of ebb and flow; water surrounds our bodies and flows naturally through our system. A yoga practice that cultivates this element is characterized by effortless, flowing movement in and out of asanas. This is also expressed by the synchronization of the breath and movement, repeating a set of flowing postures multiple times. An application of the water element is one that focuses on softening the muscular structure, allowing the muscles to become passive and relaxed. Yoga asanas that focus on the water element can help relieve tight or contracted energy in the body, whether it is in the form of a tight shoulder girdle or a stuck emotional feeling. By practicing a yoga sequence that embodies the water element, a yoga student can cultivate an awareness of life's constant ebb and flow. This series is designed to cool and calm the mind of the students, allowing them to take a break from the negative thoughts or feelings in their bodies and embrace the fluidity of synchronized breath and movement. The meditation practice at the end of this class focuses on engaging the senses and envisioning the body as a calm or steady current of water. The restorative nature of this practice allows the student to relax muscular tension, stretch impaired muscles in the upper body, and discover stillness of the mind.

Class Components. In order to ensure consistency across the series, each element themed class will contain four class components. The four components are: an introduction, a pranayama practice (breathing techniques), a sequence of asanas (postures), and a final relaxation/guided meditation. The introduction provides a brief description of the element that will be featured in the class. In order for the student to fully benefit from the yoga practice, it is essential that the theme and subsequent class components be interrelated. During the introduction to the class, the student is instructed to observe the present feelings in her body, find a quiet space for self-reflection, and prepare for the following sequence of postures and breath work.

After the introduction and centering is completed, the student will then be instructed to complete a pranayama. Each pranayama is tailored to fit the theme of the class. For example, the fire element practice features the Ujjayi breath or the breath of victory. Completing this breath work helps the student build heat in the body and focus on connecting with the strength of the fire element. Pranayama, or the art of controlling the breath, is the cornerstone of any yoga practice. It is the vehicle through which the student can make connections with the breath and body.

After completing the short breathing exercise, the student will begin the physical portion of the practice. Each posture is sequenced in a strategic manner, including transitions between each pose. The postures begin with gentle stretches and warming movements. Following a warm up, the postures become more advanced and demand more from the student physically.

Following a set of peak postures, the student is instructed to complete a series of cool down or counter poses. Throughout the asana portion of the practice, the student is reminded to connect her breath with the movements, ideally syncing one breath with one movement. By making a conscious effort to include the breath in each movement, the student is able to relax the muscles and move through the practice with intention. During the more challenging poses, the breath is critical to the maintenance of focus, balance, and ease. At the end of each practice, there is a 10-minute final relaxation pose that includes a guided meditation prompt. Prior to settling into the final pose of class, students are asked to read the prompt and engage in the practice of self-reflection and meditation. For example, in the fire element practice, students are instructed to light a candle and envision the qualities of candlelight in a loved one or in themselves. Ending with a meditation practice is a way to incorporate another aspect of yoga into this home practice series in addition to that of _____ . Combining all four of the class components is essential to

the home practice series because it facilitates a yoga class that is safe, complete, and appropriate for this particular population⁴.

Conclusion

In concluding this detailed analysis of yoga as a complementary treatment method for cancer care, we find that yoga has the potential to be an essential aspect of any conventional treatment plan. Over the course of the past two decades, scientific research in this field has begun to document the proposed benefits of this type of therapy. Receiving a cancer diagnosis does not have to be solely associated with a conventional treatment plan and a slow recovery process. The information in this paper includes original class outlines to complement the evidence-based research that exists in this field. Implementing a successful home practice series does, however, require a student to be willing and able to practice the sequence alone. It also does not facilitate the same type of community that someone might experience in a group class setting. In order to practice this series of yoga classes safely it is highly advisable to consult with a doctor about individual limitations and necessary modifications.

Yoga is a complementary approach to the healing process that addresses all aspects of the human experience. In accordance with ancient Eastern Asian traditions, yoga connects all aspects of the mind, body, and spirit. Implementing yoga therapy programs into hospitals and oncology facilities worldwide will give women and men the option to enhance their conventional treatment plans with care that goes beyond the walls of a doctors office. By relaxing the mind and controlling their breath, patients have the ability to transform gentle movements into a full body and mind experience. Through this centering practice, individuals learn life-changing skills that can help them find peace and strength in times of tremendous stress and instability. Overall, yoga

⁴ See Appendix A-C for detailed class outlines.

is a self-empowering practice that gives individuals the power to overcome the physical, emotional, and psychological challenges associated with any medical diagnosis.

References

- Bower J.E., Woolery A, Sternlieb B, et al. (2005). Yoga for cancer patients and survivors. *Cancer Control*, 12(3), 165-171.
- Banerjee B., Vadiraj H.S., Ram A. et al. (2007) Effects of an integrated yoga program in modulating psychological stress and radiation-induced genotoxic stress in breast cancer patients undergoing radiation. *Integrative Cancer Therapies*, 6(3), 242–251.
<http://dx.doi.org/10.1177/1534735407306214>.
- Blank, S.E, Kittel, J, Haberman, M.R. (2003). Active practice of Iyengar yoga as an intervention for breast cancer survivors. *International Journal of Yoga Therapists*, 13, 51-59.
- Bobier, D. (2011). Yoga and the Five Elements. Yoga Bound. Retrieved from <http://www.yogabound.com/yoga-and-the-fiveelements-space-air-fire-water-and-earth/>
- Candea, N. (2012) Yoga Impact Teacher Training Manual. Yoga Impact Training Materials.
- Candea, N. (2012). Programs and Yoga Teacher Trainings. Retrieved from <http://yogaimpact.webs.com/about-us>
- Carson, J.W., Carson, M.K., Porter, L.S., Keefe, F.J., Shaw, H., & Miller, J. (2007). Yoga for Women with Metastatic Breast Cancer: Results from a pilot study. *Journal of Pain and Symptom Management*. 33 (3), 331-341.
- Chaoul, A.M., and Cohen, L. (2010), Rethinking Yoga and the Application of Yoga in Modern Medicine. *CrossCurrents*, 60, 144–167. Doi: 10.1111/j.1939-3881.2010.00117.x
- Contemporary Definitions of Yoga Therapy. (2011). Retrieved from http://www.iayt.org/site_Vx2/publications/articles/defs.aspx?AutoID=&UStatus=&ProfileNumber=&LS=&AM=&Ds=&CI=&AT=&Return=
- Culos-Reed, N., Carlson, L.E., Daroux, L.M., & Hatley-Aldous S. (2006). A pilot study of yoga

