Peter O'Neill. *First Steps*. Oil on linen, 24″ × 30″.

Yoga appears feasible for

many patients with cancer,

and efficacy trials are in progress.

Yoga for Cancer Patients and Survivors

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Background: *Yoga has been practiced for thousands of years to improve physical and emotional well-being. Empirical research on yoga has been ongoing for several decades, including several recent studies conducted with cancer patients and survivors.*

Methods: *This review provides a general introduction to yoga and a detailed review of yoga research in cancer.*

Results: *Nine studies conducted with cancer patients and survivors yielded modest improvements in sleep quality, mood, stress, cancer-related distress, cancer-related symptoms, and overall quality of life. Studies conducted in other patient populations and healthy individuals have shown beneficial effects on psychological and somatic symptoms, as well as other aspects of physical function.*

Conclusions: *Results from the emerging literature on yoga and cancer provide preliminary support for the feasibility and efficacy of yoga interventions for cancer patients, although controlled trials are lacking. Further research is required to determine the reliability of these effects and to identify their underlying mechanisms.*

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Introduction

The word *yoga* is derived from the Sanskrit root *Yuj*, which means to join or to yoke. In philosophical terms, yoga refers to the union of the individual self with the universal self.[1] Yoga is one of six branches of classical Indian philosophy and has been practiced for thousands of years. References to yoga are made throughout the Vedas, ancient Indian scriptures that are among the oldest texts in existence.[2] Two thousand years ago the Indian sage Patanjali codified the various philosophies and methodologies of yoga into 196 aphorisms called "The Yoga Sutras," which helped to define the modern practice of yoga.[1] The Sutras outline eight limbs, or disciplines, of yoga: yamas (ethical disciplines), niyamas (individual observances), asana (postures), pranayama (breath con-

trol), pratyahara (withdrawal of senses), dharana (concentration), dhyana (meditation), and samadhi (self-realization, enlightenment). In the United States, the term yoga usually refers to the third and fourth limbs, asana and pranayama, although traditionally the limbs are viewed as interrelated.

Currently many styles of yoga are practiced in the United States (eg, Iyengar, Ashtanga, Vini, Kundalini, Bikram), some of which are more closely tied to a traditional lineage than others. It is important to note that each of these approaches represents a distinct intervention, in the same way that psychodynamic, cognitive-behavioral, and interpersonal therapies each involve different approaches to psychotherapy. These styles of yoga emphasize different components and also have diverse approaches to and standards for teacher training and certification. Currently there are no national standards for teacher certification in the United States.

Yoga is traditionally believed to have beneficial effects on physical and emotional health.[3] Over the last several decades, investigators have begun to subject these beliefs to empirical scrutiny. Most of the published studies on yoga were conducted in India, although a growing number of trials have been conducted in the United States and other Western countries. The effects of yoga have been explored in a number of patient populations, including individuals with asthma, cardiac conditions, arthritis, kyphosis, multiple sclerosis, epilepsy, headache, depression, diabetes, pain disorders, gastrointestinal disorders, and addictions (among others), as well as in healthy individuals. In recent years, investigators have begun to examine the effects of yoga among cancer patients and survivors. The term *cancer survivor* here refers to individuals who have completed cancer treatment.

The primary goal of this paper is to provide a detailed review of yoga research conducted with cancer patients and survivors, including published papers and abstracts of conference presentations. Six studies were identified through a search of PubMed, the CRISP database (to identify trials that had not yet been published), and inquiries to investigators who have previously published in this area. This literature is current as of March 2005. We also review three studies that included yoga as one component of a broader stress management intervention for cancer patients. In addition, we consider yoga studies conducted with noncancer patients that examined psychologic and somatic symptoms that are common among cancer populations, including sleep, fatigue, depressed mood, and pain.[4] The studies we review used diverse styles of yoga and consequently emphasized different components (eg, postures, breathing, meditation, and relaxation) and involved varying degrees of intervention intensity. Of note, yoga has demonstrated effects on a variety of other outcomes, including cardiopulmonary, musculoskeletal, perceptual, and cognitive function. A more comprehensive review of the yoga literature is published elsewhere.[5]

Yoga for Cancer Patients and Survivors

One of the first published studies[6] of yoga for cancer patients was conducted in India. This early trial, which lacked a control group, examined the effects of yoga among 50 ambulatory cancer patients undergoing daily radiation therapy. The yoga intervention consisted of two 90-minute sessions per week and was conducted in groups of 10 to 12 patients. Patients were taught "a series of simple Yogic relaxation exercises; no strenuous exercises were given." No information was provided on the number of sessions attended. There was no formal pre- and postintervention assessment; instead, patients indicated whether or not they perceived benefits in particular domains. Benefits reported included improved appetite (22%), improved sleep (22%), improved bowel habits (26%), and feeling of peace and tranquility (20%). Of note, more recent trials have focused on similar outcomes, particularly sleep and relaxation.

