2014 Annual Breast Cancer Rehabilitation Healthcare Provider Event

A Manual Therapy and Exercise Approach to Breast Cancer Rehabilitation Course

November 7th and 8th, 2014
Mercer University, Atlanta, GA

Sponsored By:

Presentations are Available on TurningPoint’s Website: myturningpoint.org
Click on Course Link

www.oncologypt.org
itsthejourney.org
thevisualab.com
A Manual Therapy and Exercise Approach to Breast Cancer Rehabilitation Course

Evidence-Based Approach to Lymphedema Evaluation and Management Overview

Cathy Furbish, PT, DPT, CLT

This Presentation is available on TurningPoint’s Website:
myturningpoint.org
From Homepage Click on Course Link
Lymphedema Assessment

- Signs and Symptoms
- Measurement
No universally accepted diagnostic tool to determine presence of lymphedema

- Sensation of heaviness, fatigue, tingling or aching within “at risk” territory in any woman with BC
- Circumferential measurements
- Bio-impedance Spectroscopy (BIS)
- Water displacement
- Truncated cone calculation
- Optoelectric perometry
Summed Truncated Cone Volume

- An indirect method used to calculate limb volume.
- The limb is visualized as a cone.
- The circumference of the extremity at a segment together with the length are used to calculate the volume of the segment. A series of segments is then summed for the final volume

\[ V = \frac{1}{12} \times h \times (C_t + C_b = c_2) \]

- \( V \) = volume
- \( h \) = height
- \( C_t \) = proximal circumference
- \( C_b \) = distal circumference
Optoelectric Perometer
No universally accepted diagnostic tool to determine presence of lymphedema

- All methods valid and reliable to quantify and monitor LE
- Significant variability between devices/measures to allow comparisons
- Volumetry and circumferential measures are reliable and highly correlated, but not interchangeable
No universal definition of lymphedema

- 10% or greater change in limb volume
- Greater than 1 cm to 2 cm change from baseline
- Greater than 2 cm change from unaffected limb
- 2 cm increase in 2 consecutive anatomic sites
- Greater than 200 mL of volume increase
- ACOSOG: 2 cm or greater increase over the baseline or greater than 10% increase in circumference of the ipsilateral arm at 10 cm proximal and distal to the lateral epicondyles.
- Subjective reports of heaviness, pain
Most women report that they did not receive any counseling or written information from their physicians on signs and symptoms or presence of lymphedema.

- Paskett, ED Stark N The Breast Journal 6(6) 373-378, 2000
TREATMENT OF LYMPHEDEMA

CDT: Complete Decongestive Therapy

✓ Compression:
  ✓ Bandaging
  ✓ Garments
  ✓ Pumps
✓ Manual Lymph Drainage Massage (MLD)
✓ Decongestive Exercises
✓ Meticulous Skin Care
✓ Avoid Constriction, Overheating, Sunburn, Muscle Strain, Skin breaks when possible, Reduce salt intake, Weight loss if BMI over 25
COMPLEX DECONGESTIVE PHYSICAL THERAPY: Goals

- decongest swollen body part
- eliminate fibrotic tissue
- avoid reaccumulation of lymph fluid
- prevent/eliminate infections
- improve immune system function
Compression bandaging for moderate to severe lymphedema

- Compression bandaging is a systematic application of short stretch bandages.
- Uses more bandages distally than proximally which assists the pressure gradient in moving fluid up the arm.
- Generally worn 23 hours per day in the acute phase and then at night for maintenance.
Compression Effects

- Reduces effective ultrafiltration pressure
- Increases and accelerates venous and lymphatic drainage
- Improves the venous pump function
- Softens tissues with fibrotic changes
**Lymphedema Bandages vs. ACE Wrap**

**Short Stretch Bandages**
- 60% Extensibility
- High working pressure / Resistance
  - Temporary pressure
  - Increased movement of venous and lymphatic fluids
- Low resting pressure
  - Permanent pressure
  - Low risk of tissue damage

**ACE Wrap (Long Stretch)**
- 140% Extensibility
- Low working pressure
  - Minimal decongestive effect
- High resting pressure
  - Compresses superficial venous and lymphatic vessels
  - Risk of tourniquet effect and tissue damage
Compression Garments

- The increased pressure exerted against the skin and tissues decrease filtration of lymph fluid out of the arteries and protects the lymph vessels from stretching.
- Bertelli reported statistically significant reduction in edema in patients wearing garments 8 hours per day.
- Superior reduction occurred in women without significant weight gain following treatment.


