# Mobiderm Autofit: an adjustable sleeve that enables patients to self-manage lymphoedema

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hronic oedema is the term used to describe swelling that has been present for 3 months or more, and the causes include many long-term conditions (LTC). The swelling is most likely to affect the legs; however, other areas may be affected, for example, a dependent and immobile arm following a stroke or a large abdominal flap in someone who is morbidly obese. Many older people can suffer from polymorbidity that contributes to the development of oedema, for example, arthritis, chronic venous disease, obesity and stroke. The effects of complex comorbidity can result in pain, reduced mobility, prolonged limb dependency and the need for medication that may have fluid-retaining side effects, for example, steroids and non-steroidal anti-inflammatory drugs (NSAIDs).

Lymphoedema is a form of chronic oedema caused by a congenital defect in the development of the lymphatic system (primary lymphoedema) or damage to the lymphatic system (secondary lymphoedema). The main cause of secondary lymphoedema is surgical removal or radiotherapy-induced fibrosis of lymph nodes in the management of cancer. The swelling will present distally to the damaged or removed lymphatic tissue and can therefore affect any of the limbs, the trunk, genitals, head and neck. For example, individuals with breast cancer may develop arm swelling as a result of surgical removal of the axillary lymph nodes and/or radiotherapy to the axilla (Mortimer and Rockson, 2014), but advances in breast cancer management including breast-conserving surgery (BCS) have resulted in an increase in breast oedema, with women being referred to lymphoedema services for management (Johansson et al, 2014).

If left untreated, chronic oedema and lymphoedema will result in progressive swelling, skin changes, reduced mobility, psychosocial morbidity and an increased risk of cellulitis. Prompt assessment and treatment is essential in preventing this progression. A systematic and comprehensive assessment that takes a holistic approach should be carried out, regardless of the severity, and should include the site of the swelling, degree of swelling, skin changes, impact on the patient, and the patient's readiness and ability to participate in self-care. Although this can be time-consuming, it is essential for obtaining a differential diagnosis. The severity of lymphoedema can be graded using the International Society of Lymphology (ISL) staging system (ISL, 2013) (*Table 1*).

The approach used in the assessment should continue into the management phase to encompass all factors that contribute to, or impact on, the oedema. Chronic oedema and lymphoedema can result in complex symptoms, which can be compounded by polymorbidity, for example:

- Obesity can further impede the venous and lymphatic flow from the limbs
- Some chronic conditions can result in reduced mobility and prolonged dependency, for example,

# ABSTRACT

Lymphoedema can result in debilitating physical and psychosocial morbidity and when combined with other chronic comorbidity, often requires holistic, specialist management that encompasses all the complex and compounding problems. Self-care is an integral component of any treatment strategy, however, the patient must be fully prepared and ongoing support should be provided. Self-care consists of managing the symptoms of lymphoedema but should include other fundamental aspects of healthy living, for example, maintaining a healthy weight and activity levels. To improve self-care, compression manufacturers have been instrumental in designing new ways of applying compression. Mobiderm Autofit armsleeves have been designed to improve the donning and wearing of compression sleeves in all patients. This product is especially useful for night-time wear and in the presence of fragile skin, or for those who only require reduced compression. The benefits of this garment are demonstrated in three case studies.

# **KEY WORDS**

Lymphoedema D Compression D Night-time compression

Self-care

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S1

Table 1. Stages of lymphoedema				
Stage	Presentation	Severity	Management	
Stage O	Reddish-brown discolouration on the skin, often around the ankles, feet and gaiter area (lower leg). Occurs when red blood cells leak out into the tissues: as the haemoglobin breaks down, iron is released and colours the skin			
Stage 1 (early stage)	Mild pitting oedema that resolves with elevation	Mild: <20% increase in excess limb volume	Compression hosiery, exercise, self- lymphatic drainage and preventive skin care	
Stage 2	Swelling does not resolve with elevation. Less evidence of pitting as fibrosis development occurs	Moderate: 20–40% increase in excess limb volume	Custom-made hosiery/compression bandaging, exercise, self-/manual lymphatic drainage and skin care	
Stage 3 (late stage)	Non-pitting with skin changes (e.g. papillomata, fibrosis, hyperkeratosis)	Severe: >40% increase in excess limb volume	Compression bandaging, skin care, exercise, and manual lymphatic drainage	
(International Society of Lymphology, 2013)				

#### stroke, arthritis, obesity.

These factors have a detrimental effect on outcomes and must be taken into account when planning treatment, so that adjustments can be made to standard care when necessary. The assessment process must include ascertaining all contraindications to compression, for example, reduced arterial supply, which can be measured by Doppler.

