

Microfine toe caps: an innovative and cost-saving solution

Rebecca Elwell, Jane Wigg

Rebecca Elwell, Macmillan Lymphoedema Nurse Specialist, University Hospitals of North Midlands NHS Trust;
Jane Wigg, Director/Trainer, Lymphoedema Training Academy, Staffordshire; Clinical Advisor to LymphCare UK; Clinical Innovations Manager, Haddenham Healthcare

Email: jane@lymph.org.uk

Chronic oedema is estimated to affect 3.99 per 1000 of the UK population, rising to 10.31 per 1000 aged 65–74 and 28.57 per 1000 aged 85 and over (Moffatt et al, 2003). There are many causes of chronic oedema but they largely fall into four main categories: lymphoedema (both primary and secondary), lipoedema, dependency oedema and lymphovenous oedema (Green and Mason, 2006).

The management of chronic oedema and lymphoedema poses a significant challenge for patients and health professionals alike. For health professionals, time and resource constraints mean that the best treatment option available is not necessarily the method used. As our understanding of lymphoedema develops, an increasingly wide variety of treatment options and devices are available (Wigg and Lee, 2014), and nurses and other health professionals must select between these methods and devices according to clinical usefulness and cost-effectiveness.

Compression is the mainstay of treatment for lymphoedema. It can be applied using multi-layer bandaging, compression garments or wraps. Fitting a compression garment is a complex skill in lymphoedema management, with an array of fabrics, strengths and styles all providing different solutions for the condition (Wigg and Lee, 2012). Furthermore, chronic oedema patients often require

multi-layer bandaging initially to reduce and contain their oedema. This intervention often creates increased costs from nursing time, bandaging resources and an increased skill level required in order to carry out the procedure (Haddenham Healthcare, 2015).

Toe swelling can be a natural, but under-recognised occurrence in people with chronic oedema, meaning it is often not treated until the condition worsens and lymphorrhoea commences. From clinical practice and anecdotal evidence, the authors acknowledge that digit and foot oedema is a condition that can be minimised if it is recognised early and simple solutions are implemented. Standard application of compression bandaging does not include the toes and, in many techniques, minimal compression is applied to the foot (Harding, 2004) (Figure 1). This means that the toes can swell as a consequence of compression bandaging depending on its application and technique. Chan et al (2001) found that 12 out of 194 patients attending a leg ulcer clinic receiving bandage treatment developed toe ulceration. As this study took place in a leg ulcer cohort, it can be projected that the figures would be much higher when applied to the lymphoedema population. As highlighted by the International Lymphoedema Framework (ILF) (2006), there is an increased risk of cellulitis and infection among patients with lymphoedema. Therefore, those who also have toe swelling are particularly susceptible to bacterial and fungal infections (Figure 2).

ABSTRACT

This article discusses the use of Microfine toe caps (Haddenham, UK) for the treatment of digit swelling. It will discuss the indications and contraindications of the device and offers some case studies where toe caps have been used in clinical practice. The use of the Microfine toe cap offers an alternative to toe bandaging, has many different applications and can be safe and time-saving to apply when used appropriately following a full and holistic assessment.

KEY WORDS

- ◆ Toe bandaging ◆ Toe swelling ◆ Compression ◆ Ulceration
- ◆ Chronic oedema

Toe bandaging

Toe bandaging is an accepted part of multi-layer lymphoedema bandaging (MLLB) (ILF, 2006). Compression bandaging is known to reduce capillary filtration by increasing the pressure in the subcutaneous tissues and preventing fluid from entering the interstitial spaces (European Wound Management Association (EWMA), 2005). However, this process must be ongoing; therefore, if it is initially achieved with bandaging it will need to be continued with compression hosiery. Compression combined with exercise increases lymph flow and venous return, thereby reducing the volume of oedema (ILF,



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Figure 1. 'Pushed toes' often occurring as a result of a lack of compression applied to the feet



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Figure 2. Hyperkeratosis occurring after toe swelling

2012). In addition, it increases the blood flow into the microcirculation, which may improve wound healing and help to soften thickened or woody tissues.

The use of toe bandaging in venous hypertension was reported by McCann (2008). Its ability to prevent toe ulceration in patients requiring lower-limb compression bandaging for venous leg ulceration has been reported by Todd et al (2003) and McCann (2008).

A recent article by Elwell (2014) concluded that toe bandaging is an excellent way to control and reduce swelling of the toes, improve skin changes (e.g. papillomatosis) and lymphorrhoea and reduce the risk of bacterial and fungal infections. It may also reduce the risk of toe swelling and possibly ulceration. It should therefore be considered for patients undergoing compression bandaging of the lower limb(s).

However, toe bandaging is often perceived as a complicated and potentially dangerous technique. If wrongly applied, it can cause (ISL, 2012):

- ◆ Excoriation
- ◆ Constriction
- ◆ Splaying of the fifth toe due to increased pressure over fifth metatarsal region
- ◆ Pain due to cracks on the plantar side of toes.

In addition toe bandaging can be applied incorrectly even when nurses are thought to be trained in the technique (Figure 3 and Figure 4).

