



Lymphedema and Soft Tissue Dysfunction Physical Therapy Management

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Who are we??

Women's Rehab Men's Health Physical Therapists (WRMH)

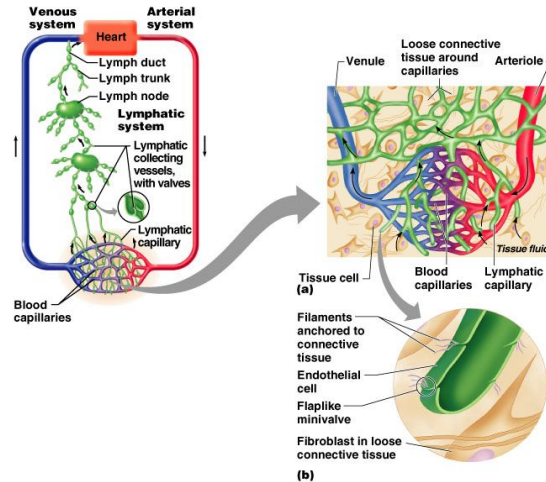
- What our specialized therapists treat:
 - Oncology rehabilitation
 - Survivorship: maximizing quality of life
 - Lymphedema management
 - Pelvic floor rehabilitation
- Where you can find us:
 - 30+ locations in and around Pittsburgh
 - Goal: access to specialized care close to home

Objectives

- Provide an understanding of:
 - Definition of lymphedema
 - Physical therapy treatment for lymphedema
 - Prevalence of lymphedema after cancer
 - Soft tissue dysfunction following cancer treatment
 - Physical therapy management of soft tissue dysfunction
 - Physical therapy oncology considerations

What is lymphedema?

- An abnormal accumulation of protein-rich fluid in the interstitium that causes chronic inflammation, reactive fibrosis, and adipose tissue proliferation of the affected tissues.
 - Recent research has discovered stem cells in the interstitium, which when influenced by the local inflammation present with lymphedema, preferentially differentiate into adipocytes.¹



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Types of Lymphedema

- Primary
 - Lymphatic dysplasia: an abnormal number of lymph nodes or malfunctioning nodes/vessels
 - Congenital: present before first birthday
 - Praecox: onset from 1-35 years old
 - Tardum: onset >35 years old
- Secondary
 - Damage of the lymphatic system by:
 - Lymph node dissection
 - Radiation
 - Surgery
 - Trauma
 - Infection (cellulitis)
 - Chronic Venous Insufficiency (CVI)
 - Obesity
 - Filariasis



Lymphedema Stages

Stage	Description
0 <i>(latent)</i>	<i>Period between removal or damage to the lymphatic system and onset of lymphedema, +/- subjective complaints only</i>
1 <i>(spontaneously reversible)</i>	<i>Onset of protein-rich edema that can reduce with elevation, focal fibrosis is possible, “pitting”, size is normal or almost normal. Negative Stemmer Sign</i>
2 <i>(spontaneously irreversible)</i>	<i>Protein-rich, irreversible edema, displays evidence of fibrosis, doesn't fully reduce with elevation. Skin changes may begin to appear. Positive Stemmer Sign.</i>
3 <i>(lymphostatic elephantiasis)</i>	<i>Proliferative protein-rich edema with extensive fibrosclerosis, increase in adipose tissue, skin changes (papillomas, thickening, lobes)</i>

Lymphedema Stages



Stage 0:
Left Unilateral Arm



Stage 1:
Left Unilateral Arm



Stage 2:
Left Unilateral Arm



Stage 3:
Left Unilateral Arm

Lymphedema Prevalence

- UE lymphedema
 - breast cancer
 - Primary cause of secondary lymphedema in the US
 - Incidence of lymphedema 24 months post BRCA surgery
 - 29.4% determined via arm circumference measurements²
- LE lymphedema
 - gynecological/urinary/prostate cancer: 27%³
 - colorectal/GI cancer: 34%⁴
- Head/Neck Lymphedema
 - >50% develop head/neck lymphedema⁵