- Pre-Operative Assessment of Breast Cancer Patients by Physical Therapists Improves Lymphedema Diagnosis and treatment
- All study participants were monitored pre-op and at one month post-surgery and at three-month intervals thereafter for one year even if they exhibited no swelling. Using both the pre- and post-operative assessments enabled investigators to diagnose lymphedema before it became visible
- The authors demonstrated the effectiveness of a surveillance program to successfully detect and treat lymphedema
- Detection and management of lymphedema at early stages may prevent the condition from progressing
- Once lymphedema was diagnosed (3%) it was managed using a light-grade compression sleeve and gauntlet for daily wear for 4 to 6 weeks and then PRN.
Manual Lymphatic Drainage (MLD)

- Specialized massage stimulates lymph flow
- Four basic strokes based on Vodder: “stationary circle”, “pump”, “rotary”, and “scoop”
- Strokes have a working phase and a resting phase
- Rhythmic: each phase about 1 second
- Redirects excess fluid to healthy lymphatic vessels
  - Healthy lymphatic territories have been prepared prior to MLD of the affected region
Lymphatic Territories and Anastomoses
Manual Lymphatic Drainage Effects:

- Increases lymph production
- Increases lymph vessel contractility
- Relieves congestion
- Removes waste products from tissues
- Stimulates all body fluids to flow
- Breaks up fibrosis

Tissues Which Are Drained by Massage or Pumping MUST BE COMPRESSED TO PREVENT RE-FILLING!
Decongestive Exercises

- Traditional CLT teaching about exercise is based on physiology
- During exercise, blood flow increases; therefore, there is an increase in filtration into the interstitium and an increase in the lymphatic load
- Compression during exercise
  - Increases effectiveness of muscle pump
  - Limits filtration out of the arterioles into the interstitium
- Sequential Pump – distal to proximal
- Deep Breathing
  - Stimulate Cisterna Chyli
  - Limit overexertion
Lymphedema management: the evidence

• Compression bandaging with and without manual lymph drainage
  • 38 pts with breast cancer and lymphedema
  • week 1, 2: bandaging alone
  • week 3: pts divided into bandaging with and without manual lymph drainage

• Results:
  • significant volume reductions in week 1, 2
  • no significant difference in volume reduction between groups in wk 3
  • but percentage volume reduction > in CB/MLD group

MLD and Compression Bandaging

- In a prospective RCT by McNeely researchers looked at reduction of arm volume from MLD in combination with CB alone

- No significant difference seen between the groups

Manual Lymph Drainage (MLD)

- A Cochrane review of 195 scientific papers found MLD provided no benefit at any point over use of the sleeve or bandages alone.

- There are limited positive applications for MLD in cases of mild lymphedema or fibrosis.

RCT: CDT vs. Compression Garments

- 103 women; 6 institutions
- All had previously been treated for LE and had >10% volume difference between arms at the time of the study
- Control group used compression garments only
- Experimental group got daily MLD + bandaging followed by compression garments

RESULTS: “trial was unable to demonstrate a significant improvement in LE with CDT compared to a more conservative approach”

Compression Pump

- Guidelines for use and selection are unclear
- Some studies show pumps ineffective; other studies show a statistically significant reduction in edema when used consistently in a 48 hour period.

Pneumatic Compression Pump

Pros
- Paid by insurance
- Easy to use
- Usage recommendations range from 1 -12 hours daily

Cons
- Time consuming and cumbersome
- Ignores lymph physiology
- Risk of trauma to initial lymphatics
- Risk of fibrous cuff
TP Guidelines for Pump Utilization

- Treatment with bandaging, exercise and lymphedema massage has been tried and patient has plateaued
- Bandaging is refused or not feasible due to co-morbidities
- Pump is tried daily in the clinic for one hour with pre and post volumetric measures taken
- If pump is effective in reducing arm circumference or volume, patient is provided a loaner pump to try for 1-2 weeks of self-management at home
Sequential multi-chambered pump (4, 8 or 12 chambers)

Chambers have valves allowing each chamber to remain inflated as the subsequent chamber fills, when all chambers are filled they deflate.

