

COMPRESSION THERAPY FOR VENOUS LEG ULCERS: PART TWO — INELASTIC, SHORT-STRETCH BANDAGES

As an essential tool in the clinician's armoury, compression therapy bandaging, and, by extension, inelastic, short-stretch bandaging, is on the front line in the fight against ulceration, but, as this article explains, factors such as chronic oedema can make a clinician's life difficult.

Every individual with chronic oedema is entitled to a comprehensive assessment by a knowledgeable, experienced clinician

PAULINE BELDON
Tissue Viability Nurse Consultant, Epsom
and St Helier University Hospitals
NHS Trust

Compression therapy bandaging has become an essential skill for all ward nurses, nursing home nurses, district and practice nurses.

The UK's aging population trend means that more patients are seen both in community and in residential and care homes with co-morbidities, which may lead to chronic oedema and/or leg ulceration.

Problems such as chronic oedema, often due to poor mobility or immobility, and sitting for long periods with legs dependent (gravitational oedema), may lead to blistering or ulceration if not controlled. The most common cause of chronic oedema in the older person is venous disease (Moffatt et al, 2003).

Every individual with chronic oedema is entitled to a comprehensive assessment by a knowledgeable, experienced clinician and failure to provide appropriate care can lead to new problems arising (Figure 1).

Causes of chronic oedema

The human body is approximately 60% water, consequently any physiological problems or disease that affects those organs responsible for fluid balance within the body may lead to oedema. Oedema is the accumulation of fluid within tissues of the body and is a symptom of an underlying physiological disease or imbalance (European Wound management Association [EWMA], 2003).

Chronic oedema is described as abnormal soft tissue swelling, present for more than three months (Moffatt et al, 2003) (Figure 2).

Underlying causes of chronic oedema include:

- ▶ Cardiac failure
- ▶ Renal failure
- ▶ Poor mobility/immobility — due to loss of the calf muscle pump aiding venous return
- ▶ Gravitational oedema caused by inactivity/sitting for long periods with lower limb dependent

- ▶ Trauma to the leg injuring the veins and soft tissue, leading to scarring (*Figure 3*)
- ▶ Severe varicose veins leading to poor venous function — venous insufficiency
- ▶ Hypoproteinaemia — caused by poor nutritional intake
- ▶ Obesity — lack of movement combined with the effect on the venous system (adapted from Bianchi et al, 2012).

The Drug Tariff classifies bandages according to their elasticity and inelastic, short-stretch bandages fall into class 2 (UK Classification for Drug Tariff). Examples include: cohesive bandages, such as Actico® (Activa) and non-cohesive bandages, such as Actiban® (Activa), Comprilan® (Smith & Nephew), Rosidal K® (Activa).

Clinical indications for use include:

- ▶ Reduction of oedema — in both mobile and immobile

- ▶ individuals
- ▶ Venous hypertension and ulceration
- ▶ Mixed-aetiology ulceration — when directed by an expert practitioner
- ▶ Distorted limb shape
- ▶ Skin folds on the leg
- ▶ Presence of lymphorrhoea (when the leg has generalised wetness with no distinct ulceration)
- ▶ Limbs that are too large to fit compression hosiery.

Inelastic bandaging on the legs

Effects of inelastic bandaging on the legs include:

- ▶ Movement of fluid into non-compressed areas of the body
- ▶ Increased lymphatic reabsorption of fluid and transport away from affected limb
- ▶ Improved venous pump function of calf muscle (Foldi et al, 2005)
- ▶ Support of over-stretched inelastic tissue

- ▶ Elimination of lymphorrhoea (Osbourne, 2007).

Vascular assessment

Prior to the application of any compression bandaging system, the patient must undergo a vascular assessment to determine whether their arterial blood supply is sufficiently robust to tolerate compression therapy. An ankle/brachial pressure index (ABPI) should be performed (Beldon, 2010).

In the patient with chronic oedema, this is often more difficult due to the size of the limb caused by the volume of fluid within (Doherty et al, 2006), consequently, a larger blood pressure cuff must be used (Bianchi, 2009).

The fluid within the limb will also cause distortion of the Doppler signal, and, consequently, a 5MHz probe, which has a lower frequency, should be used (Bianchi, 2009).



