The use of compression hosiery is commonplace in primary care. Traditionally, compression hosiery has been used to prevent leg ulceration, including prevention of the recurrence of leg ulcers and skin breakdown after ulcers have healed (Nelson and Bell-Syer, 2012).

Hosiery can also be used to maintain a reduction in limb volume in patients with chronic oedema (Lymphoedema Framework, 2006) and delay disease progression in patients who are at a high risk of lymphatic/venous disease (Bianchi, 2013; National Institute for Health and Care Excellence [NICE], 2013).

A recent randomised controlled trial (Ashby et al, 2014) has highlighted that leg ulcer hosiery kits are a viable alternative to graduated compression bandaging for the treatment of venous leg ulcers, and they have been found to be just as effective as four-layer bandaging, with the benefit of reduced risk of recurrence following healing.

**WHAT IS A LEG ULCER HOSIERY KIT?**

Leg ulcer hosiery kits contain two stockings:

- A closed-toe liner delivering a lower level of compression (normally 10mmHg)

- An open toe second layer, normally delivering 25–35mmHg or 23–32mmHg, which slides on easily over the liner.

In combination, the two layers of the kit provide an overall pressure in the region of 40mmHg. The two-layered kit allows leg ulcer healing without the bulk of bandages, which are often applied in four layers and can be extremely time-consuming for healthcare professionals, as well as uncomfortable for some patients (Ashby et al, 2014).

The liner is often silky in texture, which makes it easy to apply and assists with application of the second layer. The combination of lower compression in the bottom layer and higher compression in the second stocking facilitates ease of application. The kits are appropriate for people with low-to-moderate exudate volumes. There are suitable options for patients both with and without chronic oedema. British Standard kits are suitable for those without chronic oedema (see Figure 1), while European Class kits are ideal for those with chronic oedema.

**THE VENUS IV TRIAL**

A recent randomised controlled trial compared four-layer bandage compression with two-layer compression hosiery kits for the treatment of venous leg ulcers (Ashby et al, 2014).

The trial involved 34 centres in England and Northern Ireland with a variety of settings such as wound care clinics, GP surgeries and nurse-led community teams. The trial involved data from 453 patients who were all able to withstand high compression and all had an ankle brachial pressure index (ABPI) of at least 0.8.

**Benefits of hosiery kits**

The VenUS IV trial (Ashby et al, 2014) provides strength of evidence to use hosiery kits as a first-line approach for those with venous leg ulceration.

In comparison to four-layer compression bandaging, hosiery achieves healing:

- In a similar proportion of patients
- In a similar timeframe
- With less cost (savings of £302.00 per patient)
- With less recurrence after healing.
Choosing the right path...

...has just got easier for you and your patient
The participants were randomly assigned four-layer bandaging or two-layer hosiery and the endpoint of length of time to healing was assessed using masked photographs. Both groups healed in similar times, with the median time to healing being 99 days in the hosiery group and 98 days in the bandage group. The proportion of ulcers healing was also much the same in the two groups (70.9% hosiery and 70.4% bandage). The researchers concluded that leg ulcer hosiery kits are a viable alternative to four-layer bandage systems for treating venous leg ulcers.

The study highlighted the drawbacks to four-layer systems, pointing out that they can be bulky which can reduce ankle and leg mobility. Bandaging is also reliant on skilled application to maintain the correct pressure gradation and it may also be prone to slipping. Compression hosiery is less bulky, which may enhance ankle or leg mobility and can be worn more easily with shoes.

The study also showed that hosiery was associated with a reduced chance of ulcer recurrence after healing. It may be that using hosiery to treat venous leg ulcers prepares patients for maintenance therapy with hosiery after the ulcer has healed.

Cost-effective
The study found that the hosiery kits were also more cost-effective, not least because they encourage self-care due to the ease of application. The study concluded that increased use of two-layer compression hosiery is ‘likely to result in substantial savings (£302.40 per patient, per year) for the NHS and improved quality of life for people with venous ulcers’.

Overall, these results suggest that the traditional choice of a four-layer multicomponent compression bandage system — once considered the gold standard treatment for venous leg ulcers — should be challenged, as there may be advantages for both the patient and the NHS to using leg ulcer hosiery kits.

FULL HOLISTIC ASSESSMENT

A full holistic assessment must be undertaken before decisions are made about which method of compression a patient should use. It should include:

- Vascular assessment incorporating Doppler ultrasound to assist in determining suitability for compression (refer to local guidance)
- An assessment of the presence of oedema. Hosiery kits are not suitable for those with a highly distorted limb, as the limb shape will interfere with the effectiveness of the compression
- A full assessment of the wound’s status including exudate volume. Heavily exuding wounds should be managed with a superabsorbent dressing in conjunction with compression bandaging, until exudate volumes are controlled
- Psychosocial factors: the patient’s ability to apply hosiery should be considered. If a patient is not self-caring, a leg ulcer hosiery kit can still be used with assistance from the general practice nursing team. The patient’s preference should also be taken into account, as this can improve compliance. Application aids can also be prescribed to facilitate self-care
- A full patient history should be taken to assess for a family history of leg ulceration, lymphoedema, or known risk factors, such as deep vein thrombosis (DVT) or previous limb surgery.
BANDAGING OR HOSIERY?

