Exercise

Debunking myths

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Clinical Exercise Physiology Lab

Outline

1. Share the progression of knowledge on the role of exercise and lymphedema

2. Describe the current state of knowledge

3. Give recommendations on how to exercise

Definitions

- Exercise
  - activity requiring physical effort, carried out especially to sustain or improve health and fitness

- Resistance = weight lifting
- Aerobic = walking, cycling etc.
- Other = yoga, tai chi etc.

- Majority of research is in breast cancer-related lymphedema

Why has there been a question about exercise?

↑ blood flow & blood pressure in upper extremity

↓

↑ lymph production

micro-injury

↓

↑ inflammation

↓

↑ lymph flow with muscle activity (i.e., "muscle pump") & respiration

↓

↑ lymph drainage

Resilience to micro-injury

Schmitz KH. Exerc Sport Sci Rev 2010; 38: 17-24

1. Progression of knowledge

2000-2009

Recommendations as of 2000

1. Avoid "violent exercise and strenuous exertion"
2. Use the affected arm in moderation
3. Don't carry heavy objects (> 5 lbs)
4. Avoid repetitive motion

Erickson et al. *JNCI* 2001; 92(2): 96-111.
Petrek et al. *CA Cancer J Clin* 2000; 50:292.

Slide: Jill Binkley. PT

Ground breaking research study

Journal of Surgical Oncology 2000;74:95–99

Challenging the Myth of Exercise-Induced Lymphedema Following Breast Cancer: A Series of Case Reports

Susan R. Harris, PhD, PT,* AND Sherri L. Niesen-Vertommen, PhD, PT


Slide with permission by S. Harris

Purpose

To ***challenge these beliefs*** by systematically measuring arm circumference in a group of women living with breast cancer, who were ***training for and engaging in Dragon Boat racing***.

Harris et al. *J Surg Oncology.* 2000;74:95-99

Women at risk of getting lymphedema

- 20 women
- Age 31-63 years
- 1-17 years post-diagnosis
- All had undergone axillary dissection
- 65% had received radiation to breast and/or axilla

- Circumference measurements
  - Baseline: Beginning of paddling training
  - Mid-point: Beginning of race season (2 months later)
  - End of study: End of race season (7-8 months after baseline)

Harris et al. *J Surg Oncology.* 2000;74:95-99

No increased risk of lymphedema

- No increase in arm circumference
- Improvement in both physical and mental health
- No significant side-effects

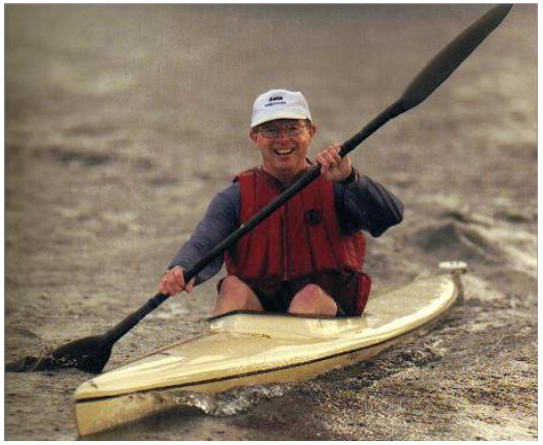
"This preliminary report suggests that women who have undergone axillary dissection and in many cases radiation for the treatment of breast cancer, ***may be able to safely engage in strenuous, repetitive upper body exercise***."

Harris et al. *J Surg Oncology.* 2000;74:95-99
Lane et al. *Eur J Can* 2005; 14:353-358

What was the significance of this study?

"We ***did not see the cases of lymphedema that we had been warned about***. In terms of impact on patients' lives, it has been the most significant experience of my professional career."

McKenzie DC. *CMAJ* 1998; 159:376-8.



What about women who already have lymphedema?

