

# The “Other” Practice: Lymphedema & Lipedema –

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Program Director Vascular Fellowship



UT Health  
San Antonio

# Objectives

Differentiate Lipedema from Lymphedema  
Differential diagnosis  
Basic evaluation  
Treatment pathways

I have no disclosures



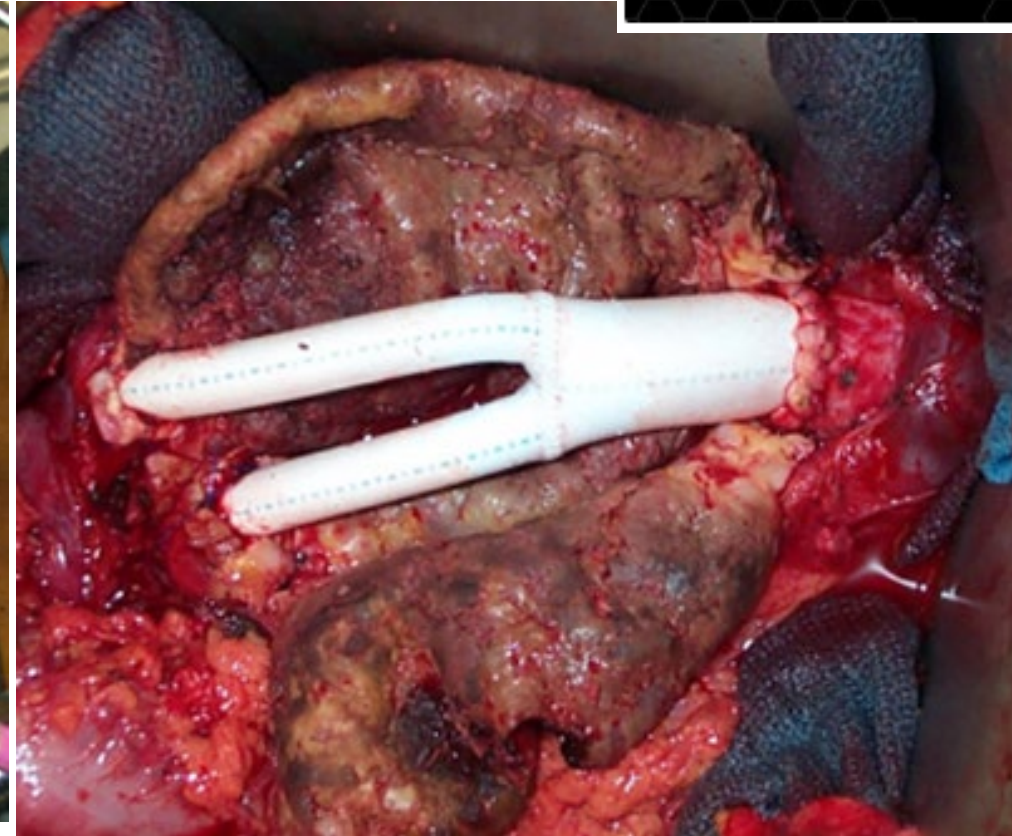
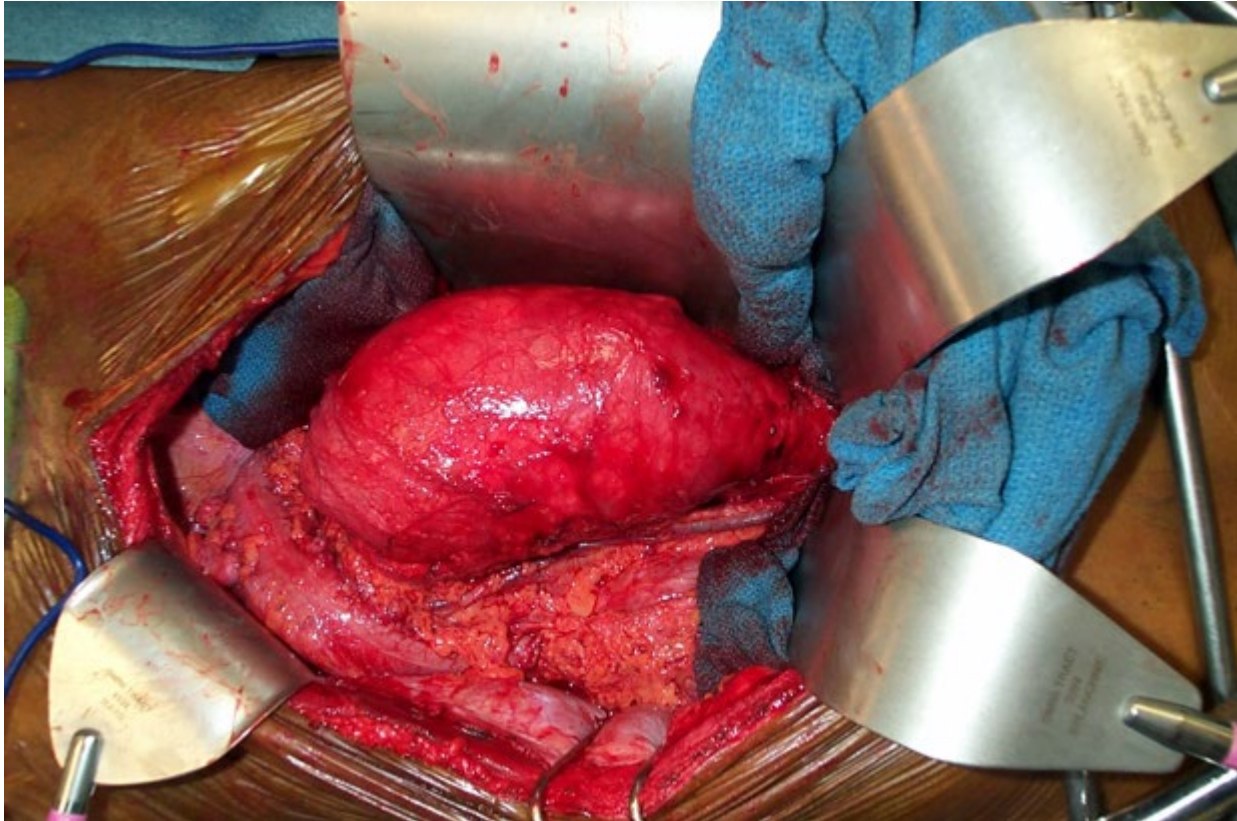
**What  
you  
want**



**What  
you  
get**



# What You Imagine Life to Be Like



# What Comes to Clinic.....





## Consult: Leg Swelling/Edema

**Cardiac, Hepatic, Renal** (trinity)

**Lymphedema** (primary/secondary)

**Lipedema**

**Complex Regional Pain** (RSD)

**Tumors / Outflow obstructions** (Malignant or nonmalignant pelvic surgery/ ligation / thrombosis / XRT fibrosis)

**Obstructive Sleep Apnea**

**Medicines** (Ca<sup>++</sup> Channel Blockers Amlodipine classic)

**Immobility** – Gravity/ loss calf muscle pump

**Orthostatic Edema**

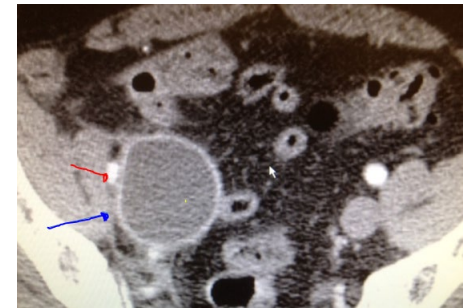
**Abnormal Postural Veno-arterial Reflex**

