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Review Article

Comparison of Different Protocols of Weight Training Exercises Used in Breast Cancer Related Lymphedema: A Review

Bhavna Anand*, Ruchika Kalra, Harshita Sharma, Himani Chauhan

Department of Applied Science, Amity University Noida, Uttar Pradesh, India

ABSTRACT

Worldwide fear of breast cancer is increasing due to the fear of lymphedema which is reduces the quality of life due to the inability to accomplish routine daily life and basic work that is thought of as weight lifting as a fear of pooling the lymph. This study objectified ways in the form of review literature to classify different followed protocols of weight training so as to strengthen other measures physical and physiologically. The study followed various scientific and journal sites, including PubMed, Google scholars, Medline library, and Cochrane Library with the help of keywords and selection criteria. In this study no filters were applied to the search, and the study included all electronic databases with no language barriers to the study. The 10 studies presented articles with regime following weight training patients diagnosed with breast cancer-related lymphedema. The studies presented different regime protocols and resulted in different measures such as arm volume, muscle strength bone mineral density, quality of life, musculoskeletal injuries and weight loss. All the authors studied and discussed the results and led to the conclusion of the study. It is essential for breast cancer-related lymphedema patients to undergo weight training to improve their quality of life and, increase muscular strength leading to fat loss. This study concludes with significant improvement in reduction of lymphedema, increase in the muscle strength of the affected limb and other outcome measures.

Keywords: Weight training; Breast cancer related lymphedema

INTRODUCTION

The most common cancer in women is breast cancer [1], and the figure of upcoming is increasing in the incline graph [2]. The treatment of breast cancer is increasing with an efficiency of increasing the survival rate with it [3], which includes many procedures of chemotherapy, surgery, radiation therapy which is a solution to tumor extraction and improve long-term life [4]. However, incorporation leads to the chances of getting breast cancer-related lymphedema which is occurs due to lymph node extraction from the neck, torso and axilla, or scarring of the lymph nodes due to radiation leading to fibrosis and accumulation of the lymph in the arm [5]. Accumulation of the fluid leads to limb weakness, muscle loss, obesity and all over decrease in physical activity [6]. Lymphedema is still not defined with any cure just as the symptomatic and preventive management to decrease and slow the occurrence of upcoming lymphedema [7]. The gold standard management of lymphedema is decongestive therapy, which works as a measure to manage it as much as possible [8]. However, the requirement for the solution of lymphedema is to rejuvenate the patient completely through all ways of life [9].

Due to the appearance or thought of breast cancer lymphedema provides a shock and demotivation of poor body appearance in the social, physical and mental life [10]. This leads to the development of depression and poor quality of life [11]. The exercises are the healer to the thought for breast cancer-related lymphedema which works as a primary solution to it as preventive or a management measure [12]. The thought that arises while engaging with exercises is whether I will be able to return to my original life, can I continue with exercises being I got operated with a recent surgery [13]. The exercises are helpful regardless of whether prior surgery, ongoing chemotherapy, ongoing radiation and possible when all the treatment ends [14]. The shoulder pain, incomplete range of motion, axilla cording,

Correspondence to: Dr. Bhavna Anand, Department of Applied Science, Amity University Noida, Uttar Pradesh, India, Tel/Fax: +44 (0)300 019 6175; E-mail: peterjo@uw.edu.com

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neurogenic pain, lymph pooling is highly complained by the patient while the presence of lymphedema where there are various physical therapy rehabilitation techniques to recover it whereas exercises are one of them [15]. The role of exercises is a prime measure to not only to improve lymphedema but also to psychological weakness, and muscle weakness leading to better quality of life. The exercises are of various types with the goal of increasing muscle contractions, flexibility, building cardiovascular endurance, improving lung patency, improving range of motion and reducing swelling.

There are various types of exercises, including aerobic, yoga, aqua training, resistance training, weight lifting, anti-gravity and swimming exercises. The rehabilitation protocol specific for exercises is invented with the help of the determinants of lymphedema such as measurements, type, skin texture and staging and on the other side of ongoing treatment such as radiation, chemotherapy, recent surgery preoperatively and postoperatively, ongoing hormone therapy, type of surgery and lymph node resection on the affected side.

Earlier exercises with the weight training were considered a cause in leading to the breast cancer related lymphedema, or begin the initiation for lymphedema as post- surgery and treatment it is told that as a precaution measure not to lift weight. However, as better treatment enhancement and control towards is accepted the initiation of weight training also begins with certain guidelines and research. Various studies have stated that weight training to be performed progressively according to endurance gain initiates muscle contraction leading to an improvement in the musculoskeletal system. As breast cancer is a key to muscle loss and fatigue, the strength training plays a role in enhancing the complete body system physiologically and building strength so that muscle contraction acts as a pump to increase the flow of lymph and not lead to the accumulation of the lymph in the arm.