Effect of Upper Extremity Exercise on Secondary Lymphedema in Breast Cancer Patients: A Pilot Study

By Donald C. McKenzie and Andrea L. Kalda

McKenzie & Kalda *J Clin Oncol 2003; 21:463-466.*

First randomized trial

- 14 women with breast-cancer related lymphedema

- 8 week supervised program
  - Resistance training + aerobic exercise (arm ergometer)

McKenzie & Kalda *J Clin Oncol 2003; 21:463-466.*

Results

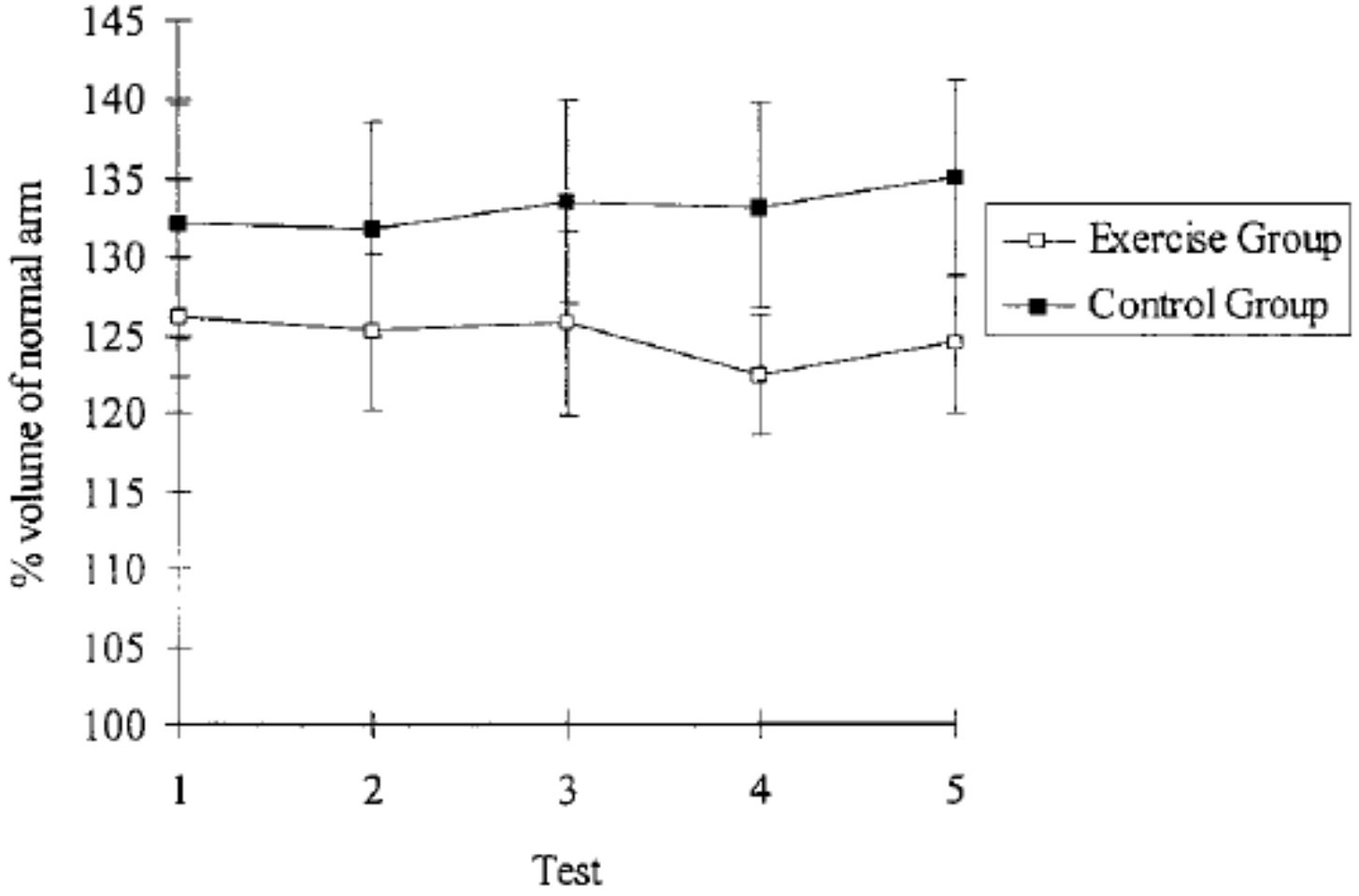


Fig 1. Response of arm volume measured by water displacement.