Using the Microfine toe cap

In order to overcome the potential hazards of toe bandaging and to maintain benefits for the patient, a toe cap or toeglove may be an effective solution. The term 'toe cap' will be used henceforth in this article, but the term 'toe glove' may be used interchangeably.

There are a number of toe caps available on the market, although there is only one (Microfine, Haddenham, UK) that is available off the shelf in standard sizes (extra small, small, medium, large and extra large) and on prescription (approximate cost £28). Based on French compression class 3 at 20–36 mmHg, the Microfine toe cap is made from a bespoke, medically engineered short-stretch fabric. This produces an extremely fine, light and conforming fabric (Close, 2010). The toe cap is available in two colours (black and beige), making it appropriate for use under open-toe garments. The toe cap can be cut to fit without fraying or altering compression, providing great versatility and reducing bulk to the forefoot (Figure 5).

Considerations

According to Scottish Intercollegiate Guidelines Network (SIGN) (2010), a vascular assessment should be carried out prior to the application of compression to exclude any arterial insufficiency. This is also transferable to patients considered for toe bandaging or the use of a toe cap. Assessment may include:

- ◆ Carrying out Doppler ultrasound and ankle-brachial pressure index assessment
- ◆ Pulse oximetry
- ◆ Toe pressures/toe-brachial pressure index.

Clinical signs and symptoms should also be recorded—for example, if colour/temperature change and comorbidities are noted, referral on to a tissue viability nurse specialist, leg ulcer nurse specialist, podiatrist or vascular surgeon may be necessary before commencing any form of compression.

Particular attention should be given to those patients

with peripheral neuropathy, e.g. patients with diabetes who may not be able to detect whether any friction or trauma is occurring. In these instances, a toe cap should only be used if the patient can be closely monitored. Patients with increased age and impaired mobility should also be carefully considered for suitability with regard to toe caps, since if there was any pain or discomfort being caused they may not be able to remove the toe cap independently. To reduce the compression in this group of patients a larger toe cap may be used.

Toe caps can be an effective way of protecting the toes from oedema being forced into them during compression therapy or it can be used as an alternative where toe bandaging is problematic. It might be the case that the technique has been tried unsuccessfully owing to patient choice, pain or lack of practitioner/patient confidence and training with the toe bandaging technique. However, if there is severe shape deformity from bandage slippage or dependency oedema, an application of a bandage applied as a stump technique may be appropriate (Figure 6).

Toe caps may be used with caution if peripheral neuropathy or diabetes is present, but it must be ensured that a full assessment has been carried out.

Toe caps should be removed if:

- ◆ Pain is reported by the patient
- ◆ Numbness/pins and needles are reported
- ◆ Blue colouration to the toes/foot is noted
- ◆ Temperature change to the toes/foot is noted
- ◆ Blue colouration to the toes/foot is noted
- ◆ Any skin trauma is noted.

The skin should be carefully scrutinised on each removal of the garment for any redness, marking or trauma. Note that there is a label sewn onto the toe cap along the seam on the sole of the foot that may need to be removed.

Fitting Microfine toe caps

Toe caps are easy to fit and allow for bespoke, custom-altered garments without the need for time-consuming and fiddly measurements being taken. The only measurement required is the circumference of ball of the foot (Table 1). In order to trim to fit, health professionals should cut away any toe parts that are not required (generally the little toe), then apply the garment to the foot and toes. Then, using a pen, mark the toe lengths at the base of the nail bed for each toe required, remove the garment and then trim. Reapply the garment to ensure the fit and make any adjustments as necessary. In addition, for extensive swelling and patients outside of the size chart, toe caps can be made to measure to fit individual patients.

Advantages of using toe caps Introduction to compression hosiery

Using a toe cap can be a good way of introducing patients to wearing compression hosiery, since if they are receiving bandaging, they will undoubtedly continue in a garment after the bandaging has ceased. Toe



Figure 3. An example of incorrectly applied toe bandaging

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Figure 4. An example of correctly applied toe bandaging

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Figure 5. An example of the Microfine toe cap product

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Figure 6. Stump technique of bandage application

Table 1. Circumference measurements (in centimetres) required for fitting toe cap

Measurement points	Extra small	Small	Medium	Large	Extra large
Ball of foot	21–23	23–25	25–27	27–29	29–31

caps can be easily combined with wrapping systems such as FarrowWrap (Haddenham Healthcare, UK) and under open or closed toe compression (Hobday and Wigg, 2013).

Avoiding misalignment problems

Toe caps do not require close consideration to be given to the positioning of the toes and feet as is the case with toe bandaging. Toes can easily be misaligned through compression bandaging and this can affect a person’s gait and possibly induce pain. Compression should not impede function or overall mobility (ILF, 2012).

Suitable for use with abnormal toes

Toe caps are easy to use in patients with poorly shaped toes, such as claw toes or amputated toes. King (2007) states that creases or fissures should be filled with foam when carrying out toe bandaging; however, this can be bulky, fiddly and time consuming. The trim-to-fit Microfine toe cap only requires adjustment prior to the first application and then is simply applied and removed at each bandage change, with a clean toe cap then applied. The toe cap fabric is designed to sit over the skin and should not cut in.