In 2004, Cohen and colleagues[7] published a randomized, controlled trial of Tibetan yoga for cancer patients. Tibetan yoga is less common than Indian techniques in the United States and has received less empirical scrutiny. The intervention consisted of 7 weekly sessions that included three components: controlled breathing and visualization; mindfulness; and simple postures from the Tibetan yoga practices of Tsa lung and Trul khor done with specific breathing patterns. The general goals of the intervention were to reduce stress and improve patients' quality of life. Yoga group participants were encouraged to practice the techniques at least once per day. Thirty-nine participants with stage I–IV lymphoma were randomly assigned to either the yoga group or a wait-list control group. Twenty-one percent of participants were receiving chemotherapy at the time of the study, and the remainder had completed chemotherapy within the past 12 months. Patients completed questionnaires assessing mood, energy, and sleep at baseline and at 1 week, 1 month, and 3 months postintervention. One intervention group participant dropped out before study onset and 8 patients did not complete the follow-up questionnaires. Thus, analyses focused on 30 subjects, with 16 in the yoga group and 14 in the control group. Results suggest that this intervention was feasible for this patient population and had beneficial effects on certain aspects of quality of life. Over half (58%) of patients assigned to the yoga intervention attended at least 5 of the 7 sessions, 32% attended 2 to 3 sessions, and 10% attended only 1 session. Participants practiced an average of two times per week at home. Yoga group participants reported significant improvements in overall sleep quality compared to controls, including falling asleep more quickly, sleeping longer, and using fewer sleep medications. There were no intervention effects on fatigue, depressed mood, anxiety, or cancer-related distress.

Cohen and colleagues[8] recently completed a second trial of Tibetan yoga for breast cancer patients, which was

presented at the annual meeting of American Psychosomatic Society. The yoga intervention consisted of 7 weekly sessions as described above, with home practice encouraged. Fifty-eight women with stage I–III cancer were randomly assigned to either the yoga group or a waitlist control group. Almost half (48%) of participants were undergoing active treatment. Patients completed measures of mood, sleep, cancer-related distress, cancer-related symptoms (including pain, fatigue, nausea, appetite and cognitive disturbance), and quality of life at baseline and at 1 week, 1 month, and 3 months postintervention.

Results again support the feasibility and potential efficacy of this yoga program, although the benefits seen in this study differed from those evidenced in the initial trial. Data on adherence was not available, but 63% of yoga participants reported that they found the yoga program useful, and over 70% reported that they practiced at least once a week. Compared to controls, the yoga group reported fewer cancer-related symptoms at the 1-week follow-up and lower cancer-related distress at the 3-month follow-up. In contrast to results seen in the first trial, no effects on sleep were observed, and there were no intervention effects on mood or quality of life. It is possible that the different outcomes observed in these two trials were due to differences in the study samples, including type of cancer (lymphoma vs breast), stage of disease (stage I–IV vs stage I–II), and percentage of patients undergoing active treatment.