- for breast cancer survivors: physical and psychological benefits. *Psycho-Oncology*, 15, 891–897.
- Danhauer, S. C., Mihalko, S. L., Russell, G. B., Campbell, C. R., Felder, L., Daley, K. and Levine, E. A. (2009), Restorative yoga for women with breast cancer: findings from a randomized pilot study. *Psycho-Oncology*, 18, 360–368. doi: 10.1002/pon.1503
- DiStasio, S. A. (2008). Integrating Yoga into Cancer Care. *Clinical Journal of Oncology Nursing*, 12(1), 125-130. doi:10.1188/08.CJON.125-130
- Dugdale, D. (2012). Lymphatic obstruction. *A.D.A.M Medical Encyclopedia*. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0002106/>
- Kupperman, L. (2011). Yoga for Survivors: Classes and Privates. Retrieved from: <http://laurakupperman.com/classes/yoga-for-survivors/>
- Matthews AK, Sellergren SA, Huo D, List M, Fleming G. (2007). Complementary and alternative medicine use among breast cancer survivors. *Journal of Alternative and Complementary Medicine*, 13(5), 555–562. <http://dx.doi.org/10.1089/acm.2007.03-9040>
- Martins, F. (2012). Yoga Poses to Nurture the Water Element. Aura Wellness Center. Retrieved from <http://www.aurawellnesscenter.com/2012/04/28/yoga-poses-to-nurture-the-water-element/>
- Moadel AB, Shah C, Wylie-Rosett J et al. (2007). Randomized controlled trial of yoga among a multiethnic sample of breast cancer patients: effects on quality of life. *Journal of Clinical Oncology*, 25, 4387–4395.
- Medina, S. (2007). Heart Grounding Pranayama. Retrieved from <http://www.energizeshanti.com/>
- M.D. Anderson Receives 4.5 Million Grant, Largest Ever for Study of Yoga and Cancer. (2011, May 12). Retrieved from <http://www.mdanderson.org/newsroom/news-releases/2010/m->

d-anderson-receives-4-5-million-grant-largest-ever-for-study-of-yoga-and-cancer.html

National Institutes of Health. (2009). *What You Need to Know About Breast Cancer* (NIH

Publication No. 09-1156). Washington, DC: U.S. Department of Health and Human

Services. Retrieved from, <http://www.cancer.gov/cancertopics/wyntk/breast/page1>

National Institutes of Health (2009). *Yoga for Health: An Introduction* (NCCAM Publication No.

D412). Washington, DC: U.S Department of Health and Human Services. Retrieved

from, <http://nccam.nih.gov/health/yoga/introduction.htm>

Nett, J. (2011). Poses for Breast Cancer Survivors. *Yoga Journal*. Retrieved from

<http://www.yogajournal.com/practice/955>

Sapna, B.A. (2010, November 4). The Five Elements of Ayurveda and Yoga. *FreeFlowing.org*.

Retrieved from <http://flowingfree.org/the-5-elements/>

Sawaswati, S. S. (2012). Purifying the Five Elements of Our Being. *Yoga Journal*. Retrieved

from http://www.yogajournal.com/for_teachers/1603

shoulder: human shoulder muscles. [Art]. In *Encyclopædia Britannica*. Retrieved from

<http://www.britannica.com/EBchecked/media/119225/Muscles-of-the-shoulder>

Smith, K. B. and Pukall, C. F. (2009). An evidence-based review of yoga as a complementary intervention for patients with cancer. *Psycho-Oncology*, 18, 465–475.

doi: 10.1002/pon.1411

Yoga Alliance. (2013). *About Us*. Retrieved from <http://www.yogaalliance.org/>

Appendix A
The Earth Element Practice: Finding the Ground

Class Introduction: Welcome to the first class of the elements home practice designed specifically for women with breast cancer. Before we begin, thank yourself for coming to your mat today and beginning this journey of empowerment and healing. Today’s class will focus on the qualities of the earth element. The purpose of today’s class is to find the stability and strength of the earth element within your own body. Each asana in this sequence will provide opportunities for stretching, strengthening, and grounding. Using the strength and stability of your breath, focus on finding your center and rooting down through all four limbs. Let the following quotes inspire your practice today:

“There is nothing like returning to a place that remains unchanged to find the ways in which you yourself have altered.”
Nelson Mandela

Guided Meditation: During final relaxation, use the following prompt to relax the mind and connect with the theme of the class. Envision yourself in front of a mountain, admiring its beauty, its size, and its strength. As you sit in front it, you witness a storm passing through it. In the midst of the storm, all the trees, plants, and foliage are wiped away. At the end of the storm, there stands the mountain: tall, strong, and resilient. Now envision that you are the mountain. How are can you channel the strength, resilience, and beauty of the mountain during stormy times? How will you come away from the storm rooted and grounded in your being?