Assessment may indicate that some patients will require compression bandaging, for example those with significant distortion due to oedema or those with a highly exuding wound. If the limb is not graduated in shape, bandaging should be used in the first instance.

‘Step-down’ approach

This involves the patient having a short period of bandaging to reduce oedema and/or exudate volumes, followed by a step-down to an appropriate hosiery kit that will facilitate clinically effective, cost-effective care (Figure 2).

It is important that a compression bandage best suited to the patient’s needs is selected in order to achieve the goals in the quickest possible time, while also being comfortable and easy to tolerate for the patient.

Ongoing reassessment of the patient’s care plan will ensure that the patient is stepped-down to a leg ulcer hosiery kit in a timely fashion.

If the patient exhibits chronic oedema at initial assessment, a hosiery kit suitable for oedema containment should be selected. Once healing has been achieved, the patient can then be stepped-down to European Class hosiery as appropriate for maintenance.

The VenUS IV trial suggests that those who have been treated with a hosiery kit are less likely to suffer recurrence at this stage, as using a hosiery kit assists with preparation for long-term maintenance (Ashby et al, 2014).

PRODUCT SELECTION

It is vital that the most appropriate product is selected in order to deliver therapeutic compression to the limb, ensure comfort for the patient and facilitate concordance. For those who are self-caring, it is important that the product can be easily applied. Hosiery application aids can assist with this.

British Standard hosiery is ideal for patients without chronic oedema (Timmons and Bianchi, 2008) and will provide effective compression to encourage wound healing.

European Class is suitable for those patients with chronic oedema and will help to contain oedema as well as facilitate healing due to a higher level of stiffness in the fabric, which encourages lymphatic movement and re-absorption of lymph (Timmons and Bianchi, 2008).

In both variants there is compression present in the foot, which will prevent any build-up of oedema in the dorsum. This may be another reason for selecting a leg ulcer hosiery kit for some patients, rather than four-layer compression.

Limb measurement

When the most suitable type of hosiery kit has been selected, the limb should be accurately measured according to manufacturer guidance and measurement charts.

Measurements should be taken as early in the morning as possible before the patient has had to stand for too long, and they need to be taken next to the skin. If the patient requires compression in both legs, both legs should be measured as there may be differences in size.

CARE DELIVERY

High levels of training and competence are required if people are to apply four-layer compression bandaging, but leg ulcer hosiery kits can be reapplied with ease. The inner layer can be easy to put on and provides a smooth surface for the outer layer to glide over (Anderson, 2013).

This means that the full nursing team can be involved in the patient’s care, not just those competent in applying compression bandaging. It can also mean that patients’ families and/or carers can be more involved and there is the greater possibility for self-care.

CONCORDANCE

Concordance with maintenance compression is notoriously low (Jull et al, 2004; Raju et al, 2007). Using hosiery kits to achieve healing prepares the patient for long-term hosiery use, in that the patient is able to experience the benefits of hosiery throughout the healing phase.

The patient is, therefore, encouraged to remain concordant with hosiery long-term, thereby helping to prevent recurrence. Long-term use of hosiery has been shown to better reduce leg ulcer recurrence than no hosiery at all (Nelson and Bell-Syer, 2012).

It has been found that working with the patient to find a suitable garment based upon choice and clinical need can also help with concordance (Gray, 2013).

THE CLINICAL AND COST-EFFECTIVE CHALLENGE

In today’s NHS, general practice nurses (GPNs) are challenged to ensure that they not only deliver the best care, but also the most cost-effective, underpinned by research evidence (Gray, 2013). Thus, it is important to consider the different compression options available, and choose the most suitable system

Figure 2.
A new approach to compression therapy.
CONCLUSION

Leg ulcer hosiery kits are a viable alternative to four-layer bandaging systems. They facilitate patient involvement and self-care where appropriate and bypass some of the drawbacks to using four-layer bandaging, such as bulkiness and reduced mobility.

The VenUS IV trial has identified cost benefits and potential quality of life benefits, as well as a reduced risk of recurrence of venous leg ulcers through continued use of leg ulcer hosiery kits.

These findings challenge the ritualistic practice of using four-layer compression bandaging as the gold standard, and suggest that this may not deliver the best outcome for the patient.

Those patients who are found to be unsuited to leg ulcer hosiery kits may benefit from a short period of bandaging to reduce their oedema or wound exudate volumes, followed by the use of a leg ulcer hosiery kit to continue the healing process.

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REFERENCES
