National Comprehensive Cancer Network®

Optimizing Care for Breast Cancer-Related Lymphedema

Ann Marie Flores

PT, MSPT, MA, PhD, Certified Lymphedema Therapist

Robert H. Lurie Comprehensive Cancer Center of Northwestern University

Northwestern Medicine®
Feinberg School of Medicine

Optimizing Care for Breast Cancer-Related Lymphedema

Presented by: Ann Marie Flores, PT, MSPT, MA, PhD, Certified Lymphedema Therapist

Associate Professor & Director of Cancer Rehabilitation, Cancer Survivorship Institute, Robert H. Lurie Comprehensive Cancer Center
Director/PI, Cancer Rehabilitation Studies Laboratory, Dept. of Physical Therapy and Human Movement Sciences

NCCN 2026 Breast Cancer Congress
Friday, February 6, 202612:10 PM – 12:40 PM CST

Learning Objectives

1. Explain strategies for screening and early detection of lymphedema in breast cancer survivors.
2. Discuss approaches for the management of lymphedema in breast cancer survivors.

Let's start with a case study

Pseudonym: Mary Jackson

- **65 yo African American female**
  - Stage 3 L-sided BC diagnosed 3.5 years ago
    - HR-positive, HER2-negative treated with surgery (mastectomy & ALND), adjuvant chemotherapy (anthracycline-taxane combination (doxorubicin & cyclophosphamide followed by paclitaxel) and IMRT
    - No reconstruction
  - **PMH:** HBP, depression, anxiety, hysterectomy
  - **PSH:** married, 1 adult child, lives in 2-story house with 3 stairs to enter/exit, quit smoking 30 yrs ago, college degree, retired art teacher, R handed

- **Self-referred to Physical Therapy & presented with:**
  - Abnormal posture while standing
  - Pain, fatigue
  - Muscle weakness
  - Limited range of motion & flexibility
  - Edema in L upper back & lateral trunk – used to come & go but now persistent w/ feeling of heaviness & interferes w/ exercise

Model photographs by Katherine Curry

Goals she wants to achieve with PT

1. "Give me back my life!"
2. Move like a normal person & get rid of the swelling
3. Travel again
4. Lose weight

How common is breast cancer-related lymphedema (BCRL)?

- Epidemiology, Risk Factors, & the Lymphedema Fibrosis Continuum

Epidemiology of BCRL

Incidence & Prevalence

- **Overall prevalence:** 16-22% of breast cancer survivors
- **Incidence varies widely (5-50%) -** *depends on diagnostic criteria, how measured, type of surgery, & follow-up duration*
  - **SLNB**: 5-10%
  - **ALND:** 20-40%
  - **ALND + regional nodal radiation:** up to 31%

- *Nogueira L, Devasia TP, et al. New Cancer Treatment and Survivorship Statistics, 2025. CA: A Cancer Journal for Clinicians. 2025.*
- *Rockson SG. Lymphedema after Breast Cancer Treatment. The New England Journal of Medicine. 2018.*
- *DiSipio T, Rye S, Newman B, Hayes S. Incidence of Unilateral Arm Lymphoedema After Breast Cancer: A Systematic Review and Meta-Analysis. The Lancet. Oncology. 2013.*
- *Davies C, Levenhagen K, Ryans K, et al. Interventions for Breast Cancer-Related Lymphedema: Clinical Practice Guideline From the Academy of Oncologic Physical Therapy of APTA. Physical Therapy. 2020.*

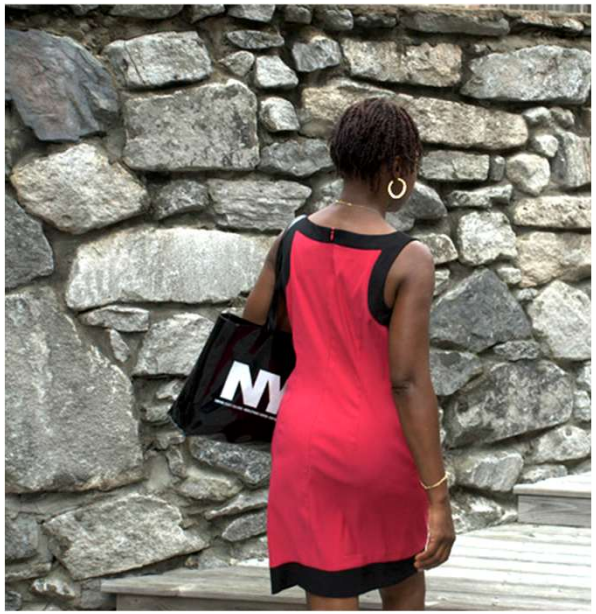
Epidemiology of BCRL

When is it most likely to develop?

- **Peak risk:** between 12 - 30 months after treatment
  - 87-90% of cases diagnosed w/in 2-3 years

- **But it is lifetime risk**
  - Up to 11 years post-treatment documented

  - ***Varies by treatment modality***
    - **SLNB +/- radiation:** peaks within 2.5 – 4 years
    - **ALND without radiation:** peaks within a year
    - **ALND + radiation:** peaks within 2 years



Model photographs by Katherine Curry

- *McDuff SGR, et al. Timing of Lymphedema After Treatment for Breast Cancer: When Are Patients Most at Risk?. International Journal of Radiation Oncology, Biology, Physics. 2018.*
- *Sharifi N, Ahmad S. Breast Cancer-Related Lymphedema: A Critical Review on Recent Progress. Surgical Oncology. 2024.*

Epidemiology of BCRL

Point Prevalence and Other Risk Factors

- **Point prevalence increases over time**
  - Baseline (w/in 6mths after BC diagnosis): 7%
  - Within 2 years: 20%
  - Within 7 years: 24%
  - *Per NCCN* - 75% diagnosed within 3 yrs of treatment
- **Other Risk factors**
  - Race: Black women (esp. young) & low SES have highest risks
  - Obesity (BMI ≥30 kg/m^2)
  - Chemotherapy (particularly taxane-based regimens)
  - Radiation therapy
  - Higher number of lymph nodes removed
  - + lymph nodes

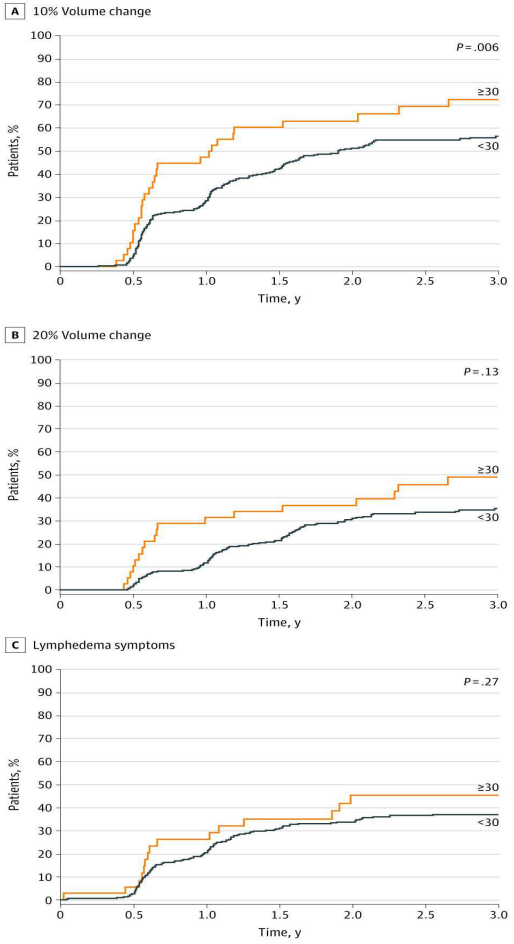
- *Ren Y, Kebede MA, Ogunleye AA, et al. Burden of Lymphedema in Long-Term Breast Cancer Survivors by Race and Age. Cancer. 2022. National Comprehensive Cancer Network. Survivorship. Updated 2025-05-23*
- *Montagna G, Zhang J, Sevilimedu V, et al. Risk Factors and Racial and Ethnic Disparities in Patients With Breast Cancer–Related Lymphedema. JAMA Oncology. 2022. 8.*
- *Flores AM, Nelson J, Andrews L, et al. Lymphedema signs and symptoms and utilization of physical therapy services among low-income breast cancer survivors. Physical Therapy. 2020;100(3):487-499.*
- *Shen A, Lu Q, Fu X, et al. Risk Factors of Unilateral Breast Cancer-Related Lymphedema: An Updated Systematic Review and Meta-Analysis of 84 Cohort Studies. Supportive Care in Cancer : Official Journal of the Multinational Association of Supportive Care in Cancer. 2022.*
- *Byun HK, Chang JS, Im SH, et al. Risk of Lymphedema Following Contemporary Treatment for Breast Cancer: An Analysis of 7617 Consecutive Patients From a Multidisciplinary Perspective. Annals of Surgery. 2021.*
- *Nguyen TT, Hoskin TL, Habermann EB, Cheville AL, Boughey JC. Breast Cancer-Related Lymphedema Risk Is Related to Multidisciplinary Treatment and Not Surgery Alone: Results From a Large Cohort Study. Annals of Surgical Oncology. 2017.*
- *NCCN Guidelines® for Survivorship - Lymphedema (Version 2.2025). © 2025 National Comprehensive Cancer Network, Inc. All rights reserved. Available at www.NCCN.org/guidelines.*

Epidemiology of BCRL

Exactly how many lymph nodes??