McKenzie & Kalda *J Clin Oncol 2003; 21:463-466.*

Conclusion: safe to exercise

- No changes in arm circumference or arm volume after exercise program in women with lymphedema after breast cancer

- A trend toward increase in quality of life (physical functioning, general and vitality) and mental health.

McKenzie & Kalda *J Clin Oncol 2003; 21:463-466.*

First systematic review appears!

Breast Cancer Res Treat (2008) 109:9–26
DOI 10.1007/s10549-007-9638-0

REVIEW

Progressive resistance training in breast cancer: a systematic review of clinical trials

Bobby Cheema · Catherine A. Gaul · Kirstin Lane · Maria A. Fiatarone Singh

- 10 studies
- "No exacerbation of objectively measured or subjectively reported lymphedema symptoms"

To summarize

- Women *without* lymphedema can safely participate in vigorous upper-body exercise (dragon boat racing)

- Women *with* breast cancer-related lymphedema can participate in exercise programs without changes in arm volume

2. Current state of knowledge

2009 onwards

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Weight Lifting in Women with Breast-Cancer–Related Lymphedema

Kathryn H. Schmitz, Ph.D., M.P.H., Rehana L. Ahmed, M.D., Ph.D., Andrea Troxel, Sc.D., Andrea Cheville, M.D., Rebecca Smith, M.D., Lorita Lewis-Grant, M.P.H., M.S.W., Cathy J. Bryan, M.Ed., Catherine T. Williams-Smith, B.S., and Quincy P. Greene

141 women *with* stable arm lymphedema

Randomized trial

N Engl J Med 2009;361:664-73.

ONLINE FIRST

Weight Lifting for Women at Risk for Breast Cancer–Related Lymphedema

A Randomized Trial

Kathryn H. Schmitz, PhD, MPH
Rehana L. Ahmed, MD, PhD
Andrea B. Troxel, ScD
Andrea Cheville, MD, MSCE
Lorita Lewis-Grant, MPH, MSW
Rebecca Smith, MD, MS
Cathy J. Bryan, MEd
Catherine T. Williams-Smith, BS
Jesse Chittams, MS

Context Clinical guidelines for breast cancer survivors without lymphedema advise against upper body exercise, preventing them from obtaining established health benefits of weight lifting.

Objective To evaluate lymphedema onset after a 1-year weight lifting intervention vs no exercise (control) among survivors at risk for breast cancer–related lymphedema (BCRL).

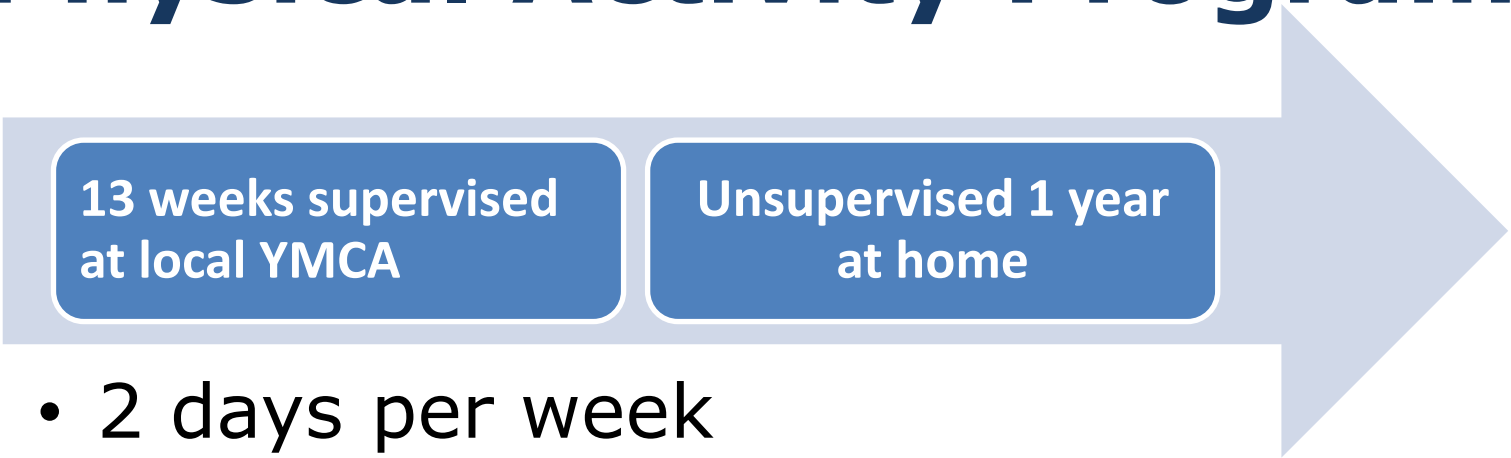
Design, Setting, and Participants A randomized controlled equivalence trial (Physical Activity and Lymphedema trial) in the Philadelphia metropolitan area of 154 breast cancer survivors 1 to 5 years postunilateral breast cancer, with at least 2 lymph nodes removed and without clinical signs of BCRL at study entry. Participants were recruited between October 1, 2005, and February 2007, with data collection ending in August 2008.