The often complex nature of chronic oedema and lymphoedema (e.g. presence of morbid obesity, chronic wounds, poor concordance, palliative disease) means that practitioners need to have a range of treatment options available to them in order to provide a completely tailored treatment package. Treatment is based on the cornerstones of care: skin care, exercise, and compression (Table 2). Lymphatic massage is the fourth cornerstone for lymphoedema patients, but other basic aspects of care should be fundamental in all patients. These include advising a healthy diet, maintaining a healthy weight, stopping smoking and limiting alcohol intake. More individualised treatment options can be added, depending on patient need, for example, for those suffering from rebound swelling (failure to maintain swelling with prescribed treatment strategies), palliative patients and those requiring 24-hour compression.

There are occasions when current management measures will fail to maintain swelling, and rebound swelling can occur if there is inappropriate hosiery selection or there are compounding clinical or compliance issues. These should be identified and addressed to ensure the correct treatment plan is followed, which will lead to improved clinical outcomes.

Adopting a 24-hour compression treatment package can help prevent rebound swelling. Research has shown that two thirds of patients report swelling to be worse at night or comparable to daytime, and in one study, more than 80% reporting a reduction of their oedema when wearing night-time compression (Whitaker, 2016). The study also recommended the development of specific night-time garments to improve overnight compliance.

The ultimate aim of any treatment strategy is to foster self-care. Self-care is a dynamic and empowering approach to healthcare management, which relies on several factors. The most important of these is that the patient must be at the centre of the decision-making and delivery process, but ongoing support from health professionals and suitable resources to facilitate this are also vital (Long-Term Conditions Alliance Scotland (LTCAS), 2008). However, willingness and ability to cooperate with self-care must be assessed before approaching this aspect of care if alienating patients and impeding relationships is to be avoided. Health behaviour change models can assist in identifying how ready the patient is to change or participate in selfcare practices (Prochaska et al, 2002).

The process of selecting the most appropriate compression system for the patients will require a comprehensive assessment of the individual's physical abilities, strength and dexterity, family or carer input, shape of the limb, degree of swelling, skin fragility, mobility, and lifestyle and preference. The main treatment aim is to improve clinical outcomes, and this requires a significant degree of compliance (Pillar, 2012). Selecting a compression system with the involvement of the patient enables self-care (or carer supported care) and improves compliance and, therefore, clinical outcomes.

# **Mobiderm Autofit**

In an attempt to improve self-care and prevent rebound swelling, compression manufacturers have been instrumental in designing new ways of applying compression. One such product is Haddenham's Mobiderm Autofit (https:// hadhealth.com/mobiderm-autofit), which is a self-adjustable arm sleeve consisting of padded foam blocks within the sleeve: the garment applies a soft pressure and encourages microcirculation within the tissues. This can assist in softening fibrosis and promoting lymphatic drainage. The garment adapts to each patient's individual morphology and varying volumes over time. It is a semi-open garment, which makes it easy to apply and remove, and there are adjustment marks to allow precise and repeatable application to control changes in limb volume. Hook and loop fasteners add to the ease of application by closing the garment without the need for tape or pins, and making adjustment quick and easy.

The Mobiderm Autofit sleeve is suitable for:

- All stages of lymphoedema: it can be used during the maintenance phase or at the end of the reduction phase
- Patients presenting with poor limb shape or fluctuating swelling
- Encouraging self-care
- For night-time use, as part of 24-hour treatment
- It is also useful in the presence of fragile skin, where applying a standard compression sleeve may cause damage: for example with palliative patients who require reduced compression and comfort only, and with those who have strength and/or dexterity issues.

Mobiderm Autofit is available on prescription; it comes in 6 sizes, each of which can be normal or long fit. The following case studies report on the use of Mobiderm Autofit.

