

LIVE

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Improving **hard-to-heal wounds** by managing oedema and fibrosis

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LIVE Q&A

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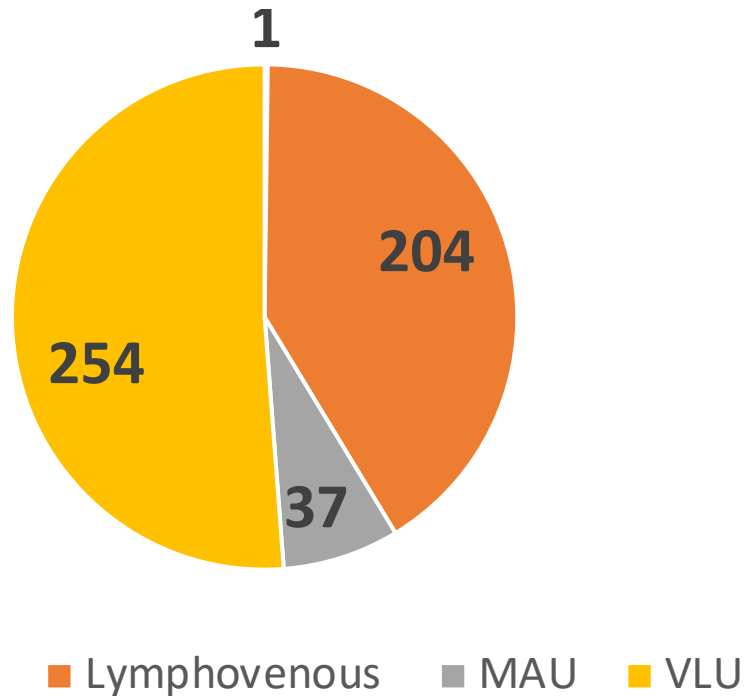
WHAT IS YOUR PREDOMINANT LEG ULCER AETIOLOGY?

- The assumption is that patients leg ulcer aetiology is predominantly venous
- Ellis (2015) states: 'Historically, lymphovenous disease has been an under-diagnosed condition due in part to the misdiagnosis of chronic oedema'
- However, one of the most predominant wound types seen in most leg ulcer clinics is lymphovenous in my experience.

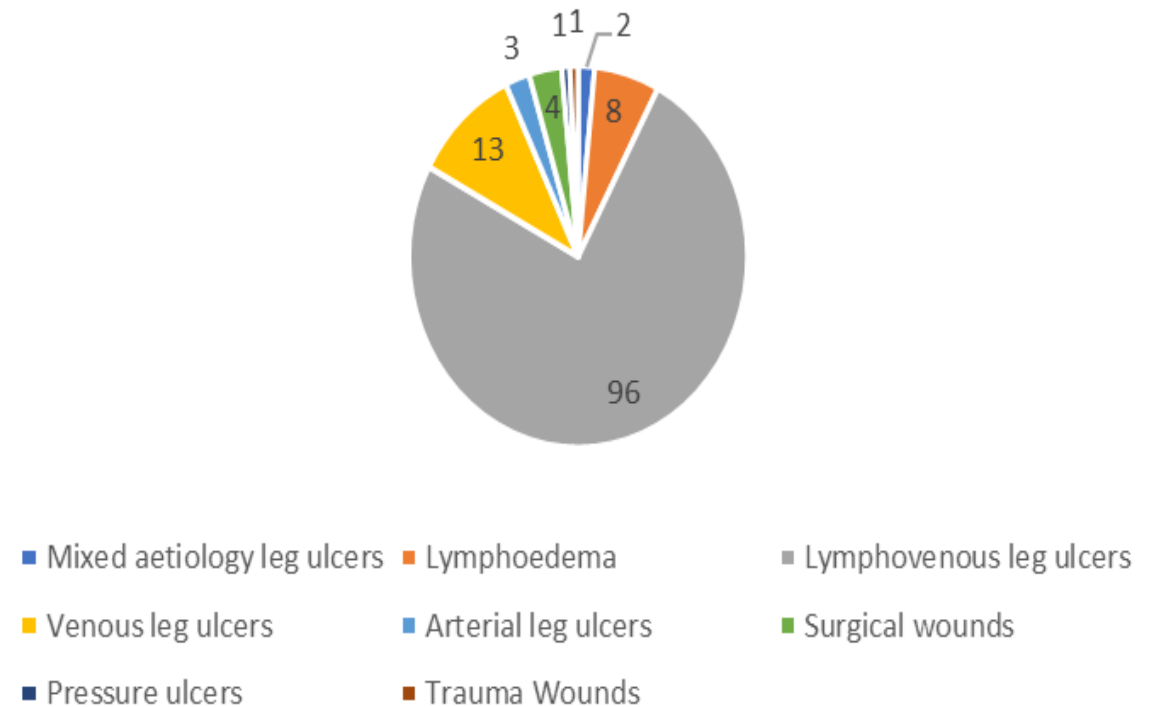
This asks the question, do we need to rethink leg ulcer aetiology and how we assess and treat to improve our outcomes?

