What happens when the lymphatic system is not working well !

Professor Neil B Piller,

Director Lymphoedema Clinical Research Unit, Department of Surgery Flinders University

Flinders UNIVERSITY

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Why we must pay attention to the lymphatic system

- The lymphatics are a sewer – it must flow!
- Good lymph flow is needed for cell health
- Slow lymph flow means more fat deposits
- Reduced lymph flow means more infections
- Our immune responses are poor when lymph flow is poor

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Overview of lymphatic system drainage

This is why we must think, assess and act holistically



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Why the big picture?



We need to "empty the buckets" first!

Create space for lymph and its contents to flow into

Its what many of our therapies attempt to do

And its what YOU, your partners or carers can do !



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General parts of the lymphatic system

General drainage areas are called

Lymphatic Territories or lymphosomes

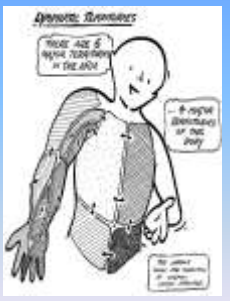
Each Lymphatic Territory separated by boundaries called

Watersheds



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Lymphatic territories/lymphosomes





These are stylised pictures and **no one's territories are exactly like this**!

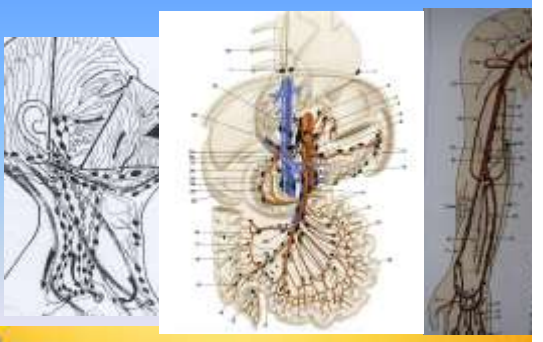
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Why we need lymphatics – fluids and cells and nutrients leak out of the blood vessels and wastes are formed and must be removed



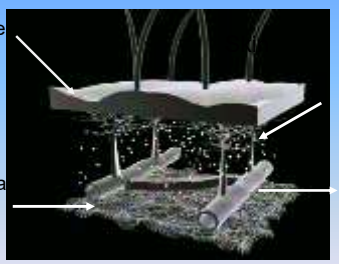
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Lymphatics – their complex !



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Let's look at the Organization of the superficial lymphatic system

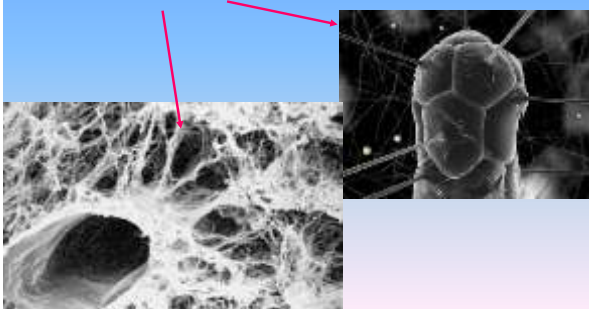


Our Muscles lie underneath this

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Functioning of the lymphatic system:

We must help fluid and contents enter them



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Functioning of the lymphatic system



Accumulated fluids must be helped **to enter + move along** lymph vessels

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Factors which determine lymph load

Blood Capillary Pressure
Blood Capillary Permeability (leakiness)
Tissue Protein Concentrations
Number of Active Blood Capillaries
Long chain (Big) fats in the diet

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Factors which contribute to lymph flow

Lymph Load

Activity in surrounding skeletal muscle

Rhythmicity of the lymph collectors

Variation in Chest/Tummy pressures

Pressure exerted by surrounding structures

Pressure exerted by applied compression

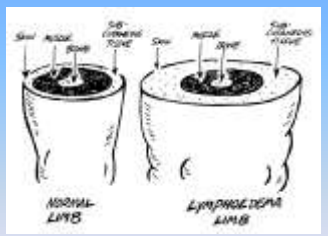
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Our Lymphatic System

- It's
  - **Low** pressure (not like blood pressure)
  - **Small volume** (2-4 litres per day total)
    - About 100 mls from arms/400 mls from legs
  - **Slow flow** and **slow acting**
  - **Essential** for a good immune response

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Lymphoedema–most of the visible changes occur superficially- above our muscles!



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Basis of Lymphoedemas

Primary cause – our genes

Deficiency/poorly formed lymphatics

Secondary due to :

Surgical removal

Surgical/Radiotherapy damage

Parasite linked blockage

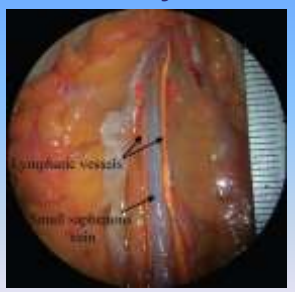
Internal/external tumor blockage

In each case there is reduced

Lymphatic Transport

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Lymphatics and veins: Look how CLOSE they are to each other!