Risk Factors for Lymphedema

- Tumor Excision/Surgery
- Axillary Node Dissection
- Inguinal Node Dissection
- Sentinel Node Biopsy
- Radiation Therapy
- Medical Complications
 - Vascular Dysfunction
 - Kidney Dysfunction
 - Liver Dysfunction
 - Obesity
 - Malnutrition



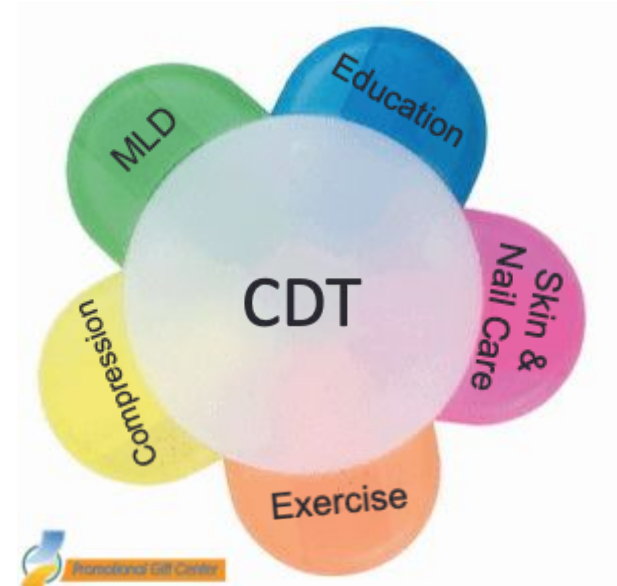
Training to Treat Lymphedema

- Certified Lymphedema Therapist - Lymphology Association of North America (CLT-LANA)
- CLT Certification
 - 135 hours course
 - Course available to:
 - Physical Therapists, Physical Therapist Assistants, Occupational Therapists, Occupational Therapist Assistants, Massage Therapists (with 500 hours of massage education or NCBTMB certified), Nurses, Athletic Trainers Certified, Nurse Practitioners, Medical Doctors, Doctors of Osteopathic Medicine, and Doctors of Chiropractic.⁶
- LANA Certification
 - Requirements to take board certified LANA exam: 90 contact hours of lymphedema education
- All UPMC Women's Rehab Men's Health Therapists complete the CLT course as part of their training



