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Strength ABC Program Training

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Overview

- Review PAL trial results
- SABC Program elements
- Review referral process from oncology
- Review Lymphedema of the Arm, Breast, and Torso (LABAT) pre-exercise evaluation
- Lymphedema Education Session (LES)
 - Review of patient eligibility to complete these sessions
 - Review instructor eligibility to conduct these sessions
 - Overview of session content for all four sessions

Overview (cont.)

Exercise Training Sessions

- Exercise protocol packet
- Teaching exercise logging
- Review of exercises in detail
- The concepts of progression, overall arm load, deconditioning
- Behavior and motivation

Discharge

- Determining if the BrCA survivor is ready to be independent
- PowerBlocks or other resistance
- Blank workout forms
- Kitchen magnets

Wrap-Up

- Flow of activities: 'Do I Get It?' FAQs for Clinicians
- In-service handout for front desk staff
- Billing codes

Balancing Risks of Deconditioning vs. Weight-Lifting for Breast Cancer Survivors



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Why should clinicians care about deconditioning vs. exercise?

- 35-58% of BrCA survivors have arm/shoulder issues*
 - Lymphedema
 - Rotator cuff issues
- Health disparity issue – Upper-body function is vital for manual labor
- Exercise is associated with reduced recurrence – Even lower-body exercise requires upper-body work
- New guidelines from American College of Sports Medicine
- Current 'standard of care' – Squeaky wheel system

*Lauridsen 2008, Nesvold 2008

Musculoskeletal Effects of Tx on Arm/Shoulder

Pre-Existing Issues

- Rotator cuff problems common in older women
- Upper body deconditioning

Surgery

- Rest of arm/shoulder = further deconditioning
- Muscles/soft tissue/nerves severed, damaged, altered
- Inflammation

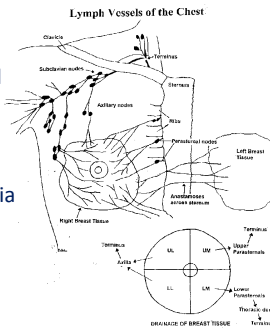
Radiation

- Soft tissue & nerve damage
- Inflammation

Lymphatic System Review

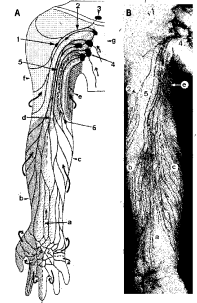
Function

- Immune surveillance
- Transports 2 liters of fluid per day
 - Proteins
 - Fat molecules
 - Cellular debris, bacteria
 - Water



Effect of Treatment on Lymphatic System

- Alteration of affected body part's ability to respond to:
 - Inflammation
 - Infection
 - Overuse
 - Injury
 - Trauma
- Linear relationship of # of nodes removed and severity of effect
- Radiation effects



Long-Held Clinical Advice

- Avoid overusing the upper body
 - STILL GOOD ADVICE
- Translation in practice
 - Avoid using the upper body
 - Deconditioning of upper body
- Cardiac rehabilitation analogy



Research Prior to PAL Trial

Prior interventions have examined the effects of upper-body exercise on lymphedema in BrCA survivors

- No increase in incidence of lymphedema or increased symptoms in women with, or at risk for, lymphedema

These studies have been limited by methodology

- Case series
- Uncontrolled pre-post designs
- Small randomized trials

MacVicar 1989; Brennan 1998; Harris 2000; Kolden 2002; McKenzie 2003; Waltman 2003; Turner 2004; Lane 2005; Sandel 2005; Johansson 2005; Cheema 2006; Courneya 2007

Based on these findings...

Supervised, slowly-progressive, controlled increase in physiological stress through strength training may be more beneficial to BrCa survivors vs. acute stress from activities of daily living.