- **ALND much higher risk than SLNB**
  - ≥30 nodes removed significantly increases risk of BCRL
    - Volume change
    - Symptoms *Armer JM, Ballman KV, McCall L, et al. Factors Associated With Lymphedema in Women With Node-Positive Breast Cancer Treated With Neoadjuvant Chemotherapy and Axillary Dissection. JAMA Surgery. 2019.*
- **Specifically**
  - ≤15 nodes removed: *Lowest risk*
  - 16-29 nodes removed: *Intermediate risk*
  - ≥30 nodes removed: *Highest risk*
    - By 5 years, cumulative incidence approx. 40-50% combined with radiation &/or chemotherapy *Naoum GE, Roberts S, Brunelle CL, et al. Quantifying the Impact of Axillary Surgery and Nodal Irradiation on Breast Cancer-Related Lymphedema and Local Tumor Control: Long-Term Results From a Prospective Screening Trial. Journal of Clinical Oncology : Official Journal of the American Society of Clinical Oncology. 2020.*
- **Even more specifically, compared to minimal node sampling:**
  - 8-11 nodes: adj. OR = 3.28
  - 12-15 nodes: adj. OR = 4.04
  - ≥16 nodes: adj. OR = 5.08

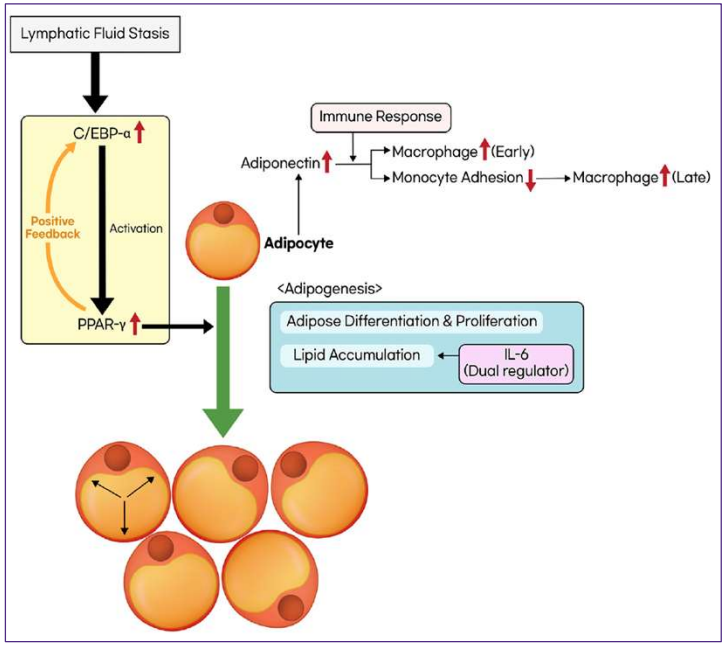
Gross JP, Whelan TJ, Parulekar WR, et al. Development and Validation of a Nomogram to Predict Lymphedema After Axillary Surgery and Radiation Therapy in Women With Breast Cancer From the NCIC CTG MA.20 Randomized Trial. International Journal of Radiation Oncology, Biology, Physics. 2019. 2-3]

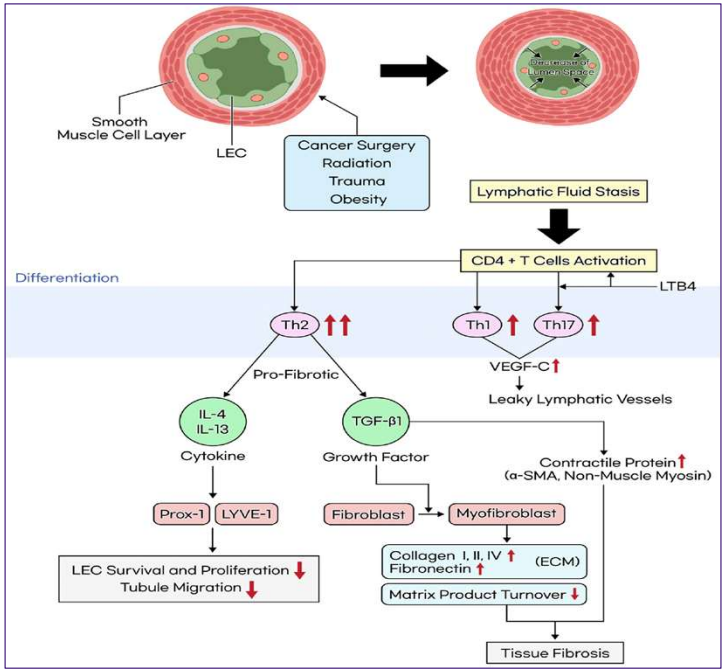


BCRL is more than fluid accumulation

*- Lymphedema Fibrosis Continuum – **A Vicious Cycle***

Lymphostasis + **Adipocyte deposition** + **Tissue fibrosis** = **Advancing lymphedema**





Figures 2 & 3 from *Lee & Kim. Front. Cell Dev. Biol. 12:1363811. doi: 10.3389/fcell.2024.13638112024*

What have we learned from recent clinical trials about optimal treatment?

All include comparisons to conservative treatment
AKA Complete Decongestive Therapy (CDT)

- Generally delivered by Physical or Occupational Therapists who are also certified lymphedema therapists (CLTs)

- **2 phases**
  - **Phase I:** *AKA Clinical/Intensive/Acute/Decongestion*
    Goal: maximize volume reduction & normalize tissue texture
    - Examination
    - Education
    - Skin Care
    - Manual techniques
    - Compression
    - Therapeutic Exercise
    - Self-management
    - Frequency of clinical visits
    - Adjunctive Therapies (laser, intermittent pneumatic pumps, kinesiotaping, extracorporeal shockwave therapy, aromatherapy, etc) *DiCecco S, et al. Med Oncol. 2024.*
  - **Phase II:** *AKA Home Care/Chronic/Maintenance*
    - **Goal:** maintain volume reduction & independence with self-care/management

Adapted from: https://lymphnet.org/page/lymphedema-therapy

MAJOR Recent Cancer-Related Lymphedema Clinical Trials

- **Phase II Study of Lymfactin® and Vascularized Lymph Node Transfer (VLNT) n = 39**
  - Double-blind, placebo-controlled, multicenter RCT evaluating safety & efficacy of Lymfactin® *(VEGF-C gene therapy to promote lymph vessel growth & repair - no generic name & not FDA approved)* + VLNT
    - + effect of VLNT in both groups
    - Significantly greater improvement in % water (via tissue dielectric constant ratios) in Lymfactin® group compared to placebo

Rannikko EH et al. Plastic and Reconstructive Surgery. 2025

- **Outcomes of LVA and VLNT in Combined Surgical Treatment n = 92**
  - Prospective cohort effectiveness study of 4 groups:
    - LVA + CDT (n = 30)
    - VLNT + CDT (n = 15)
    - LVA + VLNT + CDT (n = 13)
    - CDT control (n = 34)
    - Primary outcome = upper limb volume pre-op & 1 yr
  - Significantly reduced limb volume for surgery + CDT v. CDT alone

