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# How to select the best compression hosiery for your patient

**V**enous and lymphatic disease both result in skin changes to the lower limb. These range from early disease signs such as mild oedema and dry skin, to varicose veins, leg ulceration and chronic oedema in the later stages. Patients at all stages of disease progression are commonly encountered in the community and compression hosiery plays a key role in the prevention and management of skin changes. Its use can:

- ▶ Delay disease progression in patients with known risk factors for lymphatic/venous disease, e.g. a family history of leg ulceration
- ▶ Delay disease progression in patients with mild skin changes that are an early sign of diseases such as mild oedema and varicose veins (Bianchi, 2013)
- ▶ Heal uncomplicated venous leg ulcers as effectively as 4-layer bandaging (Ashby et al, 2013)
- ▶ Prevent skin breakdown in patients with healed venous leg ulcers (Nelson and Bell-Syer, 2012)
- ▶ Maintain a reduction in limb volume that has been achieved with intensive bandaging in patients with chronic oedema (International Lymphoedema Framework [ILF], 2006)
- ▶ Provide support to the lymphovenous system during pregnancy (National Institute for Health and Care Excellence [NICE], 2010)
- ▶ Prevent the development of deep vein thrombosis (DVT) in patients with reduced mobility (NICE, 2013).

## HOW HOSIERY WORKS

Hosiery works by compressing the lower limb so that when the calf muscle pump contracts on moving, it is met with resistance which helps to squeeze the blood in the veins of the lower leg upwards. On relaxation of the calf muscle, hosiery helps to close faulty valves in the veins, preventing blood backflow. Together, these actions improve venous return, helping to relieve congestion of blood and lymph in the lower limb, which, if left untreated, result in skin changes such as ulceration and chronic oedema (Torra i Bou and Moffatt, 2008; Bianchi, 2013).

Each patient's suitability to wear hosiery must be determined during assessment, which requires an understanding of the different products available to make the right choice for the individual patient (Gray, 2013).

## DIFFERENT TYPES OF HOSIERY

In the UK, both circular and flat-knit hosiery are available as either ready-to-wear or made-to-measure garments. Flat-knit describes the process of producing a garment as a flat piece of fabric, which is then stitched together, whereas circular-knit garments are produced as a tube (Clark and Krimmel, 2006; Lay-Flurrie, 2011). Most made-to-measure garments are flat-knit because distortion of limb shape, e.g. in patients with severe chronic oedema, can be accommodated during the stitching process. Flat-knit garments are made from a thicker yarn than circular-

knit, resulting in a stiff fabric that is better for distorted limbs as it is less likely to cut into the skin during wear. The finer, seamless finish of circular-knit hosiery may make it more cosmetically acceptable and comfortable, but some wearers may experience problems such as rolling or digging in (Clark and Krimmel, 2006; Lay-Flurrie, 2011).

Hosiery garments are standardised according to criteria which include testing methods, the yarn used in construction and compression delivered (Clark and Krimmel, 2006).

Hosiery can mainly be divided into two types:

- ▶ British Standard
- ▶ European Class.

British Standard compression garments are made from thin, light fabrics in a wide range of colours and styles. For this reason, many patients find them more acceptable and easy to wear, which may help with concordance to treatment (Timmons and Bianchi, 2008). In limbs with a graduated shape, British Standard garments provide effective compression to effectively heal venous leg ulcers and maintain healing. However, they are only suitable for patients with mild oedema (Timmons and Bianchi, 2008).

If moderate to severe oedema is present, European Class hosiery can be used to prevent deterioration, once limb volume has been reduced and stabilised using bandaging. The greater stiffness of European Class garments encourages lymphatic

movement and reabsorption of lymph (Timmons and Bianchi, 2008).

Once the decision has been made to use British Standard or European Class hosiery according to the presence or absence of oedema, the appropriate class of garment should be selected.