Figure 1. Patient sitting in a wheelchair without foot plates. Her legs are dependent and she has inappropriate bandaging causing oedema above and below bandage.



Figure 2. Chronic oedema caused by immobility, predominantly affecting the left leg, following orthopaedic surgery. Oedema of the toes is also present.



Figure 3. Previous trauma has caused scarring and has led to a misshapen limb with chronic oedema.

Pulse oximetry can also be used to assess the vascular supply (Bianchi, 2005), however, this equipment is unlikely to be widely available. It is recommended that this assessment is performed by an expert practitioner with the appropriate equipment who can then direct the clinician in treating the patient.

Inelastic bandaging for the mixed-aetiology ulcer patient

Inelastic, short-stretch bandages do not contain elastic material and do not squeeze the leg. Additionally, the bandage does not contract around the limb and so does not exert pressure when the individual is at rest, hence, the suitability for patients with mixed-aetiology ulceration — typically, a venous ulcer, but with the presence of underlying arterial disease too.

Mixed-aetiology ulcer patients often present with an oedematous limb, but due to their underlying arterial disease, clinicians are wisely reluctant to apply compression therapy bandaging. However, often, the cause of their ulcer is the oedema or co-existing venous disease, which causes frustration for both patient and clinician in terms of how to treat the oedema and ulceration.

Following assessment by an expert practitioner — either vascular surgeon or vascular nurse specialist — who can direct care, inelastic bandages have been shown to reduce oedema and heal ulceration (Mosti et al, 2012). It should be noted, however, that any patient complaining of ischaemic rest pain is contraindicated for all types of compression bandaging and should be referred urgently to a vascular surgeon (Marston and Vowden, 2003).

Inelastic bandaging for patients with chronic oedema

Inelastic, short-stretch bandages

are applied at full stretch to create a rigid casing around the limb, which creates resistance when the leg is moved from the horizontal position (when elevated), to the dependent position (when legs are lowered), or walking. The pressure under the bandage increases as the calf muscle attempts to contract against the rigid bandage.

This pressure may be as high as 70–80mmHg, when applied by an expert clinician, but only lasts for as long as the individual is mobilising (EWMA, 2005). When applied by an inexperienced clinician, who may apply the bandages more loosely, there is still a pressure of 40mmHg applied when the patient is mobilising (Moffatt, 2007).

The frequency of bandage reapplication will depend on the degree of oedema present in the limb. Individuals with a large oedematous limb may require frequent reapplication — as the oedema resolves itself, the bandage will loosen — and, if not reapplied, the limb may become misshapen, due to bunching of the loosened bandage or even result in skin damage (Acton and Charles, 2006).

Attempting to extend the reapplication time is a false economy as it protracts the patient's problems and extends the treatment period, causing frustration for both patient and clinician. This can lead to the patient doubting the skill of the clinician and even breakdown in the clinician/patient relationship, which is detrimental for all concerned (Beldon, 2009).

Those individuals with skin problems, such as varicose eczema, may require regular skin treatment in addition to their bandaging, which may dictate the frequency of bandaging. This cannot be ignored as

the patient requires a resolution to all of their problems — skin problems such as eczema or dermatitis, in addition to oedema or ulceration.

There are some general principles that apply when managing skincare for the patient with chronic oedema:

- ▶▶ Avoid the use of soap, as, due to its alkaline nature, it will dry the skin
- ▶▶ Avoid scented/perfumed products
- ▶▶ At every bandage change observe the skin for any abrasions, cuts or insect bites
- ▶▶ Ensure that any skin folds are clean and dry
- ▶▶ Wash and dry skin thoroughly, using a lined bowl/bucket used only for this purpose to minimise risk of infection (Stephen-Haynes, 2007).

The number of layers of inelastic bandage to be applied is dictated by the girth of the individual's ankle. Due to the pressure exerted by a bandage being inversely proportional to the patient's ankle circumference, the pressure exerted by the bandage decreases as the patient's ankle circumference is increased — so patients with an ankle circumference greater than 25cm require a second layer of inelastic bandage to be applied from the ankle upwards

If cardiac failure is the cause of limb oedema, the clinician must consider the consequences of reducing oedema, which may lead to increased cardio-pulmonary distress. In such circumstances, it would be wise to use only a single layer of inelastic bandage, despite the patient having an ankle circumference larger than 25cm. Limb reduction of oedema would be slowed, but safe.