Compression set at 40-50 mm Hg (must be 20 mm Hg below diastolic BP)

Pump for one hour 1-2 times per day
Recent Evidence about Pneumatic Compression Treatment for Lymphedema

2 new studies out of Warsaw, Poland were presented at the 2014 NLN Conference

- The effects of 3 years of Pneumatic Compression
  - IPC takes over the transport function of lymphatics by squeezing edema fluid to regions with normal drainage
  - No formation of a fibrous cuff

- IPC enhances the formation of tissue fluid channels
  - Compression of limb lymphedema tissues leads to formation of channels within the tissues as pathways for the evacuation of edema fluid
Arm Elevation

- There is no data on the efficacy of elevation in the treatment of lymphedema
- Recommended guidelines are not available/published
- Elevation thought to reduce the intravascular pressure allowing lymph to flow freer

Exercise and Lymphedema

Old Rationale

- Historically, heavy resistance training was discouraged in women with lymphedema because it increased blood flow, adding to the workload of the lymph system and overwhelming a compromised system

New Evidence

- Exercise increases muscle mass and the muscular pump which facilitates movement of lymph fluid
- Exercise also helps to combat obesity which is a potent risk factor for lymphedema
Challenging Teachings about Exercise

Effect of Upper Extremity Exercise on Secondary Lymphedema in Breast Cancer Patients: A Pilot Study
McKenzie DC. J Clin Onc. 2003

• Began 1996 at the University of British Columbia
• Don McKenzie – sports medicine physician who was studying cardiorespiratory fitness of BC survivors
• Strove to dispel the myth that women with BC should refrain from repetitive upper body exercise for fear of lymphedema

• “Abreast-In-A-Boat” – 1st all BC survivors team
• Training: slow, progressive weight and aerobic training
• No new cases of lymphedema; no worsening of existing cases
The effect of gentle arm exercise and deep breathing on secondary arm lymphedema.

- Subjects: 38 women participants
- Intervention: 10 minutes of standardized arm exercises and deep breathing
- Measures: limb volume and perception
- Results: decreased volume after ex. (5.8%), reductions persisted at 1 hour (5.3%), 24 hours (4.3%) and 1 week (3.5%) follow-ups
- A cohort of 24 women continued the study for 1 month
  - 10 mins. am and pm led to volume decreases persisting for 1 month.
  - After one month volume reduction was 9.0%
The effect of a whole body ex program and dragon boat training on arm volume in women treated for breast cancer.


- 16 bc survivors without lymphedema
- 20 weeks of aerobic and resistance ex
- Added dragon boat training at week 8
- All women increased in mm. strength
- No new cases of lymphedema
Lymphedema and Exercise

- No form of physical activity has been associated with new incidents of or exacerbations of lymphedema in the literature.
  - Courneya (2007) aerobic exercise
  - Lane (2005) resistance training & dragon boat paddling
  - McKenzie (2003) resistance training and arm ergometer
    - Sleeve use did not make any difference
  - McNeely (2009) weight lifting
Evidence-Based Management of Lymphedema

