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and venous disease with  
made-to-order garments

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Compression therapy plays an integral role in the management of chronic oedema and chronic venous disease (CVD). The wide selection of garments available today means the combined approach of preventive and active therapy can be achieved along the progression continuum of these conditions. When chronic oedema and CVD are left untreated and advance, they result in increased swelling, development of skin changes, and progressive venous disease, and can subsequently lead to associated physical and psychosocial morbidity (Timmons and Bianchi, 2008). Compression garments can prevent the progression of these conditions and, in some cases, actively reduce the associated symptoms. In order to

achieve this, garments must be robust enough to prevent venous dilatation when the patient is walking or standing, promote absorption of tissue fluid into the venous and lymphatic systems, and improve venous and lymphatic flow (Parsch and Jünger, 2006).

Compression garments can be prescribed in a variety of styles, compression class, and fabric construction (Table 1). Experienced practitioners can select alternative means of delivering compression depending on the severity of symptoms and individual patient needs. For example, compression bandaging may be required to reduce moderate-to-severe levels of oedema; improve the shape of the limb; or boost skin changes, including healing ulceration. There are also Velcro wrap systems that deliver compression with or without an adjunctive compression garment (Lawrance, 2008). However, compression bandaging is time consuming and costly, and the donning of Velcro wraps requires strength and dexterity to ensure the correct level of graduated compression is applied along the length of the limb. Wearing compression garments promotes self-care and offers patients and practitioners a less intrusive and more cost-effective method of managing the sequelae of venous disease and chronic oedema.

## ABSTRACT

Selecting the most appropriate compression garments is vital in the long-term management of venous disease and chronic oedema. The range of styles has improved greatly over the years and many garments are available on the UK *Drug Tariff*. Practitioners now have a wide range of options to choose from including the type of fabric, colour, compression class, and style of garment. These options increase the practitioner's ability to select the most suitable garments and combine clinical and aesthetic needs, with the ultimate aim of improving compliance. The focus of this article is to highlight the aims and qualities of the various types of compression garments available, discuss the rationale for prescribing choice, and describe the benefits of Haddenham's Veni made-to-order compression leg garments in the management of chronic oedema and venous disease. Three case studies will demonstrate the effectiveness of the Veni made-to-order range of compression garments.

## KEY WORDS

- ◆ lymphoedema ◆ chronic oedema ◆ chronic venous disease
- ◆ compression garments ◆ compression bandaging

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## Compression garments

In the UK, obesity is predicted to affect 60% of adult men, 50% of adult women, and 25% of children by 2050 (Public Health England, 2016). In addition, those aged 65 years and over will make up 23% of the total population by 2035 (Office for National Statistics, 2012). The increasing elderly and obese population means that patients with chronic oedema and venous disease will often have coexisting complex clinical and psychosocial needs. Issues such as stroke, arthritis, obesity, and age-related frailty can result in reduced mobility, strength, and dexterity; vulnerable skin conditions; and larger limb circumferences, which can have

implications in the selection of well-fitting and effective compression garments. Good clinical outcomes are reliant on having easy access to garments that are available in a wide range of sizes, to accommodate the smallest frail limbs in the elderly population to the larger limbs seen in obesity, and a variety of styles that include the male perspective (Cooper, 2015).

When selecting garments, there are several factors that must be considered to ensure effective outcomes are achieved. First, the garments must fit properly without rolling down or cutting into a patient's skin. Sizing guides with several well-signposted measurement points are available to assist in the selection of the most appropriate-sized garments. Second, if a compression garment is to adequately support the tissues to counteract capillary filtration, there needs to be a level of garment stiffness and rigidity (Mortimer and Levick, 2004) to prevent rebound swelling. Garments made of stiffer fabric are better for improving venous and lymphatic return and, thus, controlling chronic oedema, whereas finer elastic garments will allow the limb to swell (Linnitt, 2011). The static stiffness index (SSI) is the increase in interface pressure of compression that occurs when a patient's position is changed from lying down to standing (Partsch, 2007). Elastic (long stretch) fabrics commonly used to manufacture circular knit compression garments have a lower SSI than short stretch materials (e.g. flat knit garments and bandages). However, if several layers of circular knit garments are applied one on top of the other, the SSI increases (Partsch et al, 2006); only skilled practitioners should prescribe the layering of garments. Finally, in order to increase compliance, the patient should be included in the decision making regarding colour, style of garment, and fabric design.

An additional essential factor in prescribing compression garments is cost-effectiveness, especially in the present economic climate of budget constraints. Made-to-order garments are ready-to-wear and come in a large combination of sizes, styles, and fabrics. This makes them almost as accommodating as custom made-to-measure garments.

### Prescribing compression garments

When prescribing compression garments, there are a number of factors that need to be taken into account (Lee

and Wigg, 2013). The clinician should have appropriate skills and knowledge regarding the indications for use and fitting of compression garments, choice of style, and construction of garments available and how to correctly measure the limb(s). The presence of mild symptoms should never be underestimated, as early intervention can prevent the development of complicated skin changes and severe swelling, which will require more resource- and time-intensive management strategies (Todd, 2012). All patients must undergo a comprehensive assessment prior to being prescribed compression in order to identify the cause, any arterial insufficiency and other contraindications to compression, and provide a treatment plan.