LITERATURE REVIEW

Weight training is a group of exercises nowadays used in case of reduction of lymphedema in case of BCRL where in this study the review is created by analyzing various protocols of weight lifting in various studies.

The objective is to find different weight training techniques that use various types of lymphoedema in breast cancer and draft a review study from various articles. The articles studied were searched using the keywords weight training and breast cancer-related lymphedema. As per various studies for BCRL are there where we reviewed the articles involving the BCRL and weight lifting and resistance training followed din female breast cancer. This criterion provided limited set of articles with randomized control trial, review literature supported from scientific scholar sites inclusive of PubMed, Cochrane library and Medline library so as presented.

The exclusion criteria were the different studies with no presence of abstract or full text article, no BCRL, lymphedema present in the male breast, trials and reviews based on other rehabilitation protocols. The extraction and inclusion criteria followed the manual selection from the various journal sites and are represented in the flow chart format below.

Here the participant article selection was performed on the basis of the weight training regime followed in patients with breast cancer-related lymphedema, resulting in changes in various outcome measures such as lymphedema circumferential measurement, lymphedema volume changes, quality of life, muscle strength, body mass index, and lower and upper limb strength.

According to the studies selected above different numbers of samples, randomization and protocols were presented. The tabular data presented. Presenting the different protocols providing the study, its type, involved patients with their criteria and outcome measures evaluated, whereas providing the exercise prescription from different studies and according to FITT principle as provided by the study and with addition to type of treatment provided for lymphedema management and type of surgery.

In this study we used various protocols, and according to various studies the parameters to report and advise the weight training are differentiated on different outcome measures evaluation-

Changes in the arm lymphedema

Arm volume is the primary measure for the assessment tool for providing changes present in lymphedema; therefore, the effect of weight training in breast cancer-related lymphedema is essential to notify the changes in arm volume. In performed their trial on 141 patients with a 13-week protocol followed by 90 min session following all the exercises for upper and lower limbs following 10 reps for 3 sets, leading to the change in arm composition and decrease in fat overall, adding an effect on fat composition and improved lean mass when measured with dual X-ray absorptiometry. A study by stated that resistance exercise followed by three modes of low, moderate and severe performed on 21 patients stated that no exacerbations were seen in the arm volume. In performed a trial on 62 patients following the protocol of high resistance training and low resistance training to usual care concluded and burst the myth that upper limb resistance training or heavy weight lifting increased lymphedema, but the trial resulted in no disruption the increase in the lymphedema. In another study by the protocol was provided to 17 women divided into two groups with heavy and light weight lifting and measurement of arm composition with circumference using X-ray absorptiometry pre, post, 24 and 72 hours later resulted in no heaviness, tightness of the increased arm, and circumference in the affected arm. In the study had a trial on 141 patients followed twice resistance training in a week and followed on the measure of arm volume, which resulted in no difference in lymphedema but made sure to be slow and progressive so as to inhibit exacerbations, resulting in an increase in arm volume. The study by Stone et al. formed a randomized group of 295 patients provided with 12-month with 2 days each in a week with slow and progressive weight training turning into the no exacerbations of lymphedema. Study by which was inclusive of randomized groups following aerobic, anaerobic and both groups provided the 12-week intervention separately in the groups which resulted in no change in the

lymphedema status even in the case of a combination of both. A study in which 8-week moderate resistance training was added with complex decongestive therapy for 1-2 weeks, where the resistance exercises noticed no change in the arm volume. The study by Johansson et al. in 2014 administered the weight lifting protocol followed for 12 weeks following 3 days per week for 8-10 reps with the addition of a compression sleeve in the treatment leading to the arm volume reduction measured by the water displacement method, with significant decrease in arm volume and fat.

Changes in the muscular strength

Resistance exercises are created to enhance muscular strength in the normal population and, enhance the strength of breast cancer-related lymphedema patients. Few studies have completed their trials for weeks on these patients and their different protocols proposed depending on the level of resistance placed. In 62 patients participated in two groups of high load and low load resistance exercises where 75% of 1 repetition maximum was utilized at 55% of low load respectively, resulting in significant enhancement in muscular strength obtained in the upper limb. In stated that 141 women were included in the study where 2 days per week were provided to as weight training the patients and had significant improvement in muscular strength not only in the upper but lower limb too when compared to the control group. The study in 2012 followed with the 1-year intervention of resistance training in both lymphedema and risk of lymphedema patients compared with the control group. The study benefitted from the treatment as leading to enhancement of the muscular strength in the BCRL patients or even at risk of it. Stone et al. in his study demonstrated the where 2 groups with intervention and control groups were presented and provided the weight training task for 2 days in a week followed until one year with the progression slowly and steady have resulted in the difference of the muscular strength in the intervention group. Formed two groups one with patients who provided resistance training and the other with aerobic training; in comparison, the 12-week protocol resulted in no significant difference in the upper limb or lower limb compared with anaerobic to aerobic training. A study in group the patients in which the patients were equally divided into two groups out of 44 patients who received complex decongestive therapy treatment prior to the exercises where the one group turned control and the other turned with resistance exercises followed for 8 weeks and resulted in increased muscular strength post resistance training. In conducted a home exercise regimen followed for 12 weeks and 23 patients were allowed to follow three times per week resistance training and then after completion of weeks they were evaluated on the basis of isometric muscle strength and were found to be safe and feasible for BCRL patients.