Recommended class materials: A quiet space, a yoga mat, blankets (2-3), a yoga block (or thick textbook or a Harry Potter book), a yoga strap (or men’s neck tie or scarf), small candle and match, loose and comfortable clothing

Total Time	Time	Pose	Transition	Reasoning	Notes & Modifications
3	3	Bhadrasana (Upright Seating Position with Crossed Legs)	Find a cross-legged seated position. Make the hips higher than the knees- sit on a blanket or block. To begin, close the eyes and bring awareness to the breath. Simply focus on an equal inhales and exhales.	Beginning the class in a comfortable seating position allows the student to enter the yoga space, find their center, and be present in their body and breath.	Hips are higher than knees to provide a release of the inner thighs/ hips. Using a block or blanket will elevate the hips and aid in alignment. If this pose causes discomfort, modify with virasana (hero pose). This pose can be achieved by kneeling on the floor with folded blankets or blocks underneath

					the buttock.
8	5	Heart Grounding Pranayama	<p>“Clasp hands at root chakra with palms up. Inhale and bring your clasped palms up to your heart keeping shoulders down. Exhale turn clasped palms away from you at the heart and exhale fully keeping shoulders down and opening the back of the heart. Inhale turn the closed palms facing back in and then bring them back to the heart on the inhale. Exhale; turn clasped palms back up to the sky and down to the root. Move slow and controlled. When you feel complete, pause to a 60 second conversation with your heart, first listening and then sharing” (Medina, 2007).</p>	<p>Awakens and stretches the upper body. Dynamic combination of breath and movement. Connects to theme. Self-reflection and awareness exercise</p>	<p>If mobility in shoulders or chest is limited, modify by raising arms as high as you can without pain or discomfort.</p>
11	3	Cat/Cow Pose	<p>Remove block or blanket and move to all fours. Align knees under hip joints and wrists under shoulders. Exhale, round the spine. Tuck the tailbone and curl the spine one vertebra at time. Push away from the floor and imagine your belly button touching your spine. On the next inhale, drop your belly to the ground and bring your chest forward. Avoid compressing the lower back by keeping the core engaged. Repeat this movement at your own pace, focusing on</p>	<p>Awareness of the spine; synchronizes breath and movement; opens chest; allows the student to feel fully grounded and stable.</p>	<p>Modify this exercise if weight bearing in the upper body is not accessible. This can be modified in a chair (placing hand on top of your knees and repeating the same movements)</p>

			the breath.		
15	4	Arm/ Leg Extensions	Return to a neutral spine. Engage the core and extend the right arm parallel with hips. If stable, extend the left leg straight back. Hold this position for a full cycle of breath and return to neutral. Repeat with left arm and right leg. Do not sink into the grounded hip; engage the core to maintain balance. Repeat 5 times on each side. To increase intensity and add another element to the posture, round the spine and bring the elbow and knee across the body (twisting and connecting in at the center). Repeat on other side.	Ignites the core muscles; connects to theme; challenges balance; stretches arms and shoulders	Modify this exercise in a supine position. Lie on back, raise right leg 5 inches from the ground and extend left arm overhead (or into a cactus position if a full extension is not available). Switch arms and legs and repeat. This exercise can be challenging for individuals with poor core strength, be gentle with the body and listen. If one repetition is challenging, stay here and work toward increasing reps with each practice.
17	2	Child's Pose (Balasana)	From all fours, spread knees out wide and drop back onto heels. Stretch arms overhead.	Rest and return to breathe.	
19	2	Standing Pose (Samastitih)	Come through all fours and bring yourself to standing at the top of your mat. Bring feet hip width apart and ground down through all four corners of the feet. Bring hands to heart center.	Finding the ground and feeling of being centered/ stable.	Lift the heart and relax the jaw. Return to intention and class theme.
22	3	Mountain Pose (Tadasana) with side stretches	Inhale as your sweep your arms overhead. Palms face on another. Focus on relaxing shoulders; bring them down the back. Grab the left wrist with the right hand and gently bend the right. Release the left wrist and grab the right wrist. Gently bend to the	Stretches the upper body and side body. Opens up the chest and focuses on finding the ground through grounding down in the feet.	Avoid collapsing into the lower back. When arms are overhead focus on opening the chest and lifting the heart.

			left. Return to center and release grip. Exhale and release arms.		
26	4	Tree Pose (Vrkasana)	Place palms together in front of sternum and relax the shoulders. Shift weight onto right leg. While inhaling, bend your left leg and push the sole of your left foot against the inner side of your inner right ankle shin or thigh (depending on balance). Rotate your bent leg outward as far as possible to open the hip (however, not to the point where the hips are no longer square). Option to bring arms overhead and/or close the eyes.	Balancing while engaging the core; building strength in standing leg; opening the hips	Remind yourself that all trees are good trees (big or small). Embrace the wobbly feeling in standing leg.
30	4	Warrior II (Virabhadrasana II)	Turn to the right and step your feet out approx. one leg length apart. Turn your left foot completely outward and turn your right foot 45 degrees inward. Exhale and slowly bend your left knee forward until it is parallel with your ankle. Your right leg is stretched and straight. Inhale and slowly raise your arms to shoulder height (if arms are strained lower or bend one arm). Look over your left arm. Make sure your heart is lifted and your torso is upright. Hold for 4 cycles of breath and then switch sides.	Strength and stretching in legs and upper body. Empowering pose. Builds endurance and legs strength. Requires balance and focus on stability.	Feet should be aligned either heel to heel or heel to arch (depending on individual anatomy). Focus on the energy of this posture and its relation to the earth. Do you feel secure and grounded, strong and empowered?
31	1	Standing Pose (Samastithi)	Return to standing at the front of your mat; feet hip width apart; palms at	Transition	Here we can return to the intention for the practice; reminding

			heart center; notice the strength in legs and energy in the body. From here, release hands and make your way to a spine position.		the student to focus on strengthen and stabilizing the body. The earth is a fertile ground to grow and build structure. Finding the ground and the earth during this turbulent time in your life is critical to mental health and recovery.
35	4	Bridge Pose (Setu Bandhasana)	Bend both legs and place your feet hip width apart on the floor. Place your arms on the floor by your sides, palms facing downward. Inhale, engage the muscles of your pelvic floor and lift your back off the floor (vertebra by vertebra). Exhale and slowly lower down. When hips are lifted tuck shoulders under the back and focus on opening the chest. Use inner thigh strength to protect lower back. Repeat three times with rests in between.	Engages core; Opens the chest; Safe backbend supported by the feet, arms, shoulders, and head.	Several available modifications including the use of bolsters under the sacrum (as opposed to lifting hips on own) or using a belt and wrapping it around the front of the ankles to help assist the chest opening and tuck of shoulders.
40	5	Final Relaxation (Savasana)	Lower down flat on your mat. Draw the shoulder blades underneath the body. Arms and legs at about 45 degrees away from the body. Observe the body's sensations. Observe the thoughts without judgment. Return to theme of class and reflect on feelings of growth, strength, grounding, etc.)	Rest.	Option to find a wall and put legs up the wall. This modified version of final relaxation has many benefits (including a gentle stretch to back of legs, relieves tension or cramping in legs)

