Making the case for safe and effective resistance exercise

Translating research into practice for individuals with breast-cancer related lymphedema

Exercise confirmed to be safe for lymphedema patients

By Kristin Campbell (primary author) and Kirstin Lane

Over 15 years have passed since the first studies were published challenging the myth that vigorous upper body exercise may increase the risk of breast cancer related lymphedema or worsen symptoms for those already affected[1,2]. The original research by McKenzie in 1998 and Harris and Niesen-Vertommen in 2000 looked at the sport of dragon boat racing and inspired a new generation of research into how resistance training exercise could be used in the prevention and treatment of lymphedema. Fast forward to 2009/2010 with the findings of two large randomized control trials providing compelling evidence that upper body resistance exercise was indeed safe. These trials showed that a standardized 12-month weight lifting intervention did not increase the risk of developing lymphedema in women treated for breast cancer or worsen symptoms in women with established lymphedema[3,4]. Since that time there has been a dramatic shift in the recommendations around exercise in the prevention and treatment of breast cancer related lymphedema. The result is a growing amount of research that aims to understand the potential beneficial effects of exercise related to lymphedema and how the research can be translated into clinical practice. This article will provide an update on the latest research.

What is the current research evidence for safety and effectiveness of resistance training?

In 2014, Paramanadam and Robert[5] published a systematic review of all available randomized controlled trials of resistance training in women who had or were at risk of developing lymphedema following breast cancer treatment. The data from eight trials, which included 1091 women, were pooled, and overall, showed that resistance training interventions improved arm strength without an increase in arm volume or risk of development of lymphedema. The key elements to the programs reviewed by the authors were that all interventions included some degree of supervision from qualified exercise staff, the exercise prescription started with light weight and used a slow progression when increasing the weights, all the participants wore compression garments during exercise sessions, and a monitoring and referral system was in place to address any significant change in arm symptoms before continuing with the exercise program.

> The authors concluded that the program was feasible and safe, as long as the program included regular follow up.

What about lifting heavier weights?

Prior research had focused on interventions with light to moderate weights (≤70%1-RM) with high numbers of repetitions (8-20 reps). In 2013, Cormie et al. published findings that challenged the notion that heavier loads (75-85%1-RM) and lower repetitions (6-10 reps) were unsafe in women with established lymphedema. Their research showed no difference in arm volume or severity of symptoms in women with breast-cancer related lymphedema who were randomized to take part in a 3-month supervised program using heavier weights and fewer repetitions compared to those with the more traditional light to moderate weights. The researchers concluded that women with breast-cancer related lymphedema could safely lift heavier weights during an upper body resistance exercise program that is

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individualized and supervised "without fear of lymphedema exacerbation".[6] Bloomquist et al. (2014) also showed that heavier loads did not increase the prevalence of lymphedema in women treated for breast cancer; however, this study did not include a control group. Gradually progressing to lifting heavier weights may be more effective at preserving bone mass in post-menopausal women than lifting with traditional light to moderate weights.

How can this research be translated to the community?

A key aspect in translation of the available research on weight lifting for women with breast cancer related lymphedema is to look at the safety and effectiveness of the program when it is translated from the research lab into a community-based setting. In 2014, the results were reported from a study that implemented the Strength After Breast Cancer program at a new community-based setting[7]. Women with or at risk of lymphedema could be referred to the program, which was led by physical therapists. Compared to the original research trials, this community-based program demonstrated similar findings for safety with regards to lymphedema, along with improvements in muscular strength in participants, but the gains were slightly below what was seen in the original research trial. Most importantly, potential barriers to translating this research into a community program were identified, which included issues around the referral process, reimbursement, eligibility criteria and the need for champions and advocates in the community. This study points to the challenge facing researchers, clinicians and patients in translating research evidence into community-based programs and outlines several key barriers to be considered.

What about home-based programs?

Based on the beneficial effects seen with supervised programs, there is an increasing interest in determining if a home-based resistance training program can improve muscle strength and also be safe. There is limited research available. One study of note by Johansson et al. in 2014 showed that in a small, single arm study with 23 women with breast cancer related lymphedema, a 12-week weight training intervention (3 sessions per week) improved muscle strength and arm volume compared to measurements prior to the start of the intervention[8]. Arm volume, measured using water displacement, was assessed every two weeks to check for any increase in volume. The authors concluded that the program was feasible and safe, as long as the program included regular follow up visits to monitor safety. More research is needed in this area, but these initial findings are promising. A home-based program would eliminate the barriers around travel to a supervised program and potential costs associated with supervision by qualified exercise professionals for all sessions.

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Normal physiological adaptations to aerobic exercise may also benefit the lymphatic system.

What about the role of other exercise options to help to improve lymphedema symptoms?

There is also emerging research on the potential benefit of other exercise options for individuals with lymphedema, such as yoga, qi gong, aquatic therapy and pole walking. However, to date the studies on these modalities are limited to small, single group studies. Interestingly, there is little research looking at the benefit of continuous aerobic exercise on preventing and treating lymphedema. Normal physiological adaptations to aerobic exercise may also benefit the lymphatic system. Moreover, aerobic exercise has been shown to reduce all-cause mortality and prevents many comorbid conditions like heart disease, diabetes, some types of cancer recurrence, etc. Further research is needed to determine if these types of exercise programs can improve lymphedema symptoms and assist with the management of lymphedema.

Conclusion

Resistance training is a safe form of exercise for women with established lymphedema or at risk of developing lymphedema following treatment for breast cancer. Safe and effective programs often share important characteristics such as using qualified exercise professionals, tailored exercise prescriptions with gradual progressions, use of compression garments during exercise sessions, and a monitoring and referral system should arm symptoms manifest. Future research is needed into translating the current evidence into practice in order to minimize barriers to implementation while maximizing results.

What about exercise for individuals with lower extremity lymphedema?

While the majority of research has focused on the impact of resistance exercise for women at risk or with breast-cancer related lymphedema, there is a need to also understand the potential role of resistance and aerobic exercise for individuals with non-breast-related lymphedema or lower extremity lymphedema. LP

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