**Thyroid (myxedema) Endocrine (Cushing)**

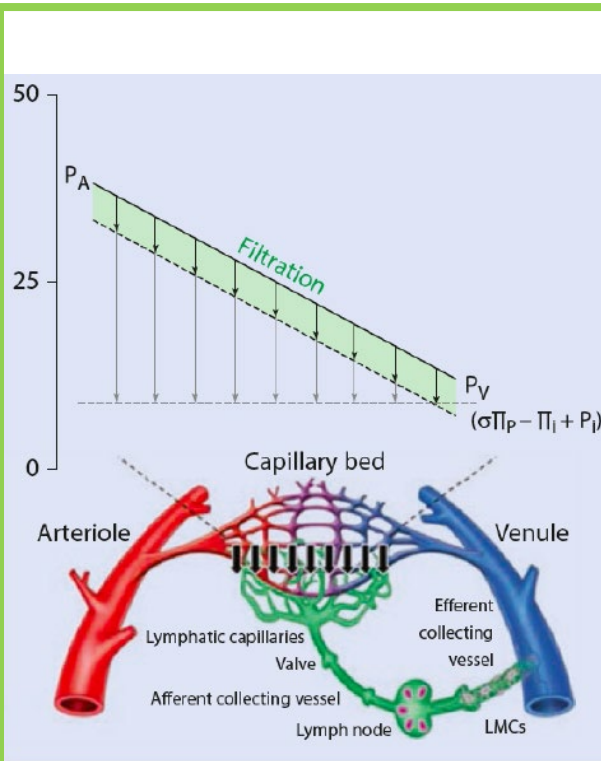
**Infectious / Inflammatory**

**Trauma/Crush/Insect bites**

LIFE IS LIKE A BOX OF  
**CHOCOLATES**  
YOU NEVER KNOW WHAT YOU'RE GONNA GET!

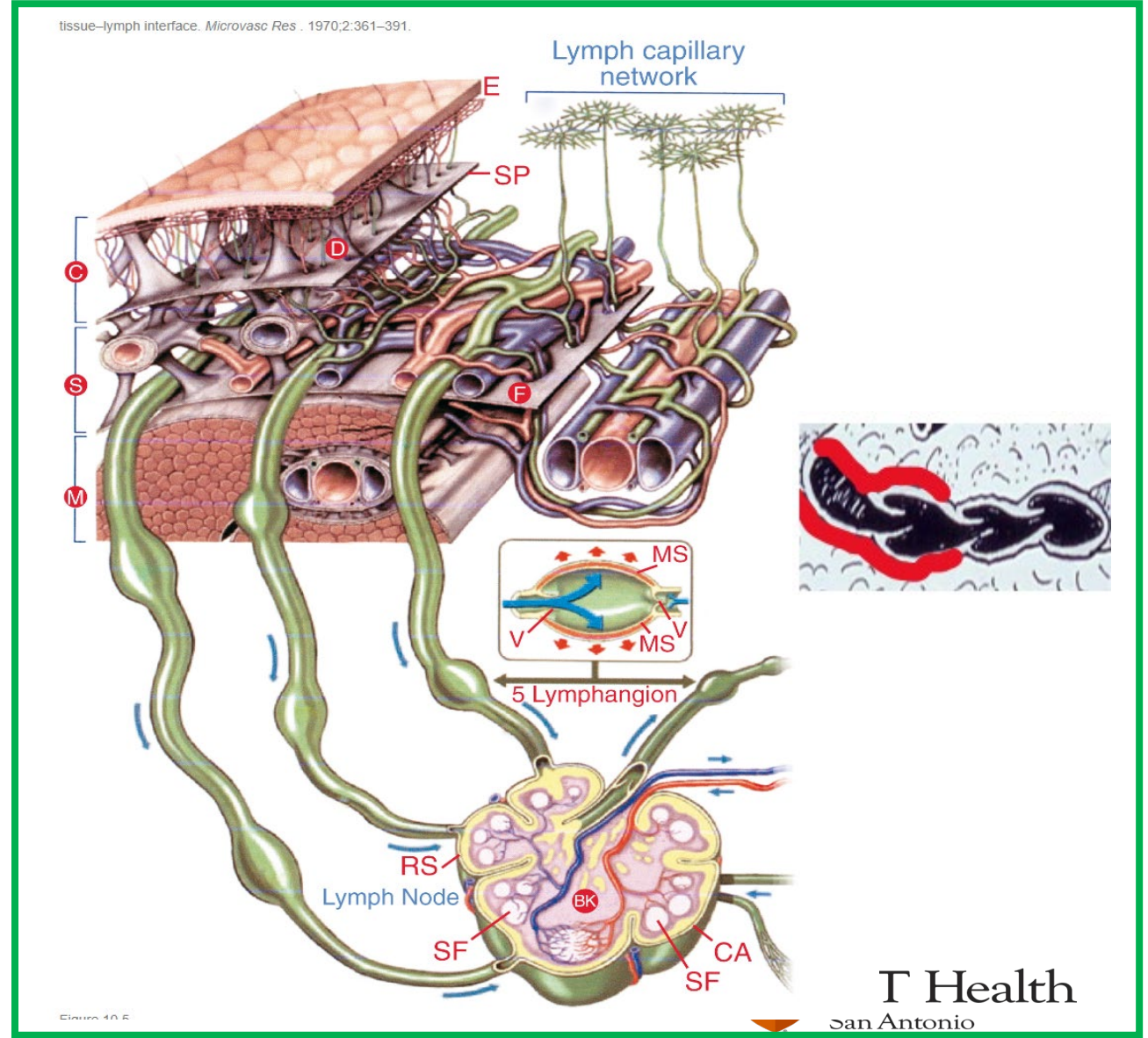
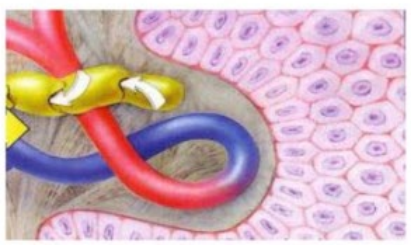


# UPDATE : The New Theory of Starling 2010

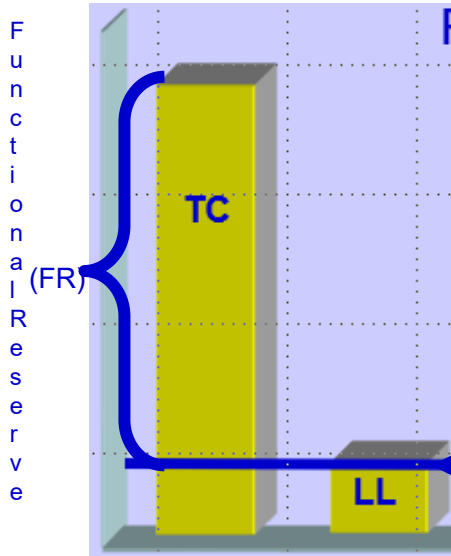


Rossitto, G., Sneddon, M., & Rockson, S. G. (2019). The lymphatic system. *Textbook of Vascular Medicine*, 45-57. doi:10.1007/978-3-030-16481-2\_5