WHAT IS YOUR PREDOMINANT LEG ULCER TYPE?

Leg Ulcer Aetiology 2018-2021



Wound Types & Leg Ulcer Aetiology





CONTRIBUTING FACTORS TO THE INCREASE IN LYMPHOEDEMA



Increased survival of heart failure patients



Numerous medications associated with oedema



Increased incidence of obesity



Ageing population



Increasing surgical procedures involving removal or damage to the lymph nodes

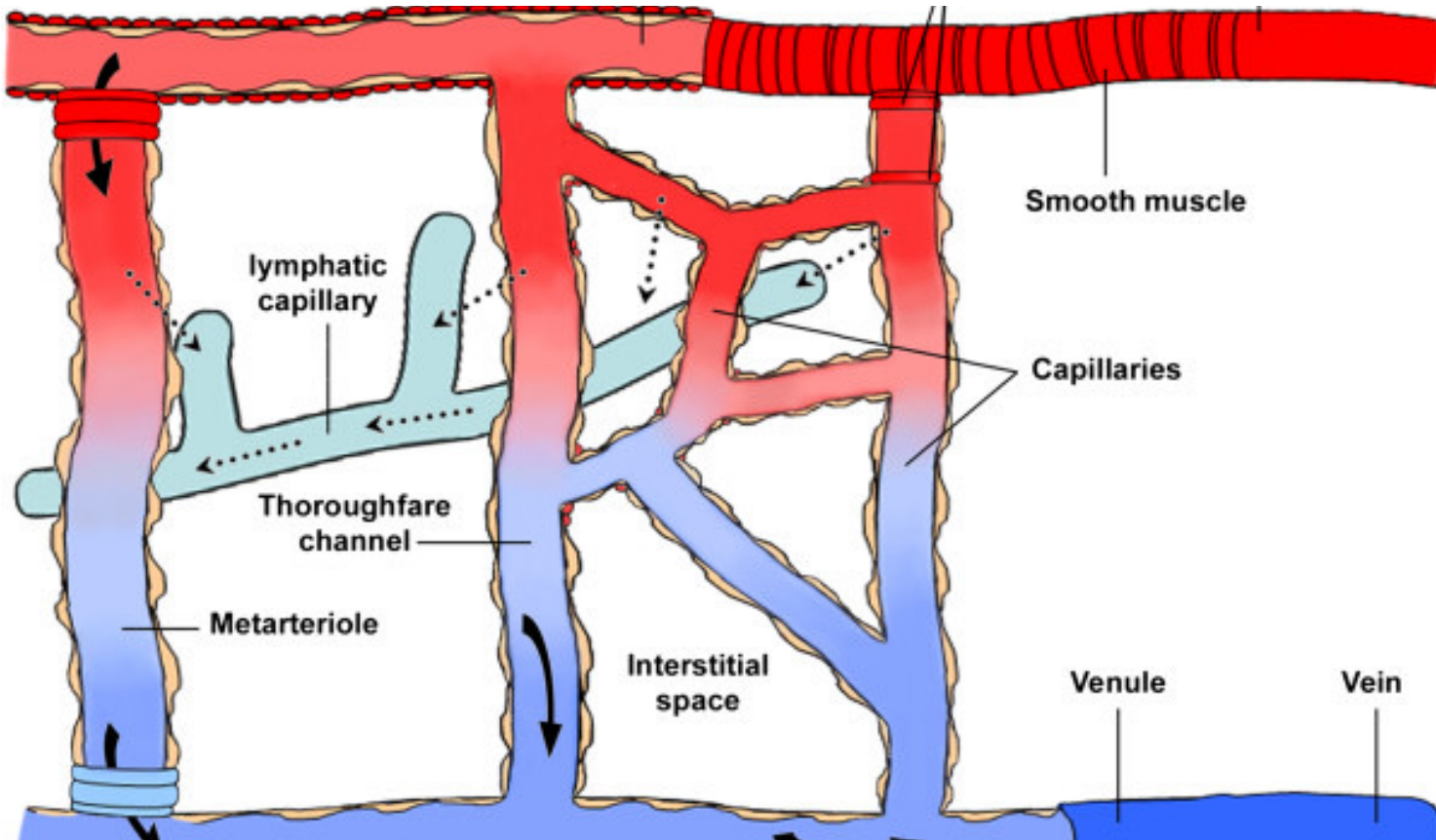
The incidence will almost certainly increase in upcoming decades. Lymphoedema has been considered an 'orphan' disease because it does not fall into any medical specialty. Consequently, few physicians or nurses are well versed in its pathophysiology or treatment (Brenner et al 2007)