Effective assessment and compression prescribing requires significant levels of skill and knowledge, which most community nurses should have. If clinicians acknowledge that there are gaps in their skills and knowledge in the management of their patients' disease progress, they have a duty to ensure they source appropriate training. While often done, it is neither appropriate nor cost-effective to refer patients to specialist services for compression garment provision only, where patients may have to travel long distances and encounter waiting times as well as progression of symptoms. Many patients, however, are not suitable for compression garments as a first-line management strategy. *Table 2* outlines the indications for the range of compression delivery systems and some of the advantages and disadvantages of each.

### Veni made-to-order range

Today's patients present with diverse needs in terms of their compression garment requirements. Haddenham Healthcare has embraced this need by providing the made-to-order system, which offers a wide range of choice. Haddenham Veni compression garments are knitted in a continuous circular style using a fixed number of needles, which reduces the range of shape distortion that can be accommodated. The shape variation is achieved by altering the tension of the inlay yarn or by changing stitch height (Clark and Krimmel, 2006). Garments made in this way are seamless, and finer yarns are used, which makes them more cosmetically appealing to patients.

**Table 1. Types of compression garments available**

Garment style	Compression class (RAL)	Fabric construction
Toe caps	Class 1 (18–21 mmHg)	Circular knit
Anklelets	Class 2 (23–32 mmHg)	Flat knit
Below knee stockings	Class 3 (34–46 mmHg)	Custom made
Thigh-length stockings	Class 4 (>49 mmHg)	Ready to wear
Tights		

**Table 2. Range of compression delivery systems**

Type of compression system	Indications	Advantages	Disadvantages
Circular-knit garments	Chronic oedema	Cosmetically pleasing	May cut into skin folds
	Venous disease	Promotes self-care	Less easy to apply
		Less expensive than flat knit	
Flat-knit garments	Chronic oedema with shape distortion or fatty limbs	Better at bridging skin folds	Less cosmetically pleasing
		Easier to apply	More expensive than circular knit
		Promotes self-care	
Short-stretch compression bandaging (SSB)	Reducing oedema	Provides high-working and low-resting pressures	Time consuming; requires 2–5 changes per week
	Improving shape	Some bandages can be reused, thus reducing cost	Bulky for use with footwear
	Improving skin changes		Reduces self-care
	Lymphorrhoea		
Long-stretch bandaging (LSB)	Venous leg ulcers (VLUs)	Weekly change	Bulky for use with footwear
		Best practice for healing VLUs	Reduces self-care
Velcro wrap	Chronic oedema	Can be used alone or as an adjunct to compression garments	Requires dexterity to apply

Source: Todd, 2011; Lawrance, 2008

The factors essential for effective outcomes—namely, size, strength, and selection—are standard in the Haddenham Veni range and are all available on the UK *Drug Tariff*. There is an extensive range of sizes from I to VIII, and this includes 3 leg lengths, 3 foot lengths, and standard width or extra wide, meaning that some of the largest legs (up to a 54 cm calf, and 78 cm thigh) can be accommodated. All garments are available in RAL compression class 1–3 (18–46 mmHg).

Patients have a large compendium of appealing styles, colours, and patterns to choose from, which can enhance compliance. Haddenham Veni is available in 11 different colours and 5 material patterns. The zig zag, diamond, and honeycomb patterns will be appealing to women, while the narrow rib and pinstripes will make the stockings look similar to socks, which will be more suitable for men. The grip top (if required) also comes in either plain or lace, and 5 or 3 cm. Garments are provided in closed toe or open toe in 10 different styles of knee-high, thigh-high, and waist-high, and each can be ordered as a single unit or in pairs. One-legged tights for either left or right leg are also available for those with swelling that extends to the trunk, and special panty selection options include lower waist line, male fly option, no gusset, and open or loose front for maternity use or those who require a looser fit—all of which is free of charge in the made-to-order range.

Haddenham Veni garments are constructed with a soft, stretchy fabric making them easy to apply and comfortable to wear, and a comprehensive but easy-to-use sizing

guide is available to ensure practitioners can order the appropriate-sized garment with minimal effort.

## Case studies

### Case study 1

A 76-year-old female with a history of osteoarthritis, hypothyroidism, and hypertension presented at the Lymphoedema Clinic at the Royal Stoke University Hospital, Stoke-on-Trent, England. Assessment revealed bilateral leg oedema that had been present for more than 10 years, and despite the mild nature of the oedema, the patient was very concerned with the appearance of her legs and her reduced choice of footwear. The shape of her legs were good and the skin was in excellent condition. There were no complaints of any pain related to the oedema, but the patient did suffer from occasional cramps. Her previous treatment had included diuretics, which had been largely ineffective, and British standard compression garments that she had been unable to wear as she felt they were too tight and uncomfortable.

