



**FDRS 2022**  
**April 22-24**

Intercontinental Hotel Cleveland  
At Cleveland Clinic

# IDENTIFYING TYPES OF FIBROSIS AND EVIDENCE-BASED TECHNIQUES TO IMPACT PAIN, SWELLING, AND FUNCTION IN FAT-RELATED DISORDERS

© 2022 KAREN ASHFORTH, MS, OTR, CLT-LANA



# DISCLOSURES

Type of financial relationship: nothing to disclose



# AGENDA

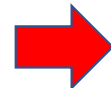
- What is fibrosis?
- What different types of fibrosis commonly occur with fat-related disorders?
- How do I prevent fibrosis?
- Help! I have fibrosis, how do I manage it?
- Lecture slides available online: [www.karenashforth.com](http://www.karenashforth.com)
- Disclaimer: SEEK GUIDANCE with new techniques

# WHAT IS FIBROSIS?

Damaged tissues become  
Hard, thick, dense  
Healthy tissues replaced by:

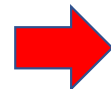


HARD COLLAGEN



Scar, radiation

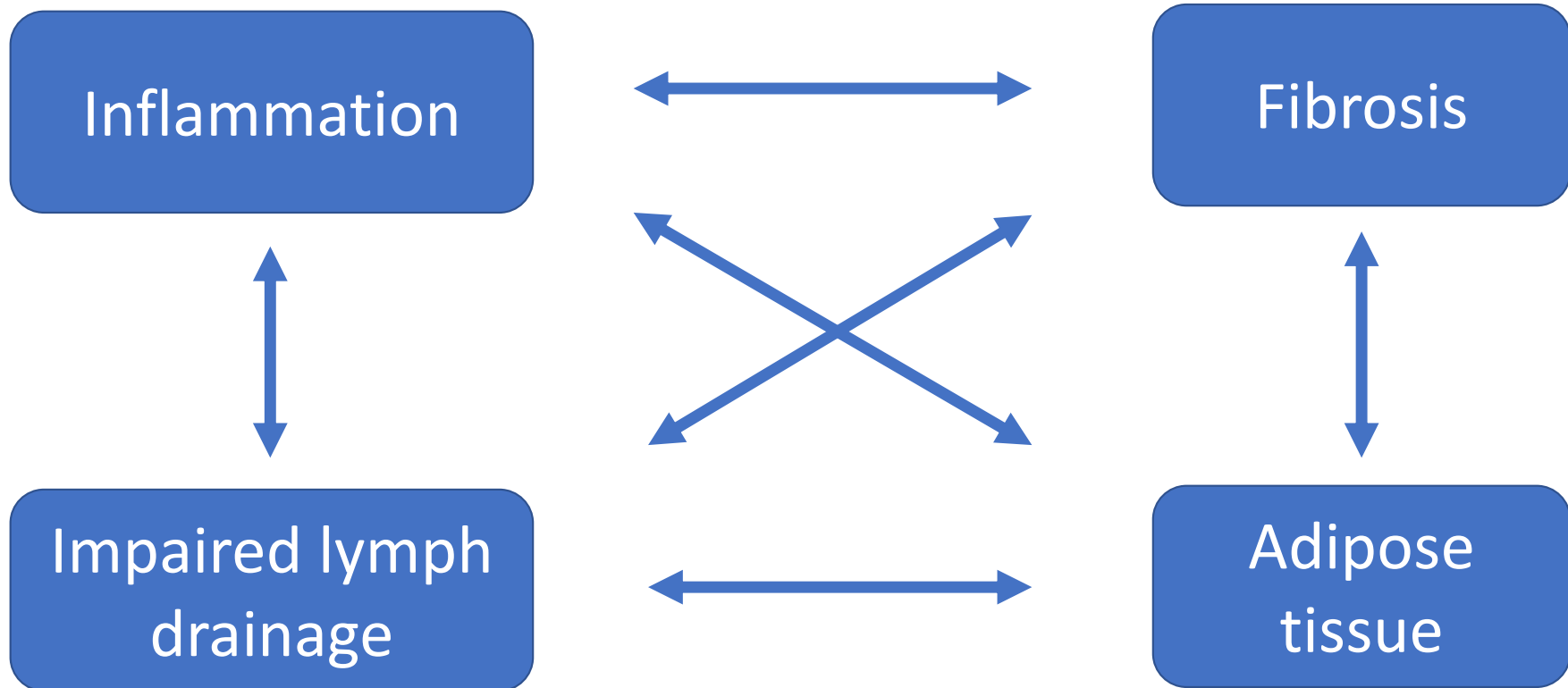
SOFT FAT



Lymphostatic, SAT

(Gardenier 2016, Ly 2017)

