

# Chronic Oedema



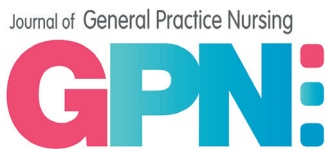
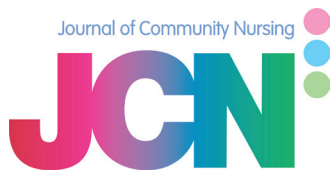
Best practice  
*in the community*

# Best practice in the community

## Chronic oedema

### Published by:

Wound Care People Limited  
Unit G, Wixford Park  
George's Elm Lane  
Bidford on Avon  
Alcester B50 4JS  
T: +44 (0) 1789 582000  
W: <http://www.woundcarepeople.com>



*Copyright ©Wound Care People 2019*

This document has been developed by Wound Care People and is supported by an unrestricted educational grant from Essity.



This document was compiled by Wound Care People in association with an expert advisory panel. The views presented in this document are the work of the authors and do not necessarily represent those of Essity.

### How to cite this document:

Wound Care People (2019) Best practice in the community. Chronic oedema. Wound Care People, Wixford. Available to download from:  
[www.jcn.co.uk](http://www.jcn.co.uk); [www.gpnursing.com](http://www.gpnursing.com)

**CONTENTS**

5

**Guide to using  
this document**

6–8

**Chronic  
oedema  
explained**

9–15

**Chronic  
oedema  
assessment**

16–26

**Chronic  
oedema  
management**

27

**Chronic  
oedema and  
wet legs  
pathway**

28–29

**References**

## Advisory panel



Chair: Nicola Rusling  
*Director, Wound Care People*



Rachel Drago  
*Advanced nurse practitioner,  
The Mount Surgery,  
Pontypool, Wales*



Rebecca Elwell  
*Lymphoedema nurse specialist,  
University Hospitals of  
North Midlands*



Binkie Mais  
*Publisher/editor, Journal of  
Community Nursing/Journal  
of General Practice Nursing*



Anna Rich  
*Clinical specialist nurse/  
team leader lymphoedema,  
University Hospitals of Derby  
and Burton NHS  
Foundation Trust*



Penny Rubio  
*Senior tissue viability  
nurse, Oxford Health NHS  
Foundation Trust*



Alison Schofield  
*Tissue viability nurse  
specialist, North Lincolnshire  
and Goole NHS  
Foundation Trust*



Mary Woods  
*Nurse consultant,  
Lymphoedema Therapy  
Services, The Royal Marsden  
NHS Foundation Trust*

## Review panel

Annette Bades, *District nurse specialist practitioner, Lancashire Care NHS Foundation Trust*  
 Sarah Gardener, *Clinical lead, Community Tissue Viability Service, Oxford Health NHS Foundation Trust*  
 Caitriona O'Neill, *Lymphoedema lead, Accelerate CIC*  
 Callum Metcalfe, *General practice nurse, trainee nurse practitioner, Attleborough Surgery*  
 Melanie Thomas, *National clinical lead for lymphoedema, Wales*

# Best practice in the community

## Chronic oedema

### Guide to using this document

This document was written in order to provide support to community practitioners with the assessment and management of chronic oedema, an umbrella term that includes all forms of swelling, including lymphoedema, that has been present for longer than three months. It aims to provide clear guidance on how to:

- ▶ Identify patients at risk of developing chronic oedema in order to encourage early intervention
- ▶ Carry out assessment using six simple steps, and describes what to look for and why it is of relevance
- ▶ Use the principles of chronic oedema management — exercise, skin care and compression therapy — in both the intensive and maintenance phases of treatment
- ▶ Recognise when specialist referral may be required.

The document was originated from a one-day meeting of the advisory panel (opposite), made up of generalist and specialist practitioners.

The advisory panel recognised the remit of the community practitioner and this document does not provide guidance on elements of care that fall into specialist provision, but rather highlights the need for referral.

The clinicians at the meeting fully acknowledged and recognised the real-life challenges presented by chronic oedema in the community setting, and aimed to provide realistic guidance underpinned by best practice. The resulting document was then further developed by the panel, and, finally was appraised by the review panel (opposite).

The document is arranged in sections that are colour coded for ease of reference, and the start of each section contains an overview of key points. In addition to practical advice, each section provides opportunity for reflection, so the reader can consider how they might apply the information to change their own practice, if needed. Finally, a care pathway is presented that pulls together the themes of the document into a one-page diagram for quick reference in practice.

It is hoped that this document will prove to be helpful to community practitioners when facing the ongoing challenges presented by an increasing number of patients with chronic oedema in primary care.

# 1. Chronic oedema explained

## Key points

---

1. Chronic oedema is the term used to describe swelling that has been present for longer than three months.
2. It is a progressive and debilitating condition that requires long-term management.
3. The prevalence of chronic oedema is currently equal to, or greater than, that of other long-term conditions, such as stroke.
4. However, this is thought to be an underestimate since it is not well recognised by clinicians and the general public until swelling is advanced, so early cases are not captured in prevalence numbers.
5. The number of people with chronic oedema is set to increase as the older population, and associated poly-morbidity, grows over the coming years.
6. Lifestyle choices, such as obesity and being sedentary, will also contribute to an increase in the number of people with chronic oedema.
7. Increased awareness of, and vigilance for, the signs and symptoms of chronic oedema can help to identify the condition in its early stages, leading to early intervention and prevention of complications. This, in turn, will improve outcomes and patient experience.

**C**hronic oedema is a progressive and debilitating long-term condition that requires effective management. It can have a detrimental and profound effect on people's quality of life, health and their ability to engage in normal daily activities, as swelling impedes movement and is painful (Moffatt et al, 2017). Correct management of the condition can greatly alleviate these issues, but many patients receive inadequate treatment or are unaware that treatment is a possibility (Lymphoedema Framework, 2006).

Chronic oedema is commonly encountered in many healthcare settings, especially the community (Atkin, 2014), and its long-term management can place a burden on health services (Moffatt et al, 2019). Anecdotal evidence exists which indicates that chronic oedema is a frustrating and time-consuming condition to manage for community practitioners (Todd et al, 2018).