A diagnosis of lymphovenous oedema was established and skincare, exercise, and the use of compression garments were recommended. A choice of styles and fabrics were shown to the patient as she had requested aesthetic compression garments, and she chose the Haddenham Veni below-knee stockings in black with a diamond pattern (*Figure 1*).



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**Figure 1. Haddenham Veni below-knee stockings with a diamond pattern**

At her 6-month review, there had been a reduction in limb volume of approximately 150 ml in the right leg and 200 ml in the left leg. The patient had found the garments to be extremely comfortable to wear and easy to apply/remove. The patient expressed concerns in wearing the



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**Figure 2. Haddenham Veni Compression Shorts**

compression garments during the warmer summer months and a lighter colour was offered and was acceptable to the patient.

### Case study 2

A 53-year-old male patient with a history of irritable bowel syndrome and malignant melanoma was referred to the Lymphoedema Clinic at the Royal Stoke University Hospital. He had undergone excisional surgery and right groin-node dissection for the malignant melanoma.

The patient developed significant postoperative oedema of the right thigh that was extremely distressing, and he was very concerned that the leg would never return to normal. As he initially had a drain *in situ*, he was prescribed a Haddenham Healthcare garment grip to adhere to the thigh, so that the drain could be applied and removed quickly and easily. He underwent radiotherapy and was advised that this may lead to a further increase in oedema, but he was instructed to carry out skin care, exercise when possible, and wear the garment grip.

Following radiotherapy, he was seen in the Lymphoedema Clinic where measurements were recorded and an excess limb volume of 750 ml was established. Oedema was noted from knee to groin, the skin was intact and in good condition, and the subcutaneous tissues were thickened and non pitting. The importance of skin care and exercise were reiterated and Haddenham Veni Compression Shorts with a jovipad under the groin (*Figure 2*) was prescribed to increase compression.

At his 3-month review, there had been a reduction in limb volume of 325 ml and the use of the jovipad was discontinued. A smaller sized pair of Haddenham Veni shorts were required, and the patient gave feedback that the shorts had been very easy to apply and felt smooth under his clothing. He felt very comfortable and well supported when wearing the garments.

### Case study 3

This is the case study of an 80-year-old female with a history of chronic kidney disease (it was now at stage 3), hypercholesterolaemia, and hypertension. Although the patient had suffered from ankle oedema for many years, when travelling and in hot weather, the swelling had only increased over the past 4 years. On assessment, a diagnosis of lipoedema was established. Lipoedema results from the predisposition of an excessive number of fat cells in the lower limbs, typically from the ankle to the waist. Dieting tends to result in loss of fat from the non-lipoedematous areas with little effect on the lipoedema itself, whereas weight gain preferentially affects lipoedema sites, particularly thighs and hips. It almost exclusively affects women with onset at puberty or around pregnancy, which suggest hormonal influence. The cause of lipoedema is not known, but genetic factors are possible and it is not unusual to find a positive family history.

Distribution of the swelling in the leg gives rise to a bracelet effect around the ankle and increased gaiter girth.

The feet are usually spared, with a fatty/doughy feel to the subcutaneous tissues, and pitting is absent. There is often easy bruising, and sufferers often complain of fluid retention and joint pain. Lipoedema can progress to include an element of lymphoedema, which is the reason for seeking early compliance with treatment.

At the Lymphoedema Clinic, the patient described how her legs and the shape of her lower body made her feel; she had been teased as a teenager for having a 'bottom like a cart horse'. She had been prescribed below-knee compression garments via her GP, but these were poorly fitting and caused a tourniquet below the knee. Haddenham Veni Compression Tights (Figure 3) were prescribed. The patient was amazed at how well they fit. She initially started with a class 1 garment and then increased over a 6-month period to a class 2.

### Conclusion

Patients with chronic oedema and CVD have a diverse range of needs that require incorporating into a suitable treatment plan if compliance and positive clinical outcomes are to be achieved. Using compression garments as a preventive or active therapy strategy requires skill and knowledge, and the Haddenham Veni range provides a wide selection of such garments that can accommodate many patient groups, with a clear but comprehensive selection guide to aid community practitioners caring for these patients. The cost savings from prescribing made-to-order Veni compression garments can be enhanced if early stage chronic oedema and CVD are identified and managed in compression garments, preventing disease progression and the need for more resource-intensive therapies. The case studies in this article have demonstrated the value of the Haddenham Veni compression garments range in the management of chronic oedema.

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**Figure 3. Haddenham Veni thigh-length stocking with a grip top**

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### KEY POINTS

- ◆ Successfully managing chronic oedema and chronic venous disease (CVD) in this population requires access to a greater choice in compression hosiery styles
- ◆ Early intervention in mild chronic oedema and CVD will help prevent disease progression and reduce the need for resource-intensive therapies
- ◆ Haddenham's Veni made-to-order compression garment range provides a greater choice for practitioners and patients, and is less expensive than similar custom-made options
- ◆ The case studies show the benefits of Haddenham's Veni range in managing chronic oedema and lipoedema