# LOWER EXTREMITY LYMPHEDEMA ~

Management by Total Dermatofasciectomy and Skin Reconstruction with Integra



Marc E. Gottlieb, MD, FACS Phoenix, AZ

# Edema

Normal Tissue

Intracellular Edema

Interstitial Edema

(pitting)

Fibrosis & edema

(brawny)

venous hypertension
venous disease & stasis
heart failure
oncotic abnormalities
postural dependency
inflammation

## - 1 -

**Edema Due to Increased Formation**

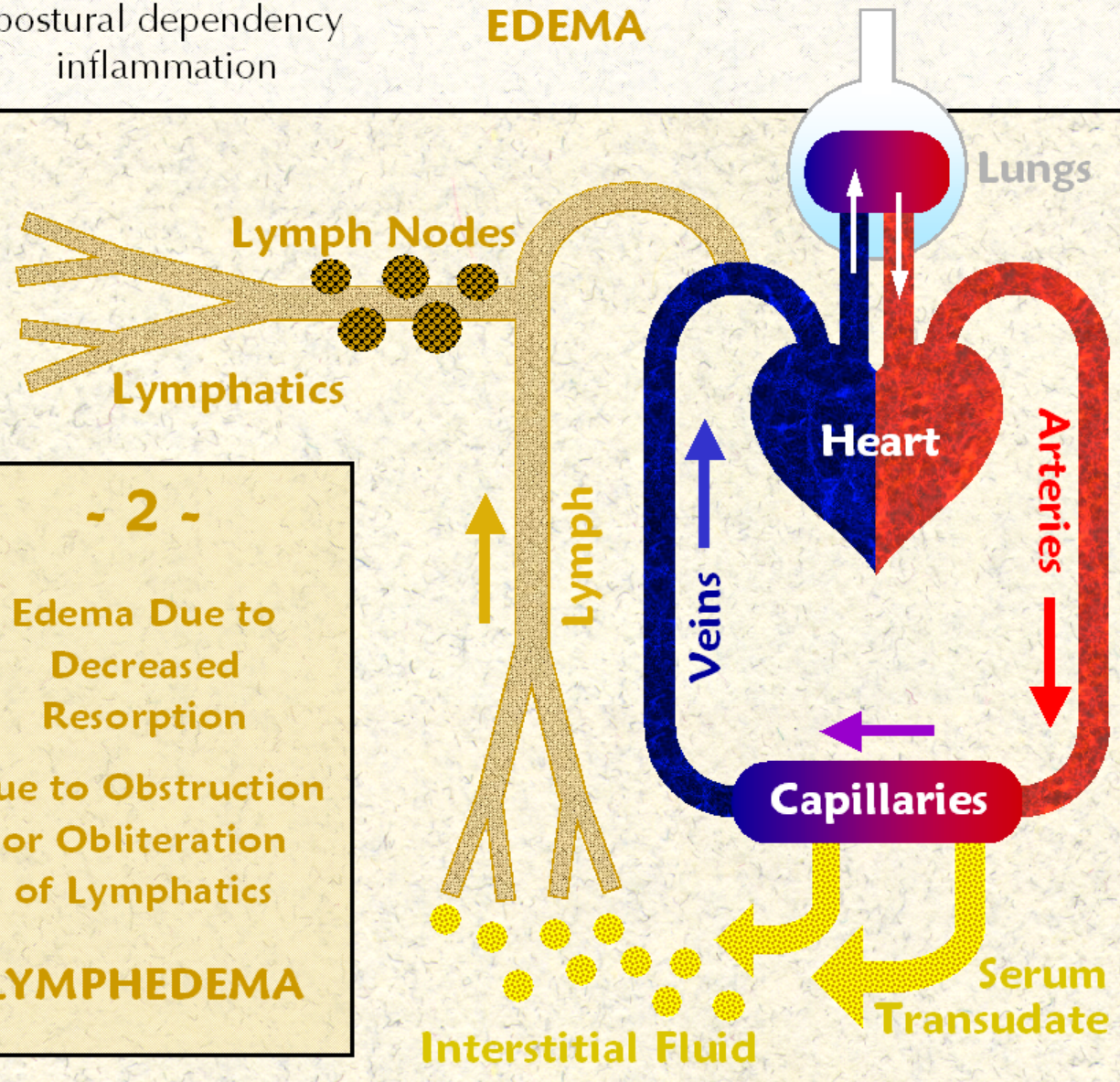