LYMPHOEDEMA AND WOUND DEVELOPMENT

- The percentage of patients with chronic oedema in a community setting (between 52% and 69%), 73% also had a leg ulcer (Moffatt et al, 2019)
- Lymphovenous oedema is the most common form of lymphoedema in the Western world
- End stage chronic venous insufficiency (CVI) leads to the development of lymphoedema, especially if there are recurrent periods of infection or inflammation due to the bacterial bioburden present in the wound bed. This prolonged oedema and lymphatic impairment can delay wound healing.



MICROCIRCULATION



- Contrary to previous concepts of Starling's Law, we now know there is no reabsorption back into the venous end of the blood capillaries and only diminishing fluid filtration across the capillary bed
- All interstitial fluid (100%) is reabsorbed by the lymphatic capillaries alone
- Consequently, all oedemas are on a lymphoedema continuum and represent relative lymphatic failure or insufficiency

CHRONIC OEDEMA/LYMPHOEDEMA

Without appropriate treatment, tissues become hard due to the accumulation of waste products and failure of the lymphatic system to drain excess fluid (Timmons and Bianchi, 2008).

Over time, affected tissues become increasingly hard, fibrosed and non-pitting and the oedema fails to reduce on elevation.

A diagnostic test for this is Stemmer's sign, which is when a fold of skin cannot be pinched or picked up from the base of the second toe (International Society of Lymphology, 2009). By this stage, symptoms will be severe and are usually irreversible.



WHAT IS FIBROSIS?

Structural elements of the tissue are replaced with excessive scar tissue composed of distorted collagens



When tissues are subjected to persistent trauma, i.e. infection/inflammation, normal wound healing goes awry



Creating a chronic inflammatory environment where cytokines, growth factors and signaling molecules are released which act to enhance the fibrotic process



This impedes the normal functioning of the organ, leading to chronic static wounds due to a continuous infection cycle further damaging the lymphatic system



(Artlett , 2012)

PROTEIN RICH FIBROSED OEDEMA

Fibrosis can eventually lead to vascular problems



Debris, dead cells, and other by products of wound healing will cause stagnation of the wound environment and slow wound healing



Thus, simple compression will only concentrate the proteins further by removing some of the water, but the remaining proteins will hold onto water molecules



Affects the nerves causing pain and discomfort



Persistent cellulitis



Hard-to-heal wounds



Vascular /aetiology Check List: ✓ (Present) X (Absent) N/A □

Arterial	Venous	Lymphovenous / lymphodema
Atrophic nail changes	Varicose eczema	Moderate/severe hyperkeratosis
Cyanosis	Atrophie blanche	Skin folds
Slow capillary refill (<3sec)	Dilated / varicose veins	Papillomatosis
Pain on exercise/cramps (intermittent claudication)	Haemosiderin staining (purple/red/brown)	Lipodermatosclerosis (inverted bottle)
	Mild hyperkeratosis	Oedema above the knees
Whiteness on elevation	Varicose eczema	Oedema to the toes
Red/blue discoloration when limb dependent	Non-tender permanent redness	Oedema does not reduce on elevation
Neuropathy	Soft pitting oedema	Lymphorrea
Distal ulceration - toes	Ankle flare (medial malleoli)	Lymphangiomata
Resting pain (on elevation)/ night pain	Oedema reduces on elevation/night	Fibrosed oedema