Analogy:

Heart attack and shoveling snow ~
Lymphedema and lifting a heavy object

The Physical Activity and Lymphedema (PAL) Trial



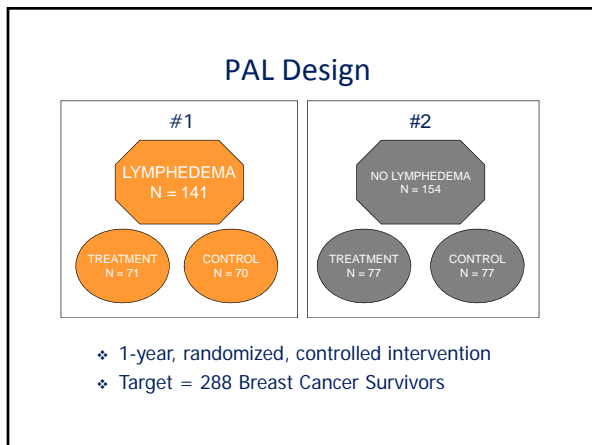
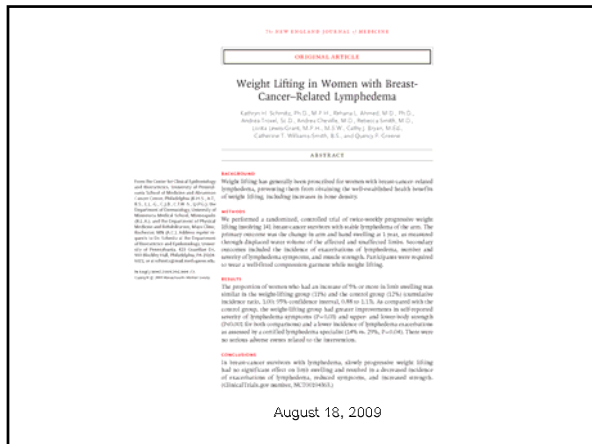
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1-year, randomized, controlled intervention

- Twice-weekly, progressive strength training
- Non-exercising control

Primary aim: To determine whether there are any changes in lymphedema outcomes

- 2 separate trials (*with* lymphedema and *at-risk* for lymphedema)
- Powered independently



- ### Measurements
- Arm volume and symptoms
 - Water-displacement volumetry
 - Self-report survey of symptoms
 - Body composition
 - Body Image
 - QOL

Demographics

	With Lymphedema (N=141)		Without Lymphedema (N=154)	
	Treatment (n=71)	Control (n=70)	Treatment (n=77)	Control (n=77)
Age (years)	56	58	54	56
Education				
HS or less	13	16	7	11
Some College	26	24	28	23
College or more	32	30	42	43
Race				
White	40	42	50	59
Black	28	26	19	17
Other	3	2	8	1

Baseline Lymphedema Characteristics

	Lymphedema		No Lymphedema	
	Tx	Ctrl	Tx	Ctrl
N	71	70	77	77
% diff volume	15.0	17.3	0.1	-0.3

Adequate Compression

ALL women with lymphedema (at entry or onset during study) were provided with custom-fitted compression garments.

Intervention Description

13 weeks supervised

- 2x weekly
- Small groups
- Calls to non-attenders
- Trainers all trained by PI to deliver intervention

9 months unsupervised

- Weekly calls for non-attenders
- Monthly safety measures
- Monthly personal training sessions

Intervention Adherence

- ❖ With lymphedema: 88% average attendance
- ❖ Without lymphedema: 79% average attendance

Strength Changes in Women WITH Lymphedema

	Treatment	Control	
Strength Changes	% Δ	% Δ	p-value*
Bench Press	29.4	4.06	<0.0001
Leg Press	32.5	7.61	<0.0001

Similar effects in women WITHOUT lymphedema

Lymphedema Outcomes in Women WITH Lymphedema

	Treatment	Control	CIR (95% CI)
	Mean Or %	Mean Or %	or p-value*
Interlimb Difference 5% increase	11%	12%	1.00
Flare-Ups	14%	29%	0.47 (0.23 , 0.97)
Δ in # of symptoms endorsed	-1.81	-1.17	0.07
Symptom severity	-0.51	-0.22	0.03

Lymphedema Outcomes in ALL Women WITHOUT Lymphedema (N=154)

	Treatment	Control	CIR (95% CI)
	Mean Or %	Mean Or %	or p-value*
Interlimb Difference 5% increase	11%	17%	0.64 (0.28, 1.45)
Clinically defined onsets	4.6%	4.4%	1.03 (0.22, 4.92)
Δ in # of symptoms endorsed	-0.51	-0.42	0.60
Symptom severity	-0.27	-0.28	0.99

Lymphedema Outcomes: SUBSET who had 5+ nodes removed (N=96)

