

# Compression garments for managing lymphoedema

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## Key words

Compression garments, lymphoedema

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## Abstract

Lymphoedema is a chronic condition due to a compromised lymphatic system and results in the accumulation of oedema. It can affect patients who have undergone cancer treatments that involve removal of lymph nodes and radiotherapy. It can also present from a congenital defect of the lymphatic system and as a complication of a venous disorder or filarial infection. The author has over 20 years’ experience working with lymphoedema patients and has a particular interest in compression garments. In this article, best practice and the author’s accumulated clinical knowledge are shared. Australia experiences some unique challenges, but many of the difficulties discussed are shared internationally.

Currently, most treatment options for lymphoedema manage, rather than cure, the condition. Internationally-researched treatment options are often multifactorial, such as complex lymphoedema treatment, which includes patient education about the condition, exercise, weight management, skin care, specific massage, compression bandaging if indicated, and maintenance with medical compression garments (Lymphoedema Framework, 2006). In 2012, Mosti and Partsch showed that compression stockings could be as effective as bandaging in reducing oedema if the size of the stockings was changed to match the limb size reduction. Other treatment modalities including low-level light laser, intermittent pressure devices, Kinesio Taping® and liposuction require a medical compression garment to maintain any reduction achieved (Lymphoedema Framework, 2006; Ridner and Sheila, 2013).

Recently, the benefits of manual lymphatic drainage massage as a stand-alone treatment have been questioned and the vital role of compression therapy confirmed (Nikolaidis et al, 2015). Many authors, including Todd (2015), describe compression hosiery as the “cornerstone of management of chronic oedema”.

The issues that arise when prescribing compression garments include:

- Comfortable fit
- Adequate graduated compression to manage oedema
- Acceptable design for the patient’s lifestyle
- Wear regimen
- Manageable cost
- Management of replacement garments.

## Fabrics and firmness

Compression garments are manufactured internationally for many different medical conditions. Australia has a relatively small population of 24 million (Australian Bureau of Statistics, 2016) and relies on industry partners to import and distribute many of the compression garments required to treat lymphoedema. This condition can require lifelong treatment with compression so it is important to correctly prescribe and fit compression garments. Most companies provide brand-specific training, which can be a valuable way of accessing information about products, correct measurement and treatment options.

There are a range of ready-to-wear sizes and lengths. Compression garments can also be custom made. The three

manufacturing techniques commonly employed are circular knit, flat knit, and cut-and-sewn (*Figure 1*).

## Circular knit

The circular knitting machine manufactures a long tube of fabric to produce quite a sheer, soft, stretchy and smooth fabric. These characteristics can make the garment more appealing; however, the fabric lacks stiffness, rests in skin creases and may roll more easily at the proximal end. Benefits include the fact there are generally no seams unless a band is attached, the fabrics can be dyed in a variety of colours and circular knits come in ready-to-wear ranges and a limited range of custom made sizes.

## Flat knit

This is manufactured as a flat piece of fabric and then constructed and sewn into the desired shape. It is a thicker and stiffer fabric than circular knit. A seam is required to construct the garment, which can be a weaker point in the design. Generally flat knit garments are sturdier than circular knit or cut-and-sewn garments. Both ready-to-wear and custom-made garments are available in these fabrics, and they are particularly suited to larger shapes.



Figure 1. The three types of compression garment fabric (left to right): flat knit, round knit and cut-and-sewn.

**Cut-and-sewn**

Here, a stretch fabric is cut and sewn into the shape required. There is great flexibility in the designs that can be used. There are several drawbacks to these garments: they often require zips for closing and have multiple seams that can be horizontal or vertical, which may cross the path of the lymphatic flow. The fabrics vary in stiffness and can be lined if frail skin is involved or the garment passes over a vulnerable joint, such as the elbow crease.

**Firmness**

The firmness of the fabric on the skin is measured in mmHg and is specified by a variety of standards (Table 1). Compression standards have been developed to ensure quality medical compression garments are available on the market.