- We now know that 0% of interstitial fluid is reabsorbed back into the venous end of the blood capillaries
- We now know that the lymphatics manage 100% of the interstitial fluid load



# Origin of Edema – Think Etiology



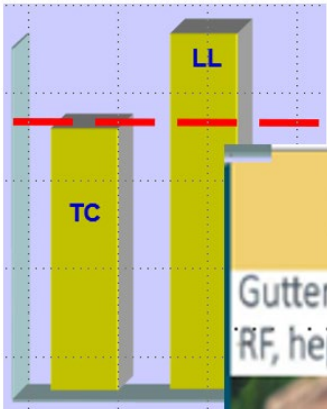
- **Transport Capacity (TC)**

The max amount of lymph transported with the Lymphatic system working as hard as possible in a given length of time

- TC is normally higher than the normal amount of LL produced

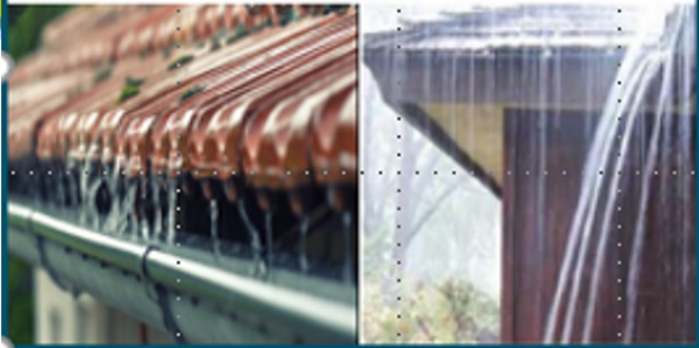
*Contraction Frequency of Lymph Collectors*

## Dynamic Insufficiency

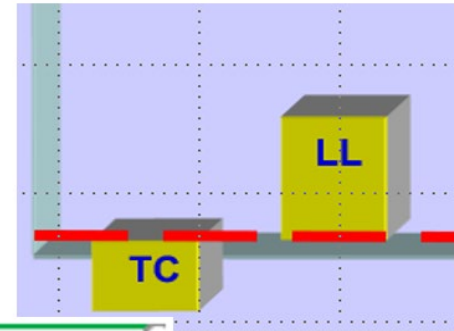


### OVERPRODUCTION but Normal Transport

Gutters work, too much fluid produced; CHF, HF, hepatic dysfunction, ect

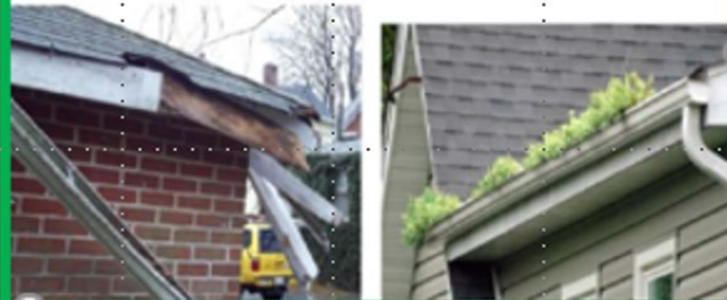


## Mechanical Insufficiency



### Normal Production but Damaged Transport

Normal lymphatic production, gutters damaged; trauma; radiation; congenital malformation, ect.



Causes:

- Surgery
- Radiation
- Infections
- Trauma
- Congenital malformation

# Lymphedema Classification

## Primary

Congenital < 1 yo  
(Milroy)  
20%: 5-10K

Precox 1-35yo  
(Meige's)  
70%: 30K

Tarda >35 yo  
(10%: 5K)



Fannie Mills, born 1859 with Milroy Disease

## Secondary

Parasitic: #1  
cause in world  
filariasis

★  
Surgery  
Trauma  
Radiation

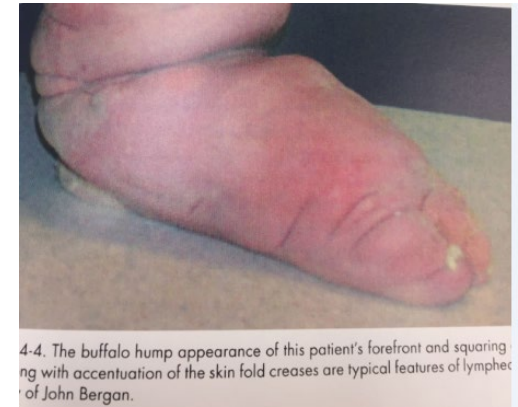
Phlebolymphe<sup>dema</sup>

# Diagnosis Physical Exam



**Figure 6a,b.** "Stemmer's Sign" is a diagnostic sign for lymphedema. A positive Stemmer's sign is the inability to pinch a fold of skin at the base of the toes. This 37-year-old woman has primary lymphedema. Her Stemmer's is positive on the left foot (b) but negative on the right (a). Note the creases from compression stockings on her left ankle and the loss of vascular markings, all indicative of subtle lymphedema.

Non-pitting edema  
 + Stemmer's sign  
 Involves the dorsum foot and toes  
 Buffalo Hump  
 "Squaring or Boxcar" toes



4-4. The buffalo hump appearance of this patient's forefront and squaring with accentuation of the skin fold creases are typical features of lymphedema. © John Bergan.



**FIG 56.2** Clinical findings in lymphedema. (A) Typical "swollen sausage" appearance of the toe. Lymphedema is usually most severe in the distal limb. (B) When lymphedema involves the leg, the toes and feet are almost always affected.



Foot involvement with squaring of the toes

**TABLE 56.1 Stages of Lymphedema**

	<b>Fibrosis</b>	<b>Pitting</b>	<b>Elevation</b>	<b>Skin</b>
Stage 0 (latent or sub-clinical condition)	None	None	No effect	No change
Stage 1 (early protein rich fluid accumulation)	None or minimal	May be present with pressure	Reduces edema	No change
Stage 2 (initial fibrosis development)	Moderate	May be present	Minimal to no reduction	Early changes
Stage 3 (marked fibrosis)	Substantial	None to minimal	No reduction	Marked trophic changes



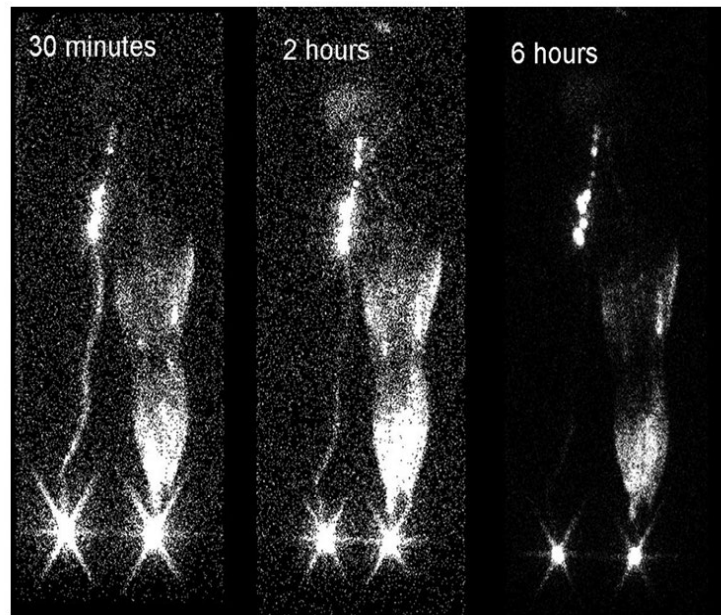
**Orthostatic Edema**

**Early – Pitting  
Late Non-Pitting**

**Elephantiasis w/ severe fibrosis; warty Papillomas; fat deposition**



# Lymphoscintigraphy vs. ICG






**FIG 56.5** Lymphoscintigram (anterior view) in patient with left leg secondary lymphedema obtained 30 minutes, 2 hours, and 6 hours after injection of radionuclide shows significant uptake asymmetry. Isotope quickly reaches ilioinguinal lymph nodes via a single lymphatic channel on the right. Marked dermal back-flow is noted on the left without reaching the ilioinguinal lymph nodes. By 6 hours, isotope transit from the injection site is completed on the right; dermal backflow persists on the left.

