

Simplifying hosiery prescribing with the Hosiery Hunter selection tool

KEY WORDS

- ▶ Adjustable velcro compression devices
- ▶ Compression hosiery
- ▶ Hosiery selection
- ▶ Medical compression stockings

Compression therapy is a lifelong intervention required for patients with lower limb venous and lymphatic disorders. Medical compression stockings (MCSs) also referred to as hosiery differ from anti-embolism stockings or non-medical support socks such as flight socks or support tights. MCSs are designed for ambulatory patients and provide graduated compression, with the greatest pressure exerted at the ankle and gradually decreasing up the garment (Lim and Davies, 2014). Adjustable velcro compression devices (ACVDs) are also described as pressure wraps (Everett, 2016), they too provide graduated compression, which is often easier to apply (Ritchie and Freeman, 2018). This article aims to highlight the many different aspects to consider when selecting a compression garment and how this could be simplified with a new selection tool.

MCSs along with AVCDs are the core treatment of patients with lower limb venous and lymphatic disorders (Tandler, 2016; Elwell 2016). For the purpose of this article the term compression garments will be used to discuss both MCS and AVCD.

When prescribing compression garments, many considerations need to be taken into account. Choosing between differing knitting styles, compression classes, fabrics and styles, along with patient factors such as mobility and dexterity (*Box 1*) Often selecting medical compression garments can seem difficult if clinicians are not equipped with appropriate knowledge about the different options available (Todd, 2015). Providing patients with MCSs can fall on different healthcare professionals — from GPs, Pharmacists to Community Nurses — all of whom will have varying experiences with the provision of compression garments. There is an extensive range of products from numerous manufacturers on the Drug tariff (NHS Business Services Authority, 2019) to meet a wide range of patients' needs. While this ensures that patients receive appropriate garments to meet the needs for both — their condition and lifestyle, it may often seem difficult for clinicians to select an appropriate garment. However, it is increasingly important to be aware of the differences in available products (Gray,

2013). If an incorrect garment is selected, it can have a detrimental effect on the condition of the patients and their future attitudes to compression garments (Moffatt, 2004). Patients who have poorly fitting garments are unlikely to wear them or be willing to wear other forms of compression. Prescribing the wrong medical compression may not only cause discomfort, but can cause harmful trauma/tissue/pressure damage where the fabric rolls or digs in (Robertson et al, 2014). If the fabric is too light, it can even cause any previous oedema to rebound.

COMPRESSION CLASS

Before prescribing compression garments, the class must be specified (Wounds UK, 2015). The compression classes relate to the amount of mmHg of compression provided in the garment. The class categories start at Class 1 for light compression and go up to Class 4, providing very high compression levels.

The values of mmHg in each class may differ depending on the standard the garments are made too. Ritchie and Freeman (2018) discussed how British standard garments provide less compression than the German RAL (also often referred to as European) alternatives. The compression class is usually determined based on the severity of the patient's symptom, following a holistic

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Box 1. Factors to consider when prescribing

- » Compression classes
- » Compression standard
- » Fabric stiffness
- » Knitting style
- » Donning and doffing of garments
- » Styles/lengths/foot options
- » Colours
- » Supply route/ procurement method
- » Patient preference

assessment, inclusive of a vascular assessment and considerations of other comorbidities along with patient preferences and tolerances (Harding, 2015)

COMPRESSION STANDARD

There is more than one standard of medical compression, which is dependent on the testing method used to characterise the compression gradient, durability and yarn specification, meaning individual compression hosiery is made to the specification of the relevant testing requirements for each standard (*Table 1*). There are three European national standards most commonly used in the UK. British, French and German (RAL). There is no independent testing authority for general European standard hosiery, whilst attempts were made in the past to produce a single European standard (draft standard ENV12718), a consensus could not be achieved and therefore the European hosiery standard was abandoned in 2005 (Clark and Krimmel, 2006).

It is important to know which compression level and what garment is required, as compression levels in each standard will differ — a class one British standard will offer 14–17mmHg, while a RAL class 1 will provide 18–21mmHg. Clinicians must be aware of the different standards to ensure that the chosen hosiery supplies the correct level of compression (Dowsett, 2011). The life span of the different garments will also differ, with RAL garments lasting twice as long as the British counterparts. The indications for use between the British and RAL standard garments also differ due to the elasticity of the stockings. British standard

garments are highly elastic and therefore are not suitable for patients with moderate limb swelling/oedema, whereas the RAL garments are made with stiffer construction allowing for better management of oedema (Moffat et al, 2006).