	Treatment Mean Or %	Control Mean Or %	CIR (95% CI) or p-value*
Interlimb Difference 5% increase	7%	22%	0.30 (0.09, 1.00)
Clinically defined onsets	2.4%	6.5%	0.37 (0.04, 3.38)
Δ in # of symptoms endorsed	-0.63	-0.83	0.55
Symptom severity	-0.30	-0.41	0.56

Summary

- Twice-weekly, slowly progressive strength training is SAFE for breast cancer survivors who have had lymph nodes removed including:
 - Those WITH lymphedema
 - Those AT RISK FOR lymphedema
- Risk of lymphedema flare-ups decreased by HALF
 - Cost effectiveness?
- Among at-risk women with 5+ nodes removed, risk of ↑ arm swelling reduced by 70%
- Substantive strength improvements
- Body image improved as well (Speck et al., 2010, Br Cancer Res Treat)
- Prevention of decline in physical function as measured by the SF-36 (Brown et al., 2015, JCO)

How do we disseminate this work?

- What steps are vital to this program?
 - Pre-exercise PT eval
 - High skill/training of interventionists
 - Standardized protocol
 - Obvious system of referral back to PT
 - SLOW progression of resistance
 - System for dealing with exercise 'holidays'
- Reimbursement issues
- Compression garments

STEP 1: Referral from Oncology Clinician to Physical Therapist @ follow-up visit

STEP 2: Physical Therapists screen, clear for exercise, teach PAL intervention

STEP 3: Survivors get resistance and the exercising begins!

STEP 4: Any changes in symptoms need to be evaluated/ treated. Appropriate return to exercise.

Acknowledgements

UMN Department of Recreation and Sports

YMCA Associations and staff (local *and* national)
Ann-Hilary Hanley, Kathy Custis, Lisa Newman, Rachel Dubin

PAL Collaborators
Rehana Ahmed, Andrea Troxel, Andrea Chevillu, Russell Localio

PAL Staff
Amy Rogerino, Cathy Bryan, Damali Mason, Lorita Grant

PA and NJ Cancer Registries
Robin Otto, Craig Edelman, Homer Wilcox

Penn Therapy and Fitness PTs

Living Well After Cancer collaborators

Funders:
NCI, Komen, UMN GCRC, Penn CTSA

PARTICIPANTS!



Strong Interest From BrCA Survivors and Media Media Coverage of the PAL Trial Results

Print

- Science Times - New York Times
- USA Today
- Wall Street Journal
- Time Magazine (2010 Year in Review)
- U.S. News and World Report
- AP article that ran in 114 newspapers across the nation

Broadcast

- NBC Nightly News
- Reuters

Online

- "Well" blog on NYTimes.com
- ABCNews.com

Disseminating PAL

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NCI R21-CA152451, NCI R01-106854, NCI U54-155850

Revised Intervention: Strength After Breast Cancer (SABC)

- Referral from an oncology clinician
- Evaluation by a Certified Lymphedema Therapist (CLT)
- Education session
- Four group or individual sessions to learn the protocol
- Choice of self-pay or insurance co-pay
- Can be offered by PTs, OTs, ATCs, or nationally-certified exercise professionals

Safety and Effectiveness: SABC vs. PAL

	Strength After Breast Cancer Effectiveness Trial			Physical Activity after Lymphedema Efficacy Trial		
	Baseline	12-month	P	Baseline	12-month	P
Lymphedema Swelling						
New lymphedema onset			.002	3.3±3.2	2.2±2.6	<.001
Flare-up of existing lymphedema				2.0±0.7	1.6±0.7	<.001
Total lymphedema				5.3±4.2	3.8±3.3	.40
Muscular Strength Outcomes						
Bench press (lbs)	45±11	51±11	<.001	19.8±7.0	17.0±6.3	<.001
Leg press (lbs)	190±58	208±54	<.001	30.8±6.7	27.7±7.2	<.001
Body Image and Relationships						
Strength and health	34.2±9.2	28.7±9.3	<.001	33.8±9.5	27.0±7.7	<.001
Social barriers	19.8±7.0	17.0±6.3	.003	16.6±6.5	14.5±6.5	<.001
Appearance and sexuality	30.8±6.7	27.7±7.2	<.001	30.0±8.0	27.0±7.7	<.001
Total score	85.8±19.9	74.0±20.3	<.001	81.2±20.2	70.0±19.1	<.001

Safety and effectiveness maintained after translation into clinical practice!