The challenges that chronic oedema presents to community services are set to intensify. The demographic of the community is changing to include an expanding ageing population. By 2039 there will be 3.5 million people aged 85 years, and many aged over 100 years (Office of National Statistics, 2017).

---

**Chronic oedema is a progressive and debilitating long-term condition that requires effective management.**

---

This increased longevity also means that many more people are living with poly-morbidity. It is estimated that nearly three million people are living with three or more long-term conditions, such as cardiovascular disease and diabetes (Department of Health [DH], 2012). The development of chronic oedema is also related to lifestyle choices, such as

immobility and obesity, both of which are expected to rise exponentially for the next 10–15 years (Moffatt et al, 2017).

It is clear that while changing demographics will increase the demand for chronic oedema management, economic pressures will limit growth in funding. Constrained budgets, coupled with increased demand, will all put more pressure on community services that are already struggling to cope with demand.

There is a predicted shortfall in the number of healthcare professionals available to deliver care. Therefore, the ongoing challenge now and in the future is how to drive up quality of care despite constraints on funding and fewer available clinicians to deliver it (Dowsett et al, 2014).

Fortunately, improvements in the quality of care delivered can be made with minimal impact on

resources; working more efficiently and a consistent evidence-based approach to delivery of care can free up time to spend elsewhere. Conversely, a lack of appropriate care can lead to increased severity of chronic oedema and the risk of complications with serious consequences, including cellulitis (skin infection), ulceration and lymphorrhoea (also known as wet or leaky legs).

**Chronic oedema is commonly encountered in many healthcare settings and can be a frustrating and time-consuming condition to manage for community practitioners.**

Once at this stage, the clinician and patient become locked in a cycle of delivering and requiring complex care respectively, with all the demands on time and resources that involves. Early identification of people at risk of, or with, chronic oedema, and prompt intervention can prevent the condition progressing and may reduce the need for complex care. It is therefore imperative that clinicians delivering care in the community setting are familiar with chronic oedema and its management.

The *NHS Long-Term Plan* (NHS England, 2019) puts health promotion and illness prevention at the centre of primary and community care. It also identifies the provision of support for self-management as one of three key approaches to improving services and patient outcomes (NHS England, 2019).

**This document provides a guide to the identification, assessment and management of chronic oedema of the lower limb and associated complications. It aims to demystify and simplify approaches to assessment and management in the community, including the promotion of self-care, with the aim of improving efficiency and delivering the best evidence-based care for patients with chronic oedema.**

## Prevalence

Chronic oedema presents a major clinical problem within community nursing services in the UK, and is set to become more problematic as the population at risk of developing chronic oedema is set to grow (Moffatt et al, 2019).

The prevalence, or number of people with chronic oedema in a health service population is high and is comparable to, or greater than, the prevalence of other serious long-term conditions, such as stroke (Moffatt et al, 2017).

A survey carried out in 2012 estimated that within the general population of the UK, approximately 3.99 people in every 1000 have chronic oedema (Moffatt et al, 2017). This is almost three times the previously reported prevalence of 1.33 per 1000 (Moffatt et al, 2003) and is thought to correlate with the increasingly ageing population and associated poly-morbidity. In people aged over 85 years, the prevalence of chronic oedema increases to 12 people in every 1000 (Moffatt et al, 2017).

The prevalence of chronic oedema has a significant association with the presence of a wound. Moffatt et al (2019) reported that between 52% and 69% of patients cared for by community nurses had chronic oedema, and of these, 73% also had a leg ulcer.

**Four people in every 1000 have chronic oedema. This increases to 12 people in every 1000 over the age of 85 years (Moffatt et al, 2017).**

Chronic oedema is also more prevalent in patients with limited mobility and obesity, both of which are expected to increase within the next 10–15 years (Moffatt et al, 2019).

However, it is thought that these current prevalence figures are underestimated, particularly in community care settings (Moffatt et al, 2017). This is for a number of reasons:

- ▶ Poor recognition and limited knowledge of chronic oedema among healthcare professionals, particularly nursing home staff
- ▶ Lack of awareness among the general population, so they do not present to health services
- ▶ Development of symptoms late in the disease process, meaning that early to mid-stage disease is missed.

## Reflect on your practice

- ▶ Do you recognise chronic oedema in your patients?
- ▶ Do you ignore swelling and consider it to be harmless or a symptom of old age?
- ▶ Do you believe it can be treated?
- ▶ Do you encourage your patients to make small changes to lifestyle that could improve their chronic oedema?
- ▶ Do you know how to manage people with chronic oedema?
- ▶ Do you always treat patients with chronic oedema in the same way? For example, do you always use bandaging?
- ▶ Do you spend a large proportion of your time managing patients with chronic oedema?
- ▶ Do you think failing to care for large oedematous limbs is neglect?

## Causes of chronic oedema

Chronic oedema results when fluid builds up in the tissues, as a consequence of an ongoing underlying problem that prevents the venous and/or lymphatic systems from maintaining fluid balance. The lymphatics are responsible for clearing fluid from the tissues and returning it to the circulation. If this process is impeded in any way, oedema occurs (Levick and Michel, 2010).

Many of the causes of chronic oedema are problems that physically affect the structure and/or the function of the venous and/or lymphatic systems (*Table 1*).

Chronic oedema of the lower limb may result from one or more underlying causes, including venous disease, trauma, infection, or following surgery. It may also be caused by hypoproteinaemia, nephrotic syndrome, limb dependency, heart failure, and obesity (Best Practice Statement,

**Table 1: Causes of chronic oedema**

<b>Overload:</b> Venous system malfunction leads to fluid overloading the lymphatics resulting in failure
<b>Insufficient lymphatics:</b> congenital abnormality can result in the absence of some lymph vessels from birth, or treatment of disease may require the surgical removal of lymph nodes
<b>Obstructed lymphatics:</b> lymph nodes or vessels can become obstructed by benign or cancerous growth
<b>Abnormal lymphatic contractability:</b> the lymph vessels do not move fluid as well as they should
<b>Trauma to lymphatics:</b> damage may occur to the lymphatic system as a result of surgery or trauma
<b>Obesity:</b> extra weight in the abdomen can put undue strain on the lymph vessels
<b>Immobility:</b> puts undue strain on the lymph vessels
<b>Chronic venous hypertension:</b> resulting from failed or damaged valves in the leg veins, can lead to pooling of blood in the legs, resulting in oedema (BPS, 2008; Newton, 2011; Todd, 2016).