The immobile patient

Chronic oedema is a common

complication of immobility since the patient is not using the calf muscle pump to exert pressure on the deep veins — the muscles are flaccid or may even have atrophied due to lack of use. Elevation of the limbs is clearly important, however, to enable to patient to tolerate elevation, the legs must be properly supported.

If the patient is able to perform dorsiflexion, this will also aid venous return and maintain the calf muscle pump (Davies et al, 2007), thus reducing oedema and aiding healing. Patients should be encouraged to follow dorsiflexion exercises as part of their responsibility for their own healing.

Discussion

The use of inelastic bandaging is a safe option for the patient with chronic oedema or mixed-aetiology ulceration, however, this option must be considered alongside the individual patient's co-morbidities — if they have severe cardiac failure it may not be appropriate for them to have compression bandaging of any kind due to the dangers of cardiac overload.

The clinician must come to a decision, together with the GP/medical team caring for the individual's underlying medical condition, as to whether or not compression therapy is appropriate, while involving the individual patient in all discussions.

Conclusion

Inelastic bandaging is a valuable form of compression therapy in the healthcare setting and the clinician should consider it for those patients with chronic oedema and a safe ABPI, as well as those with mixed-aetiology ulceration.

It should always be performed under the guidance of an expert practitioner to ensure that the clinician's knowledge and skills in

bandage application are competent, prior to treating a patient. **WE**

References

Acton C, Charles H (2006) Are short-stretch bandages better than long stretch? *Wounds UK* 2(2): 90–92

Beldon P (2009) Bandaging: which bandage to use and when. *Wound Essentials* 4: 52–61

Beldon P (2010) Performing a Doppler Assessment; the procedure. *Wound Essentials* 5: 87–90

Bianchi J (2005) LOI: an alternative to Doppler in leg ulcer patients. *Wounds UK* 1(1): 80–85

Bianchi J (2009) Arterial Assessment of patients with chronic oedema of the lower limb. In: Skills for Practice: Management of Chronic Oedema in the Community. *Wounds UK*, Aberdeen

Bianchi J, Vowden K, Whitaker J. (2012) Chronic oedema made easy. *Wounds UK Supplement* 8(2)

Davies JA, Bull RH, Farrelly IJ, Wakelin MJ (2007) A home-based exercise programme improves ankle range of motion in venous ulcer patients. *Phlebology* 22: 86–89

Doherty DC, Morgan PA, Moffatt CJ (2006) Role of Hosiery in Lower Limb Lymphoedema. In: *Lymphoedema Framework. Template for Practice: Compression Hosiery in Lymphoedema*. MEP Ltd, London 10-21

EWMA (2003) *Position Document: Understanding Compression Therapy*. MEP Ltd, London

EWMA (2005) *Focus Document: Lymphoedema Bandaging in Practice*. MEP Ltd, London

Foldi M, Junger M, Partsch H. (2005) The science of lymphoedema bandaging: In: *EWMA Focus Document Lymphoedema Bandaging in Practice*. MEP Ltd, London 1–4

Marston W, Vowden K (2003) Compression therapy: a guide to safe practice. In: *EWMA Position Document; Understanding Compression Therapy*. MEP Ltd, London

Moffatt CJ, Franks PJ, Oldroyd M, et al (1992) Community Clinics for leg ulcers and impact on healing. *British Med J* 305: 1389–92

Moffatt CJ, Franks PJ, Doherty DC, et al (2003) Lymphoedema: An Underestimated Health Problem. *QJM* 96(10): 731–38

Moffatt CJ (2007) How Compression works. In: *Compression Therapy in Practice*. *Wounds UK*. Aberdeen, UK

Mosti G, Labichella ML, Partsch H (2012) Compression therapy in mixed ulcers increases venous output and arterial perfusion. *J Vasc Surg* 55(1): 122–28

Osbourne K (2007) Principles of below and above knee inelastic multi-layer bandaging. In: *Chronic Oedema*. *Wounds UK Supplement* 3(2): 29–34

Stephen-Haynes J (2007) Skin and wound care in chronic oedema. In: *Chronic Oedema*. *Wounds UK Supplement* 3(2Suppl): 35–39