### Different classes of hosiery

Hosiery is divided into classes according to how much compression it delivers at the ankle (measured in mmHg), with class 1 garments delivering the least compression, and class 3 the most. However, the amount of compression delivered in each class varies depending on whether the garment is British Standard or European Class (*Table 1*).

The class of hosiery should be selected according to the severity of symptoms, with more severe symptoms requiring stronger compression. However, all compression-related decisions should only be made following thorough patient assessment.

## PATIENT ASSESSMENT

### Holistic assessment

Holistic assessment should be carried out to look for factors that may point to underlying venous/lymphatic disease, such as a family history of leg ulceration or known risk factors, such as DVT or previous surgery to the limb. Contraindications, such as ischaemia or immobility, should be considered. If the patient already wears hosiery, consider if the garment could be improved. If the patient wears bandaging, consider if hosiery could be used instead.

### Vascular assessment

Before making any decisions regarding hosiery choice, Doppler ultrasound should be used to confirm or exclude the presence of arterial disease in patients who are being fitted with class 2 garments or above. The use of compression on patients with arterial disease can lead to significant damage or even loss of limb. Patients with an ankle brachial pressure index (ABPI) <0.8 or >1.3 require specialist referral. If the presence of oedema prevents an effective Doppler ultrasound being

**Table 1: British Standard and European Class hosiery compression classes**

	British Standard	European Class
Class 1	14–17mmHg	18–21mmHg
Class 2	18–24mmHg	23–32mmHg
Class 3	25–35mmHg	34–46mmHg

carried out, specialist referral should be made before applying compression (Timmons and Bianchi, 2008).

### Limb shape

Limb shape is a key factor in determining the patient's suitability for compression hosiery. The limb should be graduated from ankle to below knee for compression to be effective. If the limb shape is distorted, hosiery will not deliver adequate compression and may result in damaging the limb. Padding should be used to obtain a graduated shape and bandaging applied to deliver compression in severe cases (Clark and Krimmel, 2006).

### Skin assessment

**Skin changes with or without oedema?**  
The skin should be examined to look for changes associated with lymphovenous disease. In the early stages of disease, these may include tired, aching legs, mild varicose veins, and venous dermatitis. These changes may be accompanied with or without oedema.

### Leg ulcers: with or without oedema?

A recent randomised, controlled trial (RCT) has shown that leg ulcer hosiery kits are as effective as 4-layer bandaging in healing leg ulcers in some patients (Ashby et al, 2013). Kits consist of two layers of compression hosiery, an understocking and over-stockings, which when combined deliver therapeutic compression. Although they have the advantage of being less bulky than bandaging, they are only suitable for the management of uncomplicated, healing venous leg ulcers, with mild oedema that are producing a small volume of wound exudate.

If wounds are large/heavily exuding and requiring a bulky dressing, the graduated shape of the limb will be lost, again affecting the delivery of therapeutic compression.

Hosiery is thus contraindicated and padding and bandaging will be needed to restore limb shape until the wound has reduced sufficiently in size.

If the wound is on a healing trajectory, producing a small volume of wound exudate but accompanied by moderate to severe oedema, a European Class hosiery kit may be more appropriate as the stiffer fabric will aid lymphatic return, thus helping to contain the swelling. Again, if the limb is not graduated in shape, bandaging should be used instead of hosiery.

### Healed ulcers: with or without oedema?

Once the ulcer has healed, recurrence should be prevented with long-term use of hosiery, since this has been shown to better reduce leg ulcer recurrence than no hosiery at all (Nelson and Bell-Syer, 2012). Again, it is important to consider if oedema is present on the limb, since the presence or absence of swelling and its severity should influence compression hosiery choice. If oedema is severe, bandaging may need to be used to reduce limb volume to a point where it is stabilised. At this stage, or if oedema is moderate, European Class hosiery may be used to contain the swelling. If no or minimal oedema is present, a British Standard garment can be used to prevent skin breakdown.

