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management of lymphoedema

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Lymphoedema, or chronic oedema, refers to a condition where there is an accumulation of fluid within the tissue spaces, which has been present for longer than 3 months (Lymphoedema Framework, 2006). There are many different causes of lymphoedema that have been discussed in previous articles and which are identified following referral to a specialist lymphoedema practitioner, where a full holistic assessment of each patient is undertaken. Often lipoedema, which is possibly a genetic fat disorder, is confused for lymphoedema resulting in many of these patients being referred to the lymphoedema clinic.

The lymphatic system is a complex system that is made up of initial lymphatics, which consist of a single layer of endothelial cells found in the tissue spaces and are attached to skin and muscle by anchoring filaments (Lymphoedema Framework, 2006). The anchoring filaments can be seen to act like guide ropes on a tent, as the skin is stretched or the limb moves the anchoring filaments are stretched to initiate opening and closing of the initial lymphatics, thus

allowing for interstitial fluid to pass into the vessels where it becomes lymph fluid. Filling occurs as a result of changes in tissue pressure, caused when muscles are activated or when manual therapies apply pressure to the tissues aiming to fill the lymphatics (Belgrado, 2014). The lymph fluid then passes into the pre-collecting vessels and the deeper collecting vessels where it is propelled towards the lymph nodes by the action of peristalsis (Woods, 2007). The aim of the lymphatic system is to transport all interstitial fluid from the tissues back into the circulatory system at the heart (Woodcock and Woodcock, 2012), whilst playing an important role in the production of lymphocytes to provide immunity (Williams et al, 2002).

Incidence and prevalence

Cooper and Bagnall (2016) state that incidence of all types of oedema ranges from 2.29–3.59 per 1000 of the population, however Moffatt et al (2016) state this could be as high as 4 per 1000, which when applied to the total population, as identified from the Office for national statistics (2016), equates to 260 000 people, possibly living with lymphoedema or chronic oedema in the UK. This has increased since the 2003 study conducted by Moffatt et al (2003), which suggested incidence at 1.33 per 1000. Furthermore, it is estimated that 10.31 per 1000 of people over 65 will develop oedema, as incidence increases with age (Moffatt et al, 2016). According to the Office for National Statistics (2016) there are 11.6 million people in the UK over the age of 65, giving an estimated incidence of 116 360 people in this group. Furthermore, Moffatt et al (2016) found that 40% of those identified with oedema, had a leg ulcer as well. According to Todd (2011), between 0.1% and 3% of the population in the UK will develop leg ulcers in their lifetime, this equates to 65 000–1 950 000 of the population who may develop a venous leg ulcer and subsequently require treatment using compression therapy. Furthermore, Muldoon (2010) states that the incidence of venous leg ulcers is equal to the prevalence of chronic oedema, although if 3% of the population are affected then the incidence may be much higher. In contrast, Fetzer and Wise (2015) state lipoedema is another underestimated health problem, where patients

ABSTRACT

The use of velcro compression wrapping devices in the management of lymphoedema and chronic oedema is not a new concept. Wraps have been available for many years and are being used widely in clinic and community settings where bandaging or traditional compression garments are not suitable. Furthermore, they are becoming more common when treating venous disease, patients with wounds and lipoedema. The aim of this article is to introduce the reader and clinician to the new Haddenham easywrap and to demonstrate why it is different to any other velcro wrapping device available. Case studies will be utilised from clinicians currently using easywrap in clinical practice, with both therapist and patient feedback given to demonstrate the efficacy of this new velcro compression wrapping device.

KEY WORDS

- ◆ lymphoedema ◆ chronic oedema
- ◆ lipoedema ◆ venous disease ◆ adjustable compression wraps

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are often referred to and treated under the lymphoedema umbrella. According to Foldi (2006) approximately 11% of all females suffer with this condition, which could equate to 3 million women in the UK who have the condition and who may benefit from compression therapy, to improve shape and minimise the risk of lymphoedema developing.

When analysing these statistics against population data, it could be suggested that nearly 5 million people in UK may fall into the three patient groups mentioned, and may require treatment with compression therapy at some point during their lifetime. According to Moffatt et al (2016), this indicates a growing health care problem and has the potential to impact the health care service negatively, especially if early identification and effective treatments such as compression therapy are not implemented sooner.

Compression therapy in the management of lymphoedema

According to the Lymphoedema Framework (2006), compression therapy works to promote drainage of lymph and enhance venous return from the tissues back in to the deeper circulatory system where the usual mechanisms that support normal fluid exchange have become compromised or have failed.