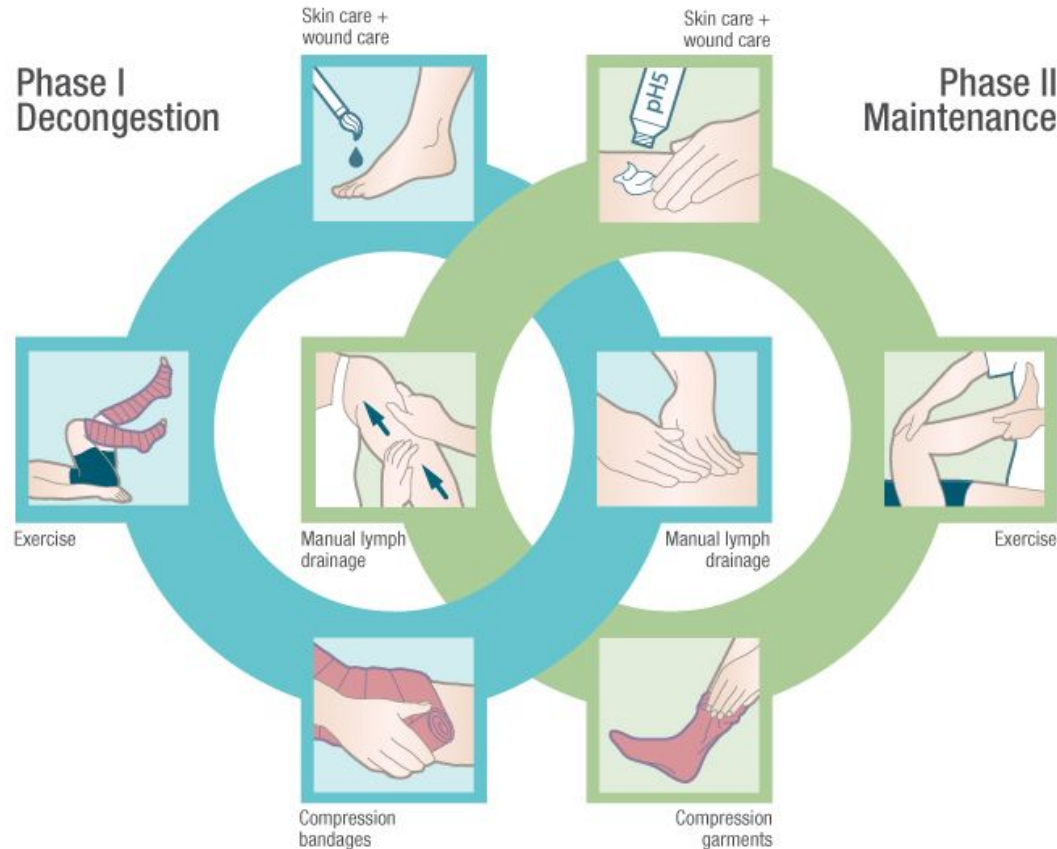
Lymphedema Treatment

- Complete Decongestive Therapy
- Reduction/Intensive Phase - Phase One
 - Compression Bandaging
 - Manual Lymphatic Drainage
 - self manual lymphatic drainage
- Maintenance Phase - Phase Two
 - Compression Garments
 - all different kinds of garments
 - Exercise
 - Skin and Nail Care
 - Weight Management



Lymphedema Treatment

Complete Decongestive Therapy



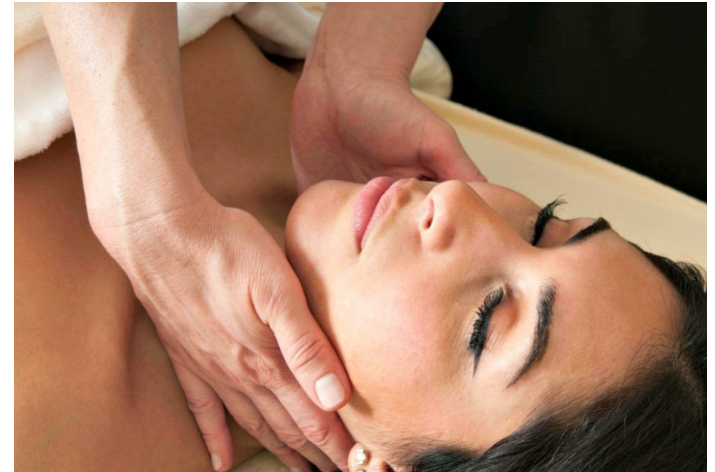
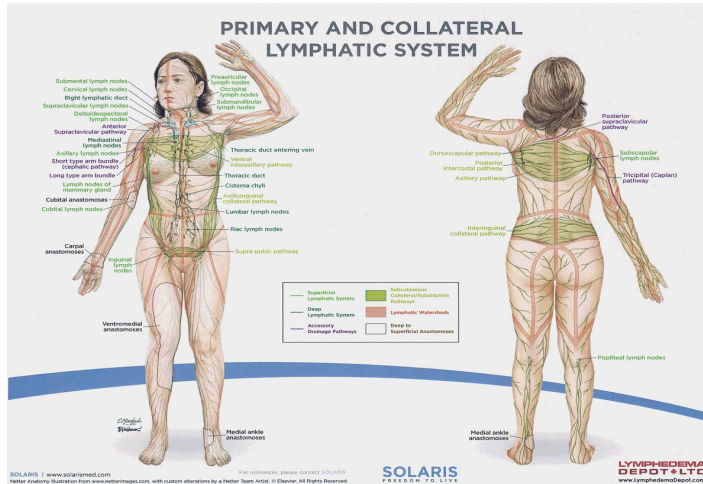
Compression Bandaging

- Short stretch bandages used to reduce limb volume
- Effects:
 - Increase tissue pressure, reduce filtration rate
 - Improves efficiency of muscle and joint pump
 - Prevents re-accumulation of evacuated lymph fluid
 - Breaks down deposits of fibrotic connective tissue
- For optimal reduction, change of bandages should be daily, usually happens every 2-3 days