Once recognized as gold standard  
Avoided secondary to causing infection  
Not available in many institutions  
**“DERMAL BACK-FLOW”**



Article

## Lymphoscintigraphy versus Indocyanine Green Lymphography—Which Should Be the Gold Standard for Lymphedema Imaging?

Brian A. Figueroa , Jacob D. Lammers , Mazen Al-Malak, Sonia Pandey  and Wei F. Chen \*

Department of Plastic Surgery, Cleveland Clinic Foundation, 9500 Euclid Avenue, Desk A60, Cleveland, OH 44195, USA

\* Correspondence: chenw6@ccf.org

**Abstract:** Early detection and treatment can slow the progression of lymphedema. To diagnose lymphedema in the subclinical phase, a sensitive imaging modality is required. Radioisotope-based lymphoscintigraphy (LSG) has been the “gold standard” for a century. Indocyanine green lymphography (ICGL) is being used at our institute for diagnosing and grading all lymphedema patients. In this study, ICGL disease detection rate was compared to that of LSG. Chart review of all patients who presented for lymphedema consult between February 2020 and April 2022 was conducted. Patients who underwent both LSG and ICG for extremity edema in symptomatic/asymptomatic limbs were included. A total of 50 limbs in 23 patients met the inclusion criteria. Of those, 37 were symptomatic and 13 were asymptomatic. LSG detected lymphatic dysfunction in 26/37(70%) of the symptomatic limbs while ICG detected the same in 37/37(100%) limbs ( $p < 0.01$ ). In the asymptomatic group, LSG detected the disease in 1/13(8%) limbs while ICG detected lymphatic dysfunction in 8/13 (62%) limbs ( $p < 0.01$ ). LSG missed symptomatic limbs 30% of the time, whereas ICG did not miss any symptomatic limbs ( $p < 0.01$ ). LSG missed asymptomatic disease 54% of the time ( $p < 0.01$ ) compared to ICG. In conclusion, ICG lymphography was determined to have a higher lymphatic dysfunction detection rate compared to LSG.



ICG detected 100% of symptomatic & 70% of asymptomatic

Barriers cost & availability

Figueroa, B.A.; Lymphoscintigraphy versus Indocyanine Green Lymphography—Which Should Be the Gold Standard for Lymphedema Imaging? *Lymphatics* 2023, 1, 25-33. <https://doi.org/10.3390/lymphatics1010004>

# Common Medications that Cause Edema

CLASS	Names
Antidepressants	Monoamine oxidase inhibitors Trazodone
Hormones	Testosterone, Estrogen, Progesterone, Corticosteroids
Proton Pump Inhibitors	Omeprazole
Antivirals	Acyclovir
Nonsteroidal Anti-Inflammatory	Cox-2 Inhibitors, Ibuprofen Motrin
Antiseizure / nerve	Gabapentin, pregabalin
Chemotherapeutics	Cyclophosphamide
Antidiabetic agents	TZD's (Pioglitazone, rosiglitazone)
Antihypertensives	Beta & Ca <sup>++</sup> channel blockers, Clonidine, hydralazine, minoxidil

- Isocarboxazid (Marplan)
- Phenelzine (Nardil)
- Selegiline (Emsam)<sup>a</sup>
- Tranylcypromine (Parnate)

*Ovaries, breast, blood, retinblastoma*

- Avandia
- Pioglitazone hydrochloride\*
- Actos
- Rezulin

- Amlodipine (Norvasc)
- Diltiazem (Cardizem, Tiazac, others)
- Felodipine.
- Isradipine.
- Nicardipine.
- Nifedipine (Adalat CC, Afeditab CR, Procardia)
- Nisoldipine (Sular)
- Verapamil (Calan, Verelan)

Months to Years after starting

# Veno-arterial Reflex & Orthostatic Edema

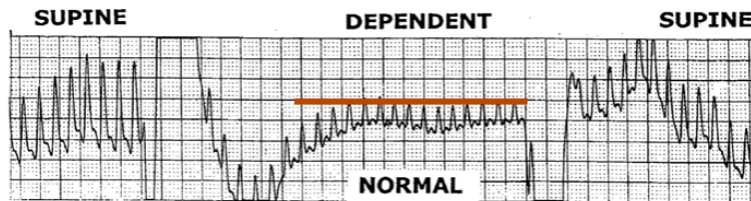


Vascular Medicine 2008; 13: 315-316

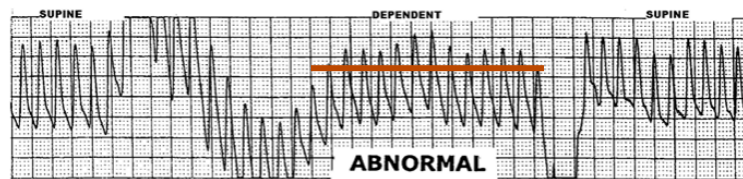
## Images in vascular medicine

### The venoarterial reflex

Suman Rathbun, P Jay Heath and Thomas Whitsett



Panel C



Panel D

Home > Orthostatic Disorders of the Circulation > Chapter

## Orthostatic Edema: Definition and Pathogenesis

David H. P. Streeten M.B., B.Ch., D.Phil., F.R.C.P., F.A.C.P.

Chapter

82 Accesses | 1 Citations | 1 Altmetric

orthostatic edema

Diagnoses (No results found)

### Abstract

Orthostatic edema is defined as a disorder characterized by edema that becomes detectable after a period of time (no more than 12 hr) in the sitting or standing posture and that disappears spontaneously in recumbency. Its occurrence does not depend on intrinsic cardiac, renal, hepatic, or obstructive venous disorders, nor is it associated with an abnormal tendency to retain fluids in recumbency. A specific maximal duration of orthostasis required for the development of manifest edema has to be included in the definition, as ankle edema may develop in individuals in robust health after more prolonged periods of sitting or standing. Thus, pitting edema was readily demonstrable at the ankles of six healthy passengers (three of them males) that I was able to examine at the end of a flight from various American cities to Copenhagen, *via* Amsterdam, which lasted 15–16 hr, in 1960. In unusually hot weather, too, it is common for persons in apparently good health to note some puffiness at the ankles after being on their feet all day. For this reason, orthostatic edema should be considered present when edema is evident after what might be considered a “normal” day’s activity, under



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## Postural Edema and Blood Pooling in Snakes

