



PILOT STUDY

Effects of yoga on arm volume among women with breast cancer related lymphedema: A pilot study



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Summary Lymphedema affects 3–58% of survivors of breast cancer and can result in upper extremity impairments. Exercise can be beneficial in managing lymphedema. Yoga practice has been minimally studied for its effects on breast cancer related lymphedema (BCRL). The purpose of this study was to determine the effect of yoga on arm volume, quality of life (QOL), self-reported arm function, and hand grip strength in women with BCRL. Six women with BCRL participated in modified Hatha yoga 3×/week for 8 weeks. Compression sleeves were worn during yoga sessions. Arm volume, QOL, self-reported arm function, and hand grip strength were measured at baseline, half-way, and at the conclusion of yoga practice. Arm volume significantly decreased from baseline (2423.3 ml ± 597.2) to final measures (2370.8 ml ± 577.2) ($p = .02$). No significant changes in QOL ($p = .12$), self-reported arm function ($p = .34$), or hand grip strength ($p = .26$) were found. Yoga may be beneficial in the management of lymphedema.

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Background

Early detection efforts and aggressive treatment have resulted in survival rates approaching 90% for women with breast cancer (Howlader et al., 2013). Treatments for breast cancer (BC) often result in upper extremity morbidities (Ghazinouri et al., 2005; Hayes et al., 2012),

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including the development of lymphedema (Hayes et al., 2008; Johansson et al., 2001). Incidence rates reported for lymphedema vary from as low as 3% for sentinel node biopsy with irradiation, to as high as 58% among women undergoing a radical mastectomy (Shah et al., 2012). Impairments may result from the development of lymphedema, including decreased arm function, range of motion and strength, along with increased arm swelling and heaviness (Hayes et al., 2008; Johansson et al., 2001). This arm swelling can be accompanied by increased tightness of the arm and chest and a general decline in the quality of life (QOL) (Oliveri et al., 2008). These impairments often require lifelong management (Lawenda et al., 2009). Therefore, it is important to determine effective methods to manage lymphedema.

Exercise is one aspect of lymphedema management that has been supported by research to improve physiologic function of the lymphatic system. A review done by Lane et al. (2005) concluded that it is possible for enhanced lymph flow to result in female survivors of breast cancer (BCS) who participate in long-term resistance and aerobic exercise programs. Physiological changes accompanying extensive exercise training included increased muscular contractions and increased ventilation, both of which can enable the return of lymph to the circulatory system (Lane et al., 2005). Furthermore, exercise has been shown to augment sympathetic outflow, and lymphatic vessels often respond to this sympathetic activation (Lane et al., 2005). Exercise may produce other beneficial lymphatic changes such as lymphangiogenesis in the affected arm and recruitment of inactive lymphatic vessels (Lane et al., 2007). Importantly, this research has shown that breast cancer related lymphedema (BCRL) has not been shown to result from, nor be exacerbated by, exercise (Lane et al., 2005). Additional benefits of resistive, aerobic, and stretching exercise have been reported, including improved shoulder range of motion or ease of movement of the upper extremities as well as strength gains (Chung et al., 2011; McNeely et al., 2010; Schmitz et al., 2009a,b). Furthermore, studies evaluating the impact of resistive exercise on lymphedema have concluded that not only is resistive exercise safe for women with lymphedema, but results in reduced arm volume and symptoms following engagement in such a program (Ahmed et al., 2006; Hayes et al., 2009; Sander, 2008; Schmitz et al., 2009a,b, 2010). Although resistive exercise programs have been shown to be safe and effective to augment lymphedema management, the effect of yoga practice on lymphedema has been minimally studied in this population.

The practice of yoga has recently risen in popularity in the United States and yoga studios or clinics frequently offer specialized classes in yoga for BCS. Yoga practice was one of several complementary and alternative therapies used by women with BCRL (Finnane et al., 2011). A review of literature to date discovered only one recent study examining the effect of yoga on BCRL. In a single cohort study, women with BCRL ($n = 35$) were enrolled in a 4 week yoga program which consisted of one 90 min instructor led yoga class/week, and 6 daily home yoga sessions (Douglass et al., 2012). Eighteen of the original 35 participants responded to requests for follow up 6 months after the conclusion of the 4-week yoga program. At this follow-up

time period, 9 BCS had continued to practice yoga at least one day/week over the previous 6 months, and 9 had not. Measurements included arm volume using bio-impedance spectroscopy, perometry, tonometry, and subjective report of arm swelling, as well as a QOL measurement using a 10 cm visual analog scale. The difference in volume between the affected and unaffected limbs for each group was calculated and compared at baseline and again after 6 months. Researchers concluded that there was no statistical difference in this limb volume change after yoga practice compared to those who did not engage in a yoga program, but this measurement did not directly examine arm volume change in the affected limb before and after yoga practice (Douglass et al., 2012). Research directly examining volume change after completion of a yoga program and the level of exposure to yoga is needed.

Other studies have investigated the effects of low impact yoga on QOL perceptions (inclusive of pain, depression and fatigue) in cancer populations. Lower sleep disturbances were reported among a group of patients with lymphoma who participated in yoga (Cohen et al., 2004). Decreased overall stress and improved QOL were reported by other researchers investigating yoga practice among cancer patients (Joseph, 1983; Speca et al., 2000). In a qualitative study examining quality of life in group of 125 cancer patients currently undergoing radiation therapy, yoga had positive effects on increasing QOL (Joseph, 1983). Ninety cancer patients exposed to mindfulness meditation during a once-weekly session including yoga practice over 7 weeks demonstrated statistically significant improvement in scores on the Profile of Mood States and Symptoms of Stress Inventory (Speca et al., 2000). Among BCS, Iyengar yoga has been purported to improve peace of mind and hope in 10 participants practicing yoga once a week for 6 weeks (Thomas and Shaw, 2011), decreased fatigue among 11 participants practicing yoga once a week for 12 weeks (Bower et al., 2011), and improved self-reported QOL among 24 participants practicing yoga twice a week for 6–12 weeks (Speed-Andrews, 2010).

Although physiologic outcomes have not yet been fully investigated in women with BCRL participating in a yoga program, the physiological effects of low impact yoga have been investigated in other populations with chronic illnesses such as hypertension and diabetes. These studies have reported positive physiological outcomes, including decreased blood pressure and body weight, and increased functional abilities such as grip strength and timed chair stands (Bower et al., 2011; Cohen et al., 2011; Malhotra et al., 2002; Rajesh et al., 2006; Selvamurthy et al., 1998; Yang et al., 2011). It is reasonable to believe that BCS will experience similar gains when engaged in a yoga program.

The primary purpose of this pilot study was to examine the effect of yoga on arm volume in women with BCRL. Secondary objectives were to determine the effect of yoga on QOL and self-reported arm function, and grip strength in breast cancer survivors with lymphedema. We hypothesized that participation in an 8 week yoga program would result in a reduction of arm volume, as well as improvement in QOL and arm function.

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