2008; Newton, 2011; Todd, 2016). As chronic oedema is caused by many different conditions, it is

commonly encountered across both primary and secondary care (Moffatt et al, 2017).

## Reflect on your practice

- ▶ How many of the people in your caseload could have chronic oedema?
- ▶ Can you make any improvements to their care?

## What is chronic oedema?

**C**hronic oedema is an umbrella term for any swelling that has been present for three months or more (Moffatt et al, 2003; BLS, 2019).

It is a progressive condition that can range from mild (*Figure 1*) to moderate swelling (*Figure 2*), to extremely swollen limbs with distorted shape (*Figure 3*) and skin changes that make management difficult.

As the condition progresses, there is the potential for further complications such as recurrent cellulitis (skin infection) and lymphorrhoea (leakage of lymph fluid through the skin of the lower limbs).

However, many of these complications associated with chronic oedema can be avoided by early identification and management.



**Figure 1.**  
*Mild oedema.*



**Figure 2.**  
*Moderate oedema.*



**Figure 3.**  
*Severe oedema extending to feet and resulting in irregular limb shape (image provided courtesy of Kendal Lymphology Centre).*

## Remember...

- ▶ Oedema or swelling is part of the body's natural response to injury; this type of swelling will resolve as recovery occurs, within a short time frame.
- ▶ Chronic oedema is swelling that has been present for **at least three months**.



# 2. Chronic oedema assessment

## Key points

1. Assessment is crucial to identify the underlying cause(s) of chronic oedema so that they can be managed where possible.
2. Assessment can be approached using the six S': story; self-care; site; skin; size; shape.
3. Physical examination of both limbs is a crucial part of assessment; the affected limb can be compared to the unaffected to see the degree of swelling, shape alteration and if any skin changes are present.
4. It is important to examine the whole of the affected lower limb, from the waist down to the toes, to establish the extent of swelling.
5. The affected limb should also be examined for signs and symptoms of peripheral arterial disease which, if suspected, may need further investigation and may contraindicate compression therapy.
6. The findings of assessment should be used to develop a care plan for the individual patient.
7. Determining the patient's ability to self-care is important, as involvement in their management can improve outcomes.
8. Assessment should not be a one-off event and re-evaluation should be performed regularly in order to change the care plan according to need.

**P**atient assessment should aim to identify all of the factors that can contribute to the development of chronic oedema. If performed correctly, assessment should:

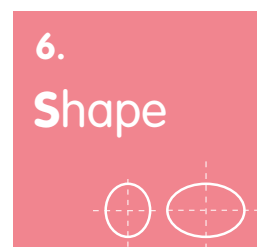
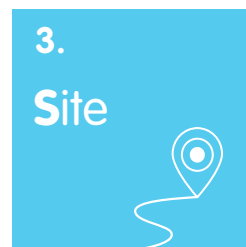
- ▶ Help to identify the cause(s) of chronic oedema
- ▶ Guide management decisions, and highlight any contraindications to treatment
- ▶ Provide a baseline of information against which improvement/deterioration of the patient and their chronic oedema can be measured
- ▶ Help to overcome 'ritualistic' or inappropriate practice by indicating when management should be changed according to improvement/deterioration
- ▶ Optimise efficiency, ensuring that the patient gets the right treatment at the right time
- ▶ Help to develop a care partnership with the patient and promote a positive experience of care
- ▶ Identify the need for further investigations and referral

- ▶ Identify the patient's ability/willingness to self-manage
- ▶ Recognise any issues that may affect the patient's ability to cope with their condition
- ▶ Set realistic treatment goals (Best Practice Statement [BPS], 2008; Fletcher, 2010).

### Six simple steps to chronic oedema assessment

A systematic approach to assessment is recommended to ensure that all factors contributing to chronic oedema are identified. These can be varied and may include lifestyle choices and the patient's general and mental health. Oedema should never be ignored or viewed as part of the aging process, and assessment should go beyond just examining the swollen limb, or just the swollen area, and take a full holistic approach.

The assessment of people with chronic oedema can be approached using the six S':



# 1. Story



It is essential to obtain the patient's background 'story' or history in order to identify the possible cause(s) of chronic oedema. Thorough history-taking can help to identify the known risk factors for the development of chronic oedema (Table 2), including underlying medical conditions, medication or lifestyle choices (Todd, 2016). Where possible, contributing issues should

**Table 2: Risk factors for chronic oedema**

- ▶ Increasing age
- ▶ Lymphatic disorder (congenital malformation of the lymphatic system)
- ▶ Surgical removal of lymph nodes
- ▶ Radiotherapy
- ▶ Tumour obstruction of lymphatic system
- ▶ Obesity
- ▶ Venous disease
- ▶ Heart failure
- ▶ Cellulitis
- ▶ Prolonged dependency
- ▶ Immobility
- ▶ General frailty
- ▶ Medication, e.g. steroids, calcium channel blockers and gabapentin
- ▶ Chronic inflammatory conditions, e.g. rheumatoid arthritis
- ▶ Significant trauma to limb, e.g. burns/degloving
- ▶ Nutritional status
- ▶ Co-morbidity, in particular, poly-morbidity

Adapted from: BPS, 2008; Todd, 2016

Accurate history-taking helps to identify cause(s) of chronic oedema, and highlights contraindications for compression therapy and the need for further investigation.

be addressed or their management optimised, to ensure any care plan is successful (Atkins, 2014).