**FILTRATION or HYDROSTATIC EDEMA**

## - 2 -

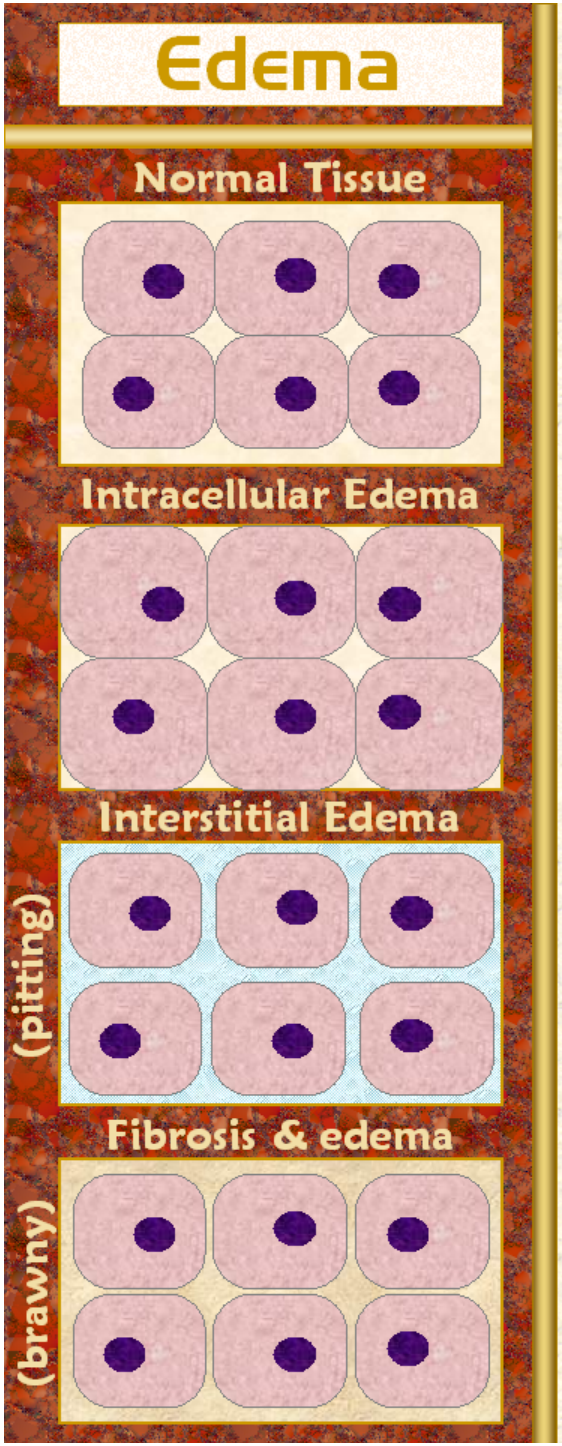
**Edema Due to Decreased Resorption**

**Due to Obstruction or Obliteration of Lymphatics**

**LYMPHEDEMA**



# Edema



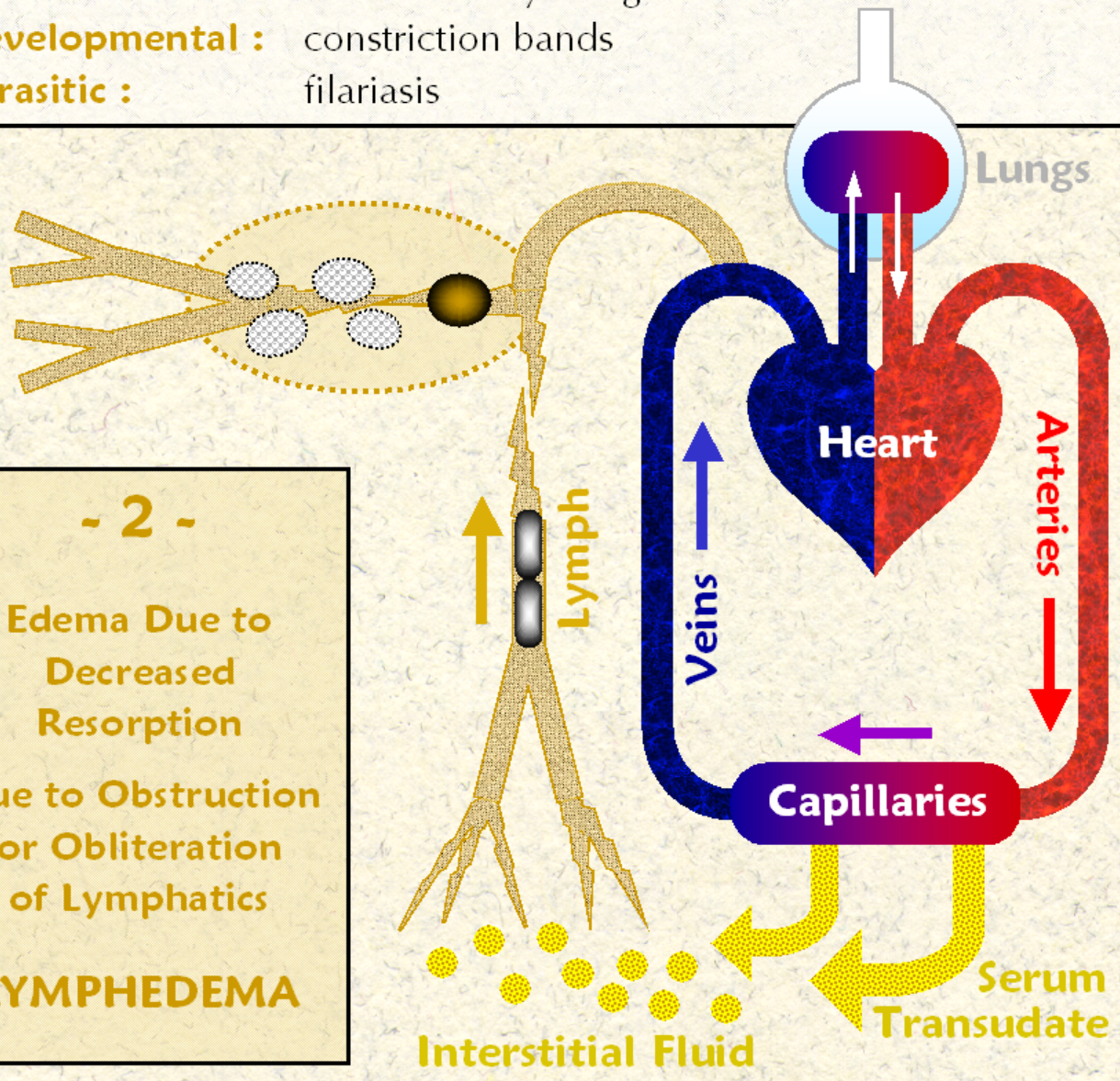

| | |
|---|---|
| **Inflammatory :** | cellulitis, lymphadenitis |
| **Cancer :** | tumor, cancer surgery, radiation |
| **Trauma :** | trauma, surgery |
| **Genetic :** | Nonne-Milroy-Meige |
| **Developmental :** | constriction bands |
| **Parasitic :** | filariasis |