Appendix B
Water Element Practice: Embracing the Ebb and Flow

Introduction: Welcome to the second class of the elements home practice designed specifically for women with breast cancer. Before we begin, thank yourself for coming to your mat today and continuing this journey of empowerment and healing. Today’s class will focus on the qualities of the water element. The purpose of today’s class is to find the fluidity and softness of the water element within your own body. Each asana in this sequence will provide opportunities for deep stretching and muscular relaxation. Through the use of flowing movements and concentrated breath work, the practice will help you embrace the constant ebbs and flows in your body and in your life. Let the following quotes inspire your practice today:

“Undisturbed calmness of mind is attained by cultivating friendliness toward the happy, compassion for the unhappy, delight in the virtuous, and indifference toward the wicked.”
-Yoga Sutra

Meditation Practice: During final relaxation, use the following prompt to relax the mind and connect with the theme of the class. Begin by envisioning that you are sitting next to a stream. Listen for the sound of the water flowing. How is the water moving (fast, slow, steady)? How does the water change as it passes over rocks or roots? How does the water transform as it moves through the other elements? What characteristics of the water element can you embody? Can you envision the ebb and flow of the current in your body? How can you embrace change and be fluid in your life? Where can you be calm and steady like the water moving down the stream? Where can you be strong and consistent like the currents of the ocean?

Recommended class materials: A quiet space, a yoga mat, blankets (2-3), a yoga block (or thick textbook or a Harry Potter book), a yoga strap (or men’s neck tie or a scarf), small candle and match, loose and comfortable clothing

Total Time	Time	Pose	Transition	Reasoning	Notes & Modifications
3	3	Savasana	Begin lying on your back. Check in with the feelings and sensations in your body. Begin to notice the breath.	This practice is focused on relaxation and calming. Beginning on the back allows you to check in and prepare for the practice.	The entire water element sequence will be completed in a supine or reclined position. The purpose of this class is to find deep relaxation and gentle stretching in key muscles of the upper body.

8	5	Dirga Pranayama (3-part diaphragmatic breath)	<p>Begin by inhaling into the low belly (on top of or just below the belly button), then move to the second position, the low chest (low half of the rib cage), then to the third, the low throat (just above the top of the sternum). The exhale starts at the low throat, moves to the low chest, and then finishes in the low belly. Rest your hands on the individual positions to feel the breath rising and falling in each position. When you are comfortable with the breath, relax the hands and breathe into the three positions gently, feeling a wave of breath move up and down the torso. Envision a wave of water washing through your body.</p>	<p>Called three-part breath because you are actively breathing into three parts of your abdomen. The first in the low belly, the second in the low chest, and the third in the low throat. The breath is continuous, inhaled and exhaled through the nose. Completely fills the lungs, expanding and stretching the lungs gently. This pranayama is nourishing, calming, and relaxing.</p>	<p>Using the hands to individually isolate the movement is helpful as a beginner to this practice.</p>
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12	4	Supine Snow Angel Exercise	<p>Bend your knees and place both feet firmly on the mat. Allow your arms to rest by your sides, palms facing up or down. Breathe deeply, relaxing the back and shoulders. Bring your arms away from your sides to about 45 degrees, palms rotating toward the ceiling. Keep your upper arms in contact with mat as much as possible. Bend your elbows. Exhale and gently slide your arms along the mat to an overhead position, touching your hands together and keeping elbows comfortably bent. Try to keep the back of your upper arms, forearms, wrists, and hands in contact with or near the mat.</p> <p>Inhale; gently bring your arms back to your starting position using the same pattern of movement. Repeat 5 times, moving slowly, connecting the breath with the movement</p>	Stretches the muscles of the shoulders and upper arms in a stable and isolated manner	Envision that you are making snow angels in the snow. Move slowly and fluidly, embodying the characteristics of the water element.
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14	2	Pelvic Tilt Exercise	Bend your knees and bring arms to either side of legs. Engage and tighten your stomach muscles by pulling in and imagining your belly button moving toward your spine. You should feel like your back is pressing into the floor and your hips and pelvis are rocking back. Hold for about 6 seconds while breathing smoothly. Repeat 8 to 12 times.	Improves the strength and posture of your lower abdominal muscles and back; Promotes back stabilization; brings awareness to the deeper muscles of the pelvic and abdominal; relaxes the hip flexors	Do this exercise in a slow and controlled manner. Engage the core and breath deeply into the deep abdominal muscles
18	4	Supta-Matsyendrasana (Knee Down Twist)	Bring your arms out to the sides with palms facing down in a T position. Bend the right knee and place the right foot on the left knee. Exhale drop the right knee over to the left side of your body, twisting the spine and low back. Look at the right fingertips. Keep shoulders flat on the floor, close the eyes and relax into the posture. Use as little effort as possible; let gravity pull the knees down. Breathe and hold for 6-10 breaths. Inhale and roll the hips back to the floor and exhale the leg back down to the floor. Repeat on the other side.	Stretches the back muscles; realigns the spine and hydrates the spinal disks; twisting helps detoxify and eliminate impurities in the digestive tract	To modify place a folded blanket under the bent knee to support it. If shoulders are not flat on the floor, use a blanket to bring the floor to the shoulders.

22	4	Supta Kapostasana (Supine Pigeon or Figure Four)	Bend your left knee and place the sole of your left foot on the mat. Keep your head and shoulders on the ground. Bend your right knee and cross the right ankle over the left thigh, making a figure four with your legs. Keep the right foot flexed and place your hands behind the back of your left thigh. Breathe and hold for 6-10 breaths. Gently pull the left leg closer to the body. Release and repeat on the opposite side.	Stretches the groin; deep stretch in the outer hips	
26	4	Supine Snow Angel Exercise	Repeat the snow angel exercise 5 times. Concentrate on moving slowly and connecting the breathe with the movement		
30	4	Modified Matsyasana (Fish Pose)	Place 2-3 folded blankets under the upper back to support the posture. Make sure the head is supported on the floor or the neck is resting on blankets. Relax onto the blankets and breathe deeply. Arms can either be alongside the torso with palms lightly holding the outsides of upper thighs or have arms raised overhead in full extension or with arms in a cactus position	Opens the chest and increase flexibility in the spine. Stimulates cardiovascular, respiratory and nervous system.	