SIZE/FIT

To work effectively compression garments must be the correct size for the patient. With sizing terminology differing between hosiery classifications and manufacturers, this can cause confusion. Dependant on the style and manufacturer, the way in which clinicians measure limbs may differ. Some medical compression requires a simple ankle and calf circumference, while others will require more in-depth measurements. The differences between measuring techniques can make it difficult to ensure all required measurements are taken at the point of contact, especially if the healthcare professional is not the prescriber of the garments. Patient position during measuring and tape measure tension can vary dependant on the type of garment being provided. It is, therefore, important for healthcare professional to be aware of how to measure and prescribe their chosen MCS.

MANUFACTURING METHODS

There are two methods of manufacturing of MCSs: flat knit or circular knit. Circular-knit hosiery is knitted with a single weft thread on a cylinder producing a seamless stocking. Most ready-to-wear hosiery is circular knit. Patients often find these garments cosmetically more acceptable to wear, which helps with concordance (Stanton et al, 2016). Flat-knit compression hosiery stockings are produced as a flat piece of fabric and knitted together with a seam; often as bespoke made-to-measure items. This results in a stiffer garment, which is particularly helpful in patients with lymphoedema or chronic oedema, distorted limb shapes and deep skin folds as the fabric is less pliable and is less likely to dig in skin folds or roll down causing damage to the skin (Anderson and Smith, 2014).

FABRIC STIFFNESS

With the focus on class and knitting standard, Partsch et al (2016) identified that stiffness is often over looked. Unlike class and standard, there is

Table 1. Compression standards and classifications

Standard	Testing method	Guaranteed compression	Compression levels
British BS 6612:1985	HATRA	3 months	Class 1: 14–17mmHg Class 2: 18–24mmHg Class 3: 25–35mmHg
German RAL-GZ 387:2000	HOSY	6 months	Class 1: 18–21 mmHg Class 2: 23–32mmHg Class 3: 34–46mmHg Class 4: >49mmHg
French ASQUAL	IFTH	6 months	Class 1: 10–15mmHg Class 2: 15–20mmHg Class 3: 20–36mmHg

currently no national set rating for stiffness of compression garments. However, best practice should take into account the static stiffness index (SSI) of the garment. The SSI, which is the difference between the standing and resting pressures, is described by Partsch et al (2016) as a valuable parameter characterising the efficacy of a specific compression product. The higher the level of stiffness of a compression garment, the greater the fluctuation in pressure in the lower leg during walking (Partsch et al, 2005). High stiffness therefore produces the greatest improvements in venous blood flow. Lower stiffness in compression will generally produce a higher resting pressure so these factors need to be considered at the point of garment selection. Some patients may find a high stiffness compression therapy system more comfortable, as it will offer a lower resting pressure than a low stiffness compression system.

PATIENT PREFERENCE

Furthermore, there is a vast array of hosiery available in each standard and class category; this includes below knee- or thigh-length stockings with or without topbands, open- or closed-toe options, all in a variety of different colours. Often the choice of style is depending on the individual need of the patient. Elwell (2016) identified that it is important to include patients in the decision-making process to ensure that the selected garments are deemed acceptable for patients’ daily activities to aid concordance. Hosiery application can be difficult, however, to be effective they need to be worn. One of the biggest influencers on garment selection is whether patients can get the garment on and off. A degree of dexterity is required and individual factors, such as comorbidities, need to be considered along with the provision of applicator aids where appropriate (National Institute for Health and Care Excellence, 2013).

THE HOSIERY HUNTER: SIMPLIFYING THE PROCESS

With a multitude of factors to consider when selecting compression hosiery garments, it is easy to see why this topic can be somewhat overwhelming for clinicians. A new focus on simplifying hosiery assessment was created using three key patient assessment areas:

- ▶▶ Disease progression
- ▶▶ Patient body mass index (BMI)
- ▶▶ Limb shape.

These three areas are easy to visually assess on patient contact and require little skill to differentiate between the selection options. To enable a simplified selection process, the suggested fabric is recommended dependant on the individual patient factors. The score when calculated together points toward the most suitable fabric or devices. No class is recommended as it is deemed that the healthcare professionals will advise the desired level of compression dependant on a full holistic assessment and patient tolerances.