- Education re: Condition, Self Management, Infection, Inflammation, Skin Care
- Exercise – aerobic and strength training
- Compression:
  - Compression sleeve and glove maintenance and surveillance program for early, mild lymphedema *(Gergich, 2008)*
  - Bandaging (wrapping) and/or Compression Sleeve combination for moderate to severe lymphedema *(Bertelli G et al, 1992; Badger, 2004)*
- Weight Loss (if applicable) *(Shaw, 2007)*
- Manual Lymphatic Drainage
- Pneumatic Compression Pumping
| TurningPoint Breast Cancer Rehabilitation’s Evidence-Based Approach to Lymphedema Management |
|-----------------------------------------------|---------------------------------|--------------------------------|--------------------------------|--------------------------------|
| **Transient Lymphostasis** | **Sub-Clinical Lymphedema** | **Mild Lymphedema** (Stage I) | **Moderate Lymphedema** (Stage II) | **Severe Lymphedema** (Stage III) |
| **SIGNS and SYMPTOMS** | Swelling of arm that occurs soon after surgery (either initial surgery or reconstruction) that resolves with or without treatment. Swelling easily reversible – usually diminishes at night. Not: Typically transient lymphedema is only identified when there is full resolution of swelling and no recurrence. Therefore, transient lymphedema is treated as per subclinical or mild lymphedema, depending on volume. | Heaviness, fullness, tingling sensations in affected arm. | Mild visible swelling in hand and/or arm. Swelling easily reversible – usually diminishes at night. | Non-reversible. Could be reversible with mild tissue changes. |
| **SHORT-TERM MANAGEMENT APPROACH** | Education: • Skin & injury precautions – avoid infection and strain/sprain. • Signs & symptoms of lymphedema progression. • Nutrition and hydration issues. • Maintenance of ideal body weight. • Recommendations for travel, including air travel. Compression: Class II compression sleeve during waking hours, including while performing athletics. + / - gauntlet per judgment. Exercise: Aerobic and upper body exercise resisted exercise. Weight management if applicable. Treat limitation in upper extremity range of motion and/or strength. | Education: See Transient. Compression: Class II compression sleeve (OTC or custom as needed) for 2-3 weeks during waking hours until reduced, then as needed if swelling recurs. + / - gauntlet per judgment. Exercise: Aerobic & upper body resisted exercise. Weight Management if applicable. Treat limitation in upper extremity ROM and strength. | See Sub-Clinical. Education: Aerobic & upper body resisted exercise. | Education: See Transient. Compression: Course of lymphedema bandaging 23 hrs/day for 2-4 weeks until volume reduced and plateaued. MLD: Use with discretion ensuring that addition of MLD produces measureable change. Exercise: Aerobic and upper body ROM and resisted exercise. Weight Management if applicable. Treat limitation in upper extremity ROM and/or strength. |
| **LONG-TERM MANAGEMENT APPROACH** | Surveillance to determine lymphostasis vs. lymphedema. | Compression: Sleeve as needed for visible or measureable swelling. Surveillance and adjustment of management plan as needed. | Compression: Sleeve as needed or measureable swelling. Sleeve as determined with PT for athletics or travel. Surveillance and adjustment of management plan as needed. | Compression: As needed to maintain lymphedema at goal volume. This may be a combination of compression sleeve and/or intermittent bandaging. Sleeve as determined with PT for athletics or travel. Continued exercise for weight maintenance/reduction. Surveillance and adjustment of management plan as needed. |
| **SIGNS and SYMPTOMS** | Typical symptoms include edema and pain that are usually reversible. | Mild tissue changes without measureable swelling. | Non-reversible. Could be reversible with mild tissue changes. | Typically non-reversible. |
| **SHORT-TERM MANAGEMENT APPROACH** | Education: • Skin & injury precautions – avoid infection and strain/sprain. • Signs & symptoms of lymphedema progression. • Nutrition and hydration issues. • Maintenance of ideal body weight. • Recommendations for travel, including air travel. Compression: Class II compression sleeve during waking hours, including while performing athletics. + / - gauntlet per judgment. Exercise: Aerobic and upper body exercise resisted exercise. Weight management if applicable. Treat limitation in upper extremity range of motion and/or strength. | Education: See Transient. Compression: Class II compression sleeve (OTC or custom as needed) for 2-3 weeks during waking hours until reduced, then as needed if swelling recurs. + / - gauntlet per judgment. Exercise: Aerobic & upper body resisted exercise. Weight Management if applicable. Treat limitation in upper extremity ROM and strength. | See Sub-Clinical. Education: Aerobic & upper body resisted exercise. | Education: See Transient. Compression: Course of lymphedema bandaging 23 hrs/day for 2-4 weeks until volume reduced and plateaued. MLD: Use with discretion ensuring that addition of MLD produces measureable change. Exercise: Aerobic and upper body ROM and resisted exercise. Weight Management if applicable. Treat limitation in upper extremity ROM and/or strength. |
| **LONG-TERM MANAGEMENT APPROACH** | Surveillance to determine lymphostasis vs. lymphedema. | Compression: Sleeve as needed for visible or measureable swelling. Surveillance and adjustment of management plan as needed. | Compression: Sleeve as needed or measureable swelling. Sleeve as determined with PT for athletics or travel. Surveillance and adjustment of management plan as needed. | Compression: As needed to maintain lymphedema at goal volume. This may be a combination of compression sleeve and/or intermittent bandaging. Sleeve as determined with PT for athletics or travel. Continued exercise for weight maintenance/reduction. Surveillance and adjustment of management plan as needed. |
TurningPoint Stages of Lymphedema