#### **Case study 1: Mrs Brown**

This case study focuses on the care of May Brown (not her real name), an 85-year-old woman diagnosed in 2008 with left-sided breast cancer. On diagnosis, she underwent a left mastectomy and axillary node clearance, and all lymph nodes removed tested positive for cancer. She then underwent radiotherapy and was commenced on hormone therapy. Other past medical history included type 2 diabetes and osteoarthritis.

Mrs Brown's history of lymphoedema dated back to 2008 when she noticed swelling throughout her left arm soon after undergoing the mastectomy and axillary node clearance. She experienced post-operative infections and had seromas drained 3-4 times; she also had an episode of cellulitis to the arm, which was treated with antibiotics. Initial measurements showed a 1.21 excess volume, representing 55%.

The oncologist was keen for Mrs Brown to undergo lymphoedema treatment as quickly as possible and referred her to an alternative service with shorter waiting times, where she underwent a course of multilayer lymphoedema bandaging (MLLB). Despite this treatment, on return to the original clinic 12 months later, the patient's arm had increased by a further 644 ml in size, which was an increase in excess volume to 83%. At this time, the cellulitis had recurred in Mrs Brown's affected arm and she was having further radiotherapy to treat this [AQ1: Radiotherapy to treat cellulitis?]. She underwent a further course of

Table 2. Cornerstones of chronic oedema care			
Skin care: to maintain skin integrity and prevent cellulitis	Encourage regular cleansing with non-soap products to avoid affecting the acid mantle of the skin and prevent it drying. Emollients should be used daily to moisturise the skin		
Exercise: muscular contraction assists venous and lymphatic flow	Encourage activity within the patient's capabilities. This may be passive movement carried out by a carer or family member, but chair-based exercises are more effective and can be carried out by most patients		
Compression: (i) enhances the calf muscle's natural pumping activity and prevents venous backflow; (ii) reduces capillary filtration and raises interstitial pressure, which promotes absorption by the lymphatics; (iii) stimulates lymphatic contraction (Partsch and Junger, 2006)	Compression can be delivered in a variety of ways. There is a wide range of compression hosiery types (circular knit, flat knit) styles, and compression classes. Short-stretch compression bandaging is favoured by lymphoedema practitioners because it provides a high working pressure but low resting pressure (Partsch, 2007), and there is wide selection. Some lymphoedema services use intermittent pneumatic compression devices as part of the treatment strategy. There are also adjustable compression systems made of inelastic fabric that wrap around the limb and are secured with hook and loop straps (Williams, 2016). More recently, foam block padding garments have been designed for overnight wear (Whitaker, 2016)		
Lymphatic drainage: encourages lymph drainage away from the congested area to an area of lymphatic drainage that is functioning normally	Lymphoedema specialists perform manual lymphatic drainage as part of decongestive lymphatic treatment for patients. Patients are taught a simple version of this procedure as part of their self-care package		
Lifestyle issues: e.g. weight management and sedentary lifestyles, to avoid further compromising poor venous and lymphatic drainage	Some patients will manage this as part of their self-care, but others may need assistance from local slimming clubs, or referral to weight management services. Patients should also avoid chronic daily occurrence of prolonged dependency of the affected limbs, e.g. sleeping in a chair, allowing the arm to dangle or sitting for long periods, to help reduce the gravitational impact on the swelling. Appropriate positioning of the limbs and regular activity is advised		



Figure 1. The Mobiderm Autofit sleeve on the day May Brown had it fitted

daily MLLB, in combination with intermittent pneumatic compression (IPC), over a 2-week period, which reduced arm volume by a 1884 ml. This reduced excess volume to 43% and Mrs Brown was provided with a custom-fit flatknit class 2 arm sleeve and full-fingered glove. From 2010, the patient continued to attend clinic regularly for review and required numerous further courses of treatment, which were either combined MLLB and IPC or IPC alone. In recent years, Mrs Brown's arm has generally maintained 60–70% excess volume and she continues to wear a class 2 custom-made flat-knit arm sleeve with full fingered glove daily, which she removes overnight.

In consultation with Mrs Brown, it was agreed to trial the Haddenham Mobiderm Autofit sleeve as an overnight option in the hope it may provide additional comfort and/or reduction in volume to her arm. *Figure 1* shows the garment in place on the day it was fitted, and it was a good, and comfortable fit. Mrs Brown used it for 11 days, during which she was instructed to continue with her usual daytime regimen of using her compression sleeve and glove, but now wearing the Mobiderm overnight.