Patient history should include:

- ▶ **Age:** the prevalence of chronic oedema increases with age
- ▶ **Presenting complaint:** has the swelling been present for longer than three months? Does it resolve with elevation?
- ▶ **History of the complaint:** onset and duration of the swelling may indicate cause, e.g. if the swelling has followed recent surgical intervention
- ▶ **History of past and current medication:** certain medications are known to increase the risk of developing oedema (Table 3)
- ▶ **Medical background:** including previous surgery and any possible post-operative complications. Has the patient had a vascular assessment within the last six months? Does the patient have vascular insufficiency or peripheral arterial disease?
- ▶ **Family background:** could the cause of swelling be hereditary, e.g. primary lymphoedema or lipoedema?
- ▶ **Nutritional status:** protein deficiency can draw fluid into the tissues resulting in swelling
- ▶ **Chronic medical conditions or comorbidities:** for example, cardiovascular disease, diabetes or cancer are known to contribute to swelling
- ▶ **Psychological status:** how is the patient coping with the swelling and underlying cause(s)? How are they coping with pain, sleeplessness, etc?
- ▶ **Socio-economic circumstance:** does the patient need assistance/support with their care?
- ▶ **Lifestyle choices:** are these contributing to swelling, e.g. a sedentary lifestyle or obesity? Does the patient spend prolonged periods sitting or standing?
- ▶ **Previous compression choices:** the success or failure of previous management choices (if any) can guide future decisions (Grey et al, 2006; Eagle, 2009; Fletcher, 2010)
- ▶ **Previous education:** what has the patient previously been told about their condition, if anything?

**Table 3: Medications that can increase the risk of developing oedema**

Calcium channel blockers, e.g. amlodipine, nifedipine
Non-steroidal anti-inflammatory drugs (NSAIDs), e.g. ibuprofen, naproxen
Gabapentin
Hormones, e.g. oral contraceptives
Steroids, e.g. prednisone
Diabetes medication (thiazolidinediones), e.g. pioglitazone, rosiglitazone
Adapted from: Todd, 2016

The findings will highlight if further investigation or referral is needed. For example, referral back to the GP may be needed to discuss medications that can potentially result in, or worsen, oedema, e.g. calcium channel blockers. If heart failure is suspected as a contributing factor to swelling, blood tests, such as B-type natriuretic peptide (BNP) may be required to confirm the diagnosis (levels are elevated in cases of heart failure and other cardiac conditions). If raised, a cardiac referral may be required. Remember that chronic oedema will not resolve if the underlying cause(s) are not addressed.

## Reflect on your practice

- ▶ Are you familiar with the factors that may contribute to the development of chronic oedema?
- ▶ How do you currently carry out assessment of patients with suspected chronic oedema?

## 2.

## Self-care



For patients with chronic oedema, it is crucial, where possible, that they engage in their care. Self-care can offer a means to maintain or even improve the capacity to live well over time (Grady and Gough, 2014).

The self-management of long-term conditions is also a key component of the *NHS Long Term Plan* to improve efficiency, and free up value resources (NHS England, 2019).

**From a clinician perspective, encouraging patients to engage in their own care can help to free up resource that can be used to deliver care elsewhere.**

Self-care is a dynamic and empowering method of long-term management. However, to engage with their own care, the patient must be:

- ▶ Willing
- ▶ Health literate
- ▶ Central to decision-making
- ▶ Central to care delivery.

Self-care requires a collaborative approach from carers, family, volunteers and healthcare professionals (Todd, 2014). Resources must be made available to provide support.

It is important to ensure that the patient does not feel abandoned with their condition and that they are supported in their self-care throughout their healthcare journey. It should not be seen as leaving the patient 'to get on with it' and a cost-free option (Todd, 2014).

▼ Encourage and support your patients to engage with self-care where possible.

It may be necessary to remind the patient that their chronic oedema is also their responsibility, not just yours.

### Can the patient self-care?

During assessment, consider the following factors to determine if the patient is able to self-manage effectively:

- ▶ **Overall health status of the patient, including co-morbidities, dexterity and mobility:** can the patient apply and remove compression garments/wraps? Is the patient able to reach their limb(s)?
- ▶ **The patient's knowledge and beliefs about their condition:** do they understand why self-care is of benefit?
- ▶ **The patient's understanding of their treatment:** can they understand the principles of care?
- ▶ **How actively does the patient wish to be involved in their treatment:** the patient must be willing to carry out some self-care for it to be successful in the long term
- ▶ **Are there any social pressures, and, if so, how will they impact on treatment:** for example, is the patient able to sleep in bed?
- ▶ **The patient's desire to change:** is the patient willing/able to modify lifestyle factors such as weight management, nutrition, lifestyle, smoking, drinking, etc?
- ▶ **Cognitive ability and skills:** is the patient mentally and/or physically able to engage in self-care?
- ▶ **Previous treatment experience:** a negative experience may

influence their outlook on care and its effectiveness

- ▶ **The role of friends, family and carers in care provision:** is the patient dependent on community staff or family for care delivery at certain times of day?

Factors known to adversely impact on the ability to self-care include:

- ▶ High levels of morbidity
- ▶ Financial constraints
- ▶ Depression
- ▶ Lower income (Bayliss et al, 2007).

In addition to supporting self-care, it is important to identify patients who are not concordant or are unable to take responsibility for their condition (Rich, 2007) so that ongoing care can be delivered.

### Remember

- ▶ Promoting self-care to your patients who are able and willing to engage means that you may be able to reduce some of your workload. It can empower your patient and free up your time.
- ▶ Remember, self-management is not abandoning the patient to care for themselves and support should be available if needed.

### Reflect on your practice

- ▶ Consider the points outlined here and reflect upon which of your patients may be able and willing to be involved in their own care.
- ▶ Do some of your cases have barriers to self-care that could be overcome?

### 3. Site



The site of the swelling should be examined as part of initial assessment and then as part of ongoing care. Looking at the lower limbs can provide meaningful information as to the extent of the swelling and possible causes, depending on presentation.

**The whole leg should be examined. Remember that the lower limb constitutes the leg from the groin down to the toes, not just below the knee. Both lower limbs should be examined for the presence of oedema, and compared to each other.**

For example, if swelling is present above the knee, the abdomen, genitalia and sacrum should also be examined; if oedema extends to these locations, this may indicate heart failure or another medical condition. If present, the patient should be referred back to the GP for further investigations.