Zeltzer A, et al. Plastic and Reconstructive Surgery. 2026

- **Lymphatic Venous Anastomosis (LVA) and Complex Decongestive Therapy Study n = 156**
  - Multicenter RCT evaluated effect of LVA on cellulitis prevention in lower extremity lymphedema.
  - LVA + CDT (n=73) was more effective in preventing cellulitis than CDT alone (n=83)

Mihara M, et al. The British Journal of Surgery. 2024

- **The LYMPH Trial** – ***recruiting; n = 280***
  - Pragmatic randomized international multicenter superiority trial
  - Compares lymphovenous anastomosis (LVA) and VLNT + Complete Decongestive Therapy (CDT) v. CDT alone
  - *Primary outcome* = patient-reported quality of life
  - *Secondary outcomes* = arm volume measurements & cost

Kappos EA, et al. BMJ Open. 2025

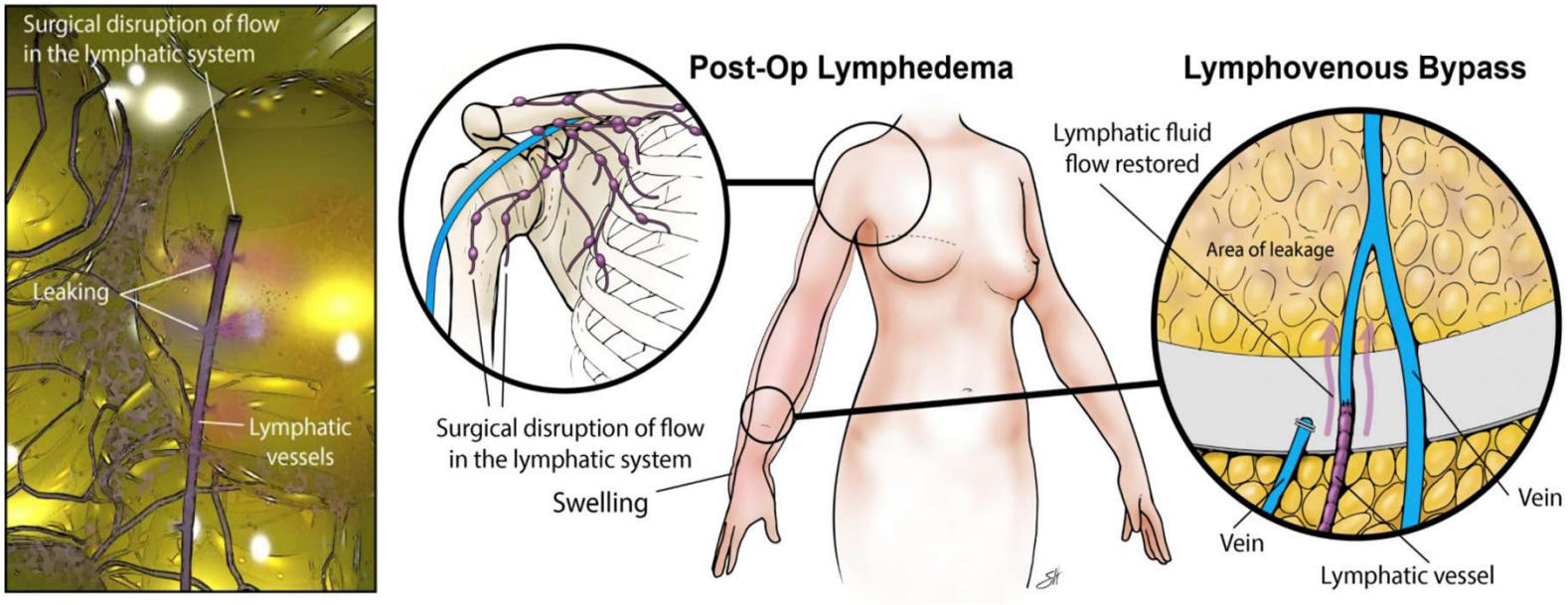
- **SurLym Trial** *AKA Added Value of Reconstructive Lymphatic Surgery to Usual Care in Lymphoedema* – ***Recruiting n = 180***
  - Multicenter RCT evaluated added value of LVA & VLNT to CDT
  - *Primary outcome* = lymphedema-specific quality of life
  - *Secondary outcomes* = limb volume & compression garment usage *Devoogdt N, et al. BMJ Open. 2024*

Surgical Approach

Immediate Lymphatic Reconstruction (lymphovenous bypass)

Immediate lymphatic reconstruction surgery (ILR)

AKA LYMPHA or S-LYMPHA



Photos by: Scott Holmes, CMI. Accessed from: https://www.bcm.edu/healthcare/specialties/oncology/cancer-types/breast-cancer/breast-cancer-surgery/lymphedema-surgery

- In combination with initial breast cancer surgery

ILR Trials – Is it optimal? Do the effects last & for whom?

- **2025 Systematic Reviews & Meta-Analyses**
  - ILR <1 yr f/u had stronger lasting effect (OR 0.11) compared to ≥2 years follow-up (OR 0.41, p=0.003).
  - 42 Single-arm studies reported pooled initial lymphedema incidence of 7.34% overall but increased to 20% >2 years
  - **Overall relative risk (RR) of 0.51 of developing BCRL in patients w/ ILR after ALND** *Du J, et al. Journal of Plastic, Reconstructive & Aesthetic Surgery. 2025.*
  - After 3 years, ILR benefits no longer significant past 3 years

Li MX, et al. Microsurgery. 2025.

- **Risk factors for ILR failure**
  - **Usual suspects for surgical complications:** smoking, inadequate patency of lymphatic channels & higher BMI *Haravu PN, et al. Annals of Surgical Oncology. 2023.*
  - Compared to white patients, black/African American patients w/ ILR had higher lymphedema rates (4.5% v. 18.8%) suggesting race as a risk factor

Jakub JW, et al. Annals of Surgical Oncology. 2024.

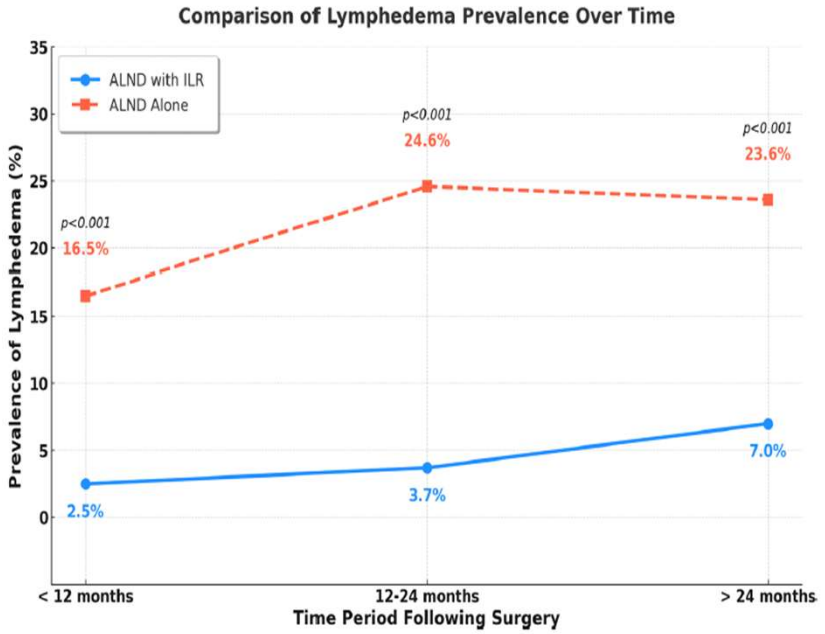


Fig 1: Comparison of lymphedema prevalence over time in patients who had ALND with ILR with pooled estimates from ALND along. From *Bakri et al. 2023*

Laser Therapy – Are we optimal yet?

Photobiomodulation (AKA PBM or Low Level Laser Therapy (LLLT))

Photobiomodulation

AKA PBM or Low Level Laser Therapy (LLLT)

- **Anti-inflammatory & penetrates skin & deeper tissues to:**
  - Promote lymph vessel angiogenesis which, in turn, improves lymphatic function
  - Reduce volume
  - Reduce fibrosis

Chiu ST, et al. Lasers in Medical Science. 2023.
Davies C, et al. Physical Therapy. 2020.
Hamblin M. Photochemistry and Photobiology. 2018.
Jang DH, et al. Lasers in Medical Science. 2016.