On return to clinic after 11 days, limb volume measurements showed a small increase of 111 ml to the affected arm. It later turned out that the patient had been wearing the Mobiderm between 7pm until 9am only, and had not been wearing any garment during the day. She commented that she enjoyed wearing the Mobiderm all night because it felt very comfortable and warm, and she felt that it supported her arm well, which in turn improved how well she slept. Her other comments included that the garment was not too restrictive and allowed a good range of movement. Mrs Brown felt that there has been a definite improvement in the overall size and shape of her arm, the tissues felt much softer and the arm had not felt as achy as previously. She applies it with ease and feels it is an advantage that she can adjust how tight it is. Figure 2a and Figure 2b show the arm immediately following removal of the Mobiderm on day 11.

Mrs Brown was keen to continue wearing Mobiderm but, given the increase in limb volume without wear of her daytime compression garments, was advised to resume wearing these and to wear Mobiderm overnight. However, it is encouraging that over this short period the patient found the garment beneficial and it appeared to be making positive improvements to the shape of her arm and the texture of tissues.

#### Case study 2: Ms Stewart

Linda Stewart (not her real name) is a 48-year-old patient



Figures 2 A and B. Mrs Brown's arm immediately following removal of the Mobiderm on day 11

who developed lymphoedema to the right arm in 2000 following treatment for non-Hodgkin's lymphoma. She had suffered numerous episodes of cellulitis to her affected arm, requiring antibiotic treatment that exacerbated the swelling. She has no other significant medical history.

Ms Stewart's lymphoedematous arm was well maintained at around an 18% excess volume in compression garments comprising of a flat-knit class 3 sleeve and flat-knit class 2 full-fingered glove from 2000 until 2013. In 2013, an episode of cellulitis caused a 628 ml increase to her arm, taking her excess volume up to 34%.

She underwent a course of decongestive lymphatic therapy (DLT), which included intermittent pneumatic compression (IPC) in combination with multilayer lymphoedema bandaging (MLLB). After 2 weeks of daily treatment Ms Stewart's arm reduced by 571 ml, with her overall excess volume reducing to 15%. She continued with daily wear of a flat-knit custom fit class 2 combined sleeve, in combination with a flat-knit class 2 glove on top.

Between 2013 and 2016, Ms Stewart experienced a further two episodes of cellulitis, increasing her overall excess volume to 41%. A course of low-level light therapy in combination with IPC in 2016 reduced this back down to 26%, but a further episode of cellulitis shortly after completion of this course of treatment caused a further increase. In 2017, she underwent a further two courses of DLT as she continued to have problems with repeated episodes of cellulitis. She had a course of antibiotics during the most recent course of DLT with her excess volume going down to 16% post-treatment.

Ms Stewart was an ideal candidate to trial the Mobiderm garment because she has always been concordant with treatment, keen to try available new treatments and maximise improvement as much as possible. She was fitted with a Mobiderm Autofit arm garment as shown in *Figure*  $\beta$  and advised to wear this as an overnight option. She may have ideally benefitted from the next size up as some of the hook and loop fastenings only just about fastened, but nonetheless the garment was reported to be comfortable.

After leaving the clinic, Ms Stewart continued daily wear of her usual compression garments over the next 11 days, and wore the Mobiderm overnight from 9pm until 7:30am. After 11 nights of wear, she returned to the clinic,. At this point, her evaluation of the Mobiderm was that it had been comfortable and had not affected her sleep. She was left with dimples to her skin on removal of the garment, but thought that her wrist looked slightly more 'puffy' than usual immediately following removal. She had a 39 ml reduction to her arm over the course of the 11 days.

*Figure 4* shows the arm following removal of the Mobiderm garment on day 11. Overall, Ms Stewart did not think that it had been an adequate period of time to wear the garment to comment further, but she was pleased with the reduction she had had up to this point. She was keen to continue overnight wear in the hope to further improvement.