Compression therapy is the mainstay of treatment in the management of lymphoedema, along with skin care, exercise and simple lymphatic drainage (International Lymphoedema Framework, 2012). However, there are many other treatments that will form part of a patient's management, which are determined on individual need (Wigg and Lee, 2014). Patients with lymphatic and venous disease are advised to wear compression therapy daily and on most occasions for life, to ease the burden of symptoms and prevent the disease from progressing (Lee and Wigg, 2012). Compression is available in many forms, ranging from bandages that are used to reduce limb volume and aid wound healing, to compression garments that are usually used in the maintenance and prevention phase of treatment (International Lymphoedema Framework, 2012). However, in an age where health care professionals are increasingly governed by budget and time constraints, (Ehmann et al, 2016) it is apparent that there is a shift in practice, moving away from management using traditional compression garments, to using made to measure compression garments and velcro wrapping devices as first-line treatment (Lee and Wigg, 2013).

Velcro wraps are compression wrapping systems that have been used previously in the management of lymphoedema during the maintenance phase of treatment (Damstra and Partsch, 2013). It is suggested that wraps act in a similar way to short stretch bandaging in that they aim to provide graduated compression to the limb, whilst applying low resting and high working pressures. There are many advantages to using velcro wrapping systems as they are less bulky than bandages, therefore reducing the restriction of mobility (Ehmann et al, 2016). Furthermore, bandages have complicated application methods requiring specialist training; using velcro wrapping devices reduces the need for this training. They are easier to apply where patients have problems with garment application,

are easier for carers to apply and are seen as a less time consuming option for treatment (Wigg and Lee, 2014).

Literature search

There is limited academic research into the use of velcro compression wrapping systems, however there are many case studies that have been published detailing the efficacy of these devices. Damstra and Partsch (2013) conducted a randomised controlled comparative study adjustable compression wraps were compared to inelastic multi component bandages on 30 hospitalised patients who were admitted due to moderate to severe unilateral lymphoedema. The primary outcome measures were limb volume reduction and interface pressures of both wraps and bandages. Participants were randomised into two groups where both wraps and bandages were applied. Pressures were measured using a Picopress transducer placed at the level of B1 with results showing the inelastic multi component compression bandage had a greater Stiffness than that of the adjustable compression wrap, which suggests a greater ability to reduce limb volume. However, as patients were able to tighten the adjustable compression wrap Damstra and Partsch (2013) state this led to the device maintaining pressure and ensuring a greater decrease in limb volume after 24 hours. This is an interesting finding as this highlights how effective velcro wrapping devices are in reducing the number of appointments that would be needed if bandages were being used, which in turn would reduce the overall costs of treatment, enabling patients to perform daily skin care (Hardy, 2012).

Within the literature there are no reports of any adverse effects on patients when using adjustable velcro compression wraps. Linnitt and Hunt (2011) report positively on the ability of patients to self-manage their condition, in particular one case study of a patient who could not attend clinic for daily treatment. The patient had a 70% excess in limb volume was advised to apply the device over her compression stocking. During follow-up 1 month later there had been a 30% reduction in limb volume with the patient reporting that she felt more confident and able to manage her condition. A second case study in the article again shows limb volume reduction and skin softening with the patient reporting that the ability to adjust the garment was beneficial to how her limb felt during the day. Wigg (2009) further highlights evidence to support the use of these devices in preventing rebound oedema and enabling maintenance of the patient condition. Again, the device was used in conjunction with compression hosiery to achieve a higher level of pressure of which the patient found was easily applicable over compression hosiery. Further highlighted in the case study discussed by Jones (2013), the patient had previously experienced issues with wearing multi-layer bandages and compression garments at her place of work. This had ultimately resulted in an excess limb volume of over 30% with multiple episodes of cellulitis. Once fitted with a velcro compression wrapping system the patient was able to take control of her care as she did not need to attend clinic for daily bandaging, she applied the device herself, on a daily basis and found it a better form of compression to wear



Figure 1: easywrap foot piece



Figure 2: easywrap leg piece



Figure 3: easywrap thigh piece

whilst at work. Her limb volume reduced to 11.7% and her concordance improved as she was able to match the covers for her device to her clothes.