# INFLAMMATORY VICIOUS CYCLE



(Azhar 2020)

# TYPES OF UPPER BODY FIBROSIS

- Lymphostatic Fibrosis
- Surgical Scar
- Radiation Fibrosis
- Cording
- Seroma Fibrosis
- Fat Necrosis
- Wound Bed Fibrosis
- Post-Cellulitis Fibrosis



Image credit: © Karen Ashforth

# TYPES OF LOWER BODY FIBROSIS

- Lymphostatic Fibrosis
- Lipodermatosclerosis
- Dermal fibrosis
- Post-Cellulitis fibrosis
- Wound bed fibrosis
- Surgical/trauma scar
- Radiation Fibrosis
- Post-thrombotic syndrome



Image credit: © Karen Ashforth

# FIBROSIS TYPES: FAT DISORDERS

- Inflamed SAT (Subcutaneous adipose tissue)
- Nodular fibrosis and lipomas



Image credits: © Karen Ashforth



# INFLAMED SAT

- Diseased fat tissue
- Unique to Lipedema, Dercum's disease, Madelung disease and FML
- Estrogen, weight gain, inflammation
- Leaky/dilated vasculature/lymphatics
- Painful, easy bruising
- Increased macrophages
- Adipocyte hypertrophy

(Herbst 2021, 2019, Al-Ghadban 2019, Beltran 2019)



# INFLAMED SAT EFFECTS

- Forms progressive dense fatty fibrosis
- Attaches to skin, bones, muscles, tendons and ligaments
- Vicious cycle: inflamed fat > fibrosis > more abnormal fat tissue
- SAT blocks circulation > increases swelling and compresses nerves > PAIN

(Herbst 2021)

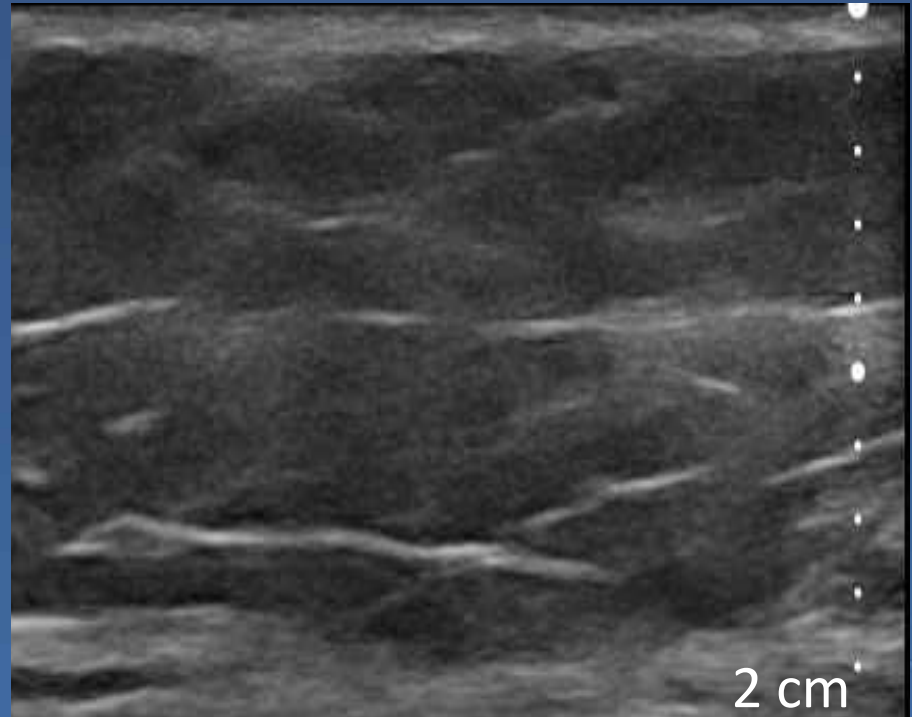
# LIPEDEMA ANTERIOR THIGH



Dermis

SAT

“Dancing”  
fascia  
lines



2 cm

Image credits: © Karen Ashforth

# EFFECTIVE DIFFERENTIATION TOOL LIPEDEMA/LYMPHEDEMA (IKER 2019)

Lymphedema

Skin:

↑ thickness

↑ hypoechogenicity



Lipedema

Subcutaneous fat layer:

↑ thickness

↑ hypoechogenicity

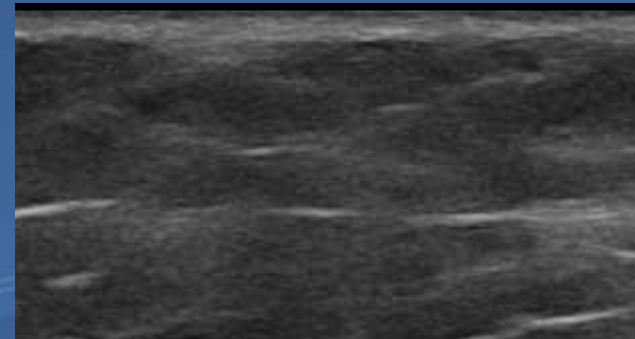


Image credits: © Karen Ashforth

# LIPDEDEMA FIBROSIS PROGRESSION

STAGE I



STAGE II



STAGE III



Image credits: © Karen Ashforth

# NODULAR FIBROSIS

- Nodules created by inflammatory SAT process
- Painful lumps range in size: grain of rice to walnut sized, or larger
- Lipomas: larger fatty nodules present in SAT disorders, FML common in Dercum's disease (Herbst 2021, 2019)



Image credit: © Karen Ashforth

# NODULAR FIBROSIS ANTERIOR THIGH



Image credits: © Karen Ashforth

# WHAT TO DO? PREVENTION IS BEST!

- Fibrosis is influenced by inflammation!
- Lower inflammation load
- Lower body mass
- Perform regular decongestion to prevent the formation of fibrosis
- Address fibrosis with anti-fibrotic modalities



# ANTI-INFLAMMATORY APPROACHES

- Risk reduction education
  - Diet, drugs, supplements
    - Counseling
      - Complimentary and alternative medicine
        - CDT, lymphedema treatment

# INFLAMMATION RISK FACTORS

- High body mass (Greene 2020)
- Salt intake (Wenzel 2018)
- Alcohol intake (Bishehsari 2017)
- Processed foods, trans-fatty acids! (Mazidi 2017)
- Omega 6 fatty acids (Innes 2018)
- Sugar and grains (Della Corte 2018)
- Medication side effects (Tesar 2018)
- Emotional stress (Maydych 2019)

## DIGESTION AND INFLAMMATION:

- Unique inflammatory factors
- Gastric inflammation, food allergies:, mast cell influences
- Drugs, supplements
- Blood/skin tests, elimination diet
- Keto diet (Keith 2019)
- Lymphedema and Lipedema Nutrition Guide (Erhlich 2016)
- Mediterranean diet (DiRenzo 2021)
- Whole 30 (Smith 2017)

*Work with  
qualified  
professionals!*

# FIBROSIS TREATMENT (NON-SURGICAL)

- Manual therapy

  - Modalities

    - Anti-fibrotic compression garments

    - Pneumatic compression

*Work with  
qualified  
professionals!*

## ANTI FIBROTIC MANUAL TECHNIQUES

SAT therapy

Anti-fibrotic MLD

MLD massage tools

Traction-assisted

MFR (myofascial release)

A/AA/PROM with/without release

Neural tension techniques

# SAT THERAPY STUDY RESULTS:

- Decreased leg volume
- Decreased fat measured by DEXA (gold standard)
- Ultrasound imaging showed improved SAT tissue structure
- Subjective improvements in pain, body sensation, body temperature, movement, restless legs, clothes fit looser
- Treatment side effects: pain, itching, swelling, bruising, GERD
- All subjects would recommend this treatment

(Herbst 2017)

# MLD ALTERNATIVES: MASSAGE TOOLS



Paint rollers



Padded rolling pin



Vibrator



Facial roller



Dry brush

# TRACTION-ASSISTED MANUAL TECHNIQUES



Elastic exercise band



Dycem



Gardening, kitchen,  
donning gloves

Image credits: © Karen Ashforth



# MODALITIES

Positive pressure

Negative pressure

Light therapy

Thermal modalities

Ultrasound

Microcurrent, PEMF

Vibration

Dry needling, Silicone Scar Gel

Extracorporeal Shock Wave Therapy?

Ultrasound Cavitation?