Major Win: Insurance is covering the program!

An attachment is provided with billing codes which are discussed in the wrap-up section.

Strength ABC Program Overview

- Referral from a breast oncology clinic
 - surgeon, medical or radiation oncologist, nurse navigator, oncology nurse navigator, flyer in waiting room, etc.
- Lymphedema Education Session (LES)
- Lymphedema of the Arm, Breast, and Torso Evaluation (LABAT) by a CLT
- Four exercise sessions to learn the exercises
- Discharge

Referrals from Oncology

- In-service with clinicians is needed
- Nurses might do more referring
- Electronic medical record (EMR)
 - Try to get an email sent to the SABC administrator with a listing of women referred so follow-up phone calls can be made.
 - No EMR? Try to get a listing of women referred so follow-up phone calls can be made.

Pre-Exercise Evaluation: LABAT Form (LABAT = Lymphedema of the Arm, Breast, and Torso)

All SABC program participants must undergo a lymphedema evaluation with a Certified Lymphatic Therapist (CLT) prior to starting the exercise instruction.

Goals:

- Clear the participant as being ready to do the exercises in the program.
- Ensure that those with lymphedema get adequate compression prior to starting the exercise program.

Lymphedema Education Session

Questions we will answer:

- What is lymphedema?
- Who is at risk?
- When is it likely to occur?
- Why does it happen?
- How do I reduce my risk?
- How is it treated?
- What are the exercise guidelines?

What is lymphedema?

Lymphedema is an abnormal accumulation of protein-rich fluid in the tissue which can result in swelling of a body part and development of fibrosis.

It only impacts the region of the body affected by lymph node removal/damage.

- Upper body for breast cancer survivors
- Lower body for endometrial cancer survivors

Who is at risk?

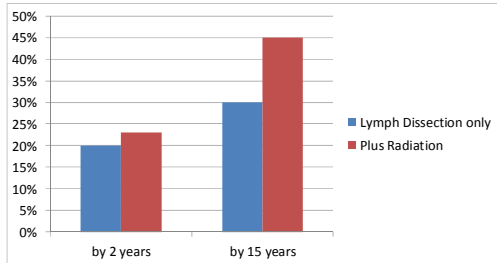
- Removal of lymph nodes
- Damage to the lymph system
- Other factors
 - Obesity
 - Poor diet

How is lymphedema acquired and how rapidly?

- Once lymphatics are removed or damaged, lymphedema may occur at any time.
- Occurs most often within 3 years of breast cancer treatment.
- Lymphedema usually occurs slowly and steadily.

Secondary Arm Lymphedema Incidence & Prevalence

Among 1151 women followed for 15 years...



www.nci.nih.gov - lymphedema

What does the lymphatic system do?

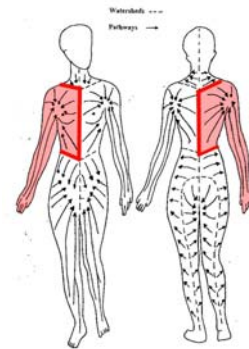
- Provides surveillance against cancer and infection
- Balances fluid and proteins in the circulatory system by transporting several liters of lymph fluid per day
- Assists fat digestion

Role of the Lymphatic System

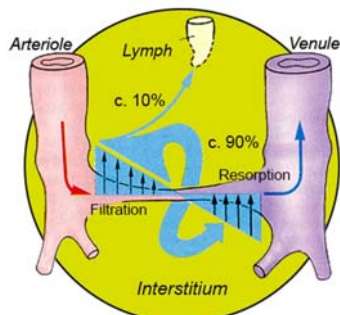
- Transports proteins
- Removes excess water
- Absorbs fat molecules from the small intestine
- Removes cellular debris and foreign material (e.g. bacteria, viruses, cancer cells)

Skin Lymph Drainage Territories

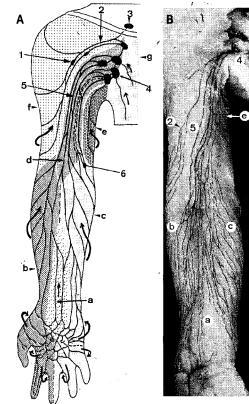
The **at risk region** is the area where lymph nodes were removed. This includes all tissues in the arm, chest and back that are draining lymph fluid toward those nodes.

