

A Pilot Randomized Trial Evaluating Low-Level Laser Therapy as an Alternative Treatment to Manual Lymphatic Drainage for Breast Cancer-Related Lymphedema

Sheila H. Ridner, PhD, RN, FAAN, Ellen Poage-Hooper, MPH, MSN, NP-C, CLT-LANA, Collin Kanar, MD, Jennifer K. Doersam, BS, Stewart M. Bond, PhD, RN, AOCN®, and Mary S. Dietrich, PhD

Declines in breast cancer mortality rates, combined with the relatively high five-year survival rates for local and regional tumors, suggest that the estimated 2.6 million breast cancer survivors living in the United States (American Cancer Society, 2011; Herdman et al., 2005; Siegel, Naishadham, & Jemal, 2013) represent a significant and growing population. Lymphedema swelling in the affected arm is a serious problem for many breast cancer survivors, with documented rates of 6%–40% (Armer, Fu, Wainstock, Zagar, & Jacobs, 2004; Ball, Waters, Fish, & Thomas, 1992; Ivens et al., 1992; Kissin, Querci Della Rovere, Easton, & Westburry, 1986; Petrek & Heelan, 1998; Wilke et al., 2006). This range includes the 7%–22% of women with lymphedema following sentinel node biopsies (Armer et al., 2004; Wilke et al., 2006). Lymphedema can occur during treatment or many years later (Coward, 1999; Ramos, O'Donnell, & Knight, 1999; Stanton, Levick, & Mortimer, 1997). Lymphedema is a progressive disease. Initially, the limb will swell and pit with pressure (stage I). Over time, the limb may become firmer, not pit with pressure, and skin changes may be noted (stage II). In its most severe form (stage III), impaired lymph flow causes very thick skin and large skin folds, and invasive treatments may be needed to reduce bulk (Pain & Purushotham, 2000). Many problematic symptoms such as fatigue and altered sensations in the limb can occur with lymphedema (Ridner, 2005), and some breast cancer survivors with lymphedema experience poor quality of life (QOL) (Park, Jang, & Seo, 2012; Ridner, 2005). To improve health outcomes, access to effective therapeutic modalities is necessary.

Literature Review

Manual lymphatic drainage (MLD) with compression is the primary therapeutic component of complete decongestive therapy, the standard for volume-reduction treatment for breast cancer-related lymphedema

Purpose/Objectives: To examine the impact of advanced practice nurse (APN)-administered low-level laser therapy (LLLT) as both a stand-alone and complementary treatment for arm volume, symptoms, and quality of life (QOL) in women with breast cancer-related lymphedema.

Design: A three-group, pilot, randomized clinical trial.

Setting: A private rehabilitation practice in the southeastern United States.

Sample: 46 breast cancer survivors with treatment-related lymphedema.

Methods: Patients were screened for eligibility and then randomized to either manual lymphatic drainage (MLD) for 40 minutes, LLLT for 20 minutes, or 20 minutes of MLD followed by 20 minutes of LLLT. Compression bandaging was applied after each treatment. Data were collected pretreatment, daily, weekly, and at the end of treatment.

Main Research Variables: Independent variables consisted of three types of APN-administered lymphedema treatment. Outcome variables included limb volume, extracellular fluid, psychological and physical symptoms, and QOL.

Findings: No statistically significant between-group differences were found in volume reduction; however, all groups had clinically and statistically significant reduction in volume. No group differences were noted in psychological and physical symptoms or QOL; however, treatment-related improvements were noted in symptom burden within all groups. Skin improvement was noted in each group that received LLLT.

Conclusions: LLLT with bandaging may offer a time-saving therapeutic option to conventional MLD. Alternatively, compression bandaging alone could account for the demonstrated volume reduction.

Implications for Nursing: APNs can effectively treat lymphedema. APNs in private healthcare practices can serve as valuable research collaborators.

Knowledge Translation: Lasers may provide effective, less burdensome treatment for lymphedema. APNs with lymphedema certification can effectively treat this patient population with the use of LLLT. In addition, bioelectrical impedance and tape measurements can be used to assess lymphedema.