Avoids tightness problems

Toe caps do not require consideration of how tightly they are being applied. Once the patient has been deemed safe for compression hosiery following a holistic assessment, a

toe cap offers a compression range of 20–36 mmHg. When toe bandaging it is essential that no tension whatsoever is applied to the base of the toes (dorsum of the foot) when anchoring the bandage; indeed, there should be minimal tension applied to the toes themselves. Owing to the small circumference of the toes (even when swollen), the level of compression must be considered. Patients should have full toe flexion and movement—health professionals should always ask patients to wriggle their toes when the toe cap has been applied as they will be able to quickly inform the professional if it feels restricted.

Avoids unnatural raising of toes

Owing to their design, toe caps will not lift the toes unnaturally as toe bandaging sometimes does.

Use for securing dressings

Toe caps can be used to secure dressings in place where there may be lymphorrhoea, ulcers, surgical interventions, etc. The toes are common places for papillomatosis (benign skin growths of epithelial tissue that may contain fibrous vascular outgrowths) to occur. These areas tend to be hyperkeratotic and have a fur-like appearance. Owing to their surface vascular supply, the villi may bleed easily if disturbed. They can make toe bandaging more challenging as they often lead to shape deformity. In this instance the use of a foam dressings or use of padding used under a toe cap is an excellent solution. In palliative cases, a circular foam dressing such as PolyMem can be used on its own, or the toe end of the toe cap can be cut to make a toe sleeve over each individual toe rather than a full cover.

Any other skin conditions (e.g. tinea pedis or fungal nail infection) should be treated immediately to prevent the risk of cellulitis. Fungal nail infections can be transferred to the skin but are difficult to distinguish from psoriasis of the nail; therefore, nail clippings should be sent for testing before treatment is commenced. Topical treatments are less effective than systemic therapy, but there are significant side effects that must be carefully considered on an individual basis (Joint Formulary Committee, 2015).

In case of fungal infections, consideration of washing of the toe caps should be discussed with the patient. Microfine toe caps should be handwashed and air dried away from direct heat sources.

Further benefits

Microfine toe caps are latex-free and, to the best of the authors’ knowledge, have not resulted in any skin reactions. Furthermore, toe caps are ambidextrous and are therefore suitable for either the left or right foot. They are ultra thin, reducing on unnecessary bulk so that footwear may be worn. There is an increasing drive to reduce the bulk in oedema and leg ulcer management to enable patients to maximise their mobility and continue to wear appropriate footwear (Moffatt et al, 2012).

Toe caps are also cost relatively cost-effective: the average cost of a made-to-measure toe cap is £75, saving staff time for bandaging. Finally, toe caps do not ‘fall off’ with the ease

that toe bandages have the tendency to This reduces patient distress and arguably leads to a better therapeutic result.

Case studies

Case study 1

John, 65, had suffered from a chronic oedema for many years as a result of increased weight gain, worsening arthritis and hypertensive issues. John wore a class 1 Pertex light garment by Haddenham Healthcare but was developing papillomatosis and oedema to the base of the toes owing to his deterioration in health. Although the garments fitted well, his dependency oedema meant that he was not as active as he would have wished. The lymphoedema therapist provided John with an extra-large toe cap, allowing for the reduction and maintenance of the toe swelling in addition to elevation and ankle flexion.

Case study 2

Michael, 73, had been receiving two-layer bandaging for venous leg ulcers for 8 months. Although the leg ulcers were healing, he had started to develop oedema to the dorsum of the foot and toes where the bandages had pushed back when applying his shoes once he has become more active. He had received toe bandaging from the leg ulcer team, but this proved bulky with his footwear and sometimes came off when removing his shoes or with general activity. A Microfine toe cap was introduced alongside a FarrowWrap Lite. This solved both of his issues. Michael could apply his shoes, he was able to carry out good foot and skin hygiene, able to apply his wrap and the toe cap remained in place better than his previous toe bandaging. This allowed for increased independence and reduced nursing interventions and time (Figure 6).

Conclusion

Toe caps are a suitable alternative to toe bandaging. They offer a number of time- and cost-saving advantages. Safety of the patient should be paramount in any assessment and treatment, and as long as adequate vascular assessment (both subjective and objective) is carried out, Haddenham Microfine toe caps offer a safe and effective method of compressing the toes to manage or prevent chronic oedema and its associated skin changes.

Health professionals should seek advice from a lymphoedema nurse specialist, tissue viability nurse or leg ulcer specialist if they require further information relating to the use of Microfine toe caps.

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Figure 6. Example of Microfine toe caps used underneath short-stretch compression garments

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KEY POINTS

- ◆ Toe swelling can be a natural but under-recognised occurrence in people with chronic oedema, meaning it is often not treated until the condition worsens
- ◆ Toe swelling can be reduced or maintained with the use of toe caps
- ◆ Toe caps are a suitable alternative to toe bandaging offering a number of time- and cost-saving advantages