

TREATING LOWER LIMB LYMPHOEDEMA WITH COMPRESSION BANDAGING

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Multilayer lymphoedema bandaging continues to play a major role in the treatment of patients with lymphoedema. Care must be exercised to ensure that it is used appropriately and all practitioners who deliver care to this patient group should receive appropriate training in its application.

Lymphoedema is a progressive, chronic condition that occurs because of an imbalance between interstitial fluid production and lymph transport. It can be classified as either primary or secondary. Primary lymphoedema results from a congenital malformation; secondary lymphoedema occurs following damage to the lymphatic system, e.g. after treatment for cancer, surgery, radiation therapy, recurrent infection or trauma (International Society of Lymphology, 2003).

Traditionally, the treatment of lymphoedema consists of two distinct phases: an intensive treatment period (phase 1) and a long-term treatment/management plan (phase 2). This conservative type of decongestive lymphatic treatment is widely accepted as an effective method for the management of lymphoedema symptoms. It is used for treating

both primary (congenital) and secondary (acquired) lymphoedema. Treatment for lymphoedema always involves the use of a combination of interventions and is based on the following components: skin care, psychosocial support, patient education, the application of external support/compression, a programme of exercise and movement, and the use of lymphatic massage.

This article will focus on the use of multilayer lymphoedema bandaging in the treatment of lower-limb lymphoedema. It should be noted that this component of treatment would not be delivered in isolation, but in combination with skin care and exercise/movement, as described above.

The multilayer compression system used in the management of lymphoedema mainly

comprises inelastic or short-stretch bandages. Multilayer compression bandage systems are usually used in the intensive phase of treatment. The aims of this treatment phase involve decongesting the lymphatic pathways to reduce the size of the limb, encouraging the development of collateral drainage routes and stimulating the function of the remaining patent routes to control swelling in the long term (Mortimer, 1995). One randomised, controlled trial has shown a greater volume reduction in lymphoedematous upper limbs with short-stretch multilayer bandages when compared to hosiery (Badger et al, 2000).

How multilayer lymphoedema bandaging works

Compression bandaging is one of the cornerstones of lymphoedema management. Its efficacy depends on the

pressure exerted on the tissue covered by the bandage. The pressure exerted by a bandage is explained by a law of physics, Laplace's law, which can be read about in more detail in the Leg Ulcer section of this journal.

Once applied, multilayer lymphoedema bandaging produces variations in tissue pressure during movement. One of the main advantages of short-stretch material is that it exerts high pressure peaks intermittently during walking, and therefore creates a massage effect, and a low resting pressure which is more comfortable for patients at night. These pressure variations allow the lymph vessels to fill and thus facilitate lymph flow (Partsch, 1991).

Resting pressure is the constant pressure applied externally to the skin by the bandage when the patient is at rest or in a supine position. Working pressure is the temporary rise in pressure exerted when muscles contract and expand and press against a resisting bandage (while walking or exercising).

The effects of multilayer lymphoedema bandaging

Lymphoedema bandaging:

- ▶▶ Facilitates the action of the calf-muscle pump by providing a semi-rigid encasement for working muscles and so enhances the movement of interstitial fluid into the lymphatics
- ▶▶ Shifts fluid into non-compressed parts of the body
- ▶▶ Restores shape in the skin and subcutis (the layer of tissue directly underlying the skin)
- ▶▶ Reverses changes in the skin



Figure 1. Hyperkeratosis.



Figure 2. Pronounced skin folds.



Figure 3. Distorted limb shape.



Figure 4. Padding a bunion on the toe.



Figure 5. Toe bandaged with bunion protected.

by breaking down fibrosclerotic tissue

- ▶▶ Supports overstretched inelastic tissue
- ▶▶ Eliminates lymphorrhoea (leakage of lymph through the skin surface)
- ▶▶ Improves the venous pump in patients with venous and lymphatic dysfunction (Foldi et al, 2005).

There are several factors to be considered before multilayer lymphoedema bandaging can be used. These include clinical as well as psychological considerations that will affect suitability and concordance with treatment (Table 1).

Multilayer lymphoedema bandaging regimes

Moffatt et al (2005) identified several categories of patients for whom differing regimes of multilayer lymphoedema bandaging would be suitable. Multilayer lymphoedema bandaging (short-stretch regimes) is integral to standard intensive therapy programmes of care. In patients with lymphatic and venous dysfunction or immobile patients, there is the option to use either inelastic or elastic multilayer bandage regimes (Table 2).

The frequency with which bandages should be changed depends on the type of oedema present. Soft oedema will require more frequent changes as a reduction in limb volume results in bandage slippage. Multilayer lymphoedema bandage systems should be changed daily for the first seven days and the response to treatment monitored. This will ensure that sub-bandage pressure keeps pace with

Table 1

Indications and contraindications for multilayer lymphoedema bandaging (MLLB)

Indications for MLLB

- Ulceration, fragile or damaged skin
- Limb too large to fit hosiery
- Hyperkeratosis (thickened skin changes) (Figure 1)
- Lymphorrhoea (leakage of lymph through the skin surface)
- Lymphangiomas (dilated skin lymphatics that may first appear as blisters)
- Pronounced skin folds (Figure 2)
- Distorted limb shape (Figure 3)

Contraindications to the use of MLLB

- Current acute cellulitis: bandages may be too painful; alternatively, reduced compression (15–25 mmHg) may be used
- Arterial insufficiency: ankle brachial pressure index <0.6. Can use modified MLLB with reduced compression and under close supervision
- Acute deep vein thrombosis
- Lymphatic obstruction
- Uncontrolled heart failure; requires medical management. When stable, modified MLLB may be applied
- Caution should be taken if sensory or vascular deficit is present (e.g. diabetes mellitus, paralysis, bronchial asthma or hypertension)

changes in the size of the limb. It may then be possible to reduce the frequency of bandage change to two or three times a week.