Harvey B. Lillywhite

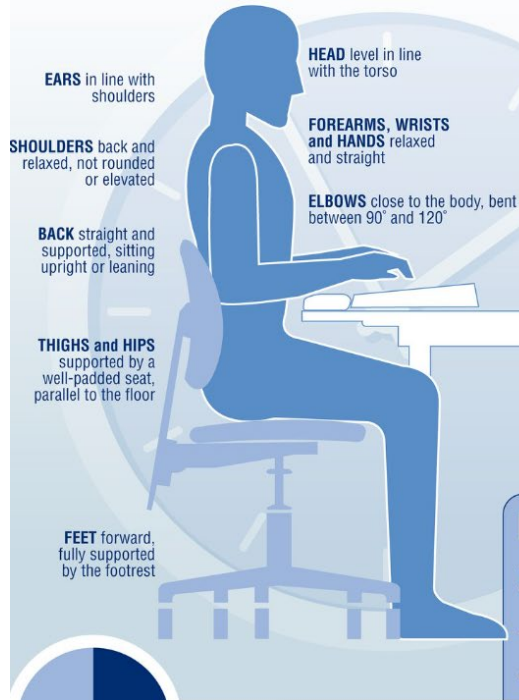


UT Health  
San Antonio

Ca<sup>++</sup> Channel Blockers  
Diabetics  
Spinal /neuropathy  
Leutal phase menstruation

# Sitting at WORK

While it may look harmless, sitting is a serious workplace health and safety issue



## Tips to get you out of your seat

- Try to decrease the amount of time you are sedentary by two to three hours over a 12-hour day.
- Find opportunities to incorporate daily physical activity.
- Use an alarm, app or smart watch to remind yourself to move around for one to three minutes every half hour.
- Stand up when using the phone if possible.
- Stand up and stretch frequently during the course of your day.

## Dangers of prolonged sitting

- Muscles are more likely to pull, cramp or strain
- Fatigue and tension in the back and neck muscles
- Steady compression on the spinal discs
- Decreased fitness
- Reduced heart and lung efficiency
- Digestive problems

## We spend more time Sitting at Work

	Low Activity Occupations	High Activity Occupations
2000		
1970		

## How employers can help

- Offer a variety of tasks to encourage physical movement.
- Consider providing workstations that allow a worker to do their work both in a sitting and standing work position.
- Support awareness by explaining the health hazards of prolonged sitting and how to improve working positions.
- Try walking or standing meetings.



More than half of an average person's day is spent being sedentary  
Sitting • Watching television • Working at a computer

**CCOHS.ca**  
Canadian Centre for Occupational Health and Safety

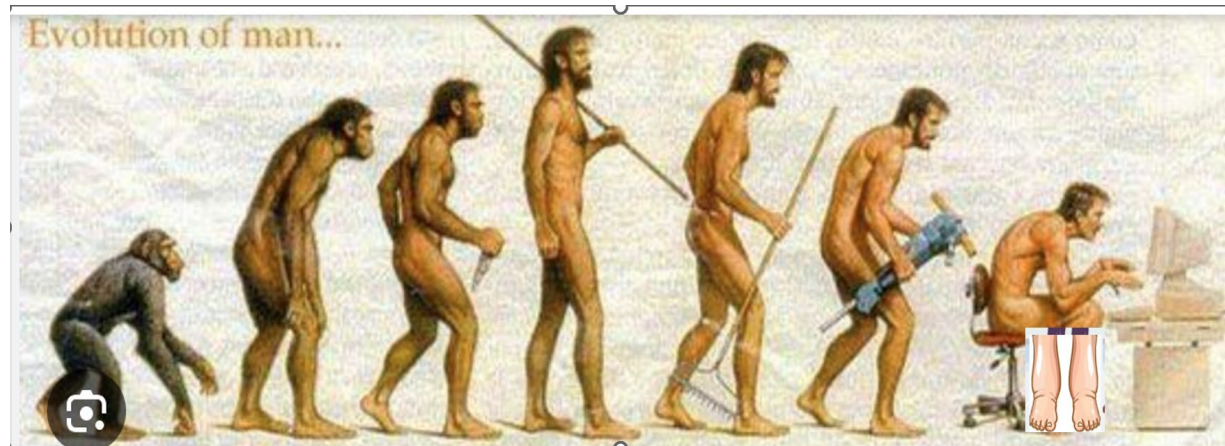


$$T^2 = \left( \frac{4\pi^2}{GM} \right) r^3 \rightarrow v = \frac{2\pi r}{T}; F = \frac{mv^2}{r} \quad \Phi = -\frac{GM}{r}$$

**GRAVITY**

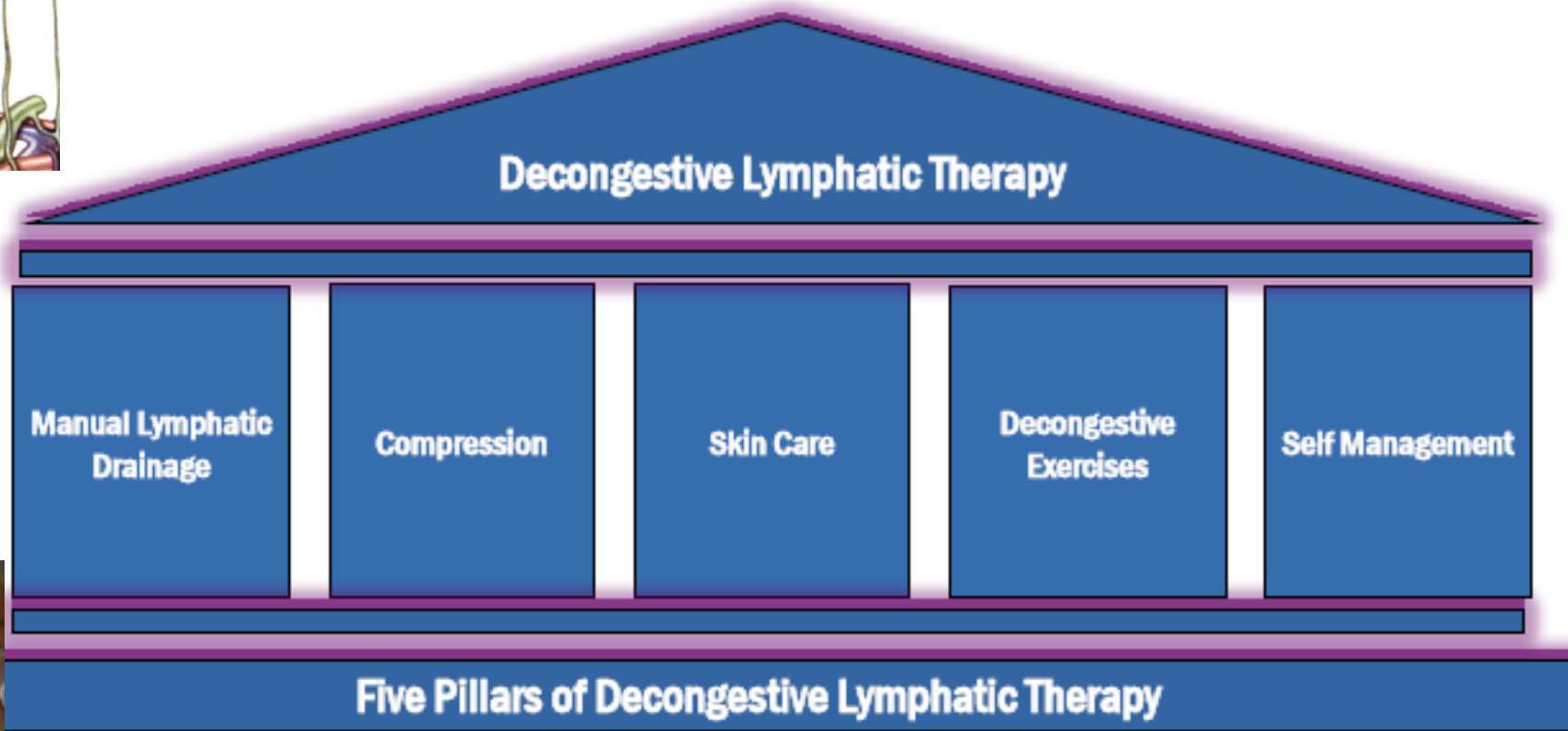
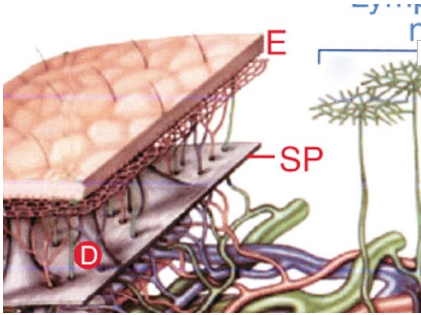
$$g = \frac{F}{M} \quad v^2 = \frac{Fr}{M} \quad \frac{2\pi^2 r^2}{T^2} = \frac{GMm}{r^2} \cdot r$$