Pan WR, le Roux CM, Levy SM. Alternative lymphatic drainage routes from the lateral heel to the inguinal lymph nodes: anatomic study and clinical implications. ANZ journal of surgery. 2011 Jun;81(6):431-5

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What this closeness to veins means

Carry-over of diseases/disorders/damage

which reduce lymph transport capacity or add to load

- Phlebitis - Lymphangitis, lymphadenitis (Inflammation)
- Fragility - Excess leakage large molecules (proteins)
- Thrombi - Blockage (external pressure)
- Stripping - Destruction of Lymph Vessels
- Ligation - Accidental ligation (tying off of lymph vessels
- Sclerotherapy – Accidental sclerosis of lymph vessels
- Harvesting - Destruction and removal of collectors (CABG)

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Assessing and knowing risk is important!

Its important If you don't have lymphoedema but are worried about getting it and want to be pro-active, but it can also help you if you already have lymphoedema !



You can do a risk assessment later if you want to

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RISK ASSESSMENT ARMS

You TICK the boxes which best apply to your AT RISK limb.

EVENT/SITUATION		Score
Whole of Breast Removed (Mastectomy)		2
Part of Breast removed		1
More than 10 nodes removed from armpit		3
More than 2 but less than 10 nodes removed from armpit		2
1 or 2 nodes removed from armpit		1
Radiotherapy to armpit area		3
Radiotherapy to chest/breast area		2
Fluids drained from wound more than 1 week		2
Infection at the wound site		2
More than 2 infections (redness) in the limb per year		3
One infection (redness) in the limb per year		2
Heaviness, tightness or tension in the limb at times		2
Limb feels different as the day progresses		1
Frequent cuts/scratches to the limb		2
Dry skin		2
OTHER PROBLEMS WHICH MAY ADD TO RISK		
Frequent long distance air traveler		1
Previous or current other injuries to limb/shoulder		1
Surgery was on side of dominant hand		2
Generally experience high stress levels		2
Generally have high non controlled blood pressure		2
Thyroid gland activity is not normal and not medicated		1
"At risk" limb is used for repetitive actions		1
Often carry heavy loads for long periods using "at risk" arm		1
Smoking is currently part of my life		1
Body weight is a little high (overweight)		2
Body weight is very high (obese)		3
Swelling was present in limb prior to surgery		1

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Risk Assessment Legs:

You tick boxes relevant to what you know about your at risk leg

EVENT/SITUATION		Score
More than 10 nodes removed from the groin		3
More than 2 but less than 10 nodes removed from groin		2
1 or 2 nodes removed from the groin		1
Radiotherapy to the groin/pelvic area		3
Fluids drained from wound more than 1 week		2
Infection at the wound site after surgery		2
Average of more than 2 infections (cellulitis) in the limb per year		3
Average of one infection (cellulitis) in the limb per year		2
Heaviness, tightness or tension in the limb at times		1
Limb feels worse as the day progresses		1
Frequent cuts/scratches to the limb		2
Dry or scaly skin on lower legs/feet		3
OTHER PROBLEMS WHICH MAY ADD TO RISK		
Family history of leg swelling		2
Frequent long distance airbus/car traveler		2
Previous or current other injuries to legs, ankles or feet		1
Limb is most often in a dependant position (standing)		3
Generally experience high stress levels		2
Generally have high blood pressure		2
Thyroid gland activity is not normal and not medicated		1
Diabetic but controlled by diet or medication		1
Diabetic uncontrolled		3
Some varicose veins or spider veins		1
Many varicose veins or spider veins		2
Prior varicose vein stripping and scars		2
Smoking is currently part of my life		1
Body weight is a little high (overweight)		2
Body weight is very high (obese)		4
Diet is rich in animal (omega 6) fats		2
Swelling was present in limb prior to surgery/radiotherapy		1

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Risk factors which contribute to lymph load

- **Skin quality** – barrier function (Toni will talk about this later)
- **Blood pressure** – when high
- **Strength** of small blood vessels (important in lipoedema)
- **Infection** of wounds, cuts and scratches
- **Weight**
- **Fats** (long chain that is big fats) in diet
- **Venous system dysfunction –** (its also a drainage system) if its not working there is increased lymph load

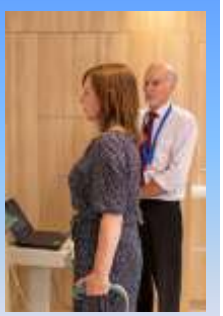
Knowing these allows YOU and us to modify/control them!

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Diagnosis can be made more objective and accurate by measuring impact of structural/functional changes using:

Bio-impedance, Tissue Dielectric Constants, Tonometry, Indurometry, Perometry etc

BUT
These are clinic based





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You can help by using - tele health and apps

You can record garment use, circumferences using Apps like Lympha Track and provide details remotely



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Something YOU and your Therapist can assess

The Stemmer Sign

Positive Stemmer Sign – Skin fold cannot be picked up

It means excess superficial fibrosis in the area

You can use it in any lymphatic territory!