A third randomized, controlled trial[9] of yoga for cancer patients was recently published in a non–peer-reviewed yoga journal. This 7-week intervention was based on Hatha yoga and was influenced by Iyengar techniques and kinesiology. During weekly 75-minute classes, participants were taught modified versions of yoga postures that involved gentle stretching and strengthening exercises and finished with 15 minutes of relaxation in corpse pose (ie, savasana). The general goals of this intervention were to improve physical fitness, reduce stress, and improve mood and quality of life. Thirty-eight participants were randomly assigned to either the intervention group or a wait-list control. The sample included a mixed group of cancer survivors (primarily breast cancer survivors) who were a minimum of 3 months posttreatment (mean = 56 months postdiagnosis). Participants completed measures of mood, stress, quality of life, and physical activity before and immediately after the intervention. Weight and physical function (grip strength, flexibility, and 6-minute walk) were also assessed. Results provide preliminary evidence for the efficacy of this program, although the analysis plan did not allow for a direct comparison of changes in intervention vs control group participants. Instead, the investigators compared postintervention scores in the two groups (without a consideration of preintervention scores) and evaluated the significance of changes *within* the yoga group from preintervention to postintervention. No information was provided on adherence. There were no significant differences between the yoga and control groups at preintervention. At postintervention, yoga group participants reported lower levels of total mood disturbance and stress and higher levels of global quality of life and pain than control participants reported. Increases in pain were attributed to increased body awareness. Yoga participants walked a longer distance in the 6-minute walk test and had a lower resting heart rate at postintervention than the control participants, although they also had a higher body weight. No significant differences were observed on measures of fatigue, sleep disturbance, cognitive function, or physical activity. Examination of change scores within the yoga group showed improvements on only two measures: cardiopulmonary stress symptoms (one of 10 dimensions of stress evaluated) and distance walked from preintervention to postintervention. Overall, results suggest that this intervention may have beneficial effects on cardiopulmonary symptoms and certain aspects of physical function, which is consistent with research conducted with noncancer populations.[5] Effects on mood, stress, and other aspects of quality of life are tenuous and require more careful statistical evaluation.

A small pilot study[10] was recently conducted by these investigators to evaluate the effect of this yoga program on a hormonal measure of stress — salivary cortisol. Study results were reported at the annual meeting of the American Psychosomatic Society. Twenty participants with mixed cancer diagnoses who had completed cancer treatment were randomly assigned to the yoga intervention (n = 10) or a wait-list control (n = 10). The majority of participants were women. Participants provided saliva samples to assess diurnal cortisol rhythm and also completed measures of mood, stress, and quality of life before and after the 7-week intervention. Analyses were conducted to compare scores on these measures at postintervention. Results indicated that yoga group participants reported significantly better quality of life and less mood disturbance at postintervention than controls, although failure to consider preintervention scores renders these findings preliminary. No group differences were observed in mean cortisol levels or diurnal cortisol slope, although given the small sample size, short intervention period, and the fact that the yoga intervention was not necessarily designed to impact the endocrine system (eg, it may not have included inversions[1]), it is difficult to draw conclusions from this finding.

In the final study identified for review, Moadel and colleagues[11] examined the effects of yoga among underserved breast cancer patients. Preliminary results from this ongoing study were presented at the annual meeting of the International Psycho-Oncology Society. The 12-week intervention consisted of weekly 90-minute yoga classes based on Hatha yoga that included gentle stretching, breathing exercises, and meditation/sitting relaxation. Classes were done in a chair or on the floor, depending on ability and limitations, with blankets and blocks for support. An audiotape and compact disk were provided for

daily at-home practice. Women with stage I–III breast cancer were randomly assigned to the yoga group (n = 59) or a wait-list control group (n = 29). All had been diagnosed with cancer within the past 5 years (mean = 1.2 years, range = 1 week to 4.7 years), and 45% were currently receiving chemotherapy. This was an ethnically diverse sample; 41% were African American, 33% were Hispanic, and 26% were Caucasian. Participants completed measures of quality of life, neurotoxicity, fatigue, and spiritual well-being at baseline and 3 months postintervention.

Adherence was challenging with this patient population. The mean number of classes attended was 5 (out of 12), and 48% of participants attended fewer than 3 classes. Predictors of nonadherence were treatment with chemotherapy and higher levels of emotional well-being, (ie, participants with higher emotional well-being were less likely to attend class). Analyses were conducted to evaluate changes within the control group and within the yoga group, focusing on participants who had attended 3 or more classes. However, there was no direct comparison of changes in the control group vs the yoga group. The control group reported significant increases in symptoms related to the central nervous system (eg, headaches, numbness) and significant declines in social well-being over the course of the study. In contrast, women who attended at least 3 yoga classes showed no change in these domains but reported significant improvements in emotional well-being. No changes were seen in either group in physical, functional, or spiritual well-being or in symptoms of fatigue. Overall, results provide preliminary support for the efficacy of the intervention, as relatively minimal exposure appeared to have beneficial effects for women in emotional distress. Perhaps more important, this study demonstrates the challenges involved in conducting a yoga intervention with an underserved and medically needy population who have many competing demands.