$$F = \frac{GMm}{r^2} \quad g = \frac{GM}{r^2} \quad T^2 = \left( \frac{4\pi^2}{GM} \right) r^3$$



Health  
tonio

# *Lymphedema, Edema & Lipedema* *Treatment: Complete Decongestive Therapy- CDT*

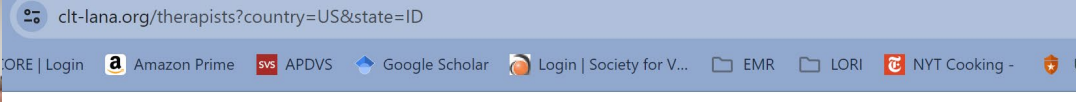


# Find someone Certified

Wrap Toes  
Stockinette  
Foam Padding  
Short Stretch



PT or OT background



Showing 1 - 10 of 17 LANA Certified Specialists

Print List

**Laura Townsend**  
PT CLT-LANA, PT  
**St. Luke's Rehab**  
1001 Bridgeway Place  
Eagle, ID 83616  
(208) 385-3500

**Katherine Quaglia**  
PT, DPT, OCS, CLT-LANA  
**St. Luke's Health system**  
1450 aviation drive  
Hailey, ID 83333  
(208) 727-8281



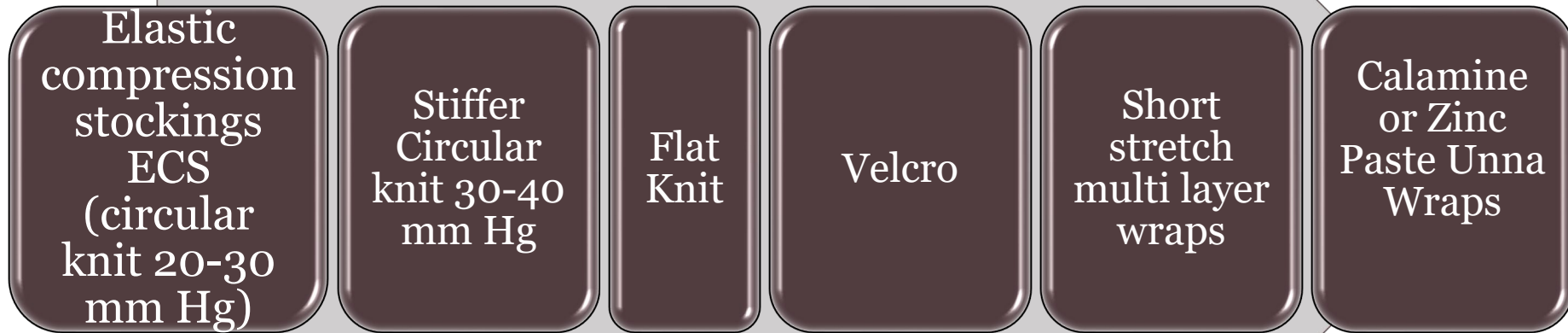
**Sarah L Armstrong**  
DPT, CLT-LANA  
**St Luke's Wood River Rehabilitation**  
100 Hospital Dr  
Ketchum, ID 83340  
(208) 727-8253

**Lindsey Schroeder**  
St. Luke's  
801 Pole Line Rd. W  
Twin Falls, ID 83301

BSN Comprilan Starting at: \$3.90	Lowest Price Short Stretch Starting at: \$3.90	L & R Residual K Short Stretch Bandage Starting at: \$4.43	SIGVARIS Bi Starting at: \$
BSN Isoband Starting at: \$9.50	L & R Idealbinde Starting at: \$10.20	Thusine Biflexideal Starting at: \$11.00	Juzo Short Stretch Bandage Starting at: \$77.54



# Compression Continuum

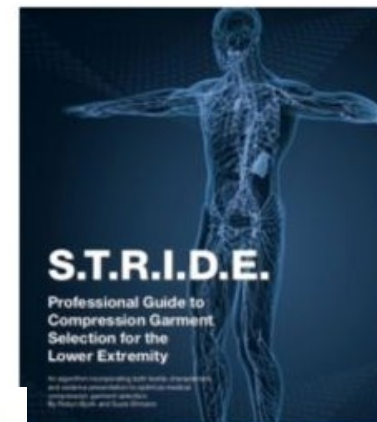


Additionally, there are guidelines that have been published with regards to the use of compression for those with peripheral arterial disease (PAD) or mixed disease (references at end of ppt):

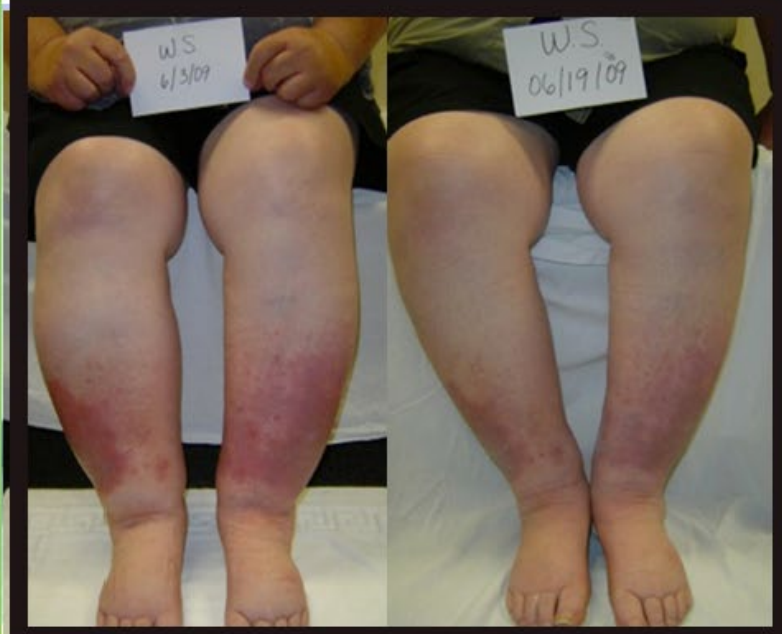
**A**  
**B**  
**I**

- ABI 1-1.4 - safe to use all levels of compression
- ABI 0.91 - 0.99 - safe to use all levels of compression
- ABI 0.8 - 0.9 - apply compression with caution (15-20, 20 to 30, 30-40mmHg)
- ABI 0.51 - 0.79 - modified inelastic compression with caution (absolute systolic ankle pressure should be >70mmHg. Short stretch/inelastic preferred/safer than elastic compression. Use reduced compression pressure (15-20, 20-30mmHg)
- ABI  $\leq 0.5$  - no compression