Bandaging principles

The principles of bandaging are outlined in *Table 3*.

Bandaging for the leg

Practical bandaging skills are important for the effective use of multilayer lymphoedema bandaging. However, appropriate training is required. Generally use:

- ▶▶ A tubular bandage over the limb. This absorbs sweat and protects the skin against the subsequent layers. It is not advisable to cut this to the length of the limb as it shrinks when washed
- ▶▶ Toe bandages if toes are swollen (a 4cm conforming bandage). Padding can be used to protect painful joints, e.g. hallux valgus (bunions) (*Figure 4 and 5*)
- ▶▶ Padding using orthopaedic wool or soft foam. This will protect the skin, prevent chafing and equalise the pressure over the entire limb (*Figure 6*).
- ▶▶ Foam padding of various densities and shapes can reshape the limb, fill hollows, dissipate pressure and break down thickened areas
- ▶▶ Short-stretch compression bandages: one 6cm, one or two 8cm, three to four 10cm, four to six 12cm. A 12cm bandage is only used to bandage the thigh (*Figure 7*)
- ▶▶ Adhesive tape to hold the bandage in place
- ▶▶ A cohesive bandage helps minimise bandage slippage from the thigh
- ▶▶ Footwear to accommodate extra bulk during treatment.



Figure 6. Padding is applied to the limb. Figure 7. Compression bandaging is applied to the limb.

Table 2

Multilayer bandaging regimens

Standard intensive therapy bandaging (with skin care, MLD, MLLB, exercise daily for 2–4 weeks)	Modified intensive therapy bandaging (using high or reduced pressure with skin care, MLLB, exercise three times weekly)
<i>For patients with moderate to severe lymphoedema</i>	<i>For the immobile, unwell, older patients, and people with lymphoedema and venous disease</i>
Skin care	Skin care
Skin protection: cotton liner or suitable under layer	Skin protection: cotton liner or suitable under layer
Wool padding	Wool padding
Foam: soft roll/sheet to reshape distorted limbs and protect bony prominences	Foam only if comfortable, for protection and to reshape the limb Reduce bulk by using fewer layers of bandages
Dense foam: to soften subcutaneous tissue thickening	Use of a cohesive layer to extend wear time
Application: usually spiral according to patient needs	Assess need for full-leg or below-knee bandaging
Inelastic bandages for more active patients	Consider continence and wound care issues
Labour and time intensive and requires commitment to treatment	For long-term use, system is simplified according to individual need

Table 3

Bandaging principles

Apply bandages at full extension, except for wrapping toes

The desired bandage pressure is achieved with several layers of short-stretch bandages

The entire limb should be protected using underpadding

Always apply additional padding to the popliteal fossa (the area on the back side of the leg at the knee joint)

Bandage joints when they are in a functional position to prevent creases during movement

It is advisable to bandage joints using figure-of-eight turns, as fewer creases develop during movement
Acute deep vein thrombosis

Lymphatic obstruction

Uncontrolled heart failure; requires medical management.

When stable, modified MLLB may be applied

Caution should be taken if sensory or vascular deficit is present (e.g. diabetes mellitus, paralysis, bronchial asthma or hypertension)

Tips on assessing your own bandaging

The following points should be addressed at every bandage application and change:

- ▶▶ Bandage placement: always apply from the distal end of the extremity and continue proximally towards the heart
- ▶▶ Bandage overlap: maintain consistency to ensure a constant number of layers along the limb. To achieve the desired bandage pressure, several layers of short-stretch bandages have to be applied. Avoid creases while bandaging
- ▶▶ Bandage extension: this is recommended by the

manufacturer. Generally do not apply more layers at the top of the limb as this results in a tourniquet effect

- ▶▶ Examination of the limb: on bandage removal, puffy areas may be seen where oedema has formed. This indicates insufficient pressure in these areas, either as a result of too few layers of bandage or not enough bandage tension. Observe for oedema of the toes if not bandaged, and for the presence of any oedema proximal to where bandaging ends
- ▶▶ Red or broken areas indicate that excessive pressure has been applied at that point and these require protection from pressure damage.

Care of bandages

Non-adhesive short-stretch bandages must be washed frequently and rolled under tension. Frequent washing not only keeps bandages clean, but also helps them to regain their shape and function.

Conclusion

A comprehensive assessment that defines the type and severity of lymphoedema, in addition to the social and psychological factors that influence treatment, is required for all patients (Twycross et al, 2000). This will identify whether specialist intervention is required

or whether care can be delivered in a general health care setting. Inelastic multilayer bandaging continues to play a major role in the treatment of lymphoedema. Care needs to be exercised to ensure inelastic multilayer lymphoedema bandaging is used appropriately in the multimodal management of lymphoedema. However, it must be emphasised that all practitioners who deliver care to this patient group require training. **WE**

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