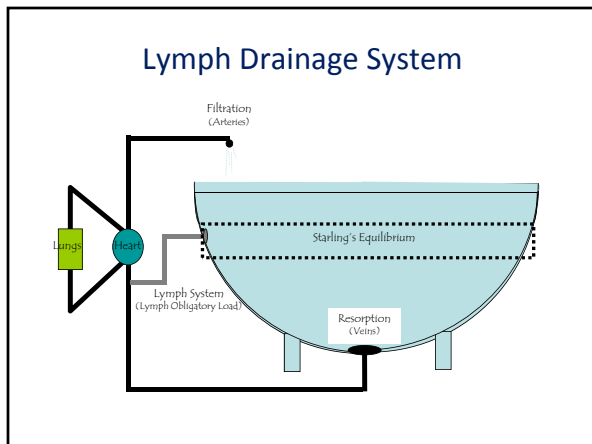
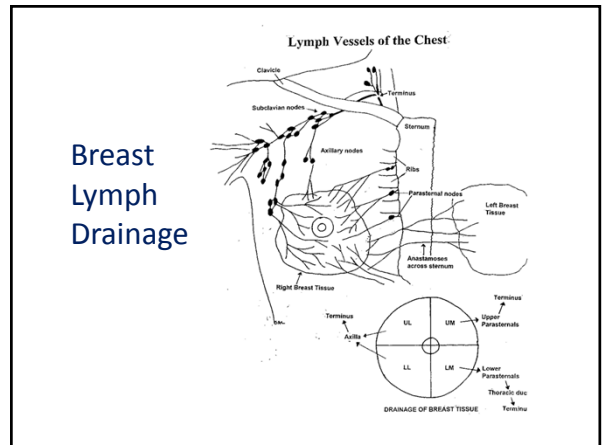
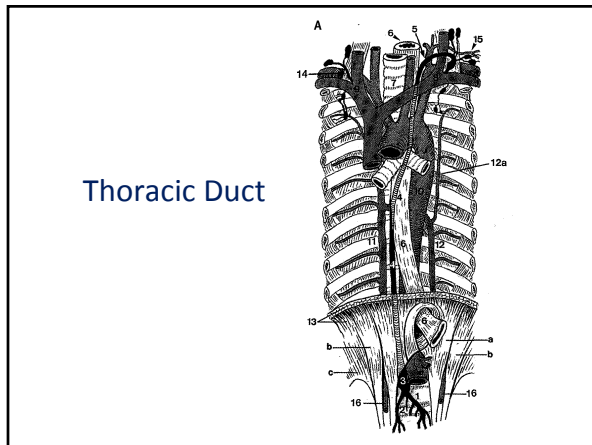
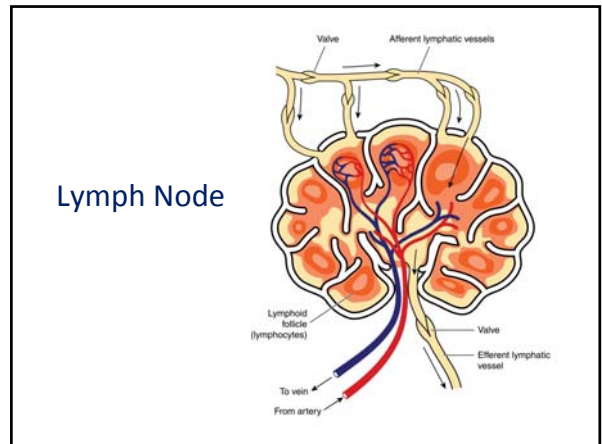
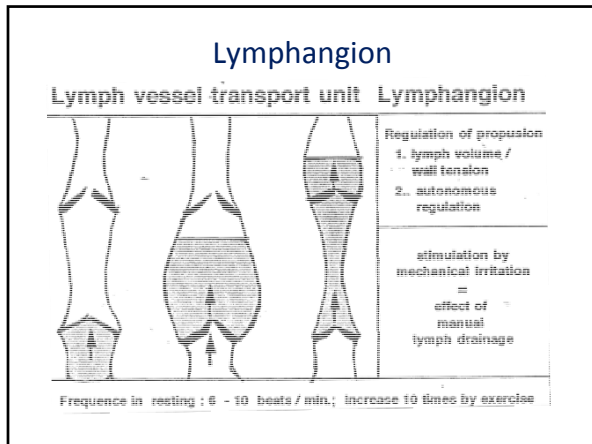