40	10	Savasana	Lower down flat on your mat. Draw the shoulder blades underneath the body. Arms and legs at about 45 degrees away from the body. Observe the body's sensations. Observe the thoughts without judgment.	Rest.	Option to find a wall and put legs up the wall. This modified version of final relaxation has many benefits (including a gentle stretch to back of legs, relieves tension or cramping in legs)
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Appendix C
Fire Element Practice: Igniting Your Inner Energy

Introduction: Welcome to the third class of the elements home practice designed specifically for women with breast cancer. Before we begin, thank yourself for coming to your mat today and continuing this journey of empowerment and healing. Today’s class will focus on the qualities of the fire element. The purpose of today’s class is to ignite your inner fire by flowing through a practice that emphasizes warmth and transformation. Each asana in this sequence will allow you to warm, stretch, and twist the body. The goal of this practice is to relieve muscle tension through the use of powerful breath work and dynamic movement. Let the following quotes inspire your practice today:

Yoga is a light, which once lit, will never dim. The better your practice, the brighter the flame.
B.K.S. Iyengar

Meditation practice: Optional to include a small candle in your yoga space during this meditation practice. During final relaxation, use the following prompt to relax the mind and connect with the theme of the class. Imagine that you are the flame on a candle. Embody its characteristics: heat, strength, light, brilliance, and guidance. Reflect on someone who is a light in your life. How do they embody the characteristics of this candlelight? Where do they lead you out of darkness? How can you be a light in your own life? Where can you foster inner energy and brilliance during challenging or dark times?

Recommended class materials: A quiet space, a yoga mat, blankets (2-3), a yoga block (or thick textbook or a Harry Potter book), a yoga strap (or men’s neck tie or scarf), small candle and match, loose and comfortable clothing

Total Time	Time	Pose	Transition	Reasoning	Notes & Modifications
3	3	Bhadrasana (Upright Seating Position with Crossed Legs)	Find a cross-legged seated position. Make the hips higher than the knees- sit on a blanket or block. To begin, close the eyes and bring awareness to the breath. Simply focus on an equal inhales and exhales.	Beginning the class in a comfortable seating position allows the student to enter the yoga space, find their center, and be present in their body and breath.	Hips are higher than knees to provide a release of the inner thighs/ hips. Using a block or blanket will elevate the hips and aid in alignment. If this pose causes discomfort, modify with virasana (hero pose). This pose can be achieved by kneeling on the floor with folded blankets or blocks underneath the buttock.

8	5	Ujjayi Breathing: Pranayama	This breathing technique is known for its oceanic sound and heat generating ability; Inhale through your nose then exhale slowly through a wide-open mouth. Direct the out-going breath slowly across the back of your throat with a drawn out HA sound. Repeat and then close the mouth. As you inhale and exhale direct the breath across the back of the throat	Increases heat in the body; the sound calms and focuses the mind; allows you to relax deeply by slowing the breath down; focus here on a smooth flow of breath	This breath can increase blood pressure so modify if necessary by returning to equal inhales and exhales; also be mindful not to tighten or restrict the muscles of the throat
11	3	Urdhva-Hastasana (Raised Arms Pose)	Inhale and raise arms overhead, parallel; palms facing each other; exhale and return palms to knees; repeat 5 times, linking breath with movement	Creates flexion in upper arm bone; increases range of motion and flexibility; this pose also creates depression by lowering the shoulder blades down the back	
15	4	Urdhva-Baddhanguliyasana	Interlace fingers; bring arms out in front of body, then bring arms overhead (palms facing the ceiling); keep arms overhead and bend to each side 3 times; from here release the grip and bring arms behind back; interlace fingers if possible or modify using a strap; focus on bringing the shoulder blades together behind the back	This pose advances the previous pose by interlacing the fingers; Creates flexion in upper arm bone; increases range of motion and flexibility; when arms are behind the back this posture allows for protraction of the shoulder blades	A strap can be used to modify if the interlacing of the fingers is not accessible.
16	1	Standing Pose (Samastitih)	Come to standing at the top of your mat.	Transition.	Notice the breath; find your center

			Bring feet hip width apart and ground down through all four corners of the feet. Bring hands to heart center.		
20	4	Modified Sun Salutations (Surya Namaskar)	Start with palms at heart center, inhale sweep the arms up overhead and bring the palms together; exhale into a forward fold; inhale and lift half way, finger tips touching the floor or the shins; exhale into a forward fold; inhale and sweep the arms overhead and bring the palms together at heart center. Complete this flow 3 times; moving with intention and alignment	This flowing sequence of movements builds heat in the body, warms up the legs and arms, and prepares the mind for the next set of postures	Move slowly and be gentle with sensitive areas of the body; bend the knees to protect tight hamstrings
21	1	Standing Pose (Samastitih)	Come to standing at the top of your mat. Bring feet hip width apart and ground down through all four corners of the feet. Hands at heart center.	Transition.	Notice the heat created in the body; feel the affects of the flowing movement in the muscles; find the breath and focus energy into the center
25	4	Utkatasana (Chair Pose)	Inhale the arms forward, parallel to the floor with palms facing down; exhale and bend the knees into a squatting position; reach hips down and back as if you were going to sit on the edge of a chair, bringing the weight into the heels. Press the shoulders down	Strengthens lower body; Energizes the whole body; stretches upper back; uses protraction of shoulders and extension of the arms	Make sure that the knees are pointed straight forward and do not bring the hips lower than the level of the knees