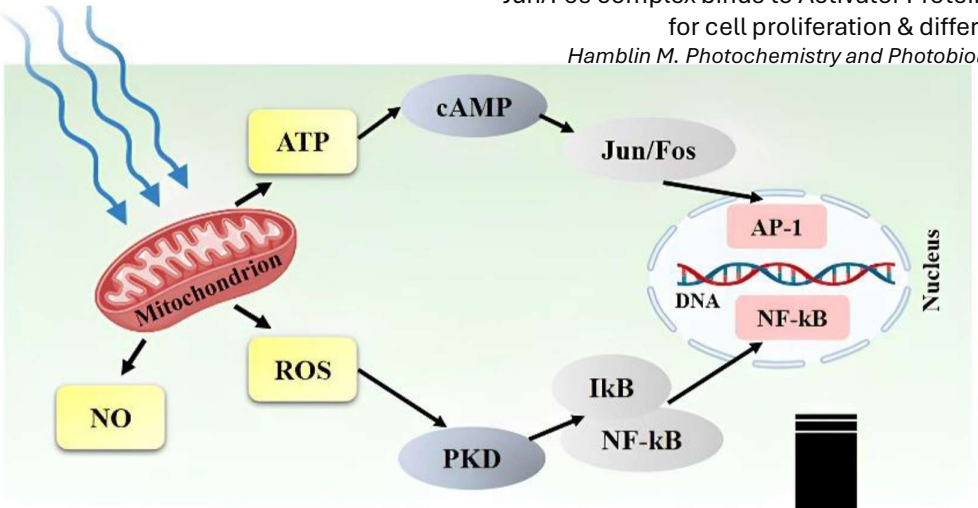
From: https://westcliffpt.com/low-level-laser-therapy/

How does PBM/LLLT work?

From: https://westcliffpt.com/low-level-laser-therapy/

Jun/Fos complex binds to Activator Protein-1 (AP-1) for cell proliferation & differentiation

Hamblin M. Photochemistry and Photobiology. 2018.



Tissue repair & inflammation modulation via ROS signaling pathways

Hamblin M. Photochemistry and Photobiology. 2018.

- **Tissue repair**
- **Anti-inflammatory effect**
- **Pain relief**
- **Nerve regeneration**

Adapted from Figure 1. Mechanism of low-level laser therapy. ATP: Adenosine triphosphate, AP-1: activator protein-1, cAMP: Cyclic adenosine monophosphate, NO: Nitric oxide, ROS: Reactive oxygen species, PKD: Protein kinase D, NF-kB: Nuclear factor-kB, IkB: Inhibitor of kB. *Bahrami R, et al. J Dent Sci. 2025*

I have a busy clinic. How do I optimize treatment of BCRL?

Here's the good news . . .

You don't have to do it all by yourself.

Seriously.

LEAN on your PT, CLT &

OT, CLT colleagues.

Oncology Providers are CRUCIAL for Early Detection

- Empower you, your team and patients to screen for early detection

Empower your patient

- Education begins at diagnosis/treatment planning
- **Early consultation with PT/OT who is also a certified lymphedema therapist (CLT) reduces risk of BCRL**
  - Referral to PT/OT, CLT means your patient will get evidence-based:
    - Patient education on Risk Reduction
      - Expectations for physical & functional recovery including lymphedema prevention & control
      - Early detection of BCRL signs/symptoms
      - Self-monitoring
      - Skin care & infection control
      - Self-referral to PT/OT, CLT
    - Evaluation, diagnosis & treatment for lymphedema
    - Home exercise program
    - Regular monitoring & appropriate elements of CDT

Empower yourself & your team

- **Ask your patient the critical questions** before BC treatment begins & at each subsequent clinic visit:
  - Is the patient a candidate for immediate lymphatic reconstruction (ILR)?
  - Do you have swelling on the affected side?
  - Does it come and go? Does it stay?
  - Do your bra, t-shirt, sleeve, shirt cuff, bracelet, watch feel tighter? Are you constantly having to adjust them?
  - Does your breast, arm, upper back, trunk feel heavy or full?
  - Has your skin color or texture changed?

- **Conduct a brief clinical examination**
  - Observation & skin inspection of entire upper quarter (residual breast, trunk, back, shoulder, arm)
    - Pitting
    - Volume measurement (circumferential, 3D measurement) of each arm
    - Bioimpedance

- **Does it appear that lymphedema is present?**
  - If yes:
    - **First** - Refer to PT,CLT or OT, CLT for diagnosis/staging & appropriate intervention elements
    - **If conservative treatment loses effectiveness**, consider referring for lymphedema surgery (ILR if candidate)

Consider Screening for Eligibility for Immediate Lymphatic Reconstruction (ILR)

1. **Node-Positive Breast Cancer** (e.g., unilateral w/ ALND) *Granoff MD, et al. Plastic and Reconstructive Surgery. 2023. Johnson AR, et al. Plastic and Reconstructive Surgery. 2021*
2. **BMI less than 30 kg/m^2** Obesity increases risk of procedural failure. *Wainwright DJ, et al. Annals of Plastic Surgery. 2024. Haravu PN, et al. Annals of Surgical Oncology. 2024.*
3. **Pre- & Post-Op Measurement & Access to Care** *Granoff MD, et al. Plastic and Reconstructive Surgery. 2023. Johnson AR, et al. Plastic and Reconstructive Surgery. 2021. Flores AM, et al. Medical Oncology. 2024*
4. **Absence of Pre-Morbid Lymphedema** *Brahma B, et al. Microsurgery. 2024*
5. **Adjuvant Therapy Considerations** Chemotherapy & radiation adds risk for BCRL development. *Weinstein B, et al. Plastic and Reconstructive Surgery. 2022.*
6. **Technically Possible** Patent lymphatic channels, lack of anatomical anomaly, and the ability to perform lymphovenous anastomosis. *Haravu PN, et al. Annals of Surgical Oncology. 2024. Pons G, et al. Journal of Plastic, Reconstructive & Aesthetic Surgery. 2025.*
7. **Non-Smoking Status** Smoking associated with ILR failure; non-smokers preferred candidates. *Haravu P, et al. Annals of Surgical Oncology. 2024.*
8. **Insurance & Financial Considerations** Access & payment influenced by insurance coverage, personal financial resources. *Huang A, et al. Journal of Surgical Oncology. 2025.*

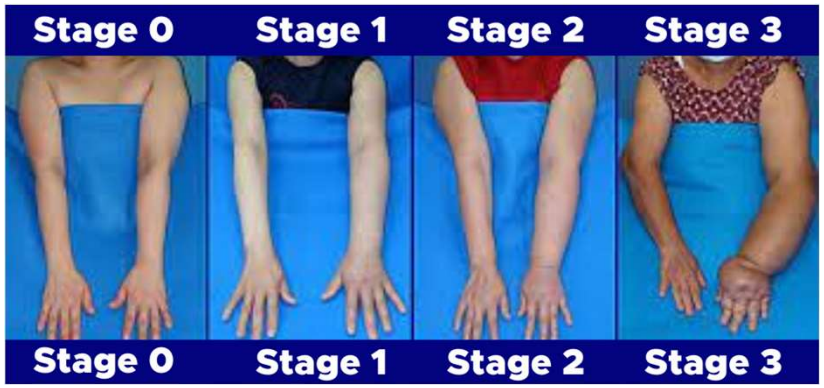
What are the clinical practice guidelines for referral, diagnosis, & treatment?

NCCN, American Physical Therapy Association, International Society of Lymphology

NCCN Guidelines – 02.2025

- Lymphedema Diagnosis & Treatment (aligns w/American Physical Therapy Association [APTA] & International Society of Lymphology [ISL])

- Presence/absence of lymphedema
- Pretreatment measurement (volume &/or bioimpedance) recommended
- **Staging reflects progression & severity per ISL; also guides intervention selection**
  - **Stage 0** = latent/sub-clinical; no discernable edema; subtle symptoms (heaviness, fullness, fatigue)
  - **Stage 1** = Spontaneously reversible; swelling reduced w/ elevation; may have some pitting; heaviness, fullness, fatigue
  - **Stage 2** = Irreversible; swelling is increased and no longer relieved by elevation; skin pitting & texture changes (spongy, tissue fibrosis & hardening)
  - **Stage 3** = lymphostatic elephantiasis; increased edema; skin no longer yields; severe skin changes (dry, scaly, thick, brawny, hemosiderin staining, blisters, papillomas, fluid leakage [weepy]); recurrent fungal and staph infections; physically & functionally debilitating; fat deposition & more fibrosis



Images from: https://lymphmanitoba.ca/about-lymphedema/

FYI . . .