Manual Lymphatic Drainage (MLD)

- It is a specialized massage designed to stimulate lymphatic system to increase movement of lymph and interstitial fluid
- Technique:
 - Gentle manual massage, typically in a circular fashion with with a working phase and relaxing phase
 - Clear proximally then distally
- Protocol is to be done daily



National Lymphedema Network: Position on Exercise



Exercise is essential for lymphedema management



Exercise should only be started after you have been cleared by a physician



Do both aerobic and resistive exercise



Wear compression garments or bandages for those with lymphedema; Garment is optional if at risk for lymphedema



Avoid repetitive overuse of the affected limb



Start gradually, increase cautiously



Stop exercise if pain or swelling



(NLN, 2013) ⁷

Nail & Skin Care

- Purpose: to prevent avenues for infection
- Education:
 - Meticulous hygiene to decrease dermal colonization
 - Apply lotion/cream to dry skin
 - Well fitted footwear to avoid blisters
 - Keep nails trimmed
 - Signs of infection



Diet/Weight Management

- Weight management decreased lymphedema morbidity ⁸
- Healthy Diet
- No fluid restriction in an otherwise healthy system



Compression Garments

- Purpose: to maintain limb status via fitted compression
- Daytime garments should be worn during waking hours and if swelling recurs over night then a night time garment should be worn
- Types:
 - Circular Knit:
 - Cheaper
 - Ready-to-wear standard sizes
 - Prophylactic
 - Flat Knit:
 - Typically custom measured - more containment
 - Ideal for patients with lymphedema
 - More costly
 - Velcro:
 - good for those that are unable to utilize traditional garments



Responsiveness to CDT

- UE
 - Systematic review of 45 studies demonstrating the CDT is associated with volume reduction and improved QOL⁹
 - Mean percentage change in edema was 38.1%¹⁰
- LE
 - 71.5% demonstrated significant improvements with CDT¹¹
- Head/Neck⁵
 - 60% improved post CDT with no adverse events
 - treatment adherence independently predicted CDT response

Adjunct Treatment to CDT

- Scar tissue management
 - Graston/IASTM: efficient at breaking up fibrosis allowing for more effective MLD
 - Low Level Laser Therapy: operates on 904 nanometers wavelength to penetrate into deeper tissues where it is absorbed by cells and converted into energy that influences the course of metabolic processes
- Kinesiotaping: increases microcirculation as the tape lifts the top layer of skin and underlying tissues
- Pneumatic compression pumps: second generation pumps provide compression to proximal trunk, better imitating MLD



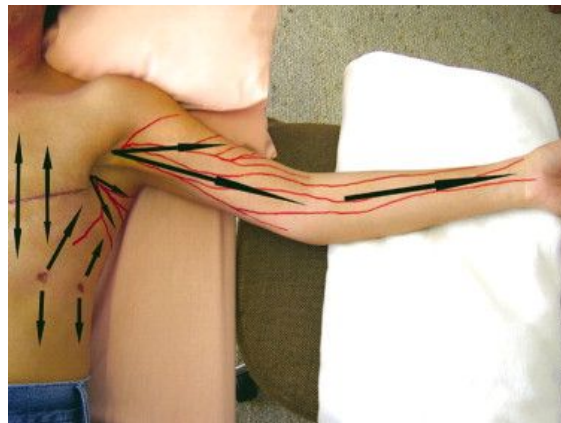
Soft Tissue Dysfunction

- Scar tissue/Fascial Restrictions
- Radiation burns/ Radiation Fibrosis
- Axillary Web Syndrome/Cording
- Lymphatic Fibrosis



Axillary Web Syndrome/Cording

- Not limited to axilla ¹²⁻¹⁴
 - Proximal: breast, trunk, abdomen
 - Distal: Elbow, wrist, thumb, hand
- Research suggests 6-86% of patients develop cording after SNB or ALND ¹²⁻¹⁴
- A 2018 study showed that 41% of participants still had AWS at 18 month follow up ¹²
- Plugged lymphatic vessel vs connective tissue adhesion