Evidence suggests that the use of these devices is suitable in those with poorer shaped limbs and obesity related oedema (Fife et al, 2008). According to Smith et al (2005) patients not only had improvements in limb volume but reported, using a 10 point physical self-management scale, that devices were easy to use and were concordant with daily application. In a study on two patients with lymphoedema, Mullings (2012) demonstrated the benefits of the device in reducing limb volume, improved wound healing and improvements in mobility, which in turn enabled treatment to proceed to the wearing of compression garments. Patients' self-esteem was also improved and promoted concordance with further treatment. This is also highlighted in Hobday and Wigg (2013), where it is reported that positive outcomes for treatment when the velcro wrapping compression device is used in combination with other devices, where swelling is reduced and enables patients to have an improved quality of life. This supports Damstra and Partsch (2013) who states that these devices are suitable as first line treatment in the lymphoedema management instead of bandages, resulting in a more cost effective treatment modality. Furthermore Clapham (2012) states that dressing times are reduced without impacting on the improvements documented in the case study, where there was oedema reduction, reduced pain and improved skin integrity.

One article compiled by Wounds UK (2014) states that treatment with velcro compression wrapping devices saved £3402.96 when compared to treating with 2 layer bandages over a 6-month period and that they enabled the patient to self-manage their condition but also promoted healing of a long-standing leg ulcer. Wrapping devices are also seen as beneficial when treating post-operative oedema compared to flat knit compression hosiery, with the small study by Munnoch and Wigg (2012) detailing better volume reduction in the management of post-operative oedema following liposuction, in addition to treating those with primary and secondary lymphoedema (Lawrance, 2010).

Although there have been no adverse effects noted from using velcro wrapping compression devices, clinicians should still seek to receive adequate training in the prescribing and fitting of compression garments and velcro wraps, as well as the theory that underpins the use of them. There are several clauses within the Nursing and Midwifery Council (2015), which state that nurses should be aware of evidence, knowledge and developments that reduce mistakes in clinical practice, and clinicians should receive training and professional development to maintain competence when giving treatments to patients. However, it is apparent that this quite often does not include the use of compression therapy. Many clinicians are not adequately trained in the selection, application and monitoring of compression therapy, which could be deemed as clinical negligence where harm is caused to the patient. Furthermore, anecdotal evidence from practice has clear evidence of the damage that compression therapy can cause when inappropriately selected and applied.

According to Cooper (2013) competency-based training could ensure that the compression choice made is appropriate to needs of the individual, appropriate to level of practice of the clinician and in turn ensure safe practice in this area.

What is easywrap?

easywrap was developed by Haddenham Healthcare following extensive research into the manufacturing and performance of the many 'Velcro' wrapping compression devices available. Feedback from clinicians was also sought to ascertain what would constitute an ideal wrapping device. Feedback obtained included that the wraps available can be quite hot and bulky leading to concordance issues as patients are not able to wear their everyday clothes over them and that they sometimes don't conform well to the limb, especially around the knee. Furthermore, clinicians like the ease of using wraps but find they are still faced with resistance from those not specialised in using them, with concern on how to achieve the correct level of compression on application.

easywrap garments consist of overlapping, single-layer textile bands which are secured by easy to attach fasteners. easywrap garments are engineered to be conforming and low profile, meaning that they can comfortably be worn under most everyday clothing and footwear.

Unlike traditional non-woven laminated fabrics, used in most Wraps, easywrap is specially woven ensuring its bands do not neck or kink when stretched helping to ensure a true 50% overlap on the limb is achieved. easywrap's UK patent pending technology means its bands are engineered



Figure 4: easywrap knee piece

to work like a short stretch bandage with an easy to feel 'lock-out' or 'end-stretch' making it simpler to achieve the correct level of consistent graduated compression.

When easywrap is worn at end-stretch, or close to end-stretch, the garment acts in a similar manner to an entirely inelastic compression garment, preventing further swelling of the limb and offering excellent working pressure; however, as the limb reduces, the elastic material in the bands is free to contract, thereby providing a substantially constant therapeutic compression to the limb leading to less

			XS	S	M	L	XL
	FOOT	a' Circumference	22-24	25-27	28-30	31-34	35-40
	REGULAR	a-heel Length	14.5-16.5	16-18	17.5-19.5	19-21	21-23
	LONG		16.5-18.5	18-20	19.5-21.5	21-23	23-25
	LEG	c Circumference	38-45	44-52	50-60	55-65	60-70
		b Circumference	23-27	28-32	33-38	39-44	45-52
	REGULAR	b-d Length	30-34	30-34	30-34	30-34	30-34
	TALL		34-38	34-38	34-38	34-38	34-38
	THIGH WITH KNEE	g Circumference	60-70	65-75	70-80	75-90	85-100
		e' Circumference	47-52	53-59	60-66	67-73	74-80
	SHORT	e'-g Length	16-20	16-20	16-20	16-20	16-20
	REGULAR		20-24	20-24	20-24	20-24	20-24
	TALL		25-30	25-30	25-30	25-30	25-30