**- 2 -**

**Edema Due to Decreased Resorption**

**Due to Obstruction or Obliteration of Lymphatics**

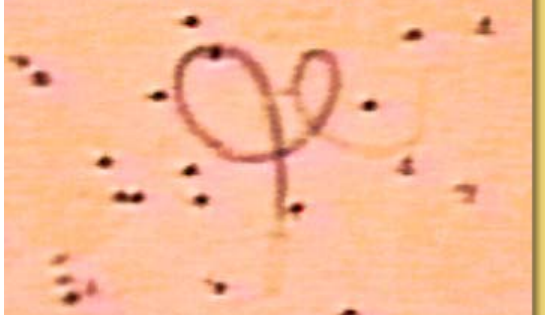
**LYMPHEDEMA**



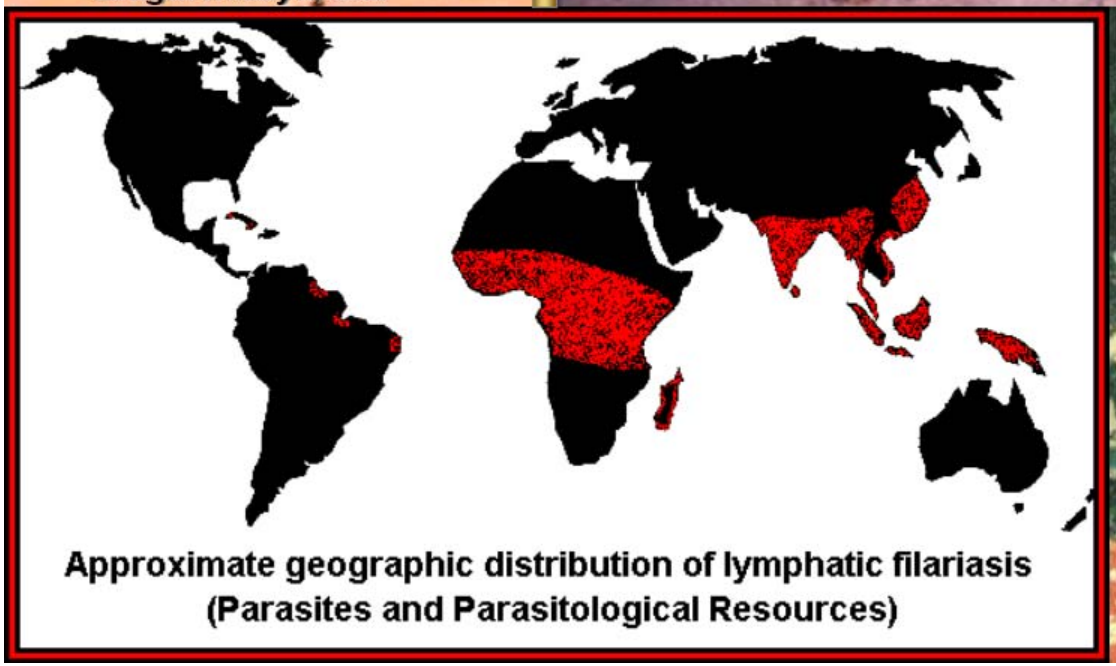
# Common scenarios

## Filariasis

*Wuchereria bancrofti* microfilaria



*Brugia malayii*, etc.



Approximate geographic distribution of lymphatic filariasis
(Parasites and Parasitological Resources)

# Common scenarios

## Postural edema

## Venous disease

Postural edema, venous disease, and lymphedema are distinct entities, but in individual patients, there can be a mix of conditions some shared pathogenetic mechanisms and treatment modalities.


Common scenarios
Cancer treatment

# Common scenarios

## Primary lymphedema

**Nonne-Milroy-Meige**

All are genetic & familial

**Lymphedema congenita**
**10 %**

**Lympedema praecox**
(childhood & young adult)
**80%**

**Lympedema tarda**
(onset after age 35)
**10%**

# Clinical pathology

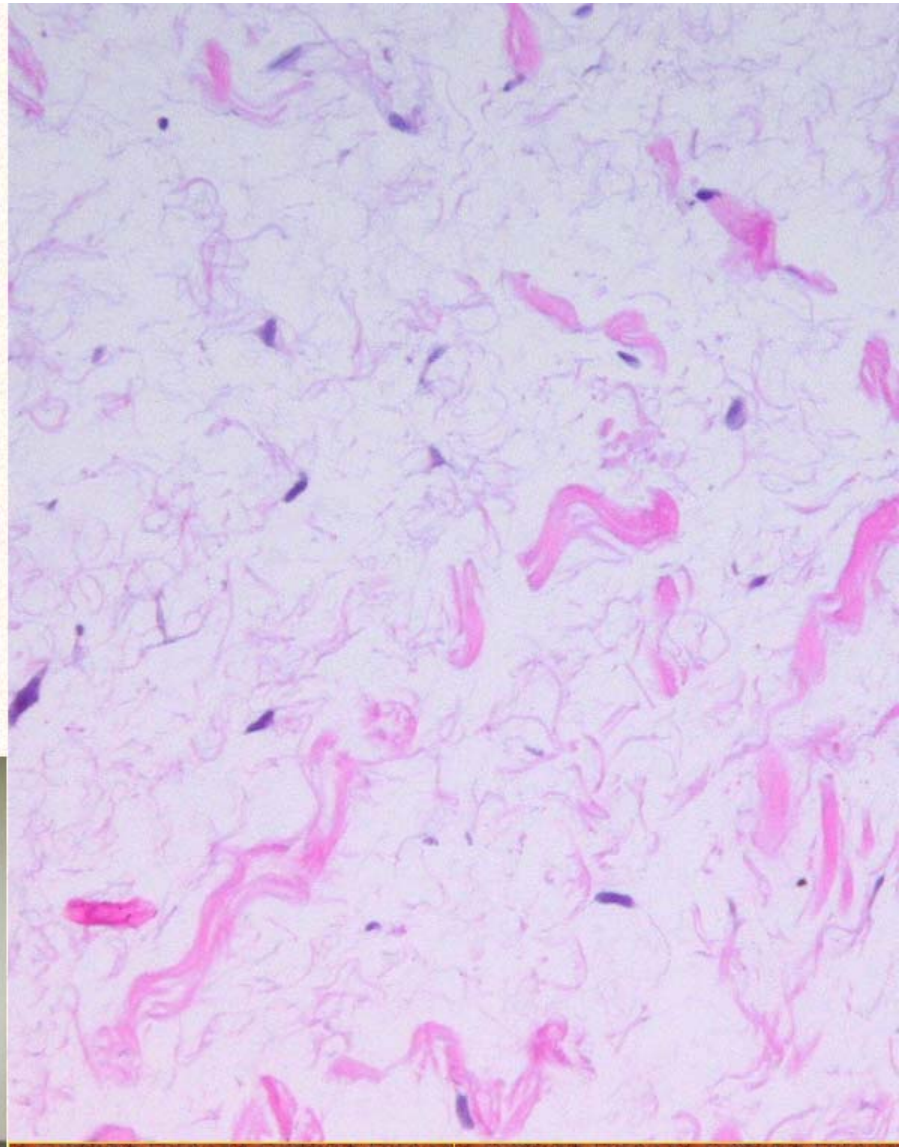
## Mechanisms

Lymphatics
Inflammation
Thrombosis
Genetics
Proteins
Fibrosis
Pannicular dysplasia

Hydrostatics
Gravity
Fluid compartmentation
Heart failure

**Lymphedema upper extremity**
gram-for-gram more disabling, but usually less severe

Lymphedema lower extremity
more morbid



genetics

proteins

# Clinical pathology

## Chronic trophic skin & fascias

Elephantiasis
Hyperkeratosis
Dermatophytosis
Inflammatory dermatoses
Liposclerosis
Brawny edema
Venous disorders
Chronic ulceration
Squamous cancer

## Acute morbidity

Exacerbated edema
Inflammatory dermatoses
Cellulitis
Lymphangiitis
Ulceration
CHF