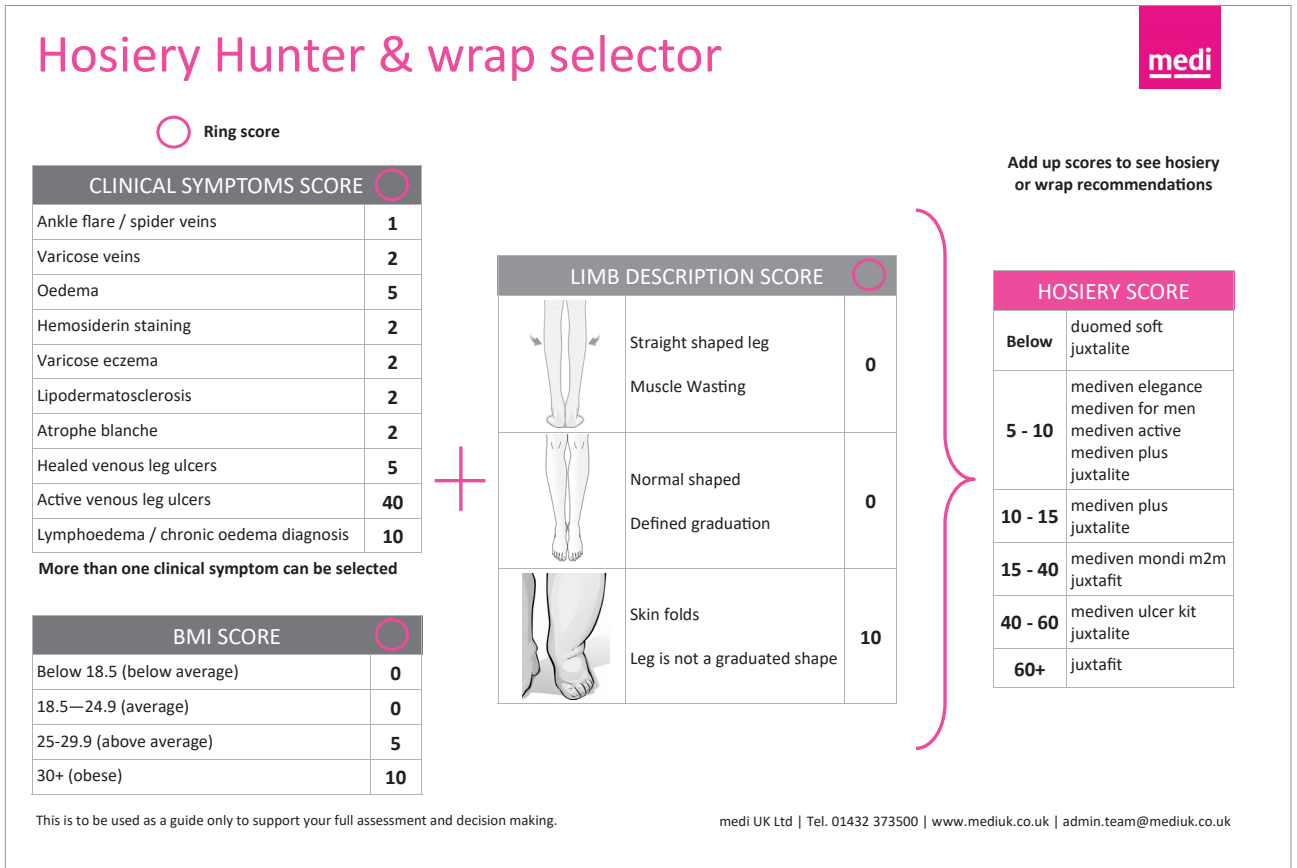
DISEASE PROGRESSION

Clinical signs are shown to correlate with disease progression in many studies reviewed by Wittens et al (2015). The Hosiery Hunter allows for healthcare professionals to select from a list of clinical symptoms varying in severity. The clinical symptoms range from indicators of mild venous disease to patients with active ulceration or lymphoedema/chronic oedema. Fabric selection will often depend on the stage of disease advancement; Lay-Flurrie (2011) recognised thicker and sturdier garments prove more useful in patients with advancing limb oedema, so it is key to score all symptoms where listed. Patients can score for more than one category in this section, all scores being calculated to form a final number at the end of the complete assessment. This visual assessment will help indicate the severity of the lower limb venous disease present dependant on the clinical presentation. There is no need for advanced technical terminology here or to have a complete list of possible symptoms as that may over complicate the tool. The simple scoring factors are relatable to the well-established CEAP classification system developed by the American venous forum in 1994.