154 women *at risk for* lymphedema

Randomized trial

JAMA. 2010;304(24):2699-2705

Physical Activity Program



- 2 days per week
- 10 exercises (upper and lower extremity)
- Small increase in weights after 2 sessions with correct form and no change in arm symptoms
- Referral to PT if any symptoms of lymphedema

Weight Lifting is safe

Women with lymphedema	Women at risk for lymphedema
• No difference in # of women with arm swelling (11% vs 12%)	• Fewer developed lymphedema in the weight lifting group (11%) than control group (17%)
• Weight lifting group = *improved* self report severity of LE *symptoms*	• Even fewer women with > 5 lymph nodes removed (7% vs. 22%)
• Fewer women experienced exacerbations in LE (14% vs. 29%)	• "…did not result in increased incidence of lymphedema"
• No serious adverse events	

What about lifting heavier weights?

- Previous recommendations: avoid lifting objects heavier than 5 lbs
- Australian study tested the response to 3-months supervised weight lifting program
- 62 women with breast cancer-related lymphedema
  - High load (n=22) [6-10 reps, 75-85 % 1 RM]
  - Low load (n=21) [15-20 reps, 55-65 % 1RM]
  - Usual care (n=19)

Cormie P et al. *J Cancer Surviv* 2013 Sep;7(3):413-24

No difference in arm swelling or severity of symptoms

- N
  o
- I
  in:
  - Muscular strength
  - Muscular endurance
  - Quality of life

High load resistance training is safe and improves health

Cormie P et al. *J Cancer Surviv* 2013 Sep;7(3):413-24

What about other exercise options to improve lymphedema symptoms?

- Emerging interest in potential of yoga, qi gong, aqua therapy and pole walking

- Studies to date limited to small, single group studies

What about exercise for people with leg lymphedema?

- One small study
  - 10 participants
  - 8 week supervised resistance (2x/week)
  - 12 week unsupervised (goal: 3x/week)

- Results:
  - Increase in muscle strength
  - Improved walking distance
  - 2 cases of cellulitis
  - **More research needed**

Katz et al. Arch Phys Med Rehabil. 2010 Jul;91(7):1070-6.

Systematic review and meta-analysis of the effects of exercise for those with cancer-related lymphedema

Ben Singh, Tracey Disipio, Jonathan Peake, Sandra C. Hayes

Singh et al. Arch Phys Med Rehab 2015 Oct 3 (e-pub)

Current state of knowledge

Individuals with secondary lymphedema can safely participate in progressive, regular exercise without experiencing a worsening of lymphedema or related symptoms.

However, the results do not suggest any improvements will occur in lymphedema

Singh et al. Arch Phys Med Rehab 2015 Oct 3 (e-pub)

Use of compression garment?

"Insufficient evidence to support or refute the current clinical recommendation to wear compression garments during regular exercise."

Singh et al. Arch Phys Med Rehab 2015 Oct 3 (e-pub)

Recommendations as of 2000

1. Avoid "violent exercise and strenuous exertion"
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Key features when being physical active

- Slow progression
- Use of compression sleeves
- Careful monitoring of arm/hand swelling and contact PT as needed
- If sessions were missed, reduce resistance and build up again

Take home message

- Moderate and vigorous resistance training is safe and beneficial for women *with* lymphedema and for women *at risk of* lymphedema
- Exercise *may* decrease the symptoms associated with lymphedema
- Not evidence to say, that exercise can prevent lymphedema

Thank you!