Illustrating the Concept of Lymphatic Transport



Arm Lymph Drainage





- ### Stages of Lymphedema
- Stage 0** – Latent, sub-clinical
 - Stage 1** – Spontaneously reversible
 - At this stage, it is present during the day but goes away overnight
 - Pitting starts between Stage 1 and 2
 - Stage 2** – Spontaneously irreversible
 - By this stage, it is still present after a night's rest, even if improved
 - Stage 3** – Lymphostatic Elephantiasis
 - Rare occurrence in breast cancer

Breast Cancer-Related Lymphedema



What changes occur with an altered lymph system?

- Excess protein in the tissues
- Accumulation of excess fluid in the limb
- Decreased oxygenation
- Slow tissue-healing time
- Formation of fibrosis

What does lymphedema feel like?

- Tightness or heaviness in the limb
- Achy
- Pins and needles
- Tenderness in the elbow
- 'Odd' sensations
- "Pain of congestion"
- Discomfort
- NOT "unbearable pain," which might be
 - malignant lymphedema
 - radiogenic plexopathy
- NOT muscle soreness
 - Let's discuss the difference...

How can you reduce your risk of developing/worsening lymphedema?

Lymphedema risk-reduction practices include:

- Skin care
- Activity and lifestyle
- Avoiding limb constriction
- Compression garments (If appropriate)
- Avoiding extremes of temperature

National Lymphedema Network (NLN) materials associated with this education session

- Training of therapists
- Risk-reduction guidelines
- Treatment of lymphedema
- Exercise guidance

Skin Care

Avoid trauma/injury and reduce infection risk

- Keep arm clean and dry
- Apply moisturizer daily to prevent chapping and chafing of skin
- Give attention to nail care; do not cut cuticles
- Protect exposed skin with sunscreen and insect repellent
- Use care with razors to avoid nicks and skin irritation (shave arm pit/axilla with electric razor)
- Wear gloves while doing activities that may cause skin injury
- If scratches/punctures to skin occur, wash with soap and water, apply antibiotics, and observe for signs of infection
- If a rash, itching, redness, pain, increased skin temperature and swelling, fever, or flu-like symptoms occur, contact your physician immediately

Activity and Lifestyle

- Gradually build up the duration and intensity of any activity or exercise
- Take frequent rest periods during activity to allow for limb recovery
- Monitor the extremity during and after activity for any change in size, shape, tissue, texture, soreness, heaviness, or firmness
- Maintain a healthy weight

Avoid Limb Constriction

- If possible, never have blood pressure taken on the arm at risk
- Wear loose-fitting clothing and jewelry

Compression Garments

- Should be well-fitting
- Support the affected arm during strenuous activity (e.g. weightlifting!)
- If you have lymphedema, wear a well-fitting compression garment for air travel

Extremes of Temperature

- Avoid exposure to extreme cold, which can be associated with rebound swelling, or chapping of skin
- Avoid prolonged (>15 minutes) exposure to heat, particularly hot tubs and saunas
- Avoid immersing arm in water temperatures above 102 degrees

What can you do if you develop lymphedema?

Get evaluated by your doctor or a Certified Lymphedema Therapist (CLT).

Early treatment results in faster response to treatment thereby decreasing the length of therapy.

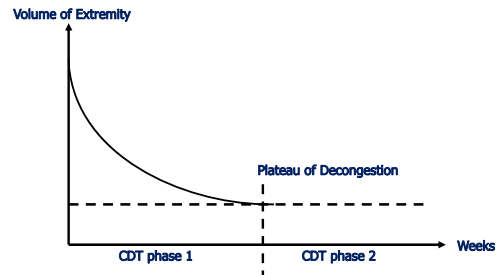
Training of Lymphedema Therapists

Read handout from the NLN (lymphnet.org). Be sure your therapist meets their minimum requirements.

How is lymphedema treated?

Complete Decongestive Therapy is an effective therapy for lymphedema and other swelling disorders.