<https://www.magonlinelibrary.com/page/jowc/resources>



# Stages Lymphedema Pre/Post

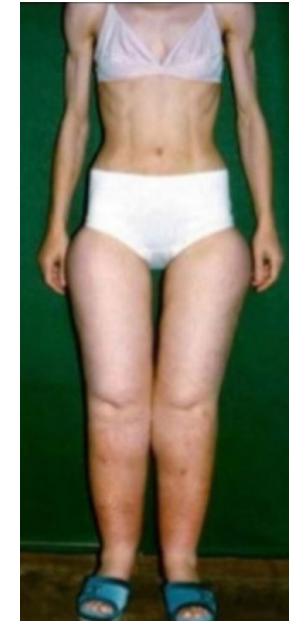


# Lipedema

Prevalence between 6% -8% population  
Up to 15-20% in Vascular Clinic patients

**Barriers to treatment include:**

- lack of knowledgeable
- difficulty self care
- mobility limitations
- social stigma
- anxiety & depression



<b>Lymphedema</b>	<b>Lipedema</b>
Women more than Men	Exclusively Women (or feminized males)
No excessive bruising	Bruising with slightest injury
Not painful (unless infection)	Painful to touch
Elevation resolves edema in early not late stages	Elevation resolves edema
Uni or Bilateral; Asymmetrical; involves foot	Bilateral; symmetrical; foot spared (ankle cut off sign)
Familial for primary only	Multiple generations of women in family affected
Abnormal lymphoscintigraphy	Normal pure lipedema but abnormal if secondary lymphedema

# Clinical Diagnosis

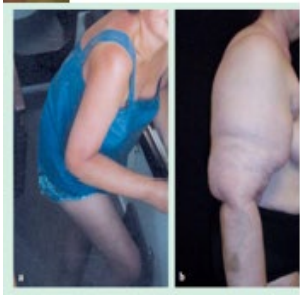
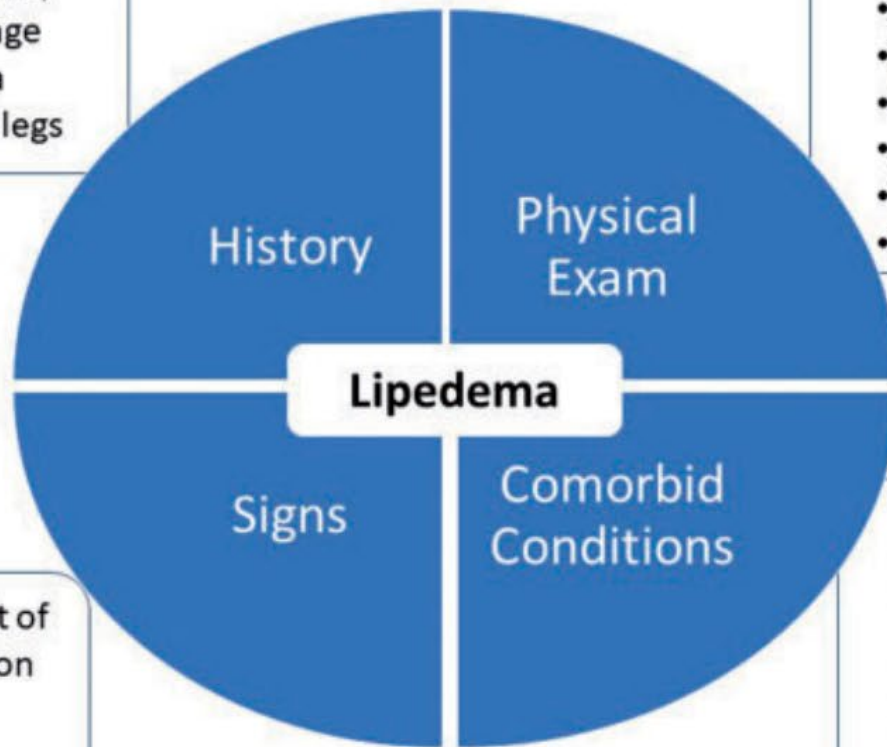


Figure 7-15)  
 a) Patient at age 51, no symptoms  
 b) Same patient at age 61, lipedema of the upper arms

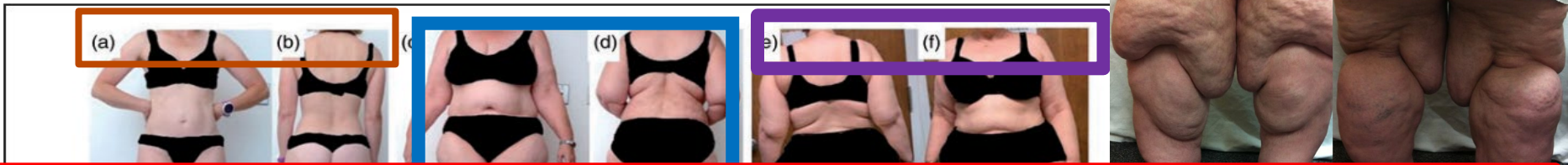
- Affected family members
- Begins at times of hormone, weight and/or shape change
- Difficulty losing lipedema tissue especially from the legs

- Persistent enlargement of the legs despite elevation
- Easy bruising and/or vascular fragility



- Disproportionately increased, loose connective (adipose) tissue on the limbs
- Symmetric tissue
- Palpable tissue nodules
- Painful tissue; not always
- Abdomen can be affected
- Limb swelling; pitting or non-pitting
- Hands and feet not affected\*

- Hypermobile joints
- Loss of tissue elasticity
- Lymphedema
- Non-lipedema obesity
- Metabolic disease in later stages
- Vascular disease



fatigue, tiredness  
swelling and fatty deposition worsening after puberty,  
pregnancies, contraceptive pills

- mobility limitations
- social stigma
- anxiety & depression

# Treatment for Lipedema



1. Complete Decongestion
2. Medications
3. Diet & Exercise
4. Liposuction
5. Support Groups
6. Contributing Factors (?)
7. Surgery special groups



DIURETICS should be avoided  
METFORMIN should be considered ( inhibits hypoxia-induced fibrosis)