*Work with  
qualified  
professionals!*

# IASTM: *AGGRESSIVE! GUIDANCE NEEDED!*

Instrument-assisted soft tissue mobilization also called:

- GUA SHA
- SASTM
- GRASTON
- ASTYM



(Seffrin 2019, Kim 2017)

Image credit: © Karen Ashforth

# IASTM: INSTRUMENT ASSISTED SOFT TISSUE MOBILIZATION

## *AGGRESSIVE! GUIDANCE NEEDED!*

- Can create bruising, petechiae (broken blood vessels)
- Increases inflammation, fibroblast and fibronectin numbers > synthesis and realignment of collagen
- Reduces pain, increases ROM, increases temperature
- Evolving research: most based on animal models, sports medicine, case studies
- Potential to “break down” and remodel fibrosis

(Cheatham 2019, Kim 2017)

# IASTM: *AGGRESSIVE! GUIDANCE NEEDED!*

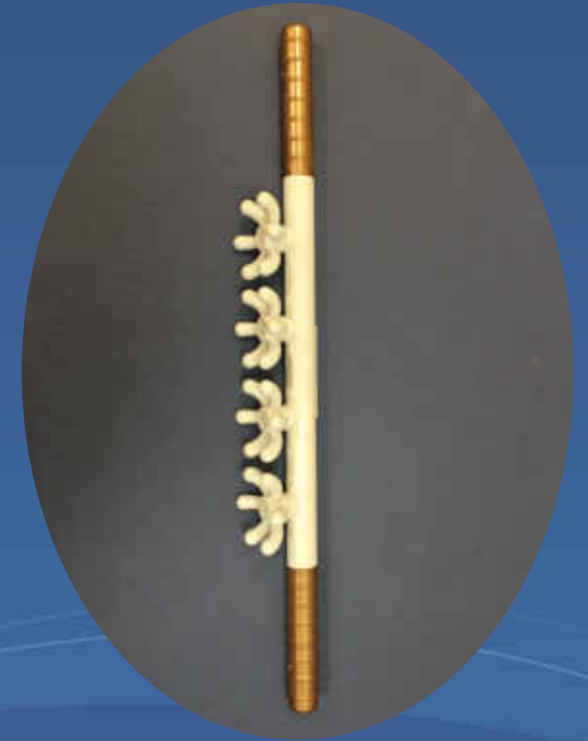


Image credits: © Karen Ashforth

# IASTM CONTRAINDICATIONS

- Acute injury/infection/contagion
- Skin rash, wound, blister, bruise
- Unknown insect bite
- Osteoporosis, advanced
- Unhealed/unstable fracture
- Myositis ossificans
- Acute/severe cardiac, liver, kidney disease, uncontrolled CHF
- Unstable epilepsy
- Severe pain or severe skin response petechiae/ecchymosis
- Treatment over surgical hardware
- Malignancy, tumor
- Uncontrolled HTN
- Circulatory, bleeding disorders
- High risk pregnancy
- Connective tissue disorder (EDS)
- Direct pressure on face, nerves, vasculature, bony prominences

(Cheatham 2019)

# IASTM PRECAUTIONS

- Patient age
- Flu or flu-like symptoms
- Cancer
- HTN, CHF, circulation disorders
- Acute inflammatory symptoms
- Burn scars
- Post steroid injection
- Unhealed fractures
- Treatment around devices (pacemaker, insulin pump)
- DM, kidney dysfunction  
(Cheatham 2019)
- Pt intolerance, hypersensate, insensate, high pain due to injury
- Anti-coagulants, hormone replacement, antibiotics
- NSAIDS, steroids, narcotics
- Osteoporosis, varicosities
- Autoimmune disorders, RA, RSD, CRPS, polyneuropathy
- Body art
- Pregnancy
- Allergies to tools, latex, cream

# NEGATIVE PRESSURE

## *AGGRESSIVE! GUIDANCE NEEDED!*

- Can create bruising, petechiae
- Horizontal and vertical stretching
- Creates local external tissue pressure that is lower than internal tissue pressure
- Mechanical tissue lengthening
- Activates fibroblasts
- Facilitates uptake of fluid in initial lymphatics

(Donahue 2021 Gott 2018, Jamalain 2017)