Complete Decongestive Therapy



Complete Decongestive Therapy

PHASE 1: Decongestion	PHASE 2: Maintenance
Meticulous skin care	Meticulous skin care
Manual Lymph Drainage	Day: Compression garment
Gradient compression bandaging	Night: Gradient compression bandaging
Remedial exercises	Self-Manual Lymph Drainage
Compression garment	Remedial exercises
	Follow-up assessment

Meticulous Skin & Nail Care

- Low-pH, gentle soaps
- Moisturizer (Low pH also recommended)
- Do not cut cuticles
- Prevent infection
- Keep skin working optimally

Manual Lymph Drainage Expert Stretching of the Skin



Manual Lymph Drainage

- Drains the congested areas
- Reduces the risk of infection
- Normalizes the size of and pressure in the limb
- Reduces pain/discomfort

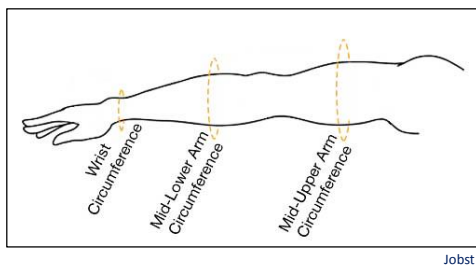
Compression Therapy

- Gradient, short-stretch bandaging
- Medical compression garment

Gradient Compression Bandaging

- Decreases the filtration rate
- Prevents re-accumulation of fluid
- Softens fibrosis
- Provides external counter-pressure during exercise

Garment Measurement



Treatment with CDT



Before CDT

After CDT

Custom Compression Garment



Remedial Lymphedema Exercises

- Improves range of motion, endurance, coordination, and strength, where possible. Will provide optimal results with decongestive therapy.
- Non-aerobic, gentle stretching
- Swimming, scuba diving, singing, yoga, Tai Chi, Chi Kun

Diaphragmatic Breathing

Abdominal breathing stimulates the transport of lymph back to the heart through the thoracic duct.

NLN Exercise Guidelines

GENERAL

- Increase gradually, progress slowly, monitor your limb
- If you have lymphedema, wear a compression garment while exercising
- There is no agreement on whether you should wear a garment if you do NOT have lymphedema
- Modify your program according to your symptom response
- Stay well hydrated
- Avoid getting overheated

LYMPHEDEMA EXERCISES

- Non-resistive active motion of the affected arm
- Part of treatment and risk reduction

NLN Exercise Guidelines (cont.)

FLEXIBILITY/STRETCHING

- May improve lymph flow by decreasing scarring and tightness
- Avoid over-stretching

STRENGTH TRAINING

- Modifications are needed
- Adequate rest between sessions is crucial
- Modify your program according to your symptom response

NLN Exercise Guidelines (cont.)

AEROBIC CONDITIONING

- Thought to be beneficial for individuals with lymphedema
- Deep respiration enhances lymph drainage
- Avoid injury by increasing very gradually
- Avoid getting overheated
- Modify your program according to your symptom response

NCCN/ACS/ACSM Guidelines for Breast Cancer Survivors

- Avoid inactivity
- Build to 150 minutes/week of aerobic activity
- Daily flexibility activities are encouraged
- Strength training activities are safe
 - Start with a SUPERVISED program
 - Start low, progress slow
 - If you have any change in upper-body symptoms that last a week or longer, get an evaluation by a clinician
 - Careful with overall arm work (e.g. If you garden on a Monday, wait to do strength training 'till Tuesday)
 - Back off resistance after an exercise 'holiday'

Strength After Breast Cancer

Based on a large clinical trial conducted at U. of Pennsylvania

- 154 BrCA survivors WITHOUT lymphedema
- 141 BrCA survivors WITH lymphedema

Women who participated had these benefits:

- 50% reduced likelihood of lymphedema worsening
- 70% reduced likelihood of lymphedema onset among women with 5 or more nodes removed
- Improved strength and energy
- Improved body image
- Reduced body fat
- Prevented decline in physical function



For more information...