# Clinical pathology

## Mechanics & disabilities

Mass and weight
Hip and shoulder torque

Hydraulic effects, hand
Impaired gross motor
Impaired fine motor

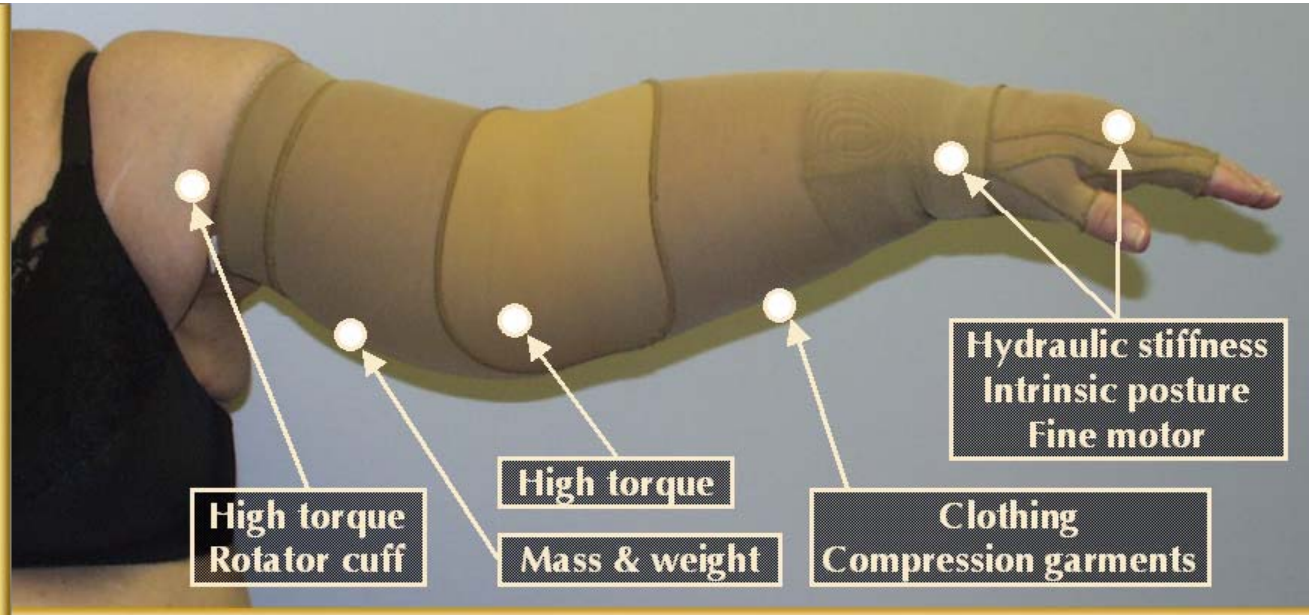
Sedentary status
Deconditioning
Secondary Obesity

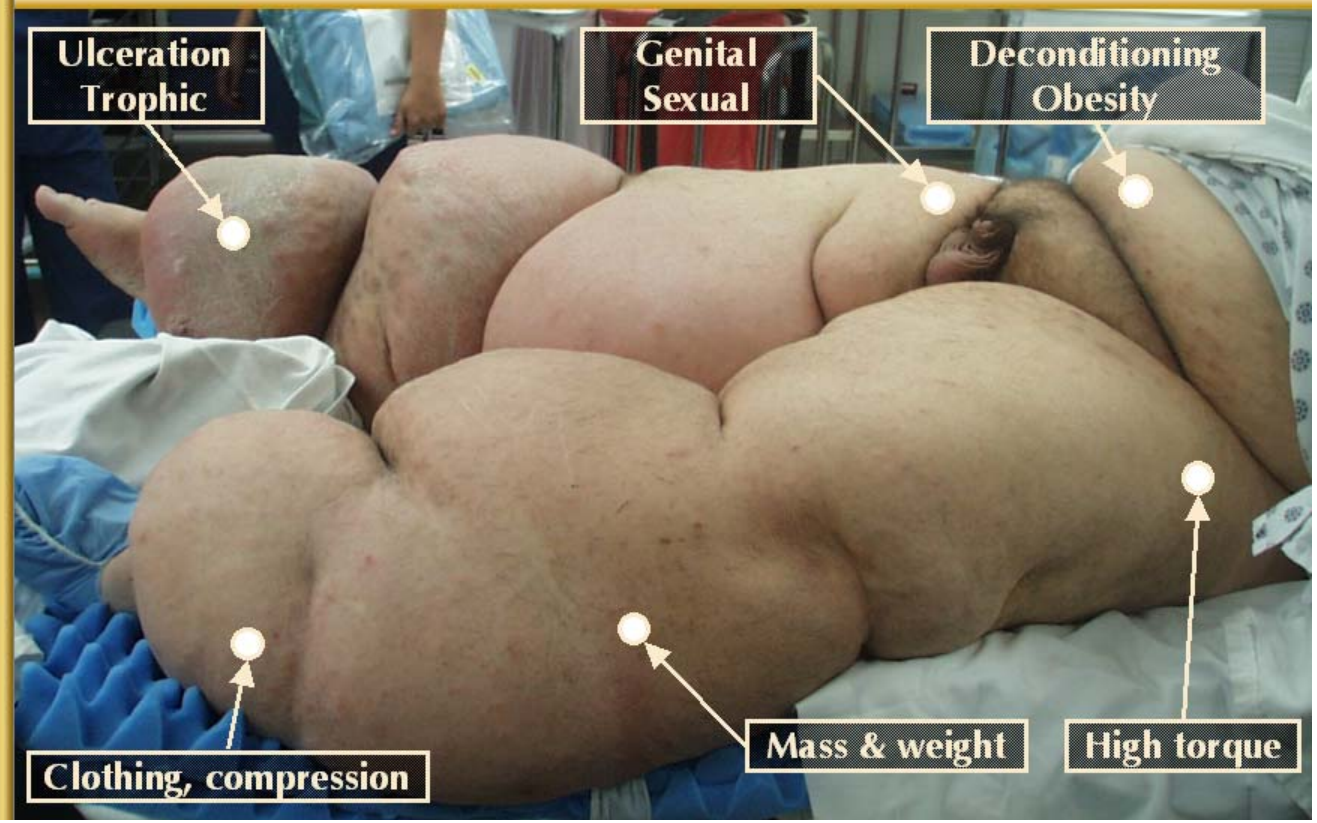
Impaired mobility
Impaired ADL
Impaired independence

Treatment needs
Garments, bandages, soil

Clothing & footwear
Furniture & seating

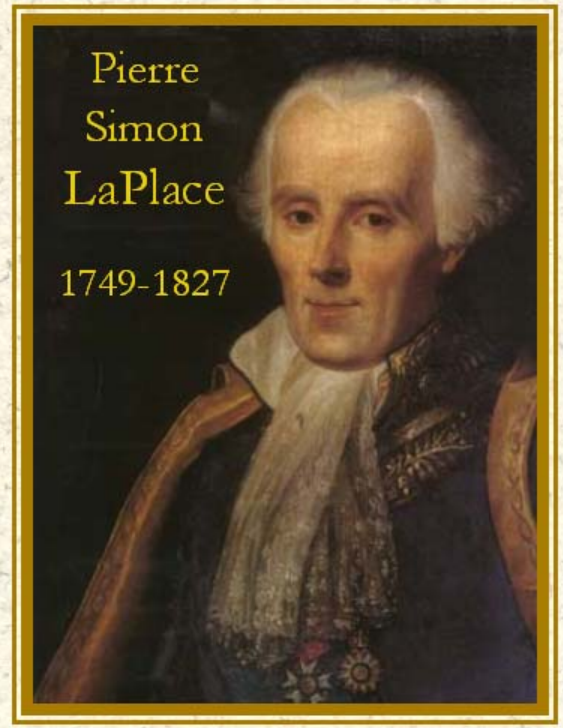
Vocational
Genital, Perineal, Sexual
Lifestyle