BODY MASS INDEX

Danielsson et al (2002) illustrated that there is a significant association between BMI and the severity of chronic venous insufficiency. Patients’ BMI is often not considered in the selection process for compression garments, however, Brailsford (2015) recognised overweight patients need special

Figure 1. The Hosiery Hunter tool



considerations. Reich-Schupke (2015) identified that compression with a high level of stiffness is preferred in obese patients to provide sufficient working pressures to manage increasing peripheral venous pressure ratios identified by Parmeggiani et al (2013) induced by the increase in inguinal pressure values seen in raised BMIs. Obese patients have further issues with donning and doffing, Reich-Schupke et al (2012) recommend the use of stiff garments to assist patients overcome this issue as they can be easier to apply. If it is not possible to weigh patients during the assessment or patients are unaware of their weight an estimate or mid-upper arm circumference Brito et al (2016) would be adequate to enable a score.

LIMB SHAPE

Limb shape is also key in garment selection. Hosiery made with more elasticity or with finer fabrics create softer and less stiff garments, which are ideal for well-defined graduated limb shapes with minimal oedema (Wounds UK, 2015). For patients that have a degree of shape distortion or

swelling, Doherty et al (2006) recommend the use of stiffer garments such as flat knit hosiery or wrap devices may be preferred as these are unlikely to dig in to skin folds or tourniquet.

The new tool named the Hosiery Hunter has been recently developed by Clinical Trainer Megan Hunter from medi UK to assist in the selection of hosiery fabrics (Figure 1) for use in clinical practice to help simplify the compression selection process. There is often more than one suitable option in the suggestion following scoring, for example a compression garment and an AVCD which allowed for patient preference and opinion to be considered at the point of selection whilst still ensuring either option would be suited to their presenting condition. The introduction of the tool was evaluated in a tissue viability community clinic on a sample of 14 patients requiring compression hosiery following a full holistic assessment. The patients scores were calculated dependant on their clinical presentation during initial assessment and then the suitability of the garments were reviewed on follow up of fitting. The suitability of the garments were

PATIENT CASE STUDY 1

A 60-year-old lady presenting with complaints of achy heavy and itchy legs. Past medical history of varicose vein surgery, hypertension and osteoporosis. ABPI recorded within normal parameters, nil contraindications for compression reported. The Hosiery Hunter



was used to calculate compression score:

Varicose veins 2 + Ankle Flare 2 = Total score 4 points. Suggested fabric: Duomed Soft

Patient measured and fitted with class 2 British standard Duomed Soft. At the follow-up appointment, the patient reported that her symptoms had improved greatly when wearing hosiery and that the garments were comfortable. No further follow up was required and patient was discharged back to the care of GP.

PATIENT CASE STUDY 2

A 68 year-old-lady who visited her GP practice 3 times a week for bandaging with PMH of chronic leg ulceration. She was referred with concerns over deteriorating wounds. Her bandages were often wet and sometimes slipped. She is a busy business owner who cannot



afford to keep taking time off work and wished to reduce attendance needed at her GP surgery. The Hosiery Hunter was used to calculate compression score:

Venous ulcer 40 + Chronic oedema 10 + BMI >30 10 + Limb shape 10 = Total score 70 points. Suggested fabric: mediven mondi/garment juxtafit

The patient was measured and fitted with juxtafit compression wrap set at 40mmHg, using the built in pressure system (BPS). At her follow-up appointment, the patient reported the juxtafit garments enabled her to care for her ulcers herself and reduce the amount of time she needed to take off work. She was comfortable in the garment and found them easy to apply and look after. The clinician reported that the limb oedema had decreased, the limb shape improved and both exudate levels and wound dimensions had reduced.