Cellulitis /infection

Number of episodes of cellulitis		Number of hospitalisations
Number of acute inflammatory episodes		Is the patient on prophylactic antibiotics:

TREATMENT

Targeted compression



- Commencing treatment plans focusing on compression management for both presenting ulcer and for lymphoedema management
- Compression aims to take the fluid to 'soft spots' to aid drainage (Wigg, 2016), kinesio to allow drainage of lymph, and strapping techniques (Hopkins et al, 2013) to improve sub-bandage pressure
- Targeted compression to areas such as toes and knee where oedema is present
- The use of multilayer short-stretch bandaging applied in a figure-of-eight (MLLB).

Breaking down fibrosis

Adapting lymphoedema techniques to break down fibrotic wound beds allowing oxygenation and nutrients to the wound bed, by either strapping, mobilising foam pads or kinesiotope. The easiest method is foam pads.

TREATING FIBROSED OEDEMA



Creative wool applications



Kinesiotape

Foam applications such as mobilising foam pads or custom-cut foam pieces



Adapting bandage techniques/chevron strapping



Simple lymphatic drainage (SLD)



HOW DOES KINESIOTAPE WORK?



Lifts the skin to form negative pressure



Blood and lymph dilate and drain



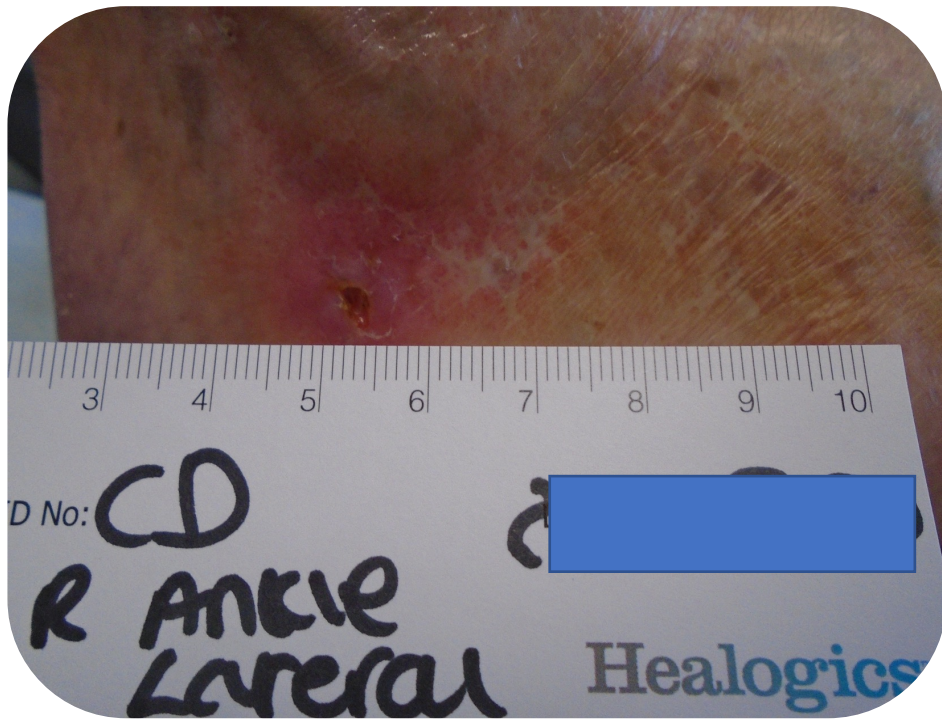
The tape increases the space in which lymphatic fluid flows and works towards working lymph nodes



It can also help to facilitate the stretch response of the angions, with movement or muscle contraction.



KINESIO FOR RETRO-MALLEOLAR WOUNDS



STRAPPING TECHNIQUES

- Standard application of cohesive inelastic bandaging — using the same size of bandage, apply strips of bandage at full stretch, in a crisscross or star shape, with a 50% overlap
- Chevron strapping or other methods to alter pressure and to enable focused compression (Hopkins et al, 2013; Mosti, 2013)
- Hopkins et al (2013) investigated the sub-bandage pressure delivered with the use of inelastic compression therapy to the retro-malleolar fossa area:
 - They found pressures were reduced to 5% at the lateral and medial retro-malleolar fossa
 - The pressures increased to 25–48 mmHg with the addition of a strapping technique.