Figure 3. The Mobiderm garment on day 1, when Linda Stewart had it fitted



Figure 4. Ms Stewart's arm at the end of the 11 nights' wear of the Mobiderm garment

#### **Case study 3: Miss Wilson**

Helen Wilson (not her real name) is a 66-year-old female who developed lymphoedema to the left arm in January 2017, immediately following surgery for left-sided breast cancer, which included a mastectomy, reconstruction and axillary node clearance. She went on to undergo chemotherapy and radiotherapy, which achieved a good response, and she was advised that her cancer had been



Figure 5. Day 1, when Helen Wilson was fitted with the Mobidermk Arm garment



Figure 6. The volume of Ms Wilson's arm had visibly reduced after 11 nights of Mobiderm garment wear

cleared. Other medical history included osteo-arthritis and previous a knee-replacement surgery.

In March 2017, Ms Wilson underwent a lymphoedema assessment, at which point her arm was visibly enlarged throughout, from her fingers extending all up the arm, she had a 725 ml/31% difference between the affected and unaffected arm. She was booked into clinic for a course of DLT, which included IPC in combination with MLLB over a 2-week period. Following this intensive phase, Ms Wilson was fitted with a custom fit, flat-knit class 2 sleeve and glove that she wore daily. She continued to attend for reducing IPC treatment for a further 8 weeks. Over the course of treatment, Ms Wilson achieved excellent results with a total

# **KEY POINTS**

- Chronic oedema and lymphoedema can present with complex symptoms
  that require adaptations and additions to standard treatment packages
- Although time-consuming, an holistic and comprehensive assessment is required to identify all the issues associated with the oedema and subsequently need to be addressed
- Self-care is a fundamental and integral part of lymphoedema management, but it requires assessment of readiness to participate, full patient involvement, support from health professionals, and suitable funding
- Night-time compression is beneficial in managing lymphoedema with reports of reduced swelling, improved pain management and better sleep
- Mobiderm Autofit is a self-adjustable arm sleeve consisting of padded foam blocks, which applies soft pressure and encourages improved micro-circulation of the arm, and is useful in the night-time management of lymphoedema

 $694\,\mathrm{ml}$  reduction; her excess volume was now down to  $57\,\mathrm{ml}/2\%.$ 

Because the patient was keen to maintain these results, she was approached and agreed to trial a Mobiderm Autofit arm garment as an overnight option. *Figure 5* shows day 1 when the garment was fitted. She was instructed to continue with her usual daytime garments and regimen, and to wear the Mobiderm overnight. On the day the Mobiderm garment was fitted, Ms Wilson's arm had reduced further and had a 2 ml/0% excess volume.

Figure 6 shows the arm on removal of the Mobiderm garment on day 11 when Ms Wilson returned to clinic to evaluate the product. Measurements at this point showed a further 52 ml reduction to the affected arm. Ms Wilson commented that she had been very happy with the garment, it had been easy to apply and really comfortable to wear, reporting that she had had the best night's sleep ever since wearing it.

She thought that her arm was less achy and noticed that the tissues in her arm felt softer. The only negative comment she made was that the garment was bulky and that, if wearing it became a daytime option she would struggle to get clothes to fit over it.

Ms Wilson was willing and keen to continue night-time wear of this garment and hoped that it continued to help to maintain her arm.

#### Conclusion

Lymphoedema patients can present with complex symptoms requiring holistic assessment and specialist treatment packages. Insightful and innovative approaches

can enhance self-care and improve clinical outcomes, but a methodical approach to assessing readiness to embrace change to improve health, and undertake lifelong care practices will help avoid resistance. With the array of complexities involved in patients' healthcare needs, practitioners need a greater range of options to manage the symptoms and any compounding issues. As demonstrated by the case studies and recent research, the development of Mobiderm Autofit has provided improvement in lymphoedema management by enhancing night-time compression therapy, and subsequently affording more selfcare choice. It is also useful in the presence of fragile skin, where applying a standard compression sleeve may cause damage, for example, with palliative patients who require reduced compression and comfort only, and with those who have strength and/or dexterity issues. Mobiderm Autofit provides practitioners with a greater range of treatment options in order to provide a completely tailored treatment package. BJCN

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# **CPD** reflective questions

- How can you ensure care provision is tailored to individual patients?
- Why is self-care important for patients with lymphoedema?
- How might case studies be a useful tool in lymphoedema care?

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