# Treatment

## Compression




$$P = T\,w\,(1/R_1 + 1/R_2)$$

*Pressure, Tension, Wall thickness, Radii in an elliptical sphere*

**T = P R**

*in a cylinder*

elastic compression **WILL** work here

elastic compression **WILL NOT** work here

Dutiful edema control = prophylaxis against complications

# Treatment

## Professional Services & Therapy

Basics
Edema Control
Compression

Acute complications

Prevention
Maintenance care
Chronic intervention
Peer group support
Dedicated clinics

Pharmaceuticals
(benzo-pyrones)
Physical modalities
(heat & microwave)
Lympedema therapy
(complex physical therapy)

Non-surgical options
Surgical options

**Treatment**
Achieving control

**Prophylaxis**
Maintaining control

**CPT**
**Professional LT**

CHINESE SAUNAS

# Lymphedema Therapy: the state of the art

## Provider pitfalls :

*Promise you everything*


**Compression**

**Physical modalities**

**Benzo-pyrones?**

**Dedicated clinics**

**CPT - professional LT**

**versus**

*Deny you anything*

"THE CONSULTATION"
Thomas Rowlandson, 1808

*Helpless physicians confronted by severe illness.*

# Treatment

## Surgery - lymph revascularization

**The history of lymphedema surgery is cobbled with rational ideas that never worked, because:**

the problem is too complex

the problem is not common enough to get attention and develop expertise

dilettante practitioners did these procedures improperly or without sufficient follow-up or adjuvant care