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Something YOU and your Therapist can assess

The Pitting test





Thumb is pressed into any lymphatic territory for ~ 30 seconds.

Residual indent means fluids present

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Learn more online about assessment – HELP Online and other programs



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the main treatment/management areas

Compression (Bandages, Garments, Wraps)
Negative Pressure
Lymphatic Drainage techniques
Lymph taping
Skin Care
Activity/Exercise/Breathing
Diet (Anti-inflammatory, MCT)
Weight Management
Water based programs

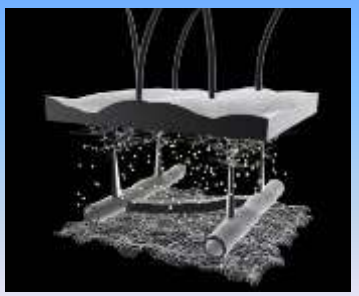






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When we compress we help reduce outflow from veins and help lymph move along pressure gradients out of the compressed area (beware of flow towards the hands or feet.!)



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Simple actions can **help** lymph flow

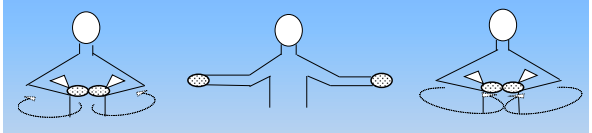
- **Deeper breathing** techniques
- **Gentle** isotonic/isometric **muscle movement**
  - General movement, self or partner massage, massage pads, electrical stimulation etc
- "**Emptying the buckets**" before donning or doffing a garment or wrap
- **Ensuring low lymph loads** from your gut prior to and during sleep

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Diaphragmatic Breathing

Coordinated arm exercise & deep breathing + rest breaks

Figure 1.



a. starting position: person starts taking a deep breath in whilst moving the arms slowly & gently outwards

b. when the arms reach full extension the breath is held in. All the arm muscles are then tightened.

c. the arm muscles are relaxed and the arms move back to the starting position whilst the breath is exhaled out.

This varies pressures in your chest and tummy

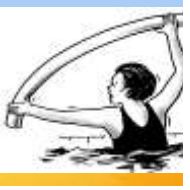
Lymphology 2005, Journal of Lymphoedema 2006

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Aqua Therapy

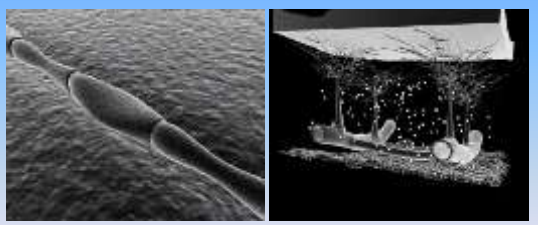
All forms of water-based activity/exercise are good as they

- Help vary tissue pressures
- Provide graded external compression
- Support the body and tissues
- Its pressure varies as you move



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When our muscles contract or our tissues are moved it helps lymph loading & flow



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But some situations may **slow** lymph flow!



- Bloating
- Constipation
- Fat **in** the tummy area
- Shallow Breathing
- Constant external pressure in wrong place – **Bras** and **underwear** for example

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Normal Lymph Flow:

- **From an ARM is about 5 ml per hr**. (~ 100 mls per day)
- **From a LEG is about 20 ml per hr** (~400 mls per day)

It does not take too much effort to make changes to these flows !

Small changes can make a big difference – we just need to know what to do !

So NOW you know!

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Conservative treatment summary

- **An Intensive phase** –then the **Maintenance phase – you, your partner or carer** takes more control
- **Explore all the treatment options**
- **Ensure what YOU want is acknowledged**
  - ? Reduction in size
  - ? Improvement in how limb feels
  - ? Better ability to undertake activities of life
- **Do only one thing different at a time so you know what works**
  - Keep a record and communicate findings (Apps available)

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We must pay more attention to the lymphatic system

- **Early Advice** (even over the phone)
  - can reduce lymphoedema risk (knowing risk factors)
- **Early signs of lymphoedema/lipoedema**
  - can be easily detected by practitioners and patients
- **Early intervention** can
  - reduce the severity of lymphoedema/lipoedema
  - slow the progression of lymphoedema/lipoedema
  - reduce health system and patient costs
  - give confidence and control back to you

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About AI

- Use AI if you want BUT remember
  - Its not a therapist or health professional
  - Its advice can be wrong !
  - The information it gives you is only as good as the information which has trained it !

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My Advice: Use Informed Web sites

- Australasian Lymphology Association (AUS)
  - www.lymphoedema.org.au
- British Lymphology Society (UK)
  - https://www.thebls.com
- Canadian Lymphoedema Framework (CAN)
  - https://canadalymph.ca/
- National Lymphodema Network (USA)
  - www.lymphnet.org
- International Lymphoedema Framework
  - www.lympho.org

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Remember

Think holistically- in partnership



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