National Lymphedema Network
www.lymphnet.org

BreastCancer.org
www.breastcancer.org

Living Beyond Breast Cancer
www.lbbc.org

American Cancer Society
www.cancer.org

Logistical Considerations

Participant Eligibility

- Breast Cancer Survivors
 - Can be undergoing treatment
 - Could be done if treatment was received many years ago!
- Cleared by CLT to do exercises
- Completed Lymphedema Education Session (LES)

Instructor Eligibility to Lead Exercise Sessions

- Must have completed this training
- This should NOT be led by a substitute after handing them the training manual
 - If you cannot lead a session you are scheduled to lead, only those who have completed this course can substitute for you
 - This is important for participant safety!

Goals for the Four Exercise Sessions

- Teach the PAL protocol exercises
- Teach the concepts of:
 - Overall arm load
 - Starting low, progressing slow
 - Exercise holidays (and how to respond to them)
 - Proper biomechanics
 - Muscle soreness versus lymphedema-related symptoms
 - Importance of behavioral consistency for results (motivation!)
- Get patients ready to do the exercises on their own
- Teach the mantra of symptom response: If you have a change in upper-body symptoms that lasts a week or longer, you need to call _____ to set up an evaluation.

Session Overview: Session 1

- Ask if they have had a change in upper-body symptoms that has lasted a week or longer.
- Session content:
 - Aerobic exercise warm-up
 - Stretches
 - Core exercises
 - Exercise logging
- Patients are expected to go home and do these exercises on their own 2x weekly until they return for Session 2.
- Distribute sufficient logs for them until their return.

Session Overview: Session 2

- Ask if they have had a change in upper-body symptoms that has lasted a week or longer.
- Repeat all they learned in Session 1 so you can review/correct, including logging.
- Session content:
 - Add 3 upper-body and 2 lower-body exercises
 - Chest
 - Leg exercise (will vary by home vs. gym and with patient)
 - Back
 - Leg exercise (will vary by home vs. gym and with patient)
 - Shoulders
 - Taught in alternating fashion (upper then lower)
- Patients should go home and do all they have learned 2x weekly 'till Session 3, including logging.
- Distribute sufficient logs for them until their return.

Session Overview: Session 3

- Ask if they have had a change in upper-body symptoms that has lasted a week or longer.
- Repeat all they learned in Sessions 1 and 2 so you can review/correct, including logging.
- Session content:
 - 2 upper-body and 2 lower-body exercises
 - Biceps
 - Leg exercise (will vary by home vs. gym and with patient)
 - Triceps
 - Leg exercise (will vary by home vs. gym and with patient)
 - Taught in alternating fashion (upper then lower)
- Patients should go home and do all they have learned 2x weekly 'till Session 3, including logging exercises.
- Distribute sufficient logs for them until their return.

Session Overview: Session 4

- Discharge day!
- Finish teaching anything you did not get to in prior sessions.
- Have patients do all exercises that they have been taught for final review/corrections.
- Give them:
 - Kitchen magnets
 - Information on how/where to get resistance equipment
 - NO THERABANDS!!!!
 - Blank exercise logs
 - Instructions to come back if they have questions
- Remind them they can redo the sessions as many times as they want to (within limits of insurance).

Review: Protocol Packet & Workout Log

Important Concepts

- Biomechanical form is really important.
- Teach two sets per exercise from the beginning.
- Add 3rd set after Session 4.
- PROGRESSION
- OVERALL ARM LOAD
- DECONDITIONING
- Consistency: Motivate participants to stay with the program long term.

Discharge!

How do you know if the BrCA survivor is ready?

Can she:

- Use resistance appropriately?
- Properly perform all stretching, core, and weightlifting exercises appropriately?
- Progress resistance appropriately?
- Complete exercise logs appropriately?
- Monitor changes in lymphedema and musculoskeletal symptoms appropriately?

If not, recommend further supervised sessions.

Home Resistance Training Options: PowerBlocks



Kitchen Magnet Content

S = Start low and increase slowly

T = Two sessions each week

R = Reduce weight if you miss any sessions

O = Overall daily arm work is important

N = Notice symptom changes that last a week or more

G = Get in touch with your health care provider if you experience a change in lymphedema symptoms that last a week or longer



When the BrCA survivors leave, they should have...

- Workout packet
- Information on where/how to get progressive resistance equipment
- Blank workout logs
- Instructions on what to do if they have a change in symptoms or an injury (Kitchen Magnet)
- LES handout for patients

Wrap-Up

Attachments:

- Flow of activities: 'Do I Get it?'
- FAQs for Clinicians
- In-service handout for front desk staff
- Billing codes