PT Treatment of Soft Tissue Dysfunction



- Manual therapy
- Therapeutic Exercise
- Neuromuscular control
- Habit/lifestyle changes
- Patient Education

Manual Therapy

- Manual therapy
 - Goal: get the hardened restricted tissue moving
 - Joint Mobilizations
 - mobilize joint capsule
 - improve arthrokinematics of affected joint
 - Soft tissue mobilizations
 - Myofascial Release
 - Skin rolling
 - Scar Massage
 - Graston (Instrument Assisted Manual Therapy)
 - Deep Fibrosis Techniques
 - Deep pressure
 - Compression



Therapeutic Exercise

- Exercise ¹⁵
 - Goals
 - maintain tissue mobility gains from manual therapy
 - get the hardened restricted tissue moving
 - Range of Motion
 - Strengthening



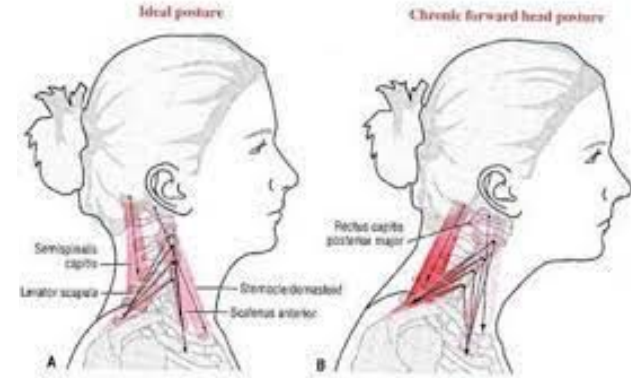
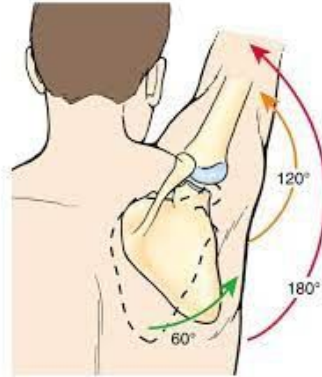
Neuromuscular Control

- Neuromuscular control
 - Goals
 - Maintain mobility gains from manual work and therapeutic exercise
 - Avoid repetitive stress and overuse from dysfunctional movement patterns
 - Postural Dysfunction
 - Breathing Dysfunction



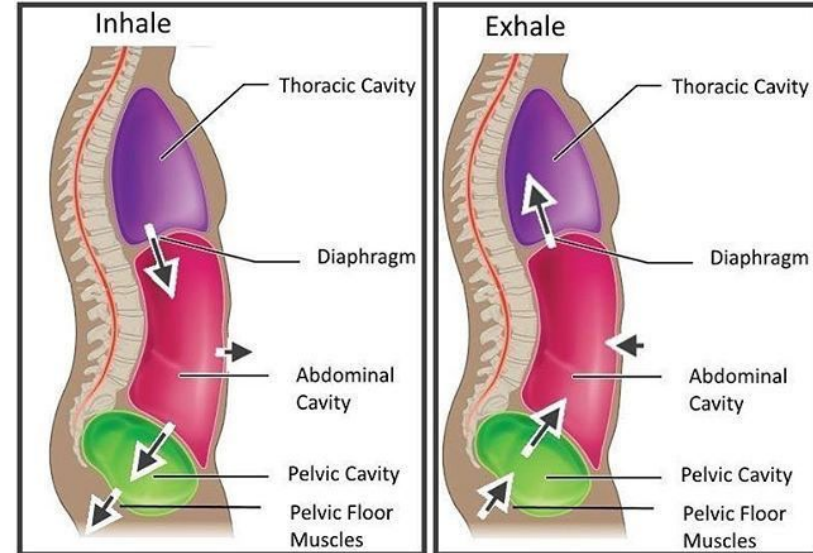
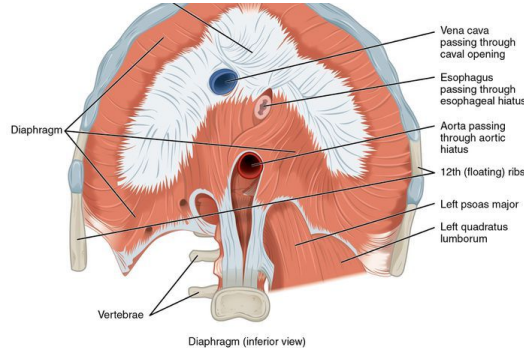
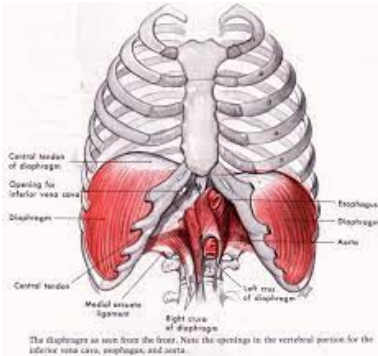
Neuromuscular Control: Posture