Clinical decision-making is required to determine the most appropriate value for a particular person. Many compression

garments are marketed by manufactures as being suitable for a particular diagnosis, but in clinical practice selection is often more complicated than this. Insufficient pressure will not manage oedema and excessive pressure can be intolerable for the patient, cause pain on pressure points or be too difficult to don.

Patients and therapists need to be aware that once compression garments have been worn and washed, the compression values cannot be guaranteed. The patient and prescriber need to monitor and replace

garments when necessary to maintain the benefit of compression.

**Garment lifetime**

Washing, sun, body oils, perspiration and stretching from donning and doffing, as well as the wear and tear of life affect compression garment fabrics. The compression garment will not provide the required compression once damaged by these factors.

The majority of manufactures recommend that if garments are worn daily, washed

Table 1. Differences in compression standards (Todd, 2015).

Class	British standard	French standard	German (RAL) standard
I	14–17 mmHg	10–15 mmHg	18–21 mmHg
II	18–24 mmHg	15–20 mmHg	23–32 mmHg
III	25–35 mmHg	20–36 mmHg	34–46 mmHg
IV	N/A	>36 mmHg	>49 mmHg

Box 1. Issues to consider when prescribing compression garments.	
• Obesity: body shape will dictate whether ready-to-wear options are possible	
• Mobility: reduced mobility will impact on lower limb oedema	
• Reduced range of movement: upper-limb restrictions will increase the risk of oedema and impact on ability to don compression garments	
• Hand dexterity: restricted hand movement will impact on ability to don garments	
• Occupation: a patient's job, eg nurse or child carer, may not be compatible with compression	
• Caring responsibilities: eg caring for older people or young children	
• Comorbidities: conditions such as arthritis or diabetes can limit tolerance to compression	
• Pain: significant pain can reduce tolerance of compression	
• Age: children and frail older people have particular needs	
• Cognitive impairment: inability to follow directions regarding the wear or care of compression could mean a carer is required for safe application	
• Personal preference: this is crucial to patient adherence	
• Finance: compression garments are expensive and subsidies may or not be available to assist with the cost; personal and/or public funding will impact on the choice of garment available	
• Geography: eg in Australia, time and distance need to be factored into prescription.	

regularly, and there are two sets to alternate, they should last 4–6 months. This is only a guide and will vary from individual to individual, so the best advice is to monitor the garments. Patients who are regularly in contact with a healthcare professional will often be assessed every 6 months, and this is when garments can be replaced.

It is vital to educate patients that compression garments will overstretch and roll if not washed daily or on alternate days. The washing process causes the fibre to return to its original size.



Figure 2. The lymphoedema compression garment decision tree.

### Issues to consider in patients with lymphoedema

#### Assessment, education, wear and care

A face-to-face assessment with the patient is important and time needs to be taken to consider options, fabrics, styles, compression levels, and to educate the patient about wear and care of the compression garment. Time invested at this stage is well spent, as an ill-fitting compression garment will not be tolerated, risks creating further oedema problems and wastes limited resources. Issues that may need to be considered when prescribing compression garments are given in *Box 1*. The process is summarised in *Figure 2*.

#### Choosing an upper-limb style

It is important to look at the whole limb and consider whether the hand or wrist is involved, as well as the arm. A simple axilla-to-wrist sleeve with a variety of finishes and fixation options at the axilla can be used for an upper limb. If the patient is overweight or obese, the upper

arm measurements will be significantly larger than the wrist. A silicone band finish can reduce rolling at the axilla and style options, such as shoulder caps and extra-wide bands, reduce the risk of rolling at the proximal end in such patients. The elbow can be problematic, as any joint will put extra stress on the fabric with movement.

When oedema involves the hand, this can be very restrictive for a patient as a full glove may be required. Gloves can cause problems with personal hygiene and are incompatible with some occupations.

#### Choosing a lower-limb style

Oedema accumulation in the lower limbs can be significantly impacted by gravity and reduced mobility, as the muscle pump will not be working as effectively. The key principles of compression are (Wounds International, 2013):

- To counteract the force of gravity and promote the normal flow of venous blood up the leg
- To improve venous and lymph return and reduce oedema.



Figure 3. An example of an ill-fitting compression sleeve requiring urgent replacement.