- **Transient Lymphostasis**
  - Swelling that occurs soon after surgery
  - Swelling is easily reversible; usually diminishes overnight
  - Only truly identified if there is full resolution

- **Sub-clinical Lymphedema**
  - Heaviness, fullness, tingling sensations in affected arm
  - Affected arm is 3-5% larger than baseline (or unaffected arm)
  - No obvious visible swelling

- **Mild Lymphedema (Stage I)**
  - Mild visible swelling in hand or arm, may still diminish at night
  - Affected arm is 3-10% larger than baseline (or unaffected arm)
TurningPoint Stages of Lymphedema

• Moderate Lymphedema (Stage II)
  • Non-reversible; Could be reversible with mild tissue changes
  • Affected arm is 11-20% larger than baseline (or unaffected arm)
  • Decreased visibility of veins
  • Visible swelling with fullness of elbow, forearm or wrist contours
  • Increased skin thickness
  • +/- hand swelling

• Severe Lymphedema (Stage III)
  • Typically non-reversible
  • Affected arm is >20% larger than baseline (or unaffected arm)
  • Skin changes with adhesions and fibrosis
  • Skin may be indurated and dry
Lymphedema Treatment: Education

The same concepts for all stages of lymphedema

- Basic lymphatic anatomy & physiology
- Skin & Injury Precautions – avoid infection, injury
  - Cellulitis
- Signs & Symptoms of LE progression
- Nutrition / Hydration Issues
- Maintenance of ideal body weight
- Benefits of exercise
- Recommendations for air travel
Lymphedema Treatment: Sub-Clinical and Mild Lymphedema (Stage I)

- **Compression:** Class II compression sleeve – OTC or custom
  - 2-3 weeks during waking hours (or until volumes are reduced)
  - +/- Gauntlet per judgment
- **Manual Lymphatic Drainage**
  - Used with discretion – ensuring that addition of MLD produces measureable changes
- **Exercise**
  - Aerobic and upper body resisted exercise
- **Treat limitations in upper extremity ROM and strength**
- **Long-term**
  - Sleeve, as needed per return of symptoms or swelling
  - Surveillance
Lymphedema Treatment: Moderate Lymphedema (Stage II)

- Compression
  - Course of bandaging, 23 hrs/day, for 2-4 weeks until volumes reduced/plateau
- MLD: used with discretion, ensuring that it produces a measureable change
- Exercise: Aerobic and upper body resistance
- Treat limitation in upper extremity ROM or strength
- Long-term management: To maintain LE at goal volume
  - Compression – sleeve and/or bandaging or night garments, as needed.
  - Sleeve as determined with PT for athletics or travel.
  - Surveillance and adjustment of plan as needed
**Lymphedema Treatment: Severe Lymphedema (Stage III)**

- Compression
  - Course of bandaging, 23 hrs/day, for 2-4 weeks until volumes reduced/plateau
- MLD: not indicated
- Soft Tissue Techniques: address fibrosis and adhesions
- Exercise: Aerobic and upper body resistance
- Treat limitation in upper extremity ROM or strength
- Trial of Pump if indicated by lack of progress with the above
- Long-term management: To maintain LE at goal volume
  - Compression – sleeve and/or bandaging or night garments, as needed.
  - Local treatment with compression for areas of fibrosis.
  - Surveillance and adjustment of plan as needed
Model Summary

- Individualized education related to lymphedema risk and risk reduction
- Assessment of baseline volume measures and ongoing surveillance to facilitate early lymphedema detection
- Aerobic and upper extremity range of motion and progressive resistance exercise for all women at risk for and with lymphedema
- Lymphedema management plan that is based on severity and stage of lymphedema, measures of impairment and functional outcome
- Development of a long-term management plan that meets women’s quality of life needs
Women who are at risk for lymphedema or have lymphedema can have excellent quality of life!