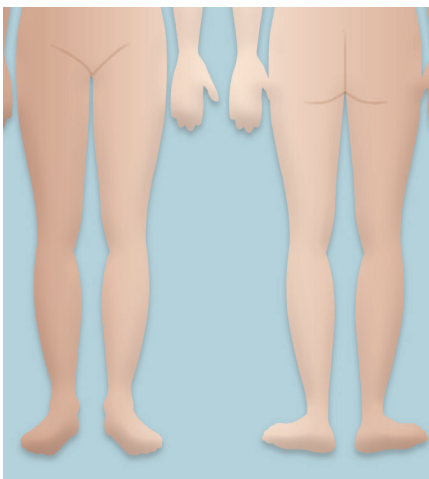


Figure 4.

*The full extent of swelling should be determined by examining the whole of the lower limb from waist to toes.*

▼ The location of chronic oedema gives clues to the possible underlying causes and informs where compression should be applied.

**Identify the full extent of the swelling; failure to examine the limb fully can create problems with management.**

Assessment of the site should aim to identify:

- ▶ Is the swelling acute or chronic?
- ▶ Does the swelling affect one limb (unilateral) or both (bilateral)?
- ▶ Is swelling localised or more generalised? (Gorman et al, 2001).

#### Oedema in both legs

Dependent oedema is a common cause of swelling in both legs, occurring when the patient sits or stands for too long. It is commonly seen in the community setting in people who sleep in a reclining chair or armchair (Evans and Ratchford, 2016).

Obesity may also result in oedema in both legs, due to the pressure of added weight on the veins in the stomach. Similarly, this coupled with hormonal changes may lead to oedema in pregnancy.

Bilateral swelling can indicate a central cause of oedema, such as chronic venous insufficiency (CVI), heart failure or nephrotic syndrome.

Patients with heart failure may present with swelling in both legs that extends onto the trunk, usually accompanied by breathlessness on exertion or when lying flat (Evans and Ratchford, 2016).

Kidney and liver conditions may result in bilateral swelling. Some medications (see *Table 3*) may also result in bilateral oedema (Evans and Ratchford, 2016).

Swelling in both legs that does not extend to the feet may indicate lipoedema, a chronic condition leading to accumulation of fat below the waist (Lipoedema UK, 2019).

#### Oedema in one leg

Unilateral chronic oedema can indicate deep vein thrombosis (DVT),



Figure 5.

*Chronic oedema present in one leg.*

superficial thrombophlebitis, or cellulitis, all of which are accompanied by redness, pain and tenderness to touch, and require urgent intervention. It may also indicate primary lymphoedema, which would require specialist referral. Unilateral oedema may also be an indication of an underlying malignancy.

#### One or both legs

Common vascular disorders, such as venous hypertension and chronic venous insufficiency, can cause swelling in one or both legs (*Figure 5*).

**Failure to examine the whole limb can result in the wrong treatment. For example, if only below the knee and above the ankle is examined, yet swelling extends to above the knee and the foot, application of compression may force fluid into these areas, resulting in further swelling. At this point, the patient can lose confidence in the clinician's ability to make decisions and may become non-concordant.**

## 4. Skin

Chronic oedema can have a detrimental effect on the skin. Failure of the lymphatics to clear fluid from the tissues can lead to the accumulation of waste products and a lack of nutrients to the area. With time, the skin undergoes changes and can thicken and harden as a result (Timmons and Bianchi, 2008). The skin in patients with chronic oedema is vulnerable to damage and may breakdown and/or become infected (Newton, 2011). Skin changes occur gradually and become more serious over time if left untreated. Complications such as wounds, lymphorrhoea, and cellulitis may arise (see p.14). These are frequently encountered in the community and prompt action is needed to prevent and manage these conditions.

Skin changes or breaks in integrity can easily be detected during assessment of the patient's skin, and, once identified, can be managed.



**Figure 6.**  
Inspect between the toes to identify breaks in the skin.



**Figure 7.**  
Hyperpigmentation of the skin is a sign of underlying venous disease.

▼ **Maintain skin integrity and health to reduce the risk of complications such as cellulitis. Examine for signs and symptoms of peripheral arterial disease which may contraindicate compression therapy.**

### Skin assessment

Skin assessment should include examination of the skin of the whole lower limb. This should include the foot and between the toes to determine if there are any skin breaks or infection present (Figure 6). Athlete's foot (*tinea pedis*) is a common fungal infection in people with chronic oedema, that is a common yet often overlooked cause of cellulitis.

The lower limbs should also be examined for signs of pressure damage, particularly in at-risk areas, e.g. behind the knees, ankles and heels.

The following should be noted while assessing the skin:

- ▶ **Dryness:** is the skin adequately hydrated?
- ▶ **Sensitivities to topical treatment:** e.g. bandages/hosiery, or wound dressings
- ▶ **Signs of cellulitis:** such as unilateral increased skin temperature, redness, tenderness or blisters and malaise
- ▶ **Colour/circulation of the skin:** Pale skin that is cold to the touch, mottled, or dusky may indicate the presence of restricted arterial blood flow. Pulselessness may also be present on palpation
- ▶ **Pigmentation:** is there any haemosiderin staining caused

by venous insufficiency of the lower limb or thickening of the subcutaneous tissue (Figure 7)?

- ▶ **Fungal infections:** such as athlete's foot, commonly occur between toes and in skin folds, which should be checked carefully and, if present, managed to avoid cellulitis
- ▶ **Hyperkeratosis:** thickened, brown, scaly skin that is a commonly seen skin change (Figure 8)
- ▶ **Appearance of the skin:** is there irritation, rash, redness or inflammation; if so, this may be indicative of eczema
- ▶ Leaking of lymph through the skin (lymphorrhoea)
- ▶ If a wound is present (Lymphoedema Framework, 2006).

### Wound assessment

If a wound is present on the limb, systematic wound assessment

### ▼ Peripheral arterial disease and vascular assessment

Ankle brachial pressure index (ABPI) is the ratio of blood pressure (bp) at the ankle compared to the arm. If the bp is lower in the leg, peripheral arterial disease may be present.

ABPI may be difficult to determine in patients with chronic oedema, and can be inaccurate due to the presence of swelling. For this reason, routine ABPI measurement is not required for people with chronic oedema in the absence of risk factors, history or signs and symptoms of peripheral arterial disease.