MULTILAYER SHORT-STRETCH BANDAGES

- Venous bandaging techniques start the compression element from the ankle to the knee. However, if you have lymphatic disease you need to start the compression from the toes and potentially go above the knee, or use a knee wrap or teach the patient SLD

Multilayer lymphoedema bandaging (MLLB) usually consists of:

- 8cm short-stretch bandages from the foot to the ankle
- 10cm from the ankle to the knee
- Potentially 12cm above the knee
- **Usually applied in a figure-of-eight and layered dependent on ankle circumference and density/fibrosis of the tissues**



HOW THE MOBILISING FOAMS WORK

- They help to maximise the effect of compression bandages by distributing consistent pressure and shear forces over a greater surface area (Hodgson et al, 2011)
- The pads are applied to mobilise the tissues and move the lymphatic system to reduce fibrosis
- They can consist of foam pads, silicone pieces, cut foam and adapted cut foams
- Channelled foam can also be used to help create tissue stretch and move lymphatic fluid along the lymphatic pathways, by pushing lymph from the high-pressure areas and allowing it to drain proximally through the low-pressure areas (Farrow, 2010).

HOW THE MOBILISING FOAMS WORK



CHECKS PRIOR TO USE

- That the skin is resilient enough to withstand the pressure and shear force from the foam cubes
- There needs to be indurated oedema. If the leg has little oedema and the skin is fragile it should not be used
- You may need to cut a window in the pad where the ulceration is present if you think the patient may experience additional pain or already has a painful ulcer site
- Do not use on infected wounds
- That you understand the principles of targeted compression alongside the use of the mobilising foam pads.

USE OF MOBILISING FOAM

How to use

- ✓ A cotton stockinette can be used next to the skin and orthopaedic wool if required.
- ✓ The pads are then placed either around the wound bed to cover the area of fibrosis, **or** over the area of fibrosis on top of the primary dressing. A window can be cut over the wound.
- ✓ The bandages/wraps or hosiery are then applied.



When to discontinue use

- ✗ Once the fibrosis has softened
- ✗ Trauma associated with its use
- ✗ Pain felt by the patient following application
- ✗ Wound infection present or suspected

CASE STUDY ONE

This gentleman had leukaemia and an ulcer of over six months' duration.

Treatment

Incorporated a short-stretch bandage applied in a figure-of-eight, retro-malleolar strapping and a mobilising foam pad.

Outcome

The peri-wound area softened and the wound went on to heal within six months, despite the patient's multiple comorbidities.

CASE STUDY ONE



CASE STUDY TWO



This lady had ulcers on her right leg.

Treatment

She had a combination of strapping and mobilising foam pads applied. The ulcer size reduced by 15.5cm² with softening of the peri-wound area within a four-week period.

CASE STUDY THREE



09/08/21



22/02/22

This gentleman had an ulcer for five years with recurrent episodes of infection, which had led to fibrosis and stage 3 lymphoedema and papillomatosis around the peri-wound area.

Wounds to both medial and lateral malleoli.

CASE STUDY THREE

Treatment:

- Antimicrobial pathway
- Curettage
- Multilayer short-stretch bandaging in a figure-of-eight and strapping, as well as localised compression to break down the fibrosis
- Kinesio to improve lymphatic flow
- Mobilising foam pads to break down fibrosis.

Outcome:

- He healed within 133 days.

SUMMARY

Assessment

Assess the type of oedema that is presenting in order to treat the wound effectively.
Have you got lymphovenous disease?



Fibrosis

If fibrosed oedema is present, treat appropriately with adapted lymphoedema techniques rather than pure venous compression techniques



Treatments

These include the adaptation of congestive decompression therapy (CDP) consisting of:

- A combination of MLLB
- Wraps
- SLD
- Kinesio taping
- Mobilising foams pads
- Exercise
- Skin care



This helps to mobilise accumulated oedema and increases lymph flow, resulting in a beneficial therapeutic effect on fibrosclerosis (Foldi et al, 2000)



Breaking down fibrosis allows oxygenation and nutrients to get to the wound, reduces infection cycles and assists in the healing process in hard-to-heal wounds

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