NCCN Guidelines® for Survivorship (Version 2.2025). © 2025 National Comprehensive Cancer Network, Inc. All rights reserved. Available at www.NCCN.org/guidelines.

Comparison of Clinical Practice Guidelines

Topic	NCCN NCCN Guidelines® for Survivorship (Version 2.2025). © 2025 National Comprehensive Cancer Network, Inc. All rights reserved. Available at www.NCCN.org/guidelines.	APTA Levenhagen et al. J Phys Ther. 2017; Ryans et al. J Cancer Survivorship. 2025
Patient Education on Risk Reduction	• Risk Reduction – *see NCCN & expert panel consensus from Brunelle et al. Med Oncol. 2024*	

Screening & Assessment	• Survivorship Question 12
	  • Early detection & awareness of risk factors are key
	  • Presence/Absence
	  • Refer to PT or OT, CLT
		• After referral to PT, CLT
		  • Bioimpedance and/or volume measurement
		  • Pre-op
		  • 1st post-op year – every 3 months
		  • Biannually thereafter

Diagnosis	• ISL Staging Criteria	• ISL Staging Criteria
Treatment	• Refer to PT or OT, CLT for conservative treatment • Consider referral to lymphedema surgeon for physiologic approach	• Conservative treatment (CDT) – in some cases may not need manual lymphatic drainage • Pneumatic compression as adjunct only • Low level laser for fibrosis may be used

Compression Garments	• ***AT RISK:***
	  • Fit for compression garment & educate on use
	  • Pneumatic compression for home use
	  • Review using multilayered bandaging
	  • Inquire about use, need and replacement at each visit
		• Stage 1 – fitted for compression garment
		• Advanced Stages –compression bandaging then fitted garments

Physical Activity/Exercise Assessment & Recommendation	• Survivorship Question 23 • Refer patient w/lymphedema to appropriate specialist (PT or exercise specialist) • Progressive Resistance Exercise (PRE) + encourage UE/shoulder exercise for BCRL • Compression use during exercise as indicated	• All Stages: Individualized aerobic + PREprogram - ***low & slow*** • Patients w/ comorbidities or complications – refer to specialist for eval. & exercise prescription; yoga may be beneficial • Prox. - distal w/ diaphragmatic breathing • Compression use during exercise

BCRL Risk Reduction Guidelines

Brunelle CL, Jackson K, Shallwani SM, et al. Evidence-based recommendations regarding risk reduction practices for people at risk of or with breast cancer-related lymphedema: consensus from an expert panel. Med Oncol. 2024 Oct 23;41(11):298. doi: 10.1007/s12032-024-02510-6. PMID: 39438352.

Evidence-based recommendations regarding Risk reduction practices for people AT RISK for Breast Cancer-Related Lymphedema (BCRL)

PROSPECTIVE SURVEILLANCE	**SKINCARE AND SKIN INFECTION**
• Seek access to screening for lymphedema, including baseline measurements of the affected areas. • Request follow-up for five years on measurements, etc., as the risk for BCRL is life-long.	• Skin protection (sunscreen, bug repellant) and hygiene of the affected area are important. • Apply first aid to cuts and scratches to avoid infection/cellulitis, which increases the risk for BCRL. • Seek immediate medical attention if any signs and symptoms of infection/cellulitis appear.
INDIVIDUAL RISK FACTORS	**ELECTIVE SURGERY POST BREAST CANCER TREATMENTS**
• **Type of surgery:** lymph node dissection poses 3x greater risk than sentinel node biopsy • **Patient factors:** BMI >25 at breast cancer diagnosis, Black race, Hispanic ethnicity • **Treatment factors:** lymph node radiation, some types of chemotherapy • **Complications:** skin infection/cellulitis, seroma, cording	• Discuss with the surgeon the benefits and risks of any elective surgery and its impact on the area at risk. • Request lymphedema assessment before and immediately following surgery.
PATIENT EDUCATION	**PROPHYLACTIC COMPRESSION**
• Seek education before and after surgery on personal risk factors and symptoms of BCRL.	• Post-surgical compression garments that are well-fitted may help prevent BCRL in people at high risk.
EXERCISE	**AIR TRAVEL**
• Supervised, slowly progressive, strengthening, and cardio exercise is safe and encouraged.	• Air travel has not been associated with an increased risk of BCRL. • If you prefer to wear a preventative garment during travel, ensure it is properly fitted.
BLOOD PRESSURE	**TEMPERATURE**
• Isolated blood pressure measurement has not been shown to trigger the onset of BCRL.	• Hot climate does not appear to increase the risk for the onset of BCRL. • Saunas should be avoided.
BLOOD DRAWS AND INJECTIONS	**SELF-MONITORING**
• Isolated blood draws/injections have not been shown to increase arm volume in people at risk for BCRL.	• Self-monitor for any individual triggers that may cause early swelling. • Seek timely treatment from a Certified Lymphedema Therapist if signs and symptoms arise.

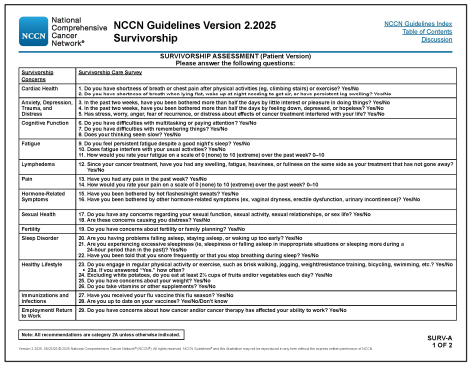
Evidence-based recommendations regarding Risk reduction practices for people WITH Breast Cancer-Related Lymphedema (BCRL)

PROSPECTIVE SURVEILLANCE	**SKINCARE AND SKIN INFECTION**
• Continue following up with your Certified Lymphedema Therapist (CLT) or other trained professional every 6-12 months for compression garment fitting and to ensure BCRL does not worsen.	• Skin protection (sunscreen, bug repellant) and hygiene in the affected area are important. • Apply first aid to cuts and scratches to avoid skin infection/cellulitis, which can worsen BCRL. • Seek immediate medical attention if any signs and symptoms of infection/cellulitis appear.
INDIVIDUAL RISK FACTORS	**ELECTIVE SURGERY POST BREAST CANCER TREATMENTS**
• Patient factors: BMI >30 • Complications: skin infection/cellulitis, seroma, cording	• Discuss with your surgeon the benefits and risks of elective surgery and its impact on BCRL. • Request lymphedema assessment before and immediately following surgery.
PATIENT EDUCATION	**AIR TRAVEL**
• Seek education about the signs and symptoms of BCRL getting worse.	• Although there is no evidence that BCRL progresses with air travel, people with BCRL should wear well-fitting compression garments during air travel as part of a self-maintenance program.
EXERCISE	**TEMPERATURE**
• Supervised, slowly progressive, strengthening, and cardio exercise is safe and encouraged.	• Exposure to hot temperatures may slightly increase swelling in people with BCRL. • Individuals are encouraged to self-monitor when exposed to high temperatures. • Saunas should be avoided.
BLOOD PRESSURE	**SELF-MONITORING**
• If possible, avoid blood pressure measurement in the arm with BCRL.	• Self-monitor for individual triggers that may cause swelling to get worse. • See a Certified Lymphedema Therapist or other trained professional should your BCRL get worse.
BLOOD DRAWS AND INJECTIONS	
• If possible, avoid blood draws, injections and infusions in the arm affected by BCRL.	