			and back; relax the shoulders down and back and reach out through the fingertips. Breathe and hold for 3-6 cycles of breath; to release: inhale and press down into the feet straightening the legs and inhale the arms up toward the ceiling; Exhale release the arms down to your side		
29	4	Parivritta Utkatasana (Chair Pose with Twist)	Using the same alignment as before come into Utkatasana; from here twist from the lower ribs and bring the left arm behind you and your right arm in front (creating a t-shape). Take 3 breaths and return to center. Come through standing and then switch to the other side- bringing the left arm behind and the right arm in front.	This pose incorporates a twisting action into the previous posture. Twisting helps to cleanse and detoxify. It also builds heat and energizes the body.	Listen to your body; return to the breath and focus on releasing excess heat with the exhale.
33	4	Modified Sun Salutations (Surya Namaskar)	Return to standing at the top of your mat, inhale sweep the arms up overhead and bring the palms together; exhale into a forward fold; inhale and lift half way, finger tips touching the floor or the shins; exhale into a forward fold; inhale and sweep the arms overhead and bring the palms together; exhale and bring the palms	Returning to the flow will help integrate the two previous poses and help you release some excess heat energy; the flow also stretches the upper arm and leg muscles	Move slowly and intentionally through this flow; synchronizing one breath with one movement

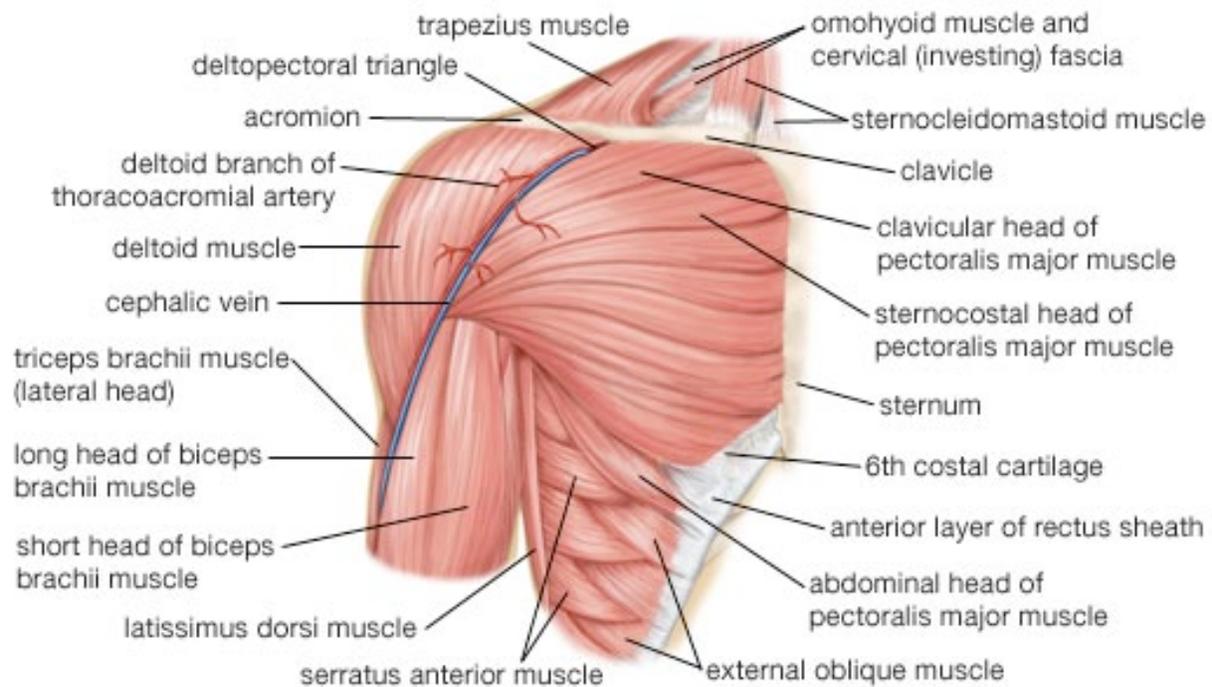
			together at heart center. Complete this flow 3 times; moving with intention and alignment		
34	1	Sukhasana (easy pose)	Come into a seated position with buttocks on the floor; cross the legs, placing the feet directly below the knees. Rest hands on the knees or the lap with palms facing up or down	Transition.	
39	5	Cow Face (Gomokasana)	Come through a tabletop position, then cross the right leg in front of the left, and walk both ankles out to the sidewalls. Use your arms to support you as you slowly lower the hips down to the floor (see modification 1); reach your left fingers between the shoulder blades and reach your right hand around the back to grasp the left fingers (see modification 2). Gently pull the arms toward each other. Stay here or exhale and lower the forehead to the knees or floor. Breathe and hold for 3-5 breathes. Repeat on other side.	Opens the hips and knee joints; stimulates digestion	Modification 1: place a cushion or folded blanket under the hips and/or on the top of the knees. Modification 2: Use a strap to get the grip behind the back or simply place the arms to the side or in front of you. Be gentle in this posture. The hip and shoulder opening can be intense. Be mindful of the breath.
40	1	Seating to Spine (lying on your back)	Come through a comfortable seated position and slowly lower down on to the back. Move slowly, one vertebra at a time,	Transition. Also, lowering down slowly helps engage the core muscles	

			engaging the core.		
50	10	Final Relaxation (Savasana)	Lower down flat on your mat. Draw the shoulder blades underneath the body. Arms and legs at about 45 degrees away from the body. Observe the body's sensations. Observe the thoughts without judgment.	Rest.	Option to find a wall and put legs up the wall. This modified version of final relaxation has many benefits (including a gentle stretch to back of legs, relieves tension or cramping in legs)

Appendix D Anatomy of the Shoulder and Chest

The pectoralis muscle refers to the muscles that connect to the front walls of the chest with the bones of the upper arm and shoulder. There are two such muscles on each side of the sternum (breastbone): pectoralis major and pectoralis minor. The pectoralis major is the larger and more superficial of the two, connecting at the clavicle (collarbone), the sternum, the ribs, and the external oblique abdominal muscles. The pectoralis major extends across the upper part of the chest and is attached to a ridge at the rear of the humerus (the bone of the upper arm). The major actions of this muscle group are adduction and depression of the arm as well as rotation of the arm forward along the axis of the body. When arms are raised, the pectoralis muscle assists the latissimus dorsi and teres major muscles in pulling the trunk up. The pectoralis minor lies underneath the pectoralis major, inserting into the scapula. It also aids in drawing the shoulder forward and downward (in opposition to the trapezius muscle). The following figure is a detailed illustration of the key muscles in the upper body, including the shoulder, chest, and arm. Locating the muscles and understanding the function of each is essential to the creation of a safe yoga practice for women with breast cancer who have had these muscles compromised by surgery (*Britannia Encyclopedia*).

