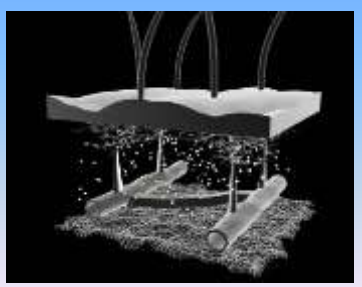
Compression therapies Why we don't always get good outcomes

Inappropriate applied pressure and pressure gradients:

Professor Neil Piller, Lymphoedema Clinical Research Unit, Department of Surgery, School of Medicine, Flinders University

1

Pressure- its not this simple!



2

We know what Compression can do

- Reduces capillary filtration
- Shift fluids into non compressed parts
- Increase lymphatic reabsorption + transport
  - Improves sub-fascial lymph transport
- Improve venous pump (in those with dysfunction)
- Accelerates blood flow in venous leg ulcers
- Possible breakdown fibro-sclerotic tissues

3

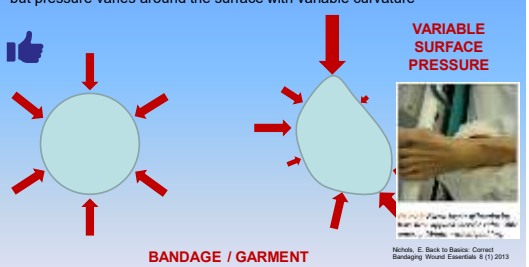
We know the Laws? Laplace's law

- Relationship between curvature of limb and pressure exerted by garment or bandage on it
  - Stronger curvature means higher pressure
- What if we don't get the pressure right?
  - for a given point on a circumference its high over a lymph collector or vein and low elsewhere?

4

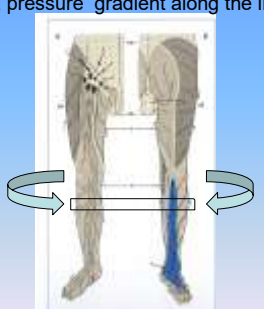
It's the LOCAL curvature that's important

It works the same for a round cross section, but pressure varies around the surface with variable curvature



5

Pressure variation at a given circumferential point due to surface curvature – Just as important to consider as a pressure gradient along the limb!



6

We know the Laws? Pascal's Law

- Contained fluids: A change in pressure at any point in an enclosed fluid is transmitted undiminished to all points in the fluid
- Uncontained fluids: Will flow down a pressure gradient
- What if we compress an area and the fluid is forced from the compressed area distally?

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BUT are we doing it right ?

Are we helping or hindering lymphatic drainage?

By

Using inappropriate pressures?
Not ensuring a pressure gradient?
Not clearing the proximal areas?

8

We must prepare the lymphatics for bandaging/Garments

- Reduce lymph load
- Clear proximal lymphatic pathways
- Ensure un-obstructed flow of fluids and lymph proximally from compressed area

9

Common issues with pressure

- **Poor pressure gradient**
  - Fluids forced distally
- **Pressure too high** (general or local)
  - Lymph flow slowed or stopped
- **Garment difficult to Don or Doff**
  - Patient unable to wear
- **Older garments/bandages** less elastic
  - Less pressure and less variation with movement
- **Pressure can't be adjusted**
  - as the fluids leave the limb and it reduces

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So what's it all mean?

- We have to **think very carefully about optimal pressures** for what we want to compress
- We have to **consider variations in pressure** at each point around a limb
- We have to **consider the location of the vessels** we want to compress
- **We have to ensure we get the pressures we want and expect !**

11

References

- **Parkinson K, van Zanten, M Piller, N Arkwright J (2017).** High resolution tape sensor improves the accuracy of applied pressure profiles during lower leg bandaging- results from a study using a fibre-optic sensing tape. **International Wound Journal** doi 10.1111/iwj.12741
- **Piller, N Green, T, Parkinson, L, Mosti,G, Lee,BB (2019)** Feeling the pressure?: How can we be sure we are getting it right? **Journal of Lymphoedema 14(1) 52-55**

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