# MANUAL/MECHANICAL SUCTION *AGGRESSIVE! GUIDANCE NEEDED!*



Pumped cups



Silicone cups



Mechanical suction

Image credits: © Karen Ashforth



# MECHANICAL SUCTION *AGGRESSIVE! GUIDANCE NEEDED!*



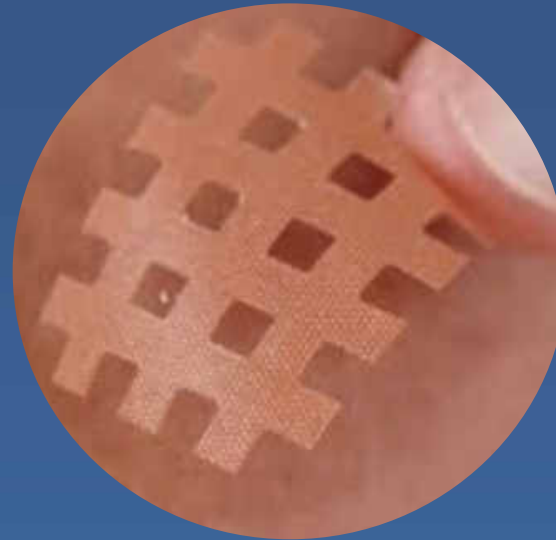
Cosmetic Cupping Machine



Medical cupping machine

Image credits: © Karen Ashforth

# ELASTIC TAPING: *GUIDANCE NEEDED!*



Tape can irritate skin, especially with mast cell issues

Elastic tape

Cross pre-cut tape

Tawfik 2018, Karwacińska 2012

Image credits: © Karen Ashforth

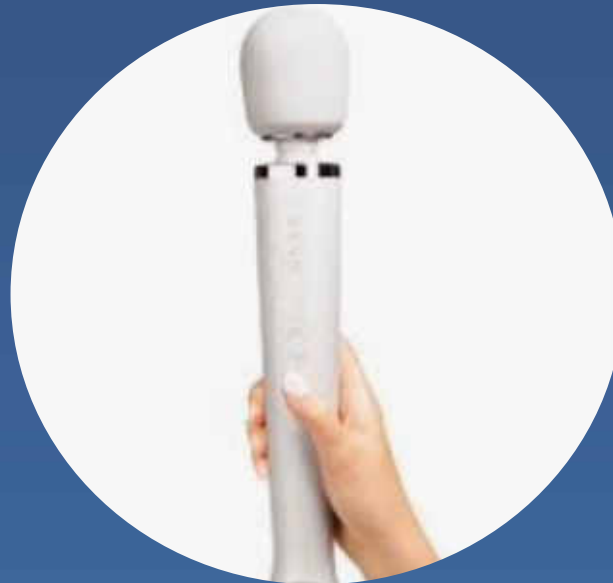
# HAND HELD VIBRATION

- Breast cancer: improved ROM (abduction, external rotation), grip strength, reduced fatigue (Kneis 2018)
- Breast cancer: decreased pain, increased ROM, decreased pectoral muscle spasm, improvement in DASH score (Celletti 2017)
- Improved scar tissue, decreased pain (Uher 2018)
- BCRL: MLD with deep oscillation (Hivamat), analgesic, reduced lymphedema, increased shoulder ROM (Kashilska 2015)

# HAND HELD VIBRATION



Hivamat



Wand vibrator



Mini vibrator

Image credits: © Karen Ashforth

# SCALP VIBRATION MASSAGERS



Image credits: © Karen Ashforth

# PERCUSSIVE VIBRATION MASSAGER AGGRESSIVE! GUIDANCE NEEDED!



Increased ROM, decreased pain (Konrad 2020)

Image credits: © Cam Ayala, Lesli Bell, used with permission

# WHOLE BODY VIBRATION (WBV) CONTRAINdicATIONS: USE WITH GUIDANCE

- Improved MLD effects lipedema (Schneider 2018)
- Improved dependent leg edema (Tsuchiya 2020)
- Survey of studies inconclusive, one showed improved muscle strength, balance, neuropathic pain in chemotherapy induced neuropathy (Verhulst 2015)
- Decreased pain, increased muscle contraction in static and dynamic activity, improved conditioning athletes (Sharma 2021)
- Clinical resource and general protocols  
(Albasini 2010)

# WHOLE BODY VIBRATION PLATES AND PLATFORMS



Image credits: © Karen Ashforth



# WBV INDICATIONS:

- Osteopenia, sarcopenia
- CVA
- Parkinson's disease
- Diabetes
- Fibromyalgia
- Low back pain
- Injury prevention
- Deficits in balance and strength (Albasini 2010)