Figure 1: The Muscles of the Shoulder and Chest



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Appendix E

Case Study: Yoga for Survivors

In 2005, Laura Kupperman founded Yoga for Survivors® after her own experience with breast cancer confirmed the benefits of maintaining a healthy lifestyle and yoga practice throughout the many challenging stages of cancer treatment and recovery. The mission of this program is to “share the healing path of yoga with cancer survivors worldwide by providing safe, accessible classes to survivors of any type of cancer, at any stage of recovery” (Kupperman, 2011). For the past eight years, Laura has been establishing programs and teaching yoga classes at various hospitals, clinics, cancer centers, and yoga studios in Colorado. Each week, Laura teaches two classes in Boulder, CO for individuals with any type or stage of cancer. By providing a small class environment, students are able to practice in a safe space with gentle, hands-on instruction. The classes create a community of individuals who can support one another during this time of healing and recovery. Laura also trains yoga instructors who would like to work with this population, providing them with the skills and tools to do this work safely and effectively.

As a part of the investigation process for this paper, research and interviews were conducted with individuals involved in the Yoga for Survivors program in Boulder, CO. The personal insight and information gained through this research helped with the creation of the home practice series. The testimony from participants in this program proves how invaluable yoga can be as a form of therapy during the treatment and recovery process. Three interviews were conducted as a part of this project to better understand the Yoga for Survivors program. To begin, an interview with the founder of the program, Laura Kupperman, was conducted to learn more about the specific challenges associated with implementing this program. This interview was helpful because it provided expert insight and first person examples of the application of this work. Two additional interviews were conducted with Kathryn Dumm and Crista Brown. Both women completed the Yoga for Survivors program in addition to their conventional cancer treatment. The following section features a summary and two questionnaires from each respective interview and personal communication.

Interview 1: Laura Kupperman

During an hour-long interview with Laura Kupperman, I was able to discuss some of the challenges of bridging the gap between standard medical care and complementary medicine (i.e. yoga and acupuncture). Laura also discusses some of the challenges associated with conducting a yoga class with a wide range of students who differ in terms of physical ability, stages in recovery, and levels of yoga experience. She mentions that during her classes, it is important to give everyone the space to have their needs met for that particular day or point on their path to recovery. It was here that we discussed the lack of standard protocol for doctor recommendations regarding what is appropriate or safe for an individual to do physically after surgery or other forms of treatment. For example, Laura mentioned that she could have two students in her class who are both six weeks removed from reconstructive surgery. One student's doctor might tell her to limit weight bearing for up to three months while the other student's doctor might recommend that she begin light weight bearing and movement after just six weeks. In this case, it is the responsibility of the teacher to bridge that gap between the differences in medical protocol and advise the students based on individual experience and insight into this complex process of

healing. It is the essence of a knowledgeable yoga instructor, one who is able to make individual recommendations and modifications for the students in their class.

When I asked Laura about what it will take for the medical community to accept and promote complementary forms of treatment such as yoga, she stated that it would require “awareness and education about the benefits of this practice.” If doctors are able to recognize and witness the numerous benefits of this holistic treatment, then they might begin to endorse and integrate yoga into standard medical care. Laura also mentioned that it will take “patients asking and demanding” for this type of treatment. Patients are “savvy consumers”, according to Laura, which means that they have the choice to pick the medical center or cancer center that meets their individual needs. If the product (yoga class) is in high demand, then more medical centers will be inclined to include it in their facilities. Making yoga a part of standard medical care is about “interfacing with the medical community and getting the word out.” Moreover, it is a lack of awareness and understanding that is currently preventing doctors and medical centers from making yoga and other integrative medicine an essential element of standard cancer care.

According to Laura, “yoga teachers are desperate to gain the information offered in trainings such as the Yoga for Survivors teacher training.” Individual testimony from participants in the program is also proof that this type of therapy has healing benefits that are incomparable to any other kind of therapy. For example, one student told Laura that when she is on the phone with her doctor receiving test results, she does “the breathing” (i.e. the practice of pranayama). By practicing simple breathing techniques, students are able to ease the anxiety and fear that is associated with aspects of their conventional treatment plan. To close of discussion, we discussed the future of yoga and its application as an intervention for cancer patients. In general, Laura expressed a great deal of optimism about the future of yoga, mentioning that emerging research will continue to promote the benefits of this therapy and “get the word out” about how important a yoga practice is in the healing process for individuals with cancer.

The following two sections include interview questions and answers with two students in the Yoga for Survivors program. Each of their individual testimonies is evidence for the remarkable healing power of this program. Their comments and suggestions cited here were used to inform the creation of the home practice series and also to further advance the purposes of this paper.

Interview 2: Crista Brown

1) When did you receive your cancer diagnosis? What type of cancer did you have?

Diagnoses: April 2011

Types: Invasive ductal carcinoma and invasive lobular carcinoma (Because I had two completely independent primary tumors manifesting at the same time, this is often referred to as invasive multicentric breast cancer.)

2) Why and when did you start your yoga practice?

I had done yoga off and on in years past, and I restarted my yoga practice about 7 weeks post-mastectomy – i.e., early July 2011. Why? Initially, I just did it again as something to try, but then it seemed so right – as though it were just what I needed – and so I continued.

3) What are the biggest changes you have felt both physically and emotionally through this program?

Physically, yoga has been an additional tool for helping me to regain range of motion and strength. Emotionally, yoga gave me a mental space of quiet and calm. Even if only for the duration of a class, that interlude of space was invaluable when I was in the long-continuing midst of procedures, tests, questions, unknowns, surgeries, exams, and decisions. Yoga allowed me to reconnect with my body during a time when my body didn't feel like a place I wanted to be, to feel a tiny measure of bodily control even when everything else about my body seemed out of control, and to slowly grow toward acceptance of a radically altered body. Yoga was empowering because it was something I myself could choose to do with my body, which was in contrast to the seemingly endless stream of things outside my control that were being done to my body by others.