Original Article

## Standard of care for lipedema in the United States

Karen L Herbst<sup>1,2,3</sup> , Linda Anne Kahn<sup>2,4</sup>, Emily Iker<sup>2,5</sup>,  
 Chuck Ehrlich<sup>2,6</sup>, Thomas Wright<sup>2,7</sup> , Lindy McHutchison<sup>2,8</sup>,  
 Jaime Schwartz<sup>2,3</sup>, Molly Sleight<sup>2,9</sup>, Paula MC Donahue<sup>2,10</sup>,  
 Kathleen H Lisson<sup>2,11</sup>, Tami Faris<sup>2,12</sup>, Janis Miller<sup>2,13</sup>,  
 Erik Lontok<sup>2,14</sup>, Michael S Schwartz<sup>2,15</sup>, Steven M Dean<sup>2,16</sup>,  
 John R Bartholomew<sup>2,17</sup>, Polly Armour<sup>2,18</sup>,  
 Margarita Correa-Perez<sup>2,19</sup>, Nicholas Pennings<sup>2,20</sup>,  
 Edely L Wallace<sup>2,21</sup> and Ethan Larson<sup>2,22</sup>

## Phlebology

Phlebology  
 2021, Vol. 36(10) 779-796  
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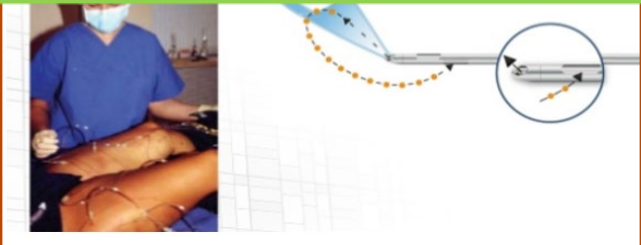


## Exercise

- Low impact aerobic exercises
- Underwater exercises
- General stretching
- Strengthening – progressive resistance – elastic bands, tubing



- Studies concluded that slowly progressive exercise modalities is not associated with the development or exacerbation of lymphedema such as aerobic and strengthening
- In patients with persistent systemic inflammation as seen in lipedema and lymphedema, regular exercise training lowers levels of pro-inflammatory cytokines



SQ adipose  
 constrict the  
 neuropathic pain

### oids

proper absorption  
 of vitamin C  
 length of the  
 help to prevent  
 and ruptures, while  
 a protective barrier  
 on  
 noids, diosmin  
 nce to twice a day



### tions

of vitamin deficiencies such as vitamin D,  
 B6  
 of homocysteine levels with high doses of  
 B6 and folate  
 minerals i.e. zinc, magnesium  
 ts & anti-inflammation – curcumin,  
 sveratrol, vitamin C

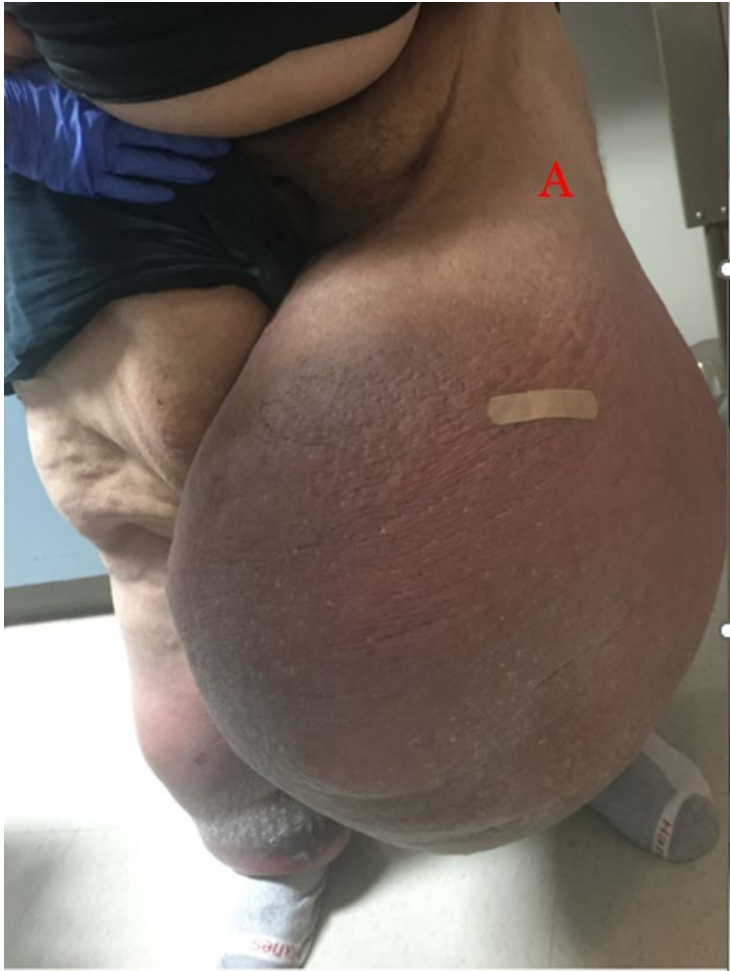


Imported From IE Google Scholar UTHSCSA Welcome! SURGERY Job

SHOP SPREAD THE WORD SCREENINGS MEDIA BLOG



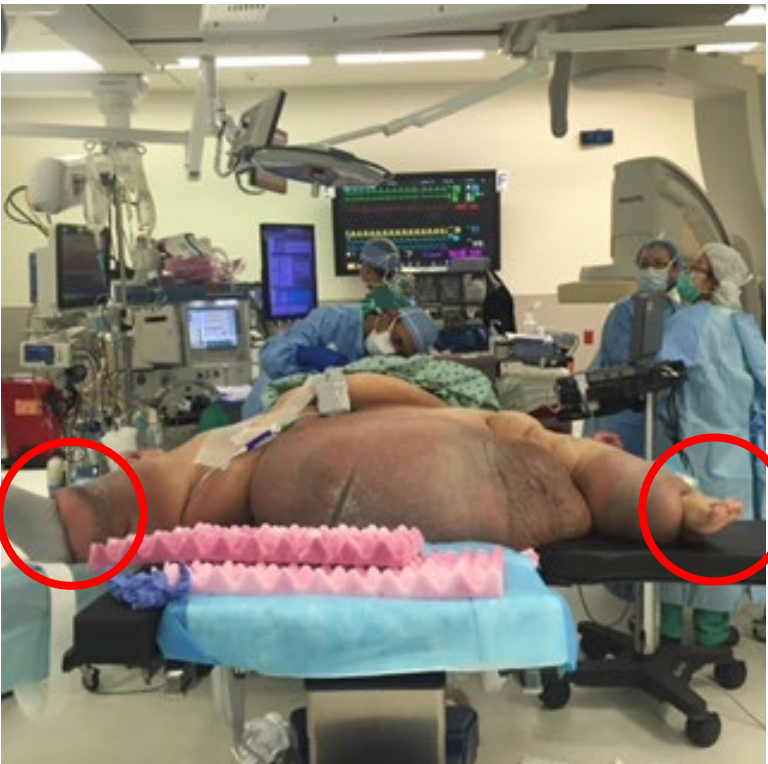
# Massive Localized Lobules



34 years old male with a 10-year history of a progressively increasing pendulous mass on left thigh  
Various trials at compression over the years. Worked full time, ambulatory

Morbidly obese Hypertension OSA  
Nonsmoker

# Intra Operative



# Conclusions

## Lipedema

Bilateral  
Hormonal  
Hereditary/Generational  
Painful  
Not “fat”  
Diagnosed on exam

## Lymphedema

Bilateral or Unilateral  
Not Hormonal  
Rare Familial  
NOT Painful  
? Associated Weight  
Other diagnostic tests

# Questions?