Figure 5: easywrap sizing chart

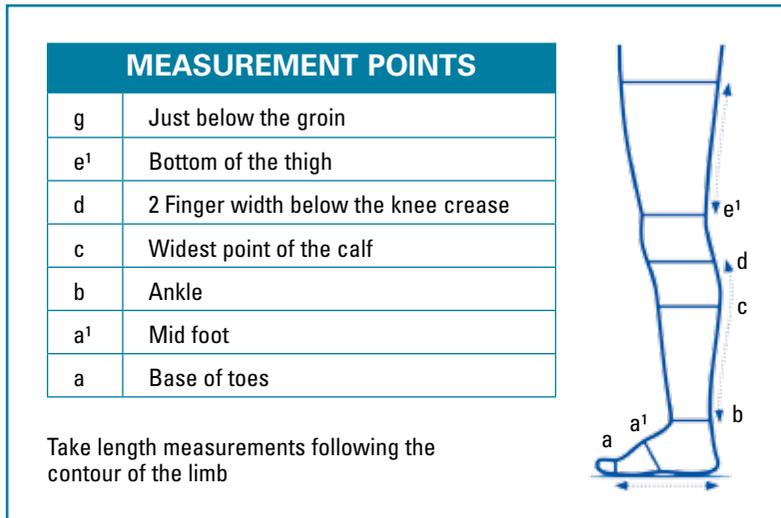


Figure 6: easywrap measurement chart

frequent re-applications and garment slippage.

easywrap is available in two fabrics Light (20–30mmHg) and Strong (30–40mmHg). easywrap Light is a more stretchy fabric suitable for mild to moderate compression needs. easywrap Strong has a similar stretch to a traditional short stretch bandage, making it excellent for patients with moderate to severe compression needs. easywrap comes in three separate parts, which can be used separately or in combination, they are designed to be worn over an anti-microbial liner. The foot, leg and thigh sections are shown in Figures 1–3. The Thigh section is made up of two parts, an innovative knee wrap and separate thigh wrap. The knee section is a unique UK patent pending device that allows for unrestricted movement due to the way in which the material bands are cut and shaped to support normal knee movement (Figure 4), it also contains a removable light weight spacer foam pad, which sits at the popliteal crease for extra comfort. easywrap comes in five different sizes

(Figure 5) and will fit larger limbs with measurements up to 100cm on the thigh. There are two different lengths available on the Foot and Leg section, with three lengths available in the Thigh section. The simplicity of measuring is detailed in Figure 6, as there are only a few circumference and length measurements required to get the correctly sized easywrap for the patient.

Case studies

Case study 1

A 69 year old gentleman with a past medical history of polio with left leg weakness and chronic left lower limb oedema secondary lymphoedema was seen in the lymphoedema clinic. The patient had struggled for 10 years to maintain his oedema with class three garments and was prone to rebound. The therapist selected the correct sized garment and combined a lower leg easywrap strong with a flat knit made to measure anklet, (Figure 7) as the patient preferred an anklet to using a foot wrap.

The therapist reported that the easywrap was easy to use conforming well to the limb and was much thinner than previous wraps used. The patient reported that he had tried other wraps previously and found them too hot and bulky, however using easywrap “has transformed the management of my leg oedema”. He reported that it was much easier to apply and was a much nicer fit. He was able to wear all of his usual clothes, whereas when using previous wraps he was not able to get his jeans on. He also reported that easywrap did not slip and his mobility improved.

The patient at baseline, had a limb volume excess of 19% with an excess of 1822ml of fluid. After just 1 week of using easywrap strong the limb volume had reduced by 584ml to 14%. The patient used the wrap over a 4-week period and on his final measurements had an excess volume of just 339ml, reducing his overall excess by 10% (over half) to a 9% excess volume.



Figure 7: Patient 1 wearing the easywrap leg piece combined with flat knit anklet

Case study 2

A 50 year old lady with a past medical history of cervical cancer 18 years ago had been attending the lymphoedema clinic for many years. She had previously undergone a hysterectomy, chemotherapy and pelvic radiotherapy, following this she had experienced a DVT to the left leg 7 years ago. The patient was diagnosed with left leg lymphoedema in 2000 and had experienced recurrent acute inflammatory episodes as a result and is now on prophylactic antibiotics. Subsequently lymphoedema was diagnosed in the right leg in 2015.