### Chronic oedema

European Class garments are always recommended for limbs with chronic oedema.

### Patient mobility/dexterity

Hosiery application can be difficult and patients and/or their carers must be able to apply and remove garments themselves. Hosiery kits can aid application as the inner layer can be easy to put on and provides a smooth surface for the outer layer (Anderson, 2013). Aids also exist to make application easier.

# What's your next step?

In order to use the knowledge you have gained from this article to inform your continuing professional development (CPD), you should take the following steps before logging onto the website ([www.jcn.co.uk/learning-zone/](http://www.jcn.co.uk/learning-zone/)) to take the learning zone test:

## Reflect

- Why is compression choice important?
- What factors should influence compression choice?
- What is the significance of the presence or absence of oedema?
- Do you understand the different types of hosiery available?

## Evaluate

Do you understand the importance of compression selection? What can you do to ensure you are well informed on the compression products available when visiting patients in the community?

## Act

Read the article when you have a spare few minutes in the day.

Make some notes on what you have learned, then visit the online test ([www.jcn.co.uk/learning-zone/](http://www.jcn.co.uk/learning-zone/)) to complete this subject.

The whole test, which involves reading this article and answering the online questions, should take you 90 minutes to complete.

Finally, download your certificate to show that you have completed the JCN e-learning unit on hand hygiene as part of your CPD portfolio.

## Patient preference

It is well known that patients with leg ulceration and/or chronic oedema can find it difficult to tolerate compression for a number of reasons, including reduced mobility, or social pressures, such as an inability to carry out work. Working with the patient to find a suitable garment greatly improves concordance (Gray, 2013).

## Limb measurement

Once a standard and class of garment have been selected according to all assessment findings, the limb should be measured to determine which size of compression product is required. Measurement guides are provided by the manufacturer but always include ankle circumference. If the limb is graduated in shape but larger than standard hosiery sizes, made-to-measure garments may be ordered to fit.

## REASSESSMENT

Hosiery choice should be reassessed regularly. A change in wound healing

status, oedema, ABPI, skin condition, mobility and comorbidities may require a change in compression therapy.

## CONCLUSIONS

Practitioner knowledge has an impact on patient concordance with compression therapy; when a practitioner understands the key principles of compression, along with the selection of products available, their ability to meet the needs of the patients is enhanced.

## REFERENCES

- Anderson I (2013) Compression hosiery to reduce leg ulcer recurrence. *Nurs Times* 109(6): 18–20
- Ashby RL, Gabe R, Ali S, et al (2013) Clinical and cost-effectiveness of compression hosiery versus compression bandages in treatment of venous leg ulcers (VenUS IV): a randomised controlled trial. *Lancet* 383(9920): 871–9
- Timmons J, Bianchi J (2008) Disease progression in venous and lymphovenous disease: the need for early identification and management. *Wounds UK* 4(3): 59–71

- Gray D (2013) Achieving compression therapy concordance in the new NHS: a challenge for clinicians. *J Community Nurs* 27(4): 107–10
- Bianchi J (2013) The CHROSS Checker: a tool kit to detect the early skin changes associated with venous and lymphovenous disease. *J Community Nurs* 27(4): 43–9
- Clark M, Krimmel G (2006) Lymphoedema and the construction and classification of compression hosiery. In: *Lymphoedema Framework. Template for Practice: compression hosiery in lymphoedema*. MEP Ltd, London
- Lay-Flurrie K (2011) Use of compression hosiery in chronic oedema and lymphoedema. *Br J Nurs* 20(7): 18–22
- Nelson EA, Bell-Syer SEM (2012) Compression for preventing recurrence of venous ulcers. *Cochrane Database of Systematic Reviews* 2012; Issue 8. Art no: CD002303. DOI: 10.1002/14651858.CD002303.pub2.tinyurl.com/compression-ulcers
- National Institute for Health and Care Excellence (2010) *Antenatal Care*. NICE Clinical guideline 62. NICE, London.