- Posture
 - Lumbopelvic
 - Scapulothoracic
 - Cervicothoracic
- Static and Dynamic Control



Neuromuscular Control: Breathing

- Neuromuscular control
 - Breathing
 - Diaphragmatic breathing ¹⁶⁻¹⁷
 - Full 360 degrees of motion
 - Decreases Accessory Muscle Compensation
 - Improves lymphatic flow
 - Stress Reduction
 - Reciprocal relationship with breathing dysfunction and musculoskeletal dysfunction



Habit/Lifestyle Changes

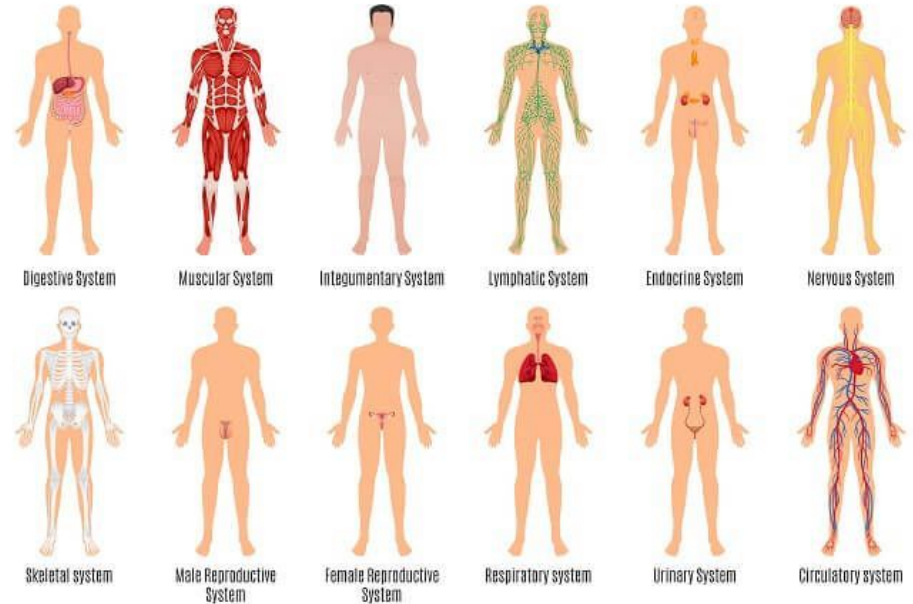
- Emphasis on life long management
- Breathing
- Postural Control
- Lymphedema Risk Reduction Strategies



Take Homes

- Cancer Survivorship: maximizing the quality of life
- It's never too late to start physical therapy!
- Other focuses of PT treatment for cancer survivors
 - Neuro/Ortho PT
 - Fatigue
 - Endurance
 - Balance
 - WRMH Pelvic Floor PT
 - Pelvic floor dysfunction
 - Bowel/Bladder/Sexual dysfunction