Previous management has involved the use of RAL class three flat knit compression therapy with night time multi-layer bandaging or wraps. The patient was fitted with easywrap strong foot and thigh piece, size extra small and a small leg piece, with an easywrap strong thigh length liner underneath (Figure 8).

Initial reports from the therapist stated how quick and easy the wraps were to apply, with much less bulk and enhanced movement and flexibility of the knee. The patient was extremely pleased with the fact that she was able to go out socially in her normal clothes and shoes, Figure 9, without anyone realising that her leg had been wrapped. Having night bandaged for many years the patient was pleased with how much more comfortable easywrap was than other wraps or MLLB, she stated that once fitted, the knee piece was much more effective and remained in place without bulges. It was much cooler and comfortable to sleep in stating she “hardly noticed it”.

Limb volume improvement was noted by day 5 with an overall reduction of 463ml equating to a 5% reduction in excess volume, by day 5 her excess volume was 174ml 2%, with her legs visibly more comparable.

Case study 3

A 40 year old lady with a history of lipoedema, exacerbated by obesity and further complicated by polycystic ovary syndrome, polyarthritis causing joint problems was first seen in the lymphoedema clinic in 2011. The patient was prescribed steroid treatment and methotrexate. Initially the patient was prescribed a class three flat knit compression garment, which was problematic due to slippage into the crease at the ankle. The patient was fitted with easywrap strong lower leg piece, Figure 10, which was initially awkward to fit due to the heaviness and shape at the ankle fold. However once fitted and initial reduction in the limb was achieved the easywrap fitted much better. The patient had always found compression problematic, whether using bandages, hosiery or wrapping devices and had found that the foot pieces on wrapping devices had not been suitable due to the shape around the ankle. Initially there was some slippage due to immediate reduction, however there was no slippage after day 3 and by day 5 the patient found her application was better as her leg shape had improved.

The patient was particularly happy that the easywrap was much thinner than previous wraps she had tried, it conformed better to her limb and due to less bulk she

KEY POINTS

- ◆ Haddenham easywraps are a low profile compression velcro wrapping system, useful for patients who do not tolerate compression hosiery or bandages.
- ◆ Haddenham easywrap are conforming, comfortable and can replace the need for night bandaging.
- ◆ The use of easywrap can aid patients to self-manage their condition, reducing patient dependency on clinic resources.

was able to wear her normal trousers. The most important factor for the patient was the ability to maintain her oedema independently as she stated “I think this wrap will be easier for me to manage than previous wraps or garments, I struggle to get garments on, and I manage this wrap independently which is really important for me.”

Limb volumes were taken at baseline and after day 5 and 10. As the patient had bilateral oedema, overall excess was not a suitable method to evaluate treatment. However the left leg was treated first, whilst the right leg continued with compression hosiery with limb volumes being monitored. Overall the left leg volume reduced by 2020ml, 2 litres by day 10, after 2 weeks of treatment. Her tissues and ankle shape improved resulting in better management and concordance with the application of her easywrap.

Conclusions

Evidence suggested in the literature review and clinical case studies demonstrates that velcro compression wraps may be safer to apply than short stretch bandages. Furthermore, the initial evaluations of easywrap show that it is an effective velcro compression wrapping device. Just as important is the applicability of the wrapping devices in patients with venous or lymphatic oedema and lipoedema, with or without wounds, in all instances has demonstrated positive outcomes for treatment. Patients who have previously been non concordant with treatment, whether that be due



Figure 8: Patient 2 wearing the whole leg easywrap



Figure 9: Patient 2 demonstrating how the low profile nature of easywrap allows for wearing of normal footwear



Figure 10: Patient 3 demonstrating how easywrap conforms to those limbs with lipoedema

to the psychosocial aspects of bandages or the inability to apply compression garments have all experienced and increase in quality of life when using easywrap. easywrap has clearly demonstrated its performance as improvements in lymphatic function, noted by decreased limb volumes.

The initiation of treatment with velcro compression wrapping devices such as easywrap impacts positively on resources as they promote self-management and a less time consuming, more cost effective treatment modality than traditional compression bandages. Therefore it can be concluded that easywrap velcro wrapping compression devices are safe and effective to use in the management of lymphoedema, chronic oedema, venous disease and lipoedema.

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