Yoga and Mindfulness-Based Stress Reduction in Cancer

A Canadian research group has conducted several studies with cancer patients that included modified yoga exercises as part of a mindfulness meditation-based stress reduction (MBSR) program.[12-14] The MBSR intervention was based on the work of Kabat-Zin and colleagues[15] and included the following components: (1) theoretical material related to mindfulness, relaxation, meditation, yoga, and the body-mind connection, (2) experiential practice of meditation and yoga during the group meetings and home-based practice, and (3) group process focused on solving problems concerning impediments to effective practice, day-to-day applications of mindfulness, and supportive interactions between group members. Yoga exercises were a central part of the intervention. Gentle, often modified yoga stretches were practiced for approximately

30 minutes in each 90-minute session, with a focus on body awareness rather than form. A booklet and audiotape were also provided.

The first study was conducted with 109 cancer patients who were heterogeneous in terms of type and stage of cancer.[12] Participants were randomly assigned to either the intervention group (n = 61) or a wait-list control group (n = 48). They completed mood and stress measures at baseline and immediately following the 7-week intervention. Compliance with this treatment program was good; among the participants in the intervention group, approximately 64% attended 6 or more sessions (out of 7), 23% attended 4 or 5 sessions, and 13% attended 3 or fewer (of note, these patients were considered to be "dropouts" and not included in the analyses). Further, the average daily meditation time for intervention participants was 32 minutes. Results showed a beneficial effect on total stress and mood disturbance, with a 65% reduction in total mood disturbance in MBSR participants compared to a 12% reduction in controls. More conservative intent-to-treat analyses yielded a similar pattern of results. In regression analyses, the number of minutes of at-home practice predicted greater declines in total mood disturbance.

A second uncontrolled trial conducted by this research group focused on patients with early-stage breast and prostate cancer.[13,14] The intervention was similar to that described above but was provided over 8 weeks and included a 3-hour silent retreat between weeks 6 and 7. All 59 study participants were at least 3 months posttreatment (median = 6 months, range = 3 months to 2 years). Participants completed measures of mood, quality of life, stress, and health behaviors, and they also provided blood and saliva samples for immune and hormonal analysis before and after the intervention. Results from this trial provide further support for the feasibility and efficacy of this intervention for cancer patients, although the absence of a control group renders the findings preliminary. In addition, the specific outcomes that improved in this trial differed somewhat from those in the first study. Analyses were based on 42 patients (33 with breast cancer, 9 with prostate cancer) who attended 7 or more sessions and completed both the preintervention and postintervention measures. The average daily practice time was 24 minutes of meditation and 13 minutes of yoga. The intervention group showed significant improvements in overall quality of life, total stress, caffeine use, exercise, and appetite. However, in contrast to the first trial, no changes were observed in mood. There was also no significant change in cancer-related symptoms, including fatigue, nausea, and pain. Results for sleep quality were mixed. The differences in study results may have been due to differences in the study samples, particularly differences in stage of disease (stage I–IV vs stage I–II) and percentage of participants undergoing cancer treatment. Changes in intracellular cytokine production were observed, but there were no changes in average daily salivary cortisol, diurnal cortisol slope, plasma dehydroepiandrosterone sulfate (DHEAS), or salivary melatonin.

A similar mindfulness-based stress reduction program was evaluated in a sample of women with breast cancer, focusing specifically on sleep disturbance.[16] The intervention was adapted from the work of Kabat-Zinn and consisted of six weekly 2-hour sessions and one 6-hour silent retreat. Participants were instructed in sitting meditation, body scan, and Hatha yoga, which was described as "stretches and postures designed to enhance greater awareness and to balance and strengthen the musculoskeletal system." Didactic material on effects on stress was also presented and cognitive-behavioral methods of coping discussed. All participants were originally diagnosed with stage II breast cancer, were within 2 years posttreatment (mean = 13.4 months, range = 2 to 25 months), and were currently considered disease-free. Sixty-three women were randomly assigned to either the intervention program or to a "free choice" control group that was encouraged to engage in stress management activities. Participants completed sleep diaries before the intervention and at 1 week, 3 months, and 9 months after the intervention. One woman dropped out of each group before study onset. Follow-up data were available from 86% of study participants (n = 54).

Despite reasonable adherence, this intervention had a minimal effect on sleep disturbance. Eighty-four percent of women who began the intervention program completed at least four of the seven sessions. Results showed no change in sleep quality or efficiency in the intervention group relative to the control condition. However, there was some evidence that participants in the intervention group who engaged in more informal practice of mindfulness techniques (such as bringing mindfulness awareness to daily activities) were more likely to feel refreshed after sleep at postintervention.