HUMAN BODY ORGAN SYSTEMS



References

1. Escobedo N, Oliver G. The Lymphatic Vasculature: Its Role in Adipose Metabolism and Obesity. *Cell Metab.* 2017;26(4):598-609. doi:10.1016/j.cmet.2017.07.020
2. Zou L, Liu F-hua, Shen P-peí, et al. The incidence and risk factors of related lymphedema for breast cancer survivors post-operation: A 2-year follow-up prospective cohort study. *Breast Cancer.* 2018;25(3):309-314. doi:10.1007/s12282-018-0830-3
3. Hayes SC, Janda M, Ward LC, et al. Lymphedema following gynecological cancer: Results from a prospective, longitudinal cohort study on prevalence, incidence and risk factors. *Gynecologic Oncology.* 2017;146(3):623-629. doi:10.1016/j.ygyno.2017.06.004
4. Brown JC, Chu CS, Cheville AL, Schmitz KH. The Prevalence of Lymphedema Symptoms Among Survivors of Long-term Cancer with or at Risk for Lower Limb Lymphedema. *American Journal of Physical Medicine & Rehabilitation.* 2013;92(3):223-231. doi:10.1097/phm.0b013e31826edd97
5. Smith BG, Hutcheson KA, Little LG, et al. Lymphedema outcomes in patients with head and neck cancer. *Otolaryngol Head Neck Surg.* 2015;152(2):284-291. doi:10.1177/0194599814558402
6. Klose G. Lymphedema Certification and Online Education. Klose Training. <https://klosetraining.com/>
7. National Lymphedema Network. Position statement of the National Lymphedema Network on exercise. 2011. <https://lymphnet.org/position-papers>
8. Helyer LK, et al. Obesity is a risk factor for developing postoperative lymphedema in breast cancer patients. *Breast J.* 2010; 16(1): 48-54. doi:10.1111/j.1524-4741.2009.00855.
9. Smile TD, et al. A Review of Treatment for Breast-Cancer Related Lymphedema. *American Journal of Clinical Oncology.* 2018;41(2):178-190. doi:10.1097/COC.0000000000000355

References

10. Ozcan DS, Diayan M, et al. Complex decongestive therapy enhances upper limb functions in patients with breast cancer-related lymphedema. *Lymph Res and Bio*. 2019; (16)5.
11. Michopoulos E, Papathanasiou G, Vasilopoulos G, Polikandrioti M, Dimakakos E. Effectiveness and Safety of Complete Decongestive Therapy of Phase I: A Lymphedema Treatment Study in the Greek Population. *Cureus*. 2020;12(7):e9264. Published 2020 Jul 19. doi:10.7759/cureus.9264
12. Koehler LA, Hunter DW, Blaes AH, Haddad TC. Function, Shoulder Motion, Pain, and Lymphedema in Breast Cancer With and Without Axillary Web Syndrome: An 18-Month Follow-Up. *Phys Ther*. 2018;98(6):518-527. doi:10.1093/ptj/pty010
13. Leidenius M, Leppänen E, Krogerus L, von Smitten K. Motion restriction and axillary web syndrome after sentinel node biopsy and axillary clearance in breast cancer. *Am J Surg*. 2003;185(2):127-130. doi:10.1016/S0002-9610(02)01214-X
14. Torres Lacomba M, Mayoral del Moral O, Coperias Zazo JL, Yuste Sánchez MJ, Ferrandez J-C, Zapico Goñi Á. Axillary web syndrome after axillary dissection in breast cancer: a prospective study. *Breast Cancer Res Treat*. 2009;117(3):625-630. doi:10.1007/s10549-009-0371-8
15. American College of Sports Medicine. New guidelines strongly recommend exercise for cancer patients, survivors. Indianapolis, IN. Updated 8/2011.
16. Aggithaya MG, Narahari SR, Ryan TJ. Yoga for correction of lymphedema's impairment of gait as an adjunct to lymphatic drainage: A pilot observational study. *Int J Yoga*. 2015;8(1):54-61. doi:10.4103/0973-6131.146063
17. Chen Y-F, Huang X-Y, Chien C-H, Cheng J-F. The Effectiveness of Diaphragmatic Breathing Relaxation Training for Reducing Anxiety. *Perspect Psychiatr Care*. 2017;(4):329. doi:10.1111/ppc.12184