4) What type of conventional treatment or treatments did you receive?

A unilateral mastectomy with three additional reconstructive surgeries.

Hormonal therapy -- continuing. (I never understand why they call it this because, really, it should be called anti-hormonal therapy.) Physical therapy – lots.

5) How easy or difficult was it for you to perform the asanas (or postures) after receiving conventional treatments?

Within four to six weeks or so after each subsequent surgery, I could do a large part of the asanas in the Yoga for Survivors class. At least I could do enough that I would want to go to class. I think this would have been virtually impossible for me in a regular yoga class. Although teachers always tell you that you're the best judge of your own body, that you should ask for modifications, etc. etc., I had lost so much confidence in my own body that I think I would have simply been afraid to go to a regular class, for a very long time. Afraid that I would hurt myself. Afraid that I would tear something loose inside. Afraid that my insides might spill out all over the floor. And on and on. (Yes, my fears were to some degree irrational – as many fears are – but I think they're fairly common fears for many women. I didn't go to a regular yoga class again until April 2012, almost eleven months after my mastectomy.)

6) Was there any particular part of this program that you found problematic and/or helpful that might merit further research for this type of therapy?

The postures/asanas in Yoga for Survivors are really oriented toward the needs of people who are going through a difficult time with their bodies, and the classes are small enough that Laura is able to watch everyone and give individual attention. It's a very safe-feeling class, and yet still provides a challenge as well. Transitions in the class tend to be much slower than in a regular class, and I think this is very helpful for people who are post-surgical and/or hyper-fatigued from chemo and/or radiation. Also, some of the hormonal therapies cause arthritic-like symptoms – i.e., very achy joints – and this is another reason why people may move slower when going from standing to floor and vice-versa. A slower pace really helps. The class also builds a sense of community, which I think is helpful, since many people with cancer tend to feel a bit isolated while they're going through it (even when there are other people around).

7) Is there a favorite posture or part of the program you would like to share? Why does this aspect of the program stand out to you?

I like the fact that we often start by lying on our backs rather than by sitting cross-legged (as many other yoga classes do). It feels very grounding, and there were many days when I needed

that. Also, I've had so many more joint issues (which is likely a drug side-effect), that sitting cross-legged is seldom comfortable anymore, at least not for very long.

8) If you had to encourage other women in the same situation to pursue a complementary or alternative therapy in addition to conventional treatments, would you recommend yoga and/or other treatments? Why or why not? What other treatments might you suggest?

Yes, I recommend yoga to virtually every women I encounter with breast cancer. I recommend yoga because it has played an important role in navigating through my own cancer journey and because it has been a significant aid in my own healing process. I don't view yoga as an alternative to any conventional therapies, but rather as a complementary tool for managing many of the effects of conventional therapies – both short-term and long-term. I also recommend acupuncture. Much to my own surprise, and without purporting to have any understanding at all of the mechanisms by which it works, I have found acupuncture to be helpful in dealing with anxiety and insomnia. I also recommend physical therapy for all breast cancer patients. I am often surprised by how little physical therapy many women wind up getting, and I think physicians often don't even bother to refer patients for physical therapy. (Maybe not in Boulder, but in other parts of the country.) In general, I think most women need more help with regaining strength, flexibility, and range-of-motion than what they are typically getting.

9) Any additional comments or feedback about the program.

I think it is a great program. After participating as a student in the Yoga for Survivors class for a year, I took the Yoga for Survivors teacher-training program, and am currently doing the internship part of that program. And, although I have come a long way physically from where I began, I still go to the Yoga for Survivors class fairly frequently. It's a yoga class that feels like home for me.

Interview 3: Kathryn Dumm

1) When did you receive your cancer diagnosis? What type of cancer did you have?

April 2010, Stage 2b IDC (breast cancer)

2) Why and when did you start your yoga practice?

I started in August or September 2010 because I was finished with all the physical therapy appointments I was allowed and needed to continue to improve mobility in my arms and chest. I also wanted a low impact form of exercise while I was on chemo. Plus, I'd been thinking about taking yoga classes literally for years and never gotten around to it.

3) What are the biggest changes you have felt both physically and emotionally through this program?

I have definitely become more aware of my posture and trying to improve it not just during practice but all the time, as well as noticing how I use my muscles for every day tasks. Also, even when I'm having a really bad day I feel so much better when I leave a yoga class. It probably carries throughout my week but I don't really notice it so much except when I've just been to a class.

4) What type of conventional treatment or treatments did you receive? Double mastectomy with lymph node dissection, reconstruction and 1 full year of chemotherapy, 6 months of which was Herceptin, which isn't so bad as full-on chemo.

5) How easy or difficult was it for you to perform the asanas (or postures) after receiving conventional treatments?

At first it was really hard but Laura was so great and always would modify postures for whatever was going on with me. Over time it got much easier, though.

6) Was there any particular part of this program that you found problematic and/or helpful that might merit further research for this type of therapy?

Overall it's been very helpful, and the only problematic thing has been figuring out how to pay for it.

7) Is there a favorite posture or part of the program you would like to share? Why does this aspect of the program stand out to you?

I really like the postures that get the lymph flowing, but that is mostly because I have lymphedema as a result of lymph node removal. The ones that feel the best though are the stretching type poses. I love the ones where we stretch the hips. I don't know what any of them are called.

8) If you had to encourage other women in the same situation to pursue a complementary or alternative therapy in addition to conventional treatments, would you recommend yoga and/or other treatments? Why or why not? What other treatments might you suggest?

I would definitely recommend yoga because it is a great way to regain movement and slowly build strength, which is so important after such a major surgery. Also, it just feels good and makes me feel happy, which is equally as important. I would also definitely recommend massage. It helps release tension (of course) and also helps with just feeling comfortable in your body again. I did acupuncture a few times while I was going through treatment, but I just couldn't take all the needles. I also did reiki, which I liked but didn't get as into, I don't know why.