If there are concerns of reduced arterial flow, referral for vascular assessment should be made.

From: BLS, 2019

should be carried out. The TIME mnemonic is well recognised as a tool for guiding wound care decisions, and is included in the *Best Practice Statement for the Holistic Assessment of Chronic Wounds* (2018). TIME has recently been updated to include R and S; TIMERS (Atkins et al, 2019).

For both venous leg ulcers and chronic oedema, the gold standard treatment is compression therapy. By managing chronic oedema as a priority, venous ulceration will improve by default as compression addresses the underlying cause of both conditions.

## Hyperkeratosis

Hyperkeratosis is a commonly seen skin change associated with chronic oedema (Figure 8). Excess lymph fluid in the skin causes it to become thickened. It is commonly seen around the toes/ankle as a brown scaly discolouration, and on the legs as thickened plaques or skin flakes. It may be present in one small area, or over a large part of the limb.



Figure 8.  
Hyperkeratosis.

## Cellulitis



Figure 9.  
Red legs are often misdiagnosed as cellulitis, however, cellulitis rarely affects both legs.

Cellulitis is a bacterial infection of the skin that usually occurs where there is a breach in the skin's integrity, such as a wound, scratch or fungal infection that provides an entry point for bacteria.

Chronic oedema means that the immune system is compromised, especially in the affected area. A delayed immune response and damaged lymphatics in the swollen tissue means that infection can occur suddenly, and the speed of onset of symptoms, such as pain, fever, rigors and vomiting, in some cases can be alarming for the patient.

In addition to the patient feeling generally unwell, the affected leg will be painful, red and hot to touch. Cellulitis is nearly always unilateral (Opuku, 2015), so if redness and swelling is present in both legs, it is unlikely to be caused by cellulitis and a differential diagnosis should be considered, such as venous eczema or red legs (Figure 9). In both of these cases, the patient does not usually feel unwell.

Red legs are commonly misdiagnosed as cellulitis in the community, leading to unnecessary antibiotic treatment and costs associated with admission.

## Lymphorrhoea: wet or leaky legs



Figure 10.  
Lymphorrhoea.

-orrhoea, - is a suffix meaning 'flow or discharge': Lymphorrhoea therefore is the flow or discharge of lymph fluid through the skin.

Lymphorrhoea occurs when untreated oedema results in rapid swelling that the skin cannot accommodate. It appears as beads of fluid which put the affected area at risk of skin damage, since the skin becomes very wet and broken, increasing the likelihood of cellulitis (Lymphoedema Network Wales, 2017).

Holistic assessment is key to determining the factors contributing to chronic oedema and lymphorrhoea. Community nurses have an essential role in delivering effective personal care, which minimises complications and eliminates hospital admission (Lymphoedema Network Wales, 2017). Lymphorrhoea is commonly mismanaged in a community setting through lack of awareness of cause. Management often consists of mopping up the fluid, rather than tackling the underlying cause, which should be managed using compression therapy (Anderson, 2017).

## 5. Size

The size of the limb should be evaluated at initial assessment to obtain a baseline set of measurements to refer to throughout the patient's journey to chart their progress. Simple measurements taken from set points above the malleolus, mid-calf and at mid-thigh can be enough to assess progress with treatment (Figure 11).

An increase in limb size may indicate the need for a period of

▼ The size of the limb can influence compression choice and indicate the need for intensive therapy to reduce swelling before maintenance therapy.

intensive therapy in order to reduce limb volume. Size of the limb is also useful, as it may influence compression choices. During assessment, consider the build of the patient:

- ▶ **Is the limb longer or shorter than average?** If so, a petite or long compression garment or wrap may be required
- ▶ **Is the limb thinner or fatter than average?** If the patient is obese, a bespoke compression garment may be necessary or some types of hosiery have a larger panty part to accommodate a larger abdomen
- ▶ **Is the patient wheelchair bound or immobile?** Consider how any treatment options may interfere with transfers.

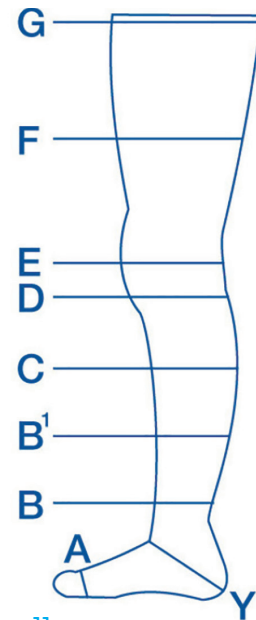
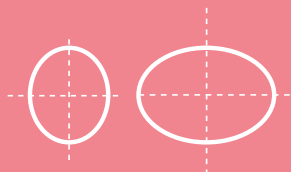


Figure 11.  
Measuring points.

## 6. Shape



It is important to note the shape of the patient's limb, since it will influence product choice when selecting compression therapy for the management of chronic oedema. Graduated compression requires a regular limb shape to be effective; deviation from this shape may mean hosiery is not suitable and specialist bandaging or a wrap may be better to restore a more regular limb shape. Referral to a competent, specialist practitioner such as a tissue viability or lymphoedema nurse specialist may be required if this is beyond the skills of the community team.

▼ Shape of the limb influences treatment choices, and may signpost the need for referral.



Figure 12.  
Champagne bottle-shaped limbs.

Examine the shape of the limb:

- ▶ Is it regular or irregular?
- ▶ Like an inverted champagne bottle shape (Figure 12)?
- ▶ Are skin folds present?
- ▶ Is oedema pitting or non-pitting?
- ▶ Is swelling confined to the feet/foot?
- ▶ Is swelling confined to the thigh(s)?
- ▶ Are the toes affected (Figure 13)?



Figure 13.  
If toes are swollen, they need compressing. If left untreated, they can begin to leak lymph, which can become difficult to manage.

Poor or irregular shape, or the presence of skin folds may need padding to restore a regular limb shape for graduated compression to be applied. If swelling extends into the toes, compression will need to be applied to these areas too. Toe bandaging or toe caps should be used.