Effects of Yoga on Psychologic and Somatic Symptoms in Noncancer Populations

Empirical investigations of yoga have been conducted with a variety of medical patients and with healthy individuals. A number of these studies have examined effects of yoga on cancer-relevant psychologic and somatic symptoms, including mood, fatigue, pain, sleep, and quality of life. Although the etiology of these symptoms may differ in different patient groups, results from these trials provide valuable information about the potential efficacy of yoga in cancer patients and survivors.

A randomized, controlled trial of yoga conducted in Australia included 59 patients with moderate to severe asthma.[17] Intervention group participants received instruction in Sahaja yoga, a meditative practice that does not include postures or breathing, whereas the control group received instruction in relaxation methods, group discussion, and cognitive behavior therapy exercises.

Both groups met weekly for 2 months. At postintervention, the intervention group demonstrated significant improvements in fatigue and mood, as well as positive changes in airway responsiveness, although these effects did not persist over a 2-month follow-up. Another small randomized trial for asthma patients found improvements in mood and relaxation following a 16-week yoga intervention that included postures, breathing, and meditation, although no changes in pulmonary function were observed in this study.[6]

Yoga interventions have also been examined among individuals with musculoskeletal conditions. Garfinkel and colleagues[18] evaluated an Iyengar yoga intervention for 42 individuals with carpal tunnel syndrome. The intervention focused on upper body postures designed to improve flexibility, correct alignment of hands, wrists, arms, and shoulders, and increase awareness of joint position during use. After the 8-week intervention, participants in the yoga group showed significant improvements in pain, grip strength, and certain signs of carpal tunnel syndrome (ie, Phalen sign), whereas control group participants showed no significant changes on these measures. No significant group differences were observed in sleep disturbance. In an earlier randomized trial, these investigators also found beneficial effects of an Iyengar yoga practice for individuals with osteoarthritis of the hand, including improvements in pain, tenderness, and range of motion.[19]

A recent trial compared the effects of yoga and aerobic exercise among 57 patients with multiple sclerosis.[20] Participants were randomly assigned to yoga, exercise, or a wait-list control group. The Iyengar yoga intervention consisted of a series of poses designed for patients with multiple sclerosis with modifications made to accommodate the specific needs of this patient population (eg, fatigue, spasticity, cerebellar dysfunction). For example, all poses were supported. The exercise intervention consisted of bicycling on stationary bicycles. Both groups met weekly for 6 months and encouraged at-home practice. Significant improvements in fatigue were observed in both treatment groups relative to controls. There were no effects on mood, other aspects of quality of life, or cognitive function.

A limited number of published trials have examined yoga interventions for individuals with depression. A research team in India found that patients with untreated melancholic depression who were randomly assigned to receive Sudarshan Kriya yoga, which involves specific breathing exercises, showed significant improvements in depressed mood that were comparable to those seen in patients assigned to receive medication or electroconvulsive therapy.[21] Significant reductions in depressed mood were also found among college students with depression who were randomly assigned to practice a specific yoga relaxation pose for 30 days.[22] Yoga interventions may also be beneficial for subclinical depression. A recent trial found that college students with mild depressive symptoms randomly assigned to a 5-week Iyengar yoga inter-

vention showed significant improvements in depressed mood and anxiety compared with a wait-list control group.[23] This intervention emphasized poses that are thought to alleviate depression, including backbends, standing poses, and inversions.[1] Similar effects on mood have been observed in noncontrolled studies. For example, a six-session yoga and meditation intervention was effective in reducing depression and anxiety among dementia caregivers.[24]

Studies conducted with healthy individuals further support the mood-enhancing effects of yoga. Two randomized trials, both conducted in India, found that yoga interventions including postures, breathing, and relaxation/meditation led to significant reductions in anxiety and depression among college and medical students.[25,26] A third study found no changes in anxiety or depression but significant improvements in well-being (including general health and sleep quality) among healthy soldiers randomly assigned to practice postures, breathing, and meditation for 3 months.[27] In two nonrandomized trials, a single session of yoga was associated with significant reductions in perceived stress and negative affect[28] and improvements in mood[29] that were comparable to changes seen with aerobic exercise. In another report, 30 minutes of yoga stretching and breathing led to increases in mental and physical energy, alertness, and enthusiasm relative to relaxation and visualization.[30]

Conclusions and Recommendations for Future Research

Results from this emerging literature suggest that yoga is a feasible intervention for a wide range of cancer patients and survivors. The existing studies have included patients with variety of diagnoses (eg, lymphoma, breast, prostate), stages of disease, and treatment status (eg, on vs off treatment). Despite this heterogeneity, the interventions appear to have been well tolerated by participants, and adherence has generally been good. Of note, most of the trials utilized "gentle" poses and stretching that could be performed even by patients with functional limitations. It is likely that this careful approach minimized adverse consequences of treatment and improved compliance. Studies conducted with noncancer populations further demonstrate the feasibility and adaptability of yoga interventions for individuals with chronic medical conditions.