Figure 4. Examples of assistive devices. From left to right: rubber gloves, Ezy-As (Ezy-As ABC), EasySlide (Arion), donning frame.

Toe involvement may necessitate toe pieces, which can be worn with open or closed toe styles. Open toe pieces may feel cooler, but they have a tendency to ride up the foot, allowing accumulation of fluid on the dorsum. Encouraging suitable shoes, such as a lace ups that can accommodate changes in size, will increase compression on the extremity.

Below-knee styles are indicated if the majority of the oedema is in the lower half of the leg. The garment needs to finish clear of the knee crease to reduce the risk of rolling at the proximal end.

Thigh-length or pantyhose styles are indicated if the majority of the oedema is in the thigh. Layering may be beneficial

to ease donning, eg a below-knee over a thigh-length can add extra compression at the extremity when required.

It is important to consider where the accumulated fluid will be directed. If it is in the thigh, for instance, will it be redirected to the genital area and bike pants may be indicated.

### When compression should be worn

Determining when compression should be worn needs to be considered on an individual basis and should be discussed by the patient and prescriber. Compression garments are typically worn during the day, when the limb is in a gravity-dependent position. A compression garment can be washed in the evening and dry overnight, ready to be refitted in the morning. In cooler months, it can be dried in front of a fan, but not in a drier as the heat damages the fabric. If two or more garments are available, wear can be rotated. Patients with particularly challenging oedema may need to wear compression at night and should have at least two garments to allow cleaning and rotation.

Many patients are concerned about how they will manage compression garments in the summer, as it gets very hot in Australia. Encouragement and simple practical approaches, such as keeping cool with fans or air conditioners in the heat of the day, reduces the discomfort for many patients with lower levels of oedema.

### Other potential challenges

Lymphoedema is a chronic condition and patients may present for treatment some years or months after an unsatisfactory prescription for garment compression. Patients prescribed ill-fitting garments (Figure 3) or not provided with information regarding where or when they were to replace the garment may have no confidence in compression therapy. Careful prescription and education regarding wear and care of the garment is required to build trust and confidence. A trial of a double layer of Tubigrip™ (Mölnlycke Health Care) may be useful to begin this process.

Difficulties donning and doffing garments are a challenge. An array of assistive devices is available (Figure 4). These are available through medical supply companies. Velcro-style wrap garments are a recent addition. These are easier for

some patients or their carers to don/doff, particularly with a large limb. Velcro wraps are bulkier than regular compression garments and need a significant level of skill to ensure appropriate compression is applied, however, and these issues will need to be considered if they are prescribed.

Another consideration is the addition of zips to custom-made compression garments. These can be useful for removing garments, but require significant manual dexterity when donning.

A final consideration is whether the patient can engage the assistance of family members or community carers. As this is usually a twice-a-day, 7-day-a-week obligation, it can be challenging for a patient to arrange.

### Financial issues

Financial support towards the cost of compression garments varies from state to state in Australia. A survey of Australasian Lymphology Association members reported that 46% of practitioners had compromised on compression garment prescription due to financial constraints (Scheer et al, 2006). Financial constraints have been reported as a concern internationally (Shih et al, 2009). Patients with lymphoedema who have private health insurance may have access to some financial support, but the rules for each policy vary greatly and change from company to company. It is recommended that patients investigate their eligibility prior to committing to expensive garments if they are relying on financial support.

Patient lobbying has been the most powerful tactic to date in successfully gaining government funding support for compression garment subsidies in Australia (Queensland Health, 2014; Mercy Health, 2015). However, the variation in subsidies and the limiting rules across the country continue to challenge patients and healthcare professionals alike.

### Conclusion

Compression garments are important and effective tools in the management of lymphoedema. They can facilitate self-sufficiency and self-care. Compression needs to be managed carefully as part of a wider management plan, however, in order

to be safe and effective. It can work in a complimentary manner with a number of treatment modalities for the management of lymphoedema. New technologies, fabrics and garment designs means the patient and prescriber need to remain up to date with what is available and what works most effectively for the individual. Australia has its own unique challenges in managing lymphoedema, but many challenges are shared internationally.

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