# 3. Chronic oedema management

## Key points

1. The management of chronic oedema should aim to alleviate swelling, pain and the impact of the condition on the patient.
2. Management can be split into two phases: the intensive phase in which oedema is reduced and stabilised with intensive therapy in the short term, and the maintenance phase in which the reduction achieved in the intensive phase is maintained in the long term.
3. In both phases of management, the key principles of skin care, exercise, and compression therapy are used.
4. Skin care is often overlooked, but is critical for the avoidance of complications such as lymphorrhoea and cellulitis.
5. Compression therapy is an essential component of care to reduce swelling in chronic oedema.
6. The management approach should be continually reviewed as the needs of the patient will change over time.
7. Engaging the patient in their care can help management to be more successful in the long-run and can free up nursing time.

**F**indings of assessment should be used to guide management decisions. Throughout the management process, the patient must be central to decisions about their care to ensure long-term success.

Remember at the outset that the management of chronic oedema is a long-term process, so various challenges and setbacks will be encountered along the way.

Setbacks should be considered in order of priority when and if they occur, e.g. the treatment of infection should take priority over the reduction of swelling.

It is important to recognise that management goals will change with time and therefore should be constantly reviewed to identify what is the priority and if referral is required. The management plan for the individual patient should be challenged on a regular basis, e.g. every few weeks, to ensure practice

is informed by assessment findings, and not driven by habit.

### Management phases

The management of chronic oedema can be split into two phases:

#### 1. Intensive phase

In this phase of management, the short-term aims are to:

- ▶ Reduce the volume of swelling until it becomes stable
- ▶ Improve limb shape where possible
- ▶ Improve skin condition
- ▶ Treat wounds/lymphorrhoea if present.

#### 2. Maintenance phase

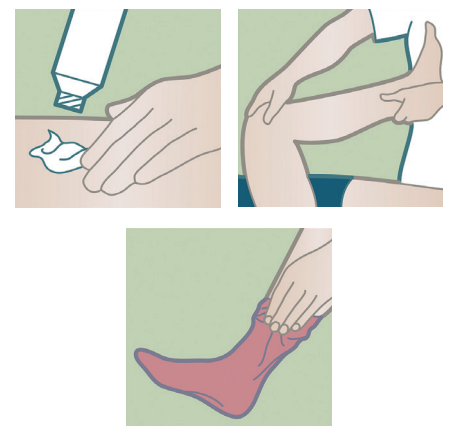
In this phase of management, the long-term aims are to:

- ▶ Maintain reduction in swelling
- ▶ Maintain improvement in limb shape
- ▶ Maintain skin integrity.

For both phases, there are three principles of care that should be applied to achieve the management

goals. These are:

- ▶ Skin and wound care
- ▶ Exercise
- ▶ Compression therapy.



These principles are only effective if any factors that may be contributing to the chronic oedema are addressed. For example, medical management of any underlying conditions should be optimised, while psychological issues, if any, should be addressed if possible to optimise compliance with treatment.





Skin care is an essential part of chronic oedema management. A daily, basic skin care routine will help to maintain skin integrity (Todd, 2014) in both the intensive and maintenance phases of treatment, and can help to prevent more serious skin changes and complications from occurring. Healthy, hydrated skin reduces the risk of breaks, and therefore the risk of infection such as cellulitis.

Skin care consists of three key components:

- ▶ Cleansing
- ▶ Drying
- ▶ Moisturising.

### Cleansing

Regular washing of the limb, at least three times a week ideally, is important to make sure dead skin cells are removed, along with dirt, the build-up of emollients and micro-organisms that may result in infection. Skin should be washed regularly, although it is important to maintain the balance between cleanliness and over-washing, which may dry out the skin, particularly in patients with old or fragile skin (Voegeli, 2008).

The skin can be cleansed effectively using tap water, in a bowl lined with plastic, using a clean flannel. Normal soap can dry out the skin and disrupt the acid mantle of

▼ **Skin care should aim to maintain or restore skin integrity and health, and promote healing if a wound is present.**

the skin. This can be prevented by using a pH-neutral cleanser or emollient as a soap substitute.

If a wound is present, make sure all of the limb is cleaned, not just the skin around the wound. Wound cleansing is important to maintain a healthy wound bed to optimise the chance of wound closure.

**Skin care is an essential part of chronic oedema management. A daily, basic skin care routine will help to maintain skin integrity... and can help prevent more serious skin changes and complications from occurring.**

### Drying

The skin should be dried by patting with a soft towel; do not rub or apply unnecessary force, especially if the skin is fragile. Take care to dry in between any skin folds and the toes to prevent the skin here becoming damp and breaking down. If it is not possible to use a towel between the toes, use tissue or gauze to ensure dryness.

### Moisturising

Emollients help to 'trap' moisture in the skin and keep it soft, as well as protecting the skin from bacteria (British Dermatological Nursing Group [BDNG], 2012). In patients with chronic oedema, leave-on emollients should be used to moisturise the skin and maintain its integrity and reduce the signs and symptoms of dry skin, such as scaling and itching.

Bland emollients should be used immediately after washing to trap moisture in the skin (BDNG, 2012).

Involving patients in the choice of emollient will help to encourage self-care.

Before using an emollient, it is important to check that the patient is not allergic to any of its components, and is happy with the product selected, as they are more likely to apply it if they have been involved in its selection. Guidance on emollient choice is presented in *Table 4*.

### Application

When using emollients:

- ▶ There is conflicting advice on application. Some guidance recommends an upward motion to encourage lymphatic return, while others recommend application in a downward motion. Whatever the preference, it is recommended that application finishes with a downward stroke in the same direction as hair growth, to reduce the risk of folliculitis (hair follicle infection)
- ▶ Ideally, emollients should be applied twice-daily. If this is not possible, a single application after washing the limb is preferred as the skin is more absorbent (Burr and Penzer, 2005)
- ▶ If possible, apply emollient in the evening as it will then be absorbed overnight. Failing this, moisturise whenever is convenient (e.g. when a compression garment is removed for dressing change, or by a visiting carer), whatever time of day (Nazarko, 2009)
- ▶ Prevent contamination of the emollient by keeping the lid on, avoiding dipping hand/fingers in to the cream. Ideally use a pump dispenser (Lawton, 2010).