# WBV CONTRAINDICATIONS:

- Pregnancy
- Venous thrombosis, PVD
- Serious cardiovascular disease
- High blood pressure, recent MI
- Pacemaker, artificial heart valve
- Recent surgery, trauma, fracture
- Hip, knee, joint fusion implants
- Recent pins, plates, IUD
- Acute hernia
- Kidney disease, epilepsy
- Aortic aneurysm
- Discopathy, disc herniation
- Spondylolysis
- Severe diabetes
- Recent infection
- Severe migraine
- Malignant tumor
- Organ failure, retinal detachment
- Bowel/bladder incontinence
- Brain/spinal cord stimulators
- Impaired sensation, cognition  
(Albasini 2010, Merriman 2009)

# ANTI FIBROTIC COMPRESSION GARMENTS: not just for pain and swelling!

- Types: elastic, quilted
- Textured micro massage to skin
- Low profile v bulky compression
- Increase effects with external pressure: bandages, elastic compression, Velcro wraps, and pneumatic compression
- Containment for bulkier tissues



Photo credits © Solaris,  
used with permission

# ELASTIC COMPRESSION



Textured circular knit  
Non-medical grade



Custom flat knit

Photo credits © Solidea Medical, Essity,  
used with permission

# CHIP FOAM COMPRESSION

- Low profile: noodle foam, channeled foam, orange foam
- The bulkier the foam, the greater the effects
- Bulky: chip foam pads or garments
- Cherry pit pads or garments (caution: aggressive!)
- Waffle foam (poor choice: flattens)

# QUILTED FOAM PADS

## CHERRY PIT PADS (Ashforth 2011)



Photo credits: Solaris, Essity/BSN Jobst, used with permission

# QUILTED CHIP FOAM GARMENTS



Photo credits: Solaris, Essity/BSN Jobst  
used with permission

# QUILTED PIT GARMENTS



Photo credits: Essity/BSN Jobst, used with permission



# CHANNELED FOAM



Image credit: © Karen Ashforth

# SPAGETTI FOAM + GREY FOAM



Image credit: © Karen Ashforth

# CHIP FOAM STRIPS AND PADS



Image credit: © Karen Ashforth

# PNEUMATIC COMPRESSION

# EVIDENCE: PNEUMATIC COMPRESSION TREATMENT

- Decreases pain (Honigman 2016)
- Decongests swelling in lipedema (Szolnoky 2008)
- Decrease capillary fragility in lipedema (Szolnoky 2008)
- Higher pressures more effective for decongestion, especially in the presence of sub-dermal fibrosis (Zaleska 2019, Olszewski 2013)

# PROGRAMING AND PRESSURE

- Start with lower pressures and gradually titrate upward depending upon tolerance
- Optimal pressure depends upon comfort, body mass, degree of fibrosis
- Peristaltic/wave mode well tolerated: no sustained pressure at hands and feet (can modify: offload pressure)
- Absence of sustained pressure at hands/feet increases tolerance for greater proximal pressure
- Many prefer sequential mode “weighted blanket effect”

# BILATERAL UE/TRUNK



Image credit: © Karen Ashforth



Image credits: © Biocompression, Lympa Press used with permission

# LOWER BODY/ABDOMEN/GENITALS



Caveat: Not all systems effectively treat genitals



# BARIATRIC LOWER BODY/ABDOMEN/GENITALS



Image credits: © Karen Ashforth

# POST-SURGICAL FIBROSIS

- Partner with a knowledgeable therapist to prepare for surgery and plan post-surgical care
- Address post-surgical swelling with compression
- Chip foam pads and garments help swelling, fibrosis, can pick up slack with post-surgical reduction
- Allow tissues time to heal before starting any aggressive manual treatment directly over incisions
- Cold laser for healing cannula incisions, softening scars
- Silicone scar tape evidence-based

# GOALS FOR TREATING FIBROSIS

- Decrease symptoms of SAT and fibrosis: pain, swelling, immobility, decreased function
- Compensate for fibrotic tissue damage
- Promote tissue remodeling and healing
- Lower inflammatory burden to prevent fibrosis formation/maturation/progression
- Maximize function and quality of life

# CONTACT INFORMATION

[www.karenashforth.com](http://www.karenashforth.com)



**FAT DISORDERS**  
RESOURCE SOCIETY

**FDRS 2022**  
**April 22-24**  
Intercontinental Hotel Cleveland (at Cleveland Clinic)  
Cleveland, OH