- **Monitoring:** Regularly for 5 years (at risk) with f/u (for those w/ BCRL) with CLT every 6 – 12 months for compression garment fitting
- **Risk Factors:** Be aware of risk factors
- **Education:** Risk factors, signs/symptoms of BCRL exacerbation
- **Exercise:** Supervised, slow & low progression (aerobic + resistance) – use compression garment
- **Blood Pressure (BP) & Blood Draws/Injections:** Isolated BP & blood draws/injections okay for those at risk; avoid, if possible, for those w/ BCRL
- **Skincare & Infection:** Good skin hygiene (sunscreen, protective clothing, insect repellent) and first aid for cuts/scratches to reduce infection risk
- **Elective Surgery:** Discuss w/ surgeon & request BCRL assessment pre- & post-op
- **Compression:** prophylactic post-op (for those at risk) & prescribed for those w/ BCRL
- **Air travel:** Use well-fitting compression garment
- **Temperature:** Avoid saunas; use caution & self-monitoring in hot climates
- **Self-monitoring:** triggers for BCRL & seek care by CLT if suspected BCRL

NCCN Guidelines – 02.2025

- *Assessment for Lymphedema & Physical Activity Implications*



NCCN Guidelines Version 2.2025
Survivorship

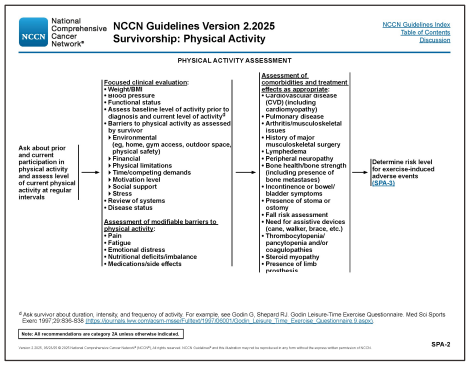
SURVIVORSHIP ASSESSMENT (Patient Version)
Please answer the following questions:

Survivorship Concerns	Survivorship Care Survey
Cardiac Health	1. Do you have shortness of breath or chest pain after physical activities (eg, climbing stairs) or exercise? Yes/No 2. Do you have shortness of breath when lying flat, wake up at night needing to get up, or have persistent leg swelling? Yes/No
Anxiety, Depression, Trauma, and Distress	3. In the past two weeks, have you been bothered more than half the days by little interest or pleasure in doing things? Yes/No 4. In the past two weeks, have you been bothered more than half the days by feeling down, depressed, or hopeless? Yes/No 5. Has stress, worry, anger, fear of recurrence, or distress about effects of cancer treatment interfered with your life? Yes/No
Cognitive Function	6. Do you have difficulties with multitasking or paying attention? Yes/No 7. Do you have difficulties with remembering things? Yes/No 8. Does your thinking seem slow? Yes/No
Fatigue	9. Do you feel persistent fatigue despite a good night's sleep? Yes/No 10. Does fatigue interfere with your usual activities? Yes/No 11. How would you rate your fatigue on a scale of 0 (none) to 10 (extreme) over the past week? 0–10
Lymphedema	12. Since your cancer treatment, have you had any swelling, fatigue, heaviness, or fullness on the same side as your treatment that has not gone away? Yes/No
Pain	13. Have you had any pain in the past week? Yes/No 14. How would you rate your pain on a scale of 0 (none) to 10 (extreme) over the past week? 0–10
Hormone-Related Symptoms	15. Have you been bothered by hot flashes/night sweats? Yes/No 16. Have you been bothered by other hormone-related symptoms (ex, vaginal dryness, erectile dysfunction, urinary incontinence)? Yes/No
Sexual Health	17. Do you have any concerns regarding your sexual function, sexual activity, sexual relationships, or sex life? Yes/No 18. Are these concerns causing you distress? Yes/No
Fertility	19. Do you have concerns about fertility or family planning? Yes/No
Sleep Disorder	20. Are you having problems falling asleep, staying asleep, or waking up too early? Yes/No 21. Are you experiencing excessive sleepiness (ie, sleepiness or falling asleep in inappropriate situations or sleeping more during a 24-hour period than in the past)? Yes/No 22. Have you been told that you snore frequently or that you stop breathing during sleep? Yes/No
Healthy Lifestyle	23. Do you engage in regular physical activity or exercise, such as brisk walking, jogging, weight/resistance training, bicycling, swimming, etc.? Yes/No • 23a. If you answered "Yes," how often? 24. Excluding white potatoes, do you eat at least 2½ cups of fruits and/or vegetables each day? Yes/No 25. Do you have concerns about your weight? Yes/No 26. Do you take vitamins or other supplements? Yes/No
Immunizations and Infections	27. Have you received your flu vaccine this flu season? Yes/No 28. Are you up to date on your vaccines? Yes/No/Don't know
Employment Return to Work	29. Do you have concerns about how cancer and/or cancer therapy has affected your ability to work? Yes/No

Note: All recommendations are category 2A unless otherwise indicated.

SURV-A
1 OF 2

Survivorship Assessment.
Question12: Since your cancer treatment, have you had any swelling, fatigue, heaviness or fullness on the same side of your treatment that has not gone away?



NCCN Guidelines Version 2.2025
Survivorship: Physical Activity

PHYSICAL ACTIVITY ASSESSMENT

Ask about prior and current participation in physical activity and assess level of current physical activity at regular intervals

Focused clinical evaluation:
- Weight/BMI
- Blood pressure
- Functional status
- Assess baseline level of activity prior to diagnosis and current level of activity[a]
- Barriers to physical activity as assessed by survivor
  - Environmental (eg, home, gym access, outdoor space, physical safety)
  - Financial
  - Physical limitations
  - Time/competing demands
  - Motivation level
  - Social support
  - Stress
- Review of systems
- Disease status

Assessment of modifiable barriers to physical activity:
- Pain
- Fatigue
- Emotional distress
- Nutritional deficits/imbalance
- Medications/side effects

Assessment of comorbidities and treatment effects as appropriate:
- Cardiovascular disease (CVD) (including cardiomyopathy)
- Pulmonary disease
- Arthritis/musculoskeletal issues
- History of major musculoskeletal surgery
- Lymphedema
- Peripheral neuropathy
- Bone health/bone strength (including presence of bone metastases)
- Incontinence or bowel/bladder symptoms
- Presence of stoma or ostomy
- Fall risk assessment
- Need for assistive devices (cane, walker, brace, etc.)
- Thrombocytopenia/pancytopenia and/or coagulopathies
- Steroid myopathy
- Presence of limb prosthesis

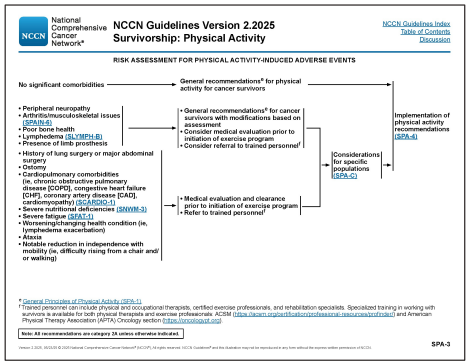
Determine risk level for exercise-induced adverse events (SPA-3)

[a] Ask survivor about duration, intensity, and frequency of activity. For example, see Godin G, Shephard RJ. Godin Leisure-Time Exercise Questionnaire. Med Sci Sports Exerc 1997;29:S36-S38. (https://journals.lww.com/acsm-msse/Fulltext/1997/06001/Godin_Leisure_Time_Exercise_Questionnaire.9.aspx)

Note: All recommendations are category 2A unless otherwise indicated.