Results also provide preliminary support for the efficacy of yoga interventions for cancer patients. Positive effects have been seen on a variety of outcomes, including sleep quality, mood, stress, cancer-related distress, cancer-related symptoms, and overall quality of life, as well as functional and physiological measures. These effects were evident across a number of different therapeutic approaches, some of which incorporated both postures and seated mindfulness/meditation practice (eg, Tibetan yoga, mindfulness-based stress reduction) and others that emphasized yoga postures and relaxation. It should be noted that several of these trials had methodological limitations that render the findings preliminary, including small sample size, lack of a control group, and inadequate statistical analyses. Results from the cancer trials are bolstered by studies conducted with noncancer populations, which have demonstrated positive effects on similar outcomes (eg, improvements in mood and fatigue). These studies were typically more methodologically rigorous than those conducted with cancer populations and often included active control groups (eg, relaxation, exercise, and medication), lending further support to results. It is important to note that the studies reviewed here represent only some of the possible benefits of yoga. A growing body of research has shown positive effects of yoga on outcomes ranging from cardiopulmonary function[5] to perceptual and motor skills,[31] which may also be relevant for cancer patients and survivors.

Yoga trials conducted with cancer patients have yielded different results depending on the type of cancer, stage of disease, and point in the treatment trajectory.[7,8,12,14] Some of the variability in study outcomes may be explained by the "all-purpose" nature of these interventions, which focused more on general stress reduction than on improving specific areas of functioning. Given the diverse problems and abilities of cancer patients and survivors, it is likely that the effects of these general interventions will also be quite variable depending on the patient population. An alternative approach is to develop interventions that are targeted towards specific problems or symptoms commonly experienced by cancer patients. This approach has been used successfully in trials conducted with other patient populations, such as interventions designed to improve upper body flexibility, alignment, and joint awareness in individuals with carpal tunnel syndrome[18] or to regulate autonomic tone in individuals with irritable bowel syndrome.[32] Targeted interventions may be most appropriate for cancer patients who are experiencing particular problems or symptoms. For example, we are currently conducting a pilot study of an Iyengar yoga intervention for breast cancer survivors with persistent fatigue that emphasizes poses believed to reduce fatigue symptoms (eg, backbending poses such as Setu Banda (Figure).

Supported backbending pose (Setu Banda).

On a related note, there is growing evidence that psychosocial interventions for cancer patients may be most effective for those who are most in need. For example, recent studies have shown that breast cancer patients who lack support,[33] are less optimistic,[34] or experience increased distress[35] are most likely to benefit from group therapy. It will be important to determine whether yoga is also more effective for particular types of patients, such as those who are experiencing or at risk for specific symptoms, or whether it has more global benefits. The type of intervention delivered may be an important determinant of these different outcomes.

One of the challenges for this developing field is the heterogeneity of yoga techniques, which differ significantly in emphasis and approach to working with cancer patients. We make the following recommendations for advancing empirically based research in this area. First, it is important to specify the techniques or approach used in a particular trial and to articulate why that approach was selected. For example, are the postures tailored for a specific patient population, or are they applicable to all cancer patients? Second, identifying specific outcomes is critical for evaluating the effectiveness of yoga interventions. Is the intervention designed to influence a specific symptom, such as fatigue or depression, or to promote general relaxation and stress reduction? The primary outcomes of interest should be clearly linked to the approach selected for evaluation. Third, examining theoretically based mechanisms for intervention effects will enable us to understand not only if these therapies work, but also how. Fourth, control groups should be carefully designed to control for nonspecific aspects of the interventions, such as group context, instructor attention, and physical activity. Fifth, it will be important to determine the duration of intervention effects, and to identify ways to maintain practice after trial completion. Finally, we recommend that classes be taught by advanced yoga instructors who have expertise with cancer patients and survivors and understand the unique needs of this population.

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