**Lympho-venous**


**Lymphatic Anastomosis**

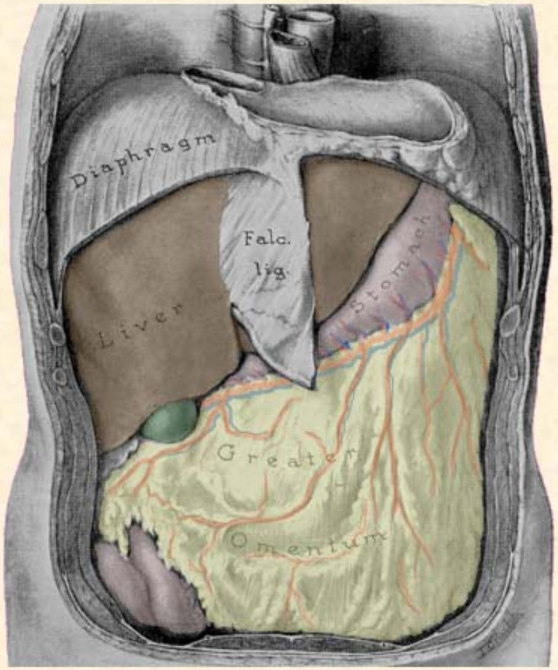
**Lympho-lymphatic**

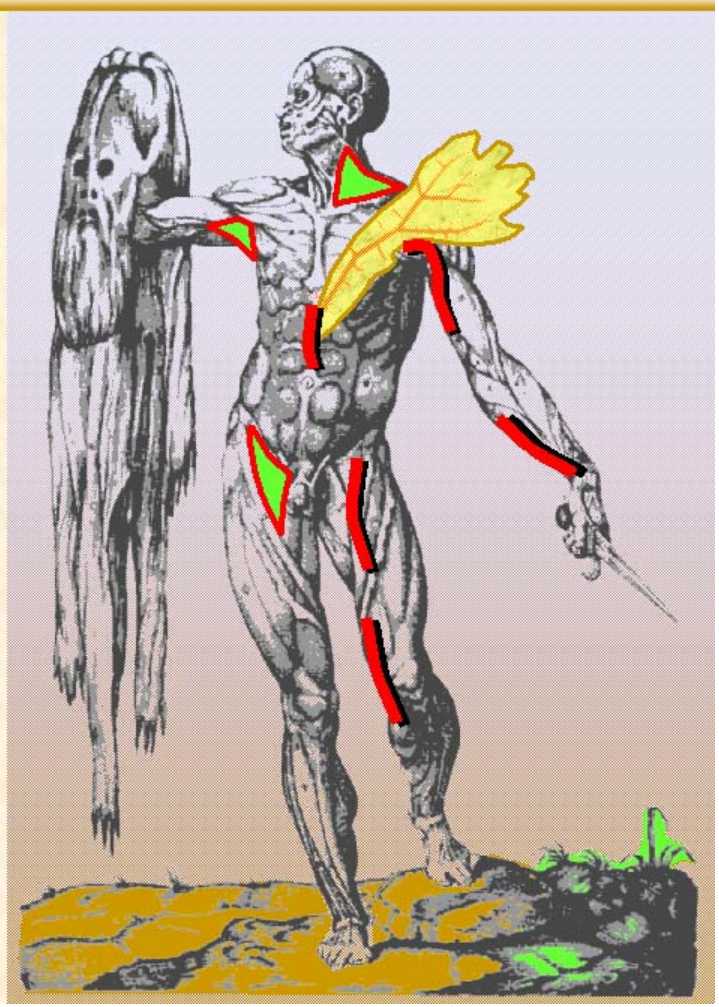
Reasonable idea
- - -
rarely works

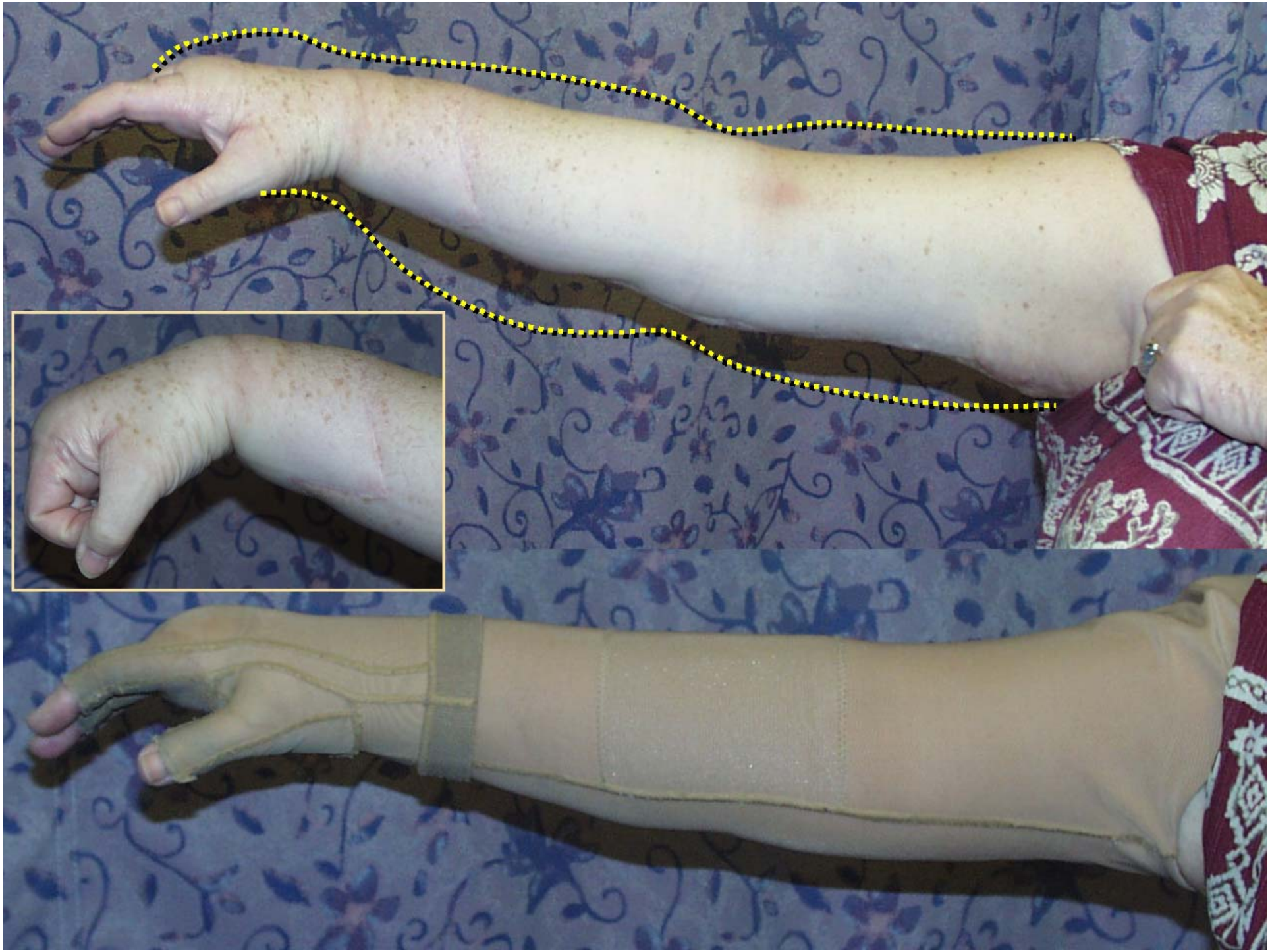
## Omentum Transfer

Corrects the problem - if successful

Technique crucial

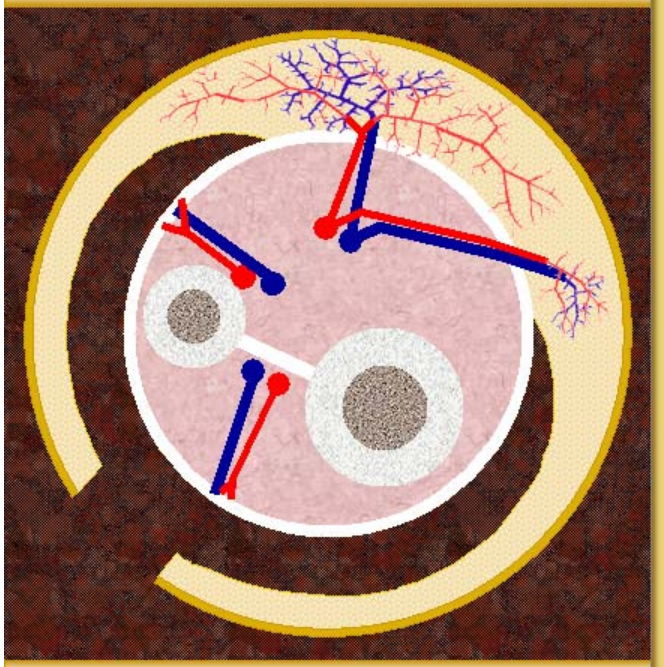




# Treatment

## Panniculectomy & variations



Does not cure the cause, but removes the effects

Multiple stages

Nuisance complications

Prolonged recovery

Inadequate edema control

# Surgery

## Dermatofasciectomy & skin reconstruction

We do dermatofasciectomy (dermatolipectomy) and skin reconstruction for other problems.

Why not do it for this one?