PATIENT CASE STUDY 3

83-year-old lady with a history of Arthritis, obesity, hypertension, cellulitis and lower limb oedema, presented to the clinic for oedema reduction. She had declined previously to have intensive decongestion therapy for her legs with bandages or adjustable velcro wrap devices. Hosiery Hunter used to calculate compression score:



Hosiery Hunter used to calculate compression score:

Lymphoedema/chronic oedema 10 + BMI >30 10 Limb shape 10 = Total score 30 points. Suggested fabric/garment: mediven mondi/juxtafit

The patient was measured and fitted with class 2 flat knit mediven mondi closed toe hosiery as she had previously declined the use of velcro wrap devices. On follow-up, the patient reported that she found the garments easy to apply and remove with assistance from her husband and said her legs felt much better in the garments. In this case, the patient was booked a further follow-up appointments in 3 months time to review the oedema again due to possible limb volume reduction and need to be re-measured for smaller garments.

judged against the ability to manage the condition along with patient-led feedback.

Simple questions were created to evaluate the tool from the healthcare professionals' perspective. These questions included: "Did you find the Hosiery Hunter easy to use? Were you able to select a garment from the suggestions relating to the score? And finally, on fitting/follow up, are the garments suitable to meet the needs of the patient?"

All patients were pleased with the compression decision, and reported they were satisfied with the type of garments they had been provided. The health professionals using the tool agreed with the suitability of the garments scored in all of the suggested cases (Table 2) and felt they meet the individual clinical needs of patients. They also found the tool easy to use and felt more confident selecting garments with the support of the tool.

Knowing which compression hosiery suits a patient can be quite challenging, given the wide range of products now available. The growing range of hosiery is great for patient's choice, however, being the clinician trying to choose the specific selection can be complicated.

Patients were involved in their hosiery selection wherever the tool gave more than one option. This supported patients in becoming more self-caring with managing their oedema. Using hosiery opposed to compression bandages helps reduce the time spent and the cost of care (Tickle, 2015)

CONCLUSION

The tool was successful in simplifying hosiery selection in a complex arena of compression, allowing nurses to increase in confidence in relation to compression hosiery decision making. It is key to note Small sample size of patients were used in the evaluation process and feedback from only two clinicians were sought. While the use of such tools can aid garment, decision making the selection tool should be used alongside clinical judgement and individualised patient factors. Simplifying the selection process and helping to fit patients in to suitable fabrics on first application can aid with patient comfort and confidence and long-term concordance compression garments. The tool has since been introduced in to community nursing services in the locality to ascertain if the use of the Hosiery Hunter can aid general compression

garment selection in the community, therefore improving patient management and concordance.

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Table 2. Results table for the 14 patients after the Hosiery Hunter clinical evaluation

Clinical Symptoms	BMI	Limb shape	Total score	Suggested Garment	Selected Garment	Was suggestion appropriate?
Oedema in well-defined limb, nil other symptoms	Below average	Well defined	5	mediven plus	Measured for plus	yes
BMI >30, ulceration, oedema, skin folds	Obese	Skin folds present	65	mondi or juxtafit	Measured for juxtafit	yes
BMI >30, oedema, skin folds	Obese	Skin folds present	25	Suggested mondi or juxtafit	Measured for mondi	yes
BMI >30, chronic oedema, skin folds, ulcer	Obese	Skin folds present	70	mondi or juxtafit	juxtafit	yes
BMI >30, skin folds, chronic oedema	Obese	Skin folds present	30	Suggested mondi or juxtafit	Measured for juxtafit	yes
Primary lymph early stage 2	Average	Well defined	10	Mediven plus	Measured for plus	yes
Venous oedema, healed ulcer, leg is not graduated shape	Average	Not graduated shape	20	mondi or juxtafit	Measured for mondi	yes
Ulcer, oedema, varicose veins	Average	Well de-fined	47	juxtalite or mediven ulcer kit	Measured for juxtalite	yes
BMI >30, oedema, skin folds	Obese	Skin folds present	25	Suggested mondi or juxtafit	Measured for juxtafit	yes
Varicose veins, well defined leg, Telangiectasia	Average	Well de-fined shape	3	Duomed soft	Measured for Duo-med soft	yes
BMI >25, oedema, healed ulcer	Above average	Well de-fined shape	15	mediven mondi or juxtafit	Measured for juxtafit	yes
BMI>30, active ulcer, oedema	Obese	Skin folds present	55	mediven mondi or juxtafit	measured for juxtafit	yes
BMI 27, healed ulcer	Above Average	Well de-fined shape	10	juxtalite or RAL range	juxtalite	yes
Varicose veins, oedema	Average	Well de-fined shape	7	RAL range or juxta-lite	mediven elegance	yes