SPA-2

Physical Activity Assessment.
Determine risk level for exercise induced adverse events (cause or exacerbate lymphedema, infection)



NCCN Guidelines Version 2.2025
Survivorship: Physical Activity

RISK ASSESSMENT FOR PHYSICAL ACTIVITY-INDUCED ADVERSE EVENTS

No significant comorbidities → General recommendations[a] for physical activity for cancer survivors

- Peripheral neuropathy
- Arthritis/musculoskeletal issues (SPA-H-6)
- Poor bone health
- Lymphedema (SLYMPH-B)
- Presence of limb prosthesis
- History of lung surgery or major abdominal surgery
- Ostomy
- Cardiopulmonary comorbidities (ie, chronic obstructive pulmonary disease [COPD], congestive heart failure [CHF], coronary artery disease [CAD], cardiomyopathy) (SCARDIO-1)
- Severe nutritional deficiencies (SNWM-3)
- Severe fatigue (SFAT-1)
- Worsening/changing health condition (ie, lymphedema exacerbation)
- Ataxia
- Notable reduction in independence with mobility (ie, difficulty rising from a chair and/or walking)

→ General recommendations[a] for cancer survivors with modifications based on assessment
- Consider medical evaluation prior to initiation of exercise program
- Consider referral to trained personnel[b]

→ Medical evaluation and clearance prior to initiation of exercise program
- Refer to trained personnel[b]

[Considerations for specific populations (SPA-C)]

Implementation of physical activity recommendations (SPA-4)

[a] General Principles of Physical Activity (SPA-1)
[b] Trained personnel can include physical and occupational therapists, certified exercise professionals, and rehabilitation specialists. Specialized training in working with survivors is available for both physical therapists and exercise professionals: ACSM (https://acsm.org/certification/professional-resources/prohibit/) and American Physical Therapy Association (APTA) Oncology section (https://oncologypt.org/).

Note: All recommendations are category 2A unless otherwise indicated.

SPA-3

No significant comorbidities or risk? Refer to trained professional

PA For Survivors with lymphedema

- Workup [diagnosis] & treatment for lymphedema
- Physical activity & progressive resistance recommended
- For UE lymphedema, encourage arm/shoulder exercises
- Refer to Physical Therapist or, if appropriate exercise specialist

What does optimal management of BCRL look like?

Optimal Team Composition – *shared leadership, unique expertise*

Team Member	Responsibility

Oncology MD, APP, Nurse	• Screening & triage for BCRL
	• ***Referrals related to BCRL?***
	  • *BEST PRACTICE* refer to PT, CLT or OT, CLT before BC treatment starts
	  • Consider referral to plastic surgeon for ILR or less than optimal CDT outcome

Physical or Occupational Therapist **who is also** Certified Lymphedema Therapist	• Pre-treatment diagnosis, evaluation, & treatment
	• Quarterly & biannual monitoring up to at least 5 years w/ f/u CDT as needed
	• ***Referrals related to BCRL?***
	  • Exercise specialist as needed
	  • Plastic surgery if less than optimal CDT outcome
	  • Adverse event – report & refer to appropriate provider

Plastic Surgeon for Lymphedema Procedures	• Screening, assessment for physiological procedures (LVA, VLNT) as indicated
	• ***Referrals?***
	  • PT, CLT or OT, CLT for pre-, peri, and post-op conservative management
	  • Oncology provider if suspect recurrence

Registered Dietician	• Provide dietary recommendations, body composition & weight management • ***Referrals?*** • If BCRL or physical/functional impairment suspected - PT, CLT or OT, CLT & oncology provider

Exercise Specialist w/ Advanced Training in Oncology & Exercise	• Community fitness programming
	• ***Referrals?***
	  • If BCRL or physical/functional impairment suspected - PT, CLT or OT, CLT & oncology provider
	  • Registered Dietician for dietary recommendations, body composition & weight management

OPTIMAL

BCRL screening, education, & appropriate conservative intervention begins @ BC diagnosis

SUMMARY

- **High risk**
  - Refer pre-op measurement & education
- **0 – 3 months – All Risk**
  - Refer everyone at risk for assessment & (as needed) intervention
  - **High risk** patients - issue compression garment, individualized exercise + diaphragmatic breathing
- **> 3 months post-op – All Risk**
  - Risk reduction practices
  - Monitoring
    - If BCRL detected, diagnose, stage & appropriate intervention

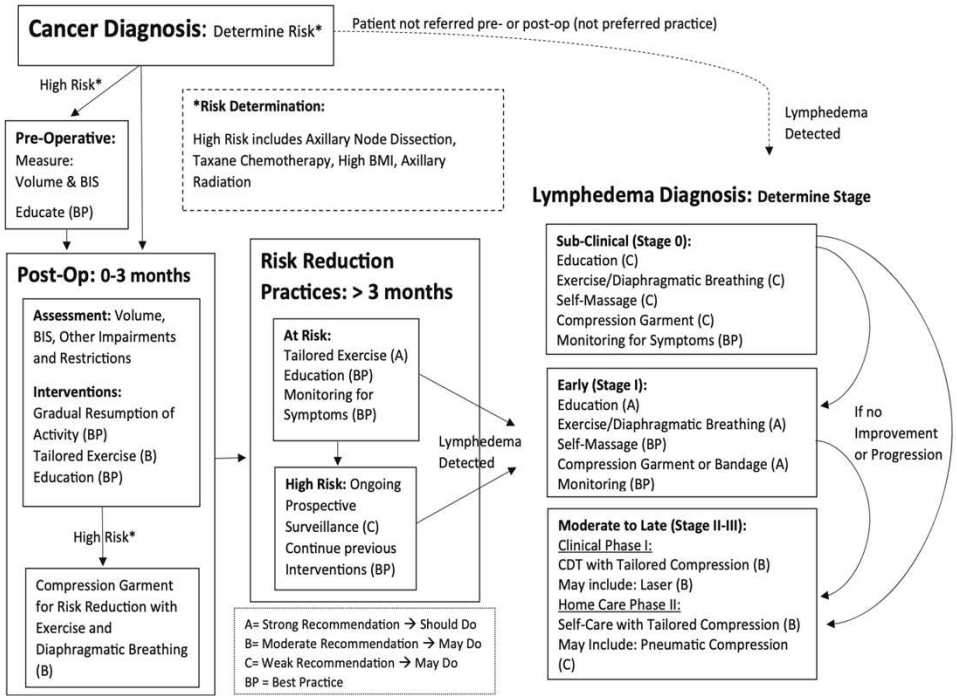


Fig. 1 Interventions across the breast cancer trajectory

Ryans K, Perdomo M, Davies CC, Levenhagen K, Gilchrist L. Rehabilitation interventions for the management of breast cancer-related lymphedema: developing a patient-centered, evidence-based plan of care throughout survivorship. J Cancer Surviv. 2023 Feb;17(1):237-245.

Optimal Recommended Interventions **Summary**

- **CDT is cornerstone**
  - **Stage 0 & I**
    - modified CDT
  - **Stage II & III**
    - CDT w/ or w/o LLLT
    - Consider intermittent pneumatic compression

When LLLT & intermittent pneumatic pump might be used

- differs from NCCN Guidelines

Patient presentation from the clinical practice guideline recommendations [3]	Stages from the International Society of Lymphology (ISL) [4]	Description of stages	Recommended interventions by stage [2]
At risk	NA	Individuals with insult to the lymphatic system but without symptoms or signs of lymphatic transport impairment	Exercise (B) Education (BP) High risk: (see Fig. 1) Compression garment (B) Education (BP) Prospective surveillance model (C)
Subclinical	Stage 0	Subclinical state where swelling is not visible, but lymphatic transport is impaired by clinical measures. Symptoms and subtle tissue changes may be noted	Education (BP) Exercise (A) Self-massage (C) Compression garment (C)
Early lymphedema	Stage I	Early onset of swelling that is visible and subsides with elevation. Pitting may be present	Modified CDT: Education (A) Exercise (A) Self-massage (C) Compression garment (A) Monitoring* (B)
Moderate lymphedema	Stage II	Consistent volume change with pitting present. Elevation rarely reduces the swelling and progressive tissue fibrosis occurs	CDT: (B) Clinical phase I with or without laser Home-care phase II with or without intermittent pneumatic compression pump
Late lymphedema	Stage III	Skin changes such as thickening, hyperpigmentation, increased skin folds, fat deposits, and warty overgrowths occur. Tissue is very fibrotic and pitting is absent	CDT: (B) Clinical phase I with or without laser Home-care phase II with or without intermittent pneumatic compression pump

Table 1 Lymphedema staging model and recommended interventions (modified from Levenhagen et al. 2017 [3])

*If no response to treatment or progression of lymphedema with modified CDT, transition to full CDT

CDT, complete decongestive therapy; *A*, strong recommendation—should do; *B*, moderate recommendation—may do; *C*, weak recommendation—may do; *BP*, best practice

Ryans K, et al. J Cancer Surviv. 2023.