**Acute**

degloving
burns
necrotizing fasciitis

**Chronic**

venous ulcers
immunopathic ulcers
hidradenitis





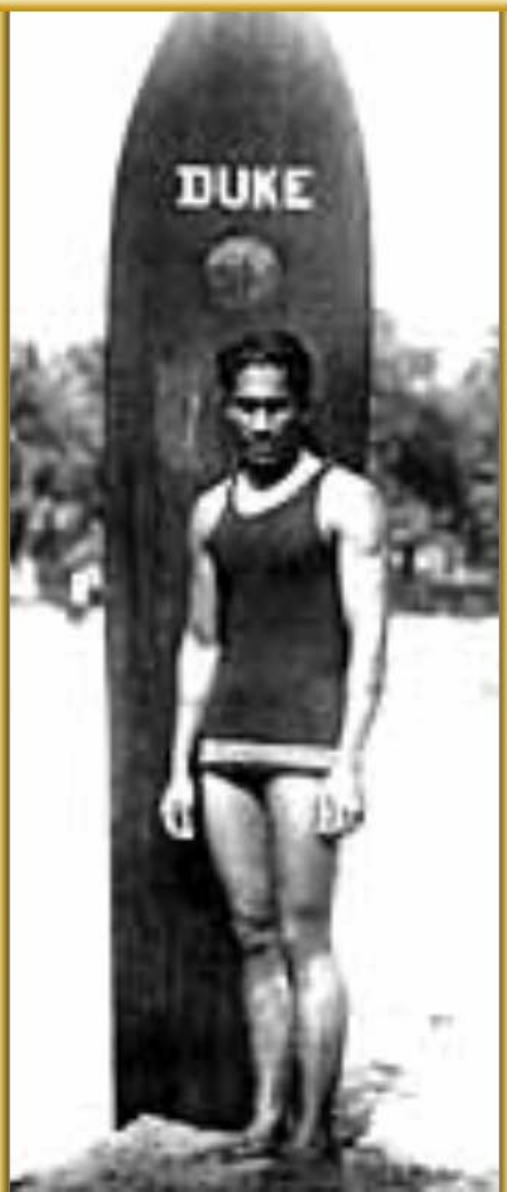


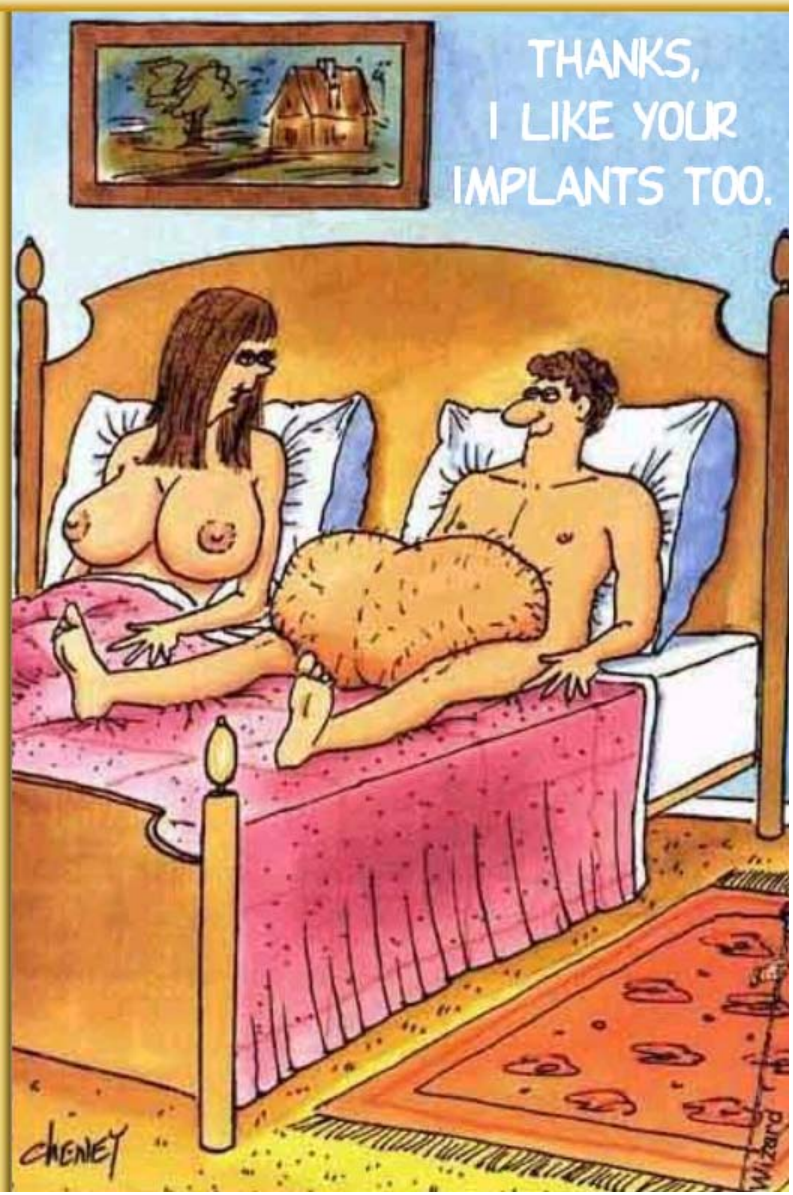


New technologies permit superior skin reconstruction.
Don't save disease when you can make healthy new parts.

# LET'S CLARIFY SOME TERMINOLOGY

| Big Scrotum | Big Kahuna | Big Cojones |
| --- | --- | --- |




KR 38M


JG 32M


MG 53M


RF 41M


FH 2F


Issues:
technique & conduct
Issues:
planning & strategy
Issues:
miscellaneous

# Results

## Dermatofasciectomy and Integra

**Three men:** 33, 39, 53 yo (one more 41m in the works)
one disabled (forest ranger)
two sedentary and unemployed
all with secondary obesity
one had prior unsuccessful panniculectomies

**Surgery:** bilateral lower extremity dermatofasciectomies
concurrent R & L in one patient
sequential in other two

**Integra:** standard management
weekly visits until skin grafts

**Skin grafts:** from thighs, opposite leg, abdomen
harvest from disposable areas desirable

**Touch-ups:** one - second piece Integra (ankle tendons)
minor skin grafts
one - flap across popliteal

**Utilization:** 4 operations (2 pts), 5 ops (1 pt)
main sequence completed in 4 months
10 acute inpatient days

**Wow:** total resected mass (per patient) 80kg

**Outcomes:** ranger rtw 4 months from first procedure
others began rehabilitation and lost weight

**All felt that their lives had been returned to them.**

# How-to

## Dermatofasciectomy and Integra

**Non-operative care comes first**

compression, modalities, lymphedema therapy

**Surgery has a role when non-operative care fails**

dermatofasciectomy and skin reconstruction with Integra is effective

**Some important points**

- multiple procedures are the rule
- do as much or as little in any one session as safety and circumstances permit

- if both extremities are to be done, sequential or concurrent okay
- if done serially, the second leg can donate the skin grafts for the first side
- sequential management is preferable

- a tourniquet is mandatory during leg fasciectomy
- thigh panniculectomy should precede leg surgery so that tourniquets can be placed
- have blood available during surgery

- the Integra reconstruction seems resistant to recurrent edema, but high quality elastic compression must remain in effect

**Preventive or maintenance care must continue afterward**

compression, modalities, lymphedema therapy

# Summary

## Dermatofasciectomy and Integra

Treat lymphedema first by compression and therapy;
this is the current state of the art.

When therapy fails, conventional surgery
(panniculectomy or fasciectomy and skin grafts)
is a problematic option -
complications and poor results
sway management away from surgery.