Changes in the quality of life and disabilities

Quality of life measurement is the priority nowadays to look after pre-and post-intervention as different quality of life scales have different measures that allow a significant numerical on life-achieving grades in special aspects of life. The same is true for patients with breast cancer with lymphedema. Action resistance exercises on quality of life have been studied by different trials in different studies. Provided 62 patients into two groups; one group provided high and low-load weight exercises, in which 75 percent of one repletion maximum was high load and 55 percent in low load exercises, which were followed for 12 weeks and quantified on the scale of quality of life and proved to be significant in both groups. However, the study by Buchan et al. in 2016 interpreted that resistance training followed for 12-week has proven to be significant in the FACT B+4 sub-scales that quality of life is improved with resistance training. The study by follow various scales of quality of EORTC QLQ, EORTC BR 23 DASH and many more prior treatments where the 8-week protocol was followed for the resistance training where the complex decongestive therapy was provided intensively prior resistance training and proven to be significant.

DISCUSSION

Weight training as a regime of exercise for BCRL can be a significant type of exercise in reduction of lymphedema, so as this study reviewed the trial studies proposing various protocols and reviewing them on different outcome measures

In the 2000s, the lymphedema challenges by the authors step up and present a negative effect on BCRL, In 2010, the reviews changed to no negative effects on the BCRL, where reviews and studies present a with positive effect of weight training in lymphedema as the enhancement of the assessment and efficiency of gold standard treatment that is complex decongestive therapy in lymphedema with an addition of weight training is the step forward to the better quality of life and sustainability of lymphedema reduction as the follow-up. Exercise training with weights enhances muscle contraction, leading to the contraction of muscle, channelizing the lymph, and improving circulation of accumulated lymph. The type of exercise may lead to damage to tissues of the upper limb depending on the type of load shifting but it does not affect the pooling of the lymph, leading to an increase in lymphedema.

There are studies that have reported the impact of inflammatory markers and tumor Ki67, where post-weight training had an impact and reduction in the inflammatory markers while on weight reduction protocol and not interrupt in tumor growth. Other studies have reported the effect of weight training on other markets such as adipocytokines and metabolic factors such as insulin, lipids and C-reactive protein, which have significant reduction when followed with high-intensity weight reduction training, and the effects on apoptosis were significant in post-physical training with an increase in intensity of training. Although aerobic training has an impact not in prevention, but treating cancer can be efficient in reducing of tumor growth, total antioxidant capacity is increased and tumor volume growth is reduced. Moreover changes in insulin concentrations with benefits were also noticed with it with the changes in the enhancement in the cardiorespiratory fitness with enhanced folic acid levels. The fact that cancer leads to muscle wasting can be turned into non-affecting/less affecting side effects by following it on high-intensity training physical activity as even mice have shown the results.

This study presented various protocols followed by the researchers by their efficient trials performed on patients already having BCRL and with different exercise regimes with different sample sizes number and protocol times. The exercise regime was different depending on their upcoming outcome measures such as quality of life, fat loss, strength measurement, circumferential measurement and bone mineral density.

Weight training is an essential regime in increasing the muscular strength and does create the changes in the bone mineral density but it has been seen but in beneficial in pre-menopausal women with breast cancer in post-menopausal breast cancer patients there is no changes seen in the patients. The regime was created progressively to avoid injuries to the joints and to build the endurance step by step. Some regimes presented with upper limbs and no lower limbs but some presented as a combination of both limbs side by side to create an active life not for lymphedema but in enhancement of the quality of life by all means. The regime was built up in three phases: aerobic to weight training and cool down a suitable method to improve the sustainability of the complete quality of life, as lymphedema is not the only agent that affects only, but cancer is the main cause of complete body fatigue demotivated life leading to altered quality of life.

CONCLUSION

The study struck to the conclusion stating that resistance exercise has an impact on the patients with breast cancer related lymphedema which not only enhance the circumferential measurements as on outcome measures but also have a great impact on the quality of life, strength of muscle groups and ease in activities of daily living. The studies provide the regime to be progressive in nature so that load shifts to slow and steady with the prior of aerobic training to increase muscle efficiency to perform and cool down after the exercise protocol so as to minimize the chance of the injury. Weight training exercises in BCRL are not only essential to train the upper limb but also to improve physical activity on the other side leading to better quality of life.

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