OPTIMAL
Safe Exercise for All

SUMMARY

- **Pre-op – exercise & education**
- **Adhere to risk reduction**
- **Slow & low exercise**
- **Aerobic + resistance**
  - 3 x weekly - 30 mins moderate intensity aerobic
  - 2 x weekly - 20 – 30 mins resistance training

- **High Risk Patients**
  - Wear compression to reduce risk & during exercise
  - Exercise supervision
  - Diaphragmatic breathing

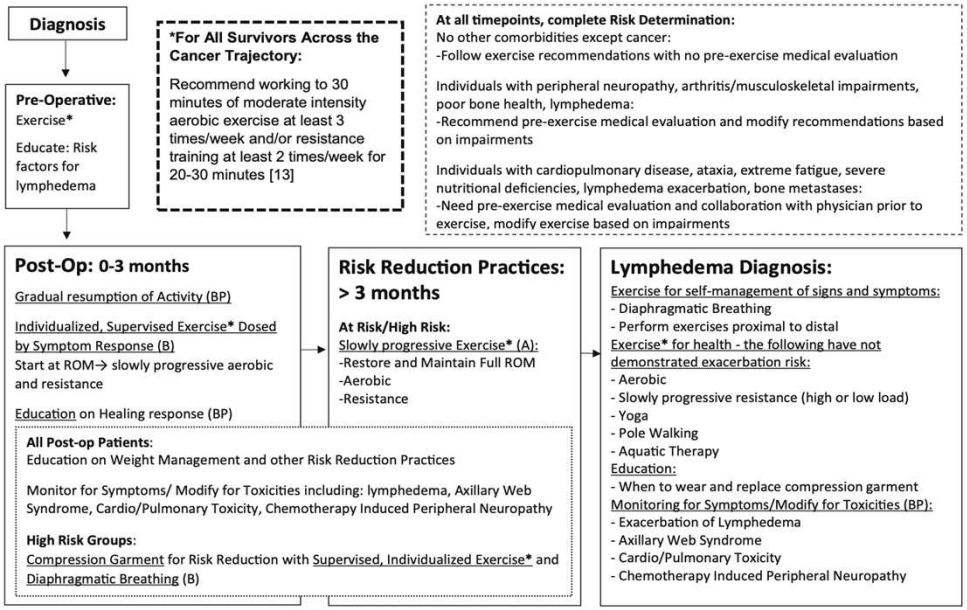
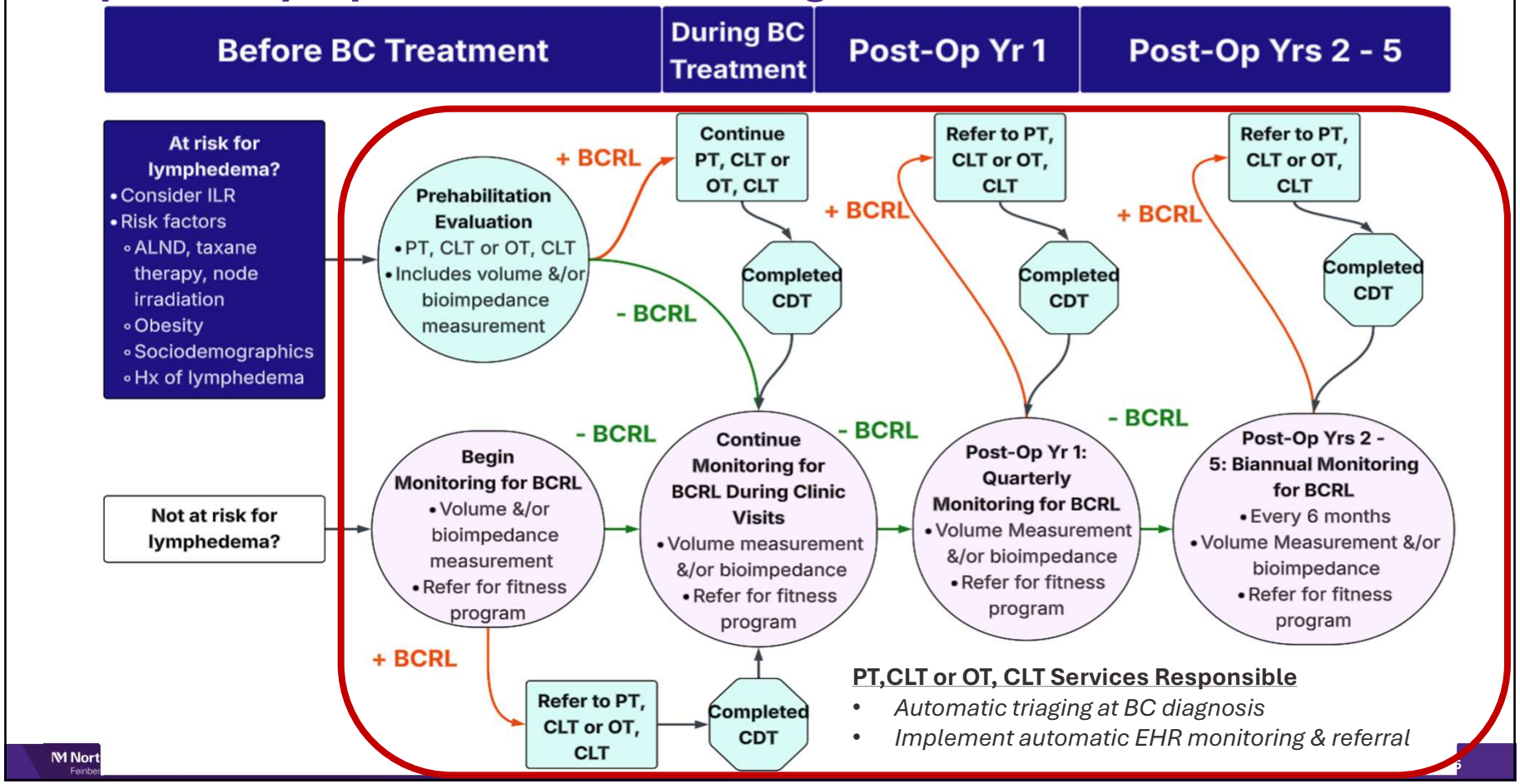


Fig. 2 Exercise along the breast cancer-related lymphedema trajectory

Ryans K, et al. J Cancer Surviv. 2023.

A= Strong Recommendation → Should Do
B= Moderate Recommendation → May Do
C= Weak Recommendation → May Do
BP = Best Practice

Optimal Lymphedema Monitoring & Care Workflow



What would you do different for Mary?

- Using your regular clinical assessment(s), would you have detected chest & trunk lymphedema?
  - *Will that change after this lecture? Why or why not?*
- When is the best time to screen & refer her?
- Who is the best professional to treat her?
- What would you advise Mary re: lymphedema, lymphedema risk reduction, diet & exercise?

Model photographs by Katherine Curry

Thank you

Northwestern Medicine®
Feinberg School of Medicine

Model photographs by Katherine Curry

National Comprehensive Cancer Network®

NCCN Member Institutions

Who We Are

An alliance of leading cancer centers devoted to patient care, research, and education

Our Mission

To define and advance quality, effective, equitable, and accessible cancer care and prevention so all people can live better lives

Our Vision

Access to high-quality, high-value, patient-centered cancer care for all people globally

NCCN.org – For Clinicians | **NCCN.org/patients** – For Patients | **Education.nccn.org** – CE Portal

National Comprehensive Cancer Network®

NCCN 2026 BREAST CANCER CONGRESS

with Updates from the 2025
San Antonio Breast Cancer Symposium

Hosted by: Northwestern Medicine® | Robert H. Lurie Comprehensive Cancer Center of Northwestern University

Friday, February 6, 2026

NCCN.org – For Clinicians | **NCCN.org/patients** – For Patients | **Education.nccn.org** – CE Portal

Audience Poll: Session Evaluation

Optimizing Care for Breast Cancer-Related Lymphedema

PRESENTED BY:

Ann Marie Flores, PT, MSPT, MA, PhD
Certified Lymphedema Therapist
Robert H. Lurie Comprehensive Cancer Center of Northwestern University

This session will help me overcome challenges to delivery of care.

A. Yes

B. No

C. N/A

Bonus Question!

What was your "A-Ha!" moment from the morning sessions?

National Comprehensive Cancer Network®

Lunch & Exhibits

Educational sessions will resume at 1:40 PM CST.