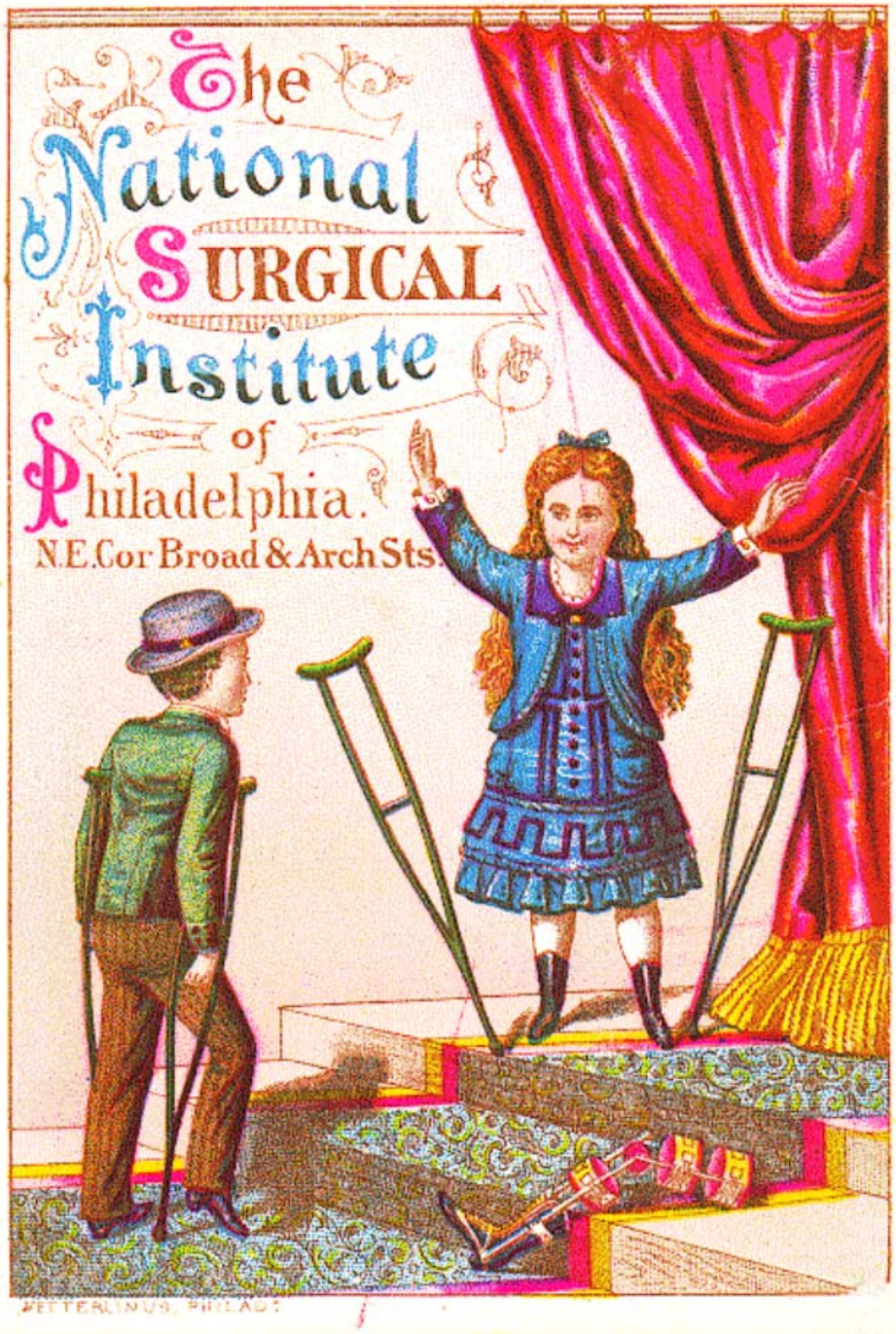
Dermatofasciectomy and skin reconstruction
with Integra is effective with few complications.

It is thus a good option in the integrated approach
to care rather than something to be avoided.

These patients had a 15% lean
body surface acute loss of skin,

yet their care was elective,
largely outpatient,
and resolved a disabling
historically difficult-to-treat problem.

**This is another example of Integra's utility
to redefine the care of complex problems.**


The National Surgical Institute of Philadelphia.
N.E.Cor Broad & Arch Sts.


The Institute of Dumb-Ass Plastic Surgeons
Who would have a nicer life and make a better living if they did not do this crap.

**Lower Extremity Lymphedema – Management by Total Dermatofasciectomy and Skin Reconstruction with Integra**

Marc E. Gottlieb, MD, FACS Phoenix, AZ

Lymphedema, due to obstructed lymphatics from various causes, can cause grotesque tissue hypertrophy, forced immobility, and secondary obesity and disabilities. Morbidity, as ulceration and cellulitis, is common. Treatments are compression, physical modalities, and peer group psycho-social support. Surgery has a role, to treat ulcers or for panniculectomy, often with prolonged skin and wound complications. Management is variably successful, sometimes very much so, but failure is common due to inadequate patient and provider knowledge, lack of community or personal resources, and obstinacy of the disease. Reported here are three patients with familial praecox (idiopathic young adult onset) lymphedema. All were resolved of disabling lower extremity lymphedema by complete excision of all involved skin and fascias, and skin reconstruction with Integra artificial skin.

**Principles of care.** Prevention and pre-emptive control is better than trying to reduce advanced edema. Compression bandages and habits of leg elevation are the crucial control measures. When advanced edema resists compression, "lymphedema therapy" by trained therapists can reduce limb size, often dramatically so, to the point that ordinary compression can maintain the improvement. Some notable clinics worldwide have resources dedicated to this problem, and in these special venues, therapy and bandaging effectively manage the problem for most patients. When compression and therapy fail or are inordinately difficult to administer, surgery becomes a problematic option. The conventional procedure, staged fasciectomy with skin preservation, is plagued by necrosis, ulceration, and ineffective results. Dermatofasciectomy with skin grafts often results in chronic ulceration. Using Integra in lieu of skin grafts, patient care after fasciectomy is dramatically simplified, and the Integra leads to a high quality skin reconstruction that is more stable over tendons, joints, and time.

**Patients.** Three men, 33, 39, 53 yo. One was disabled as a forest ranger, two had sedentary lives, all had secondary obesity. One had had prior panniculectomies but with persistent edema, ulceration, dermatitis, excess mass. Bilateral lower extremity dermatofasciectomies were performed all at once or in staged sessions, based on individual circumstances. Resected-reconstructed areas were posteromedial thigh, dorsal foot, and total knee, leg, ankle. Integra was applied immediately, then managed by standard practice, observing it weekly and applying skin grafts when fully regenerated. A second piece of Integra was used around one ankle for better tendon coverage. Each patient had 4 operations, completed in 4 months. Averages for each patient: total resected mass 80kg, 10 acute inpatient days. The ranger returned to work 4 months from first procedure. The others began rehabilitation programs and lost additional weight. All felt that their lives had been returned to them.

**Recommendations.** Treat lymphedema first by compression and therapy. When this fails, dermatofasciectomy and skin reconstruction with Integra is effective. Unlike conventional panniculectomy and skin grafts, where bad results and long complications sway management away from surgery, Integra reconstruction is effective and largely uncomplicated. It is thus a good option in the integrated approach to care rather than something to be avoided. The following are important points for safe and effective completion of these reconstructions: multiple procedures are the rule; as much or as little can be done in any one session as safety and circumstances permit; a tourniquet should be used to avoid hemorrhage during leg fasciectomy; thigh panniculectomy should precede leg surgery so that tourniquets can be placed; have blood available during surgery; both extremities can be done concurrently; if done serially, the second leg can donate the skin grafts for the first side; the Integra reconstruction seems resistant to recurrent edema, but high quality elastic compression must remain in effect. These patients had a 15% lean body surface acute loss of skin, yet their care was elective, largely outpatient, and resolved a disabling historically difficult-to-treat problem, another example of Integra's utility to redefine the care of complex problems.