### Remember...

The daily skin routine provides a good opportunity to check the skin for marks, redness and heat or any other signs of damage. Remember to care for and examine the skin in between the toes; this area is often overlooked, but is hard to heal once damaged or infected.

**Table 4:** Guide to emollient selection

Emollient type	Description	Example products
Greasy*	<ul style="list-style-type: none"> <li>▶ Does not contain preservatives</li> <li>▶ Very effective at holding water in the skin, therefore useful for very dry and thickened skin and night-time application</li> <li>▶ Not suitable for weeping eczema, can exacerbate acne, can cause folliculitis if over used</li> <li>▶ Select product containing urea for management of hyperkeratosis</li> </ul>	50/50 WSP/LP Epaderm® ointment Emulsifying ointment Emollin aerosol spray
Creamy	<ul style="list-style-type: none"> <li>▶ Mixture of oil and water</li> <li>▶ Feels light and cool on the skin and absorbs easily</li> <li>▶ May be preferred for daytime use</li> <li>▶ Can be used on weeping eczema</li> <li>▶ All creams contain preservatives that may cause sensitivities</li> </ul>	E45 Cream Diprobase® Cream Dermol® Cream (if skin infected) Calmurid® Cream (10% urea) Balneum® Cream (urea)
Light	<ul style="list-style-type: none"> <li>▶ Contains more water and less fat than creams and is therefore less effective at moisturising the skin</li> <li>▶ Suitable for mild dry skin conditions, hairy areas, e.g. scalp and weepy skin</li> </ul>	E45 Lotion (contains lanolin) Aveeno® lotion

\* There is a fire hazard with paraffin-based emollients, which is increased when applied to large areas of the body, clothing or dressings. Patients should be advised to stay away from fire/flames and not to smoke if used

## Wound care

Detailed direction on wound management is beyond the scope of this document, however, with a clean wound bed, the application of compression therapy will invariably promote wound

improvement by addressing the underlying cause in the majority of cases.

It is important that the condition of the patient's skin is evaluated regularly, along with

the effectiveness of their skin care regimen. Left unchecked, complications such as lymphorrhoea (leakage of lymph fluid through the skin) and recurrent cellulitis (skin infection) can arise.

## The epidermis and skin care

- ▶ The outermost layer of the skin, the epidermis, provides a physical barrier against the environment, including micro-organisms responsible for infection.
- ▶ The epidermis can be damaged by prolonged contact with moisture, or become dry as a result of inadequate skin care.
- ▶ The skin surface — a thin film made up of natural oils, including sebum, sweat, and skin cells — is known as the acid mantle, as it is slightly acidic at pH 5.5.
- ▶ The acid mantle ensures that the friendly micro-organisms that live on the skin can survive, while preventing virulent bacteria and other micro-organisms that thrive at a higher pH from colonising the skin (Zulkowski, 2017).
- ▶ If over hydrated, the pH of the skin increases, becoming more alkaline, promoting proliferation of virulent micro-organisms. As a consequence, there is an association between moist skin and secondary fungal and bacterial infections (Jones et al, 2008; Woo et al, 2009).
- ▶ If harsh products are used, they can disrupt the acid mantle, affecting pH and stripping the skin of oil. As a result, skin may become irritated and dry, and with time may become cracked and broken.
- ▶ If the skin is broken, it provides an entry point for bacteria to enter, increasing the risk of infection.

## Management of common skin complications

### Hyperkeratosis

If hyperkeratosis is present, removal of the dry skin flakes may be needed. A greasy emollient, containing urea, is recommended to help with removal of skin build-up. However, it is important to remember that the main treatment for hyperkeratosis is compression therapy as this helps to move fluid from the limb, improving skin health from the inside out.

### Cellulitis

If cellulitis is diagnosed, its management must be a priority. The skin is more prone to breakdown and infection may cause intense pain. Compression therapy should be discontinued if the patient finds the pain unbearable, but should be resumed as soon as it can be tolerated to prevent worsening of oedema.

Cellulitis should be treated with oral antibiotics in mild cases, in addition to painkillers. Intravenous antibiotics with admission may be needed if infection is severe (Anderson, 2017).



**Figure 14.**

*Draw around the boundaries of redness on the limb with cellulitis to track if the infection is worsening (spreads beyond the pen line) or resolving (recedes from the pen line).*

The British Lymphology Society (BLS) provides guidance on the management of cellulitis in patients with chronic oedema, since it can differ to the usual cellulitis guidance (BLS, 2019).

Once a patient develops cellulitis, they are at an increased risk of further episodes (Cox, 2002), which can result in admission to hospital and associated spiralling costs (Clinical Resource Efficiency Support Team [CREST], 2005). Repeated episodes of cellulitis account for 2–3% of all hospital admissions (Posnett and Franks, 2008).

For this reason, guidelines state that patients who have had an attack of cellulitis carry a two week supply of antibiotics with them, particularly when away from home for any length of time, e.g. on holiday. Amoxicillin 500mg tds is recommended or, for those allergic to penicillin, erythromycin 500mg qds or clarithromycin 500mg bd. Antibiotics should be started immediately if familiar symptoms of cellulitis develop, but a medical opinion should be sought as soon as possible (BLS, 2019).

It is important to break the vicious cycle of cellulosic episodes by maintaining skin health and being vigilant for bacterial entry points in the skin. Compression therapy helps to remove fluid from the limb while skin care can help prevent damage from occurring.

#### **Lymphorrhoea: wet leaky legs**

Lymphorrhoea (Figure 15) is commonly mismanaged in a community setting through lack of awareness of cause. Management often consists of mopping up the fluid, rather than tackling the underlying cause, which should be managed using compression therapy (Anderson, 2017). If dressings are applied by the community nurse, they will need a high frequency of change, which can be time-consuming and therefore costly.

Unmanaged, the loss of fluid can be so extreme that patients may place their legs in plastic bags and resort to using nappies, sanitary towels or incontinence pads to absorb the fluid produced. This, understandably, can cause reduced quality of life for the patient as a

result of embarrassment, anxiety and depression, leading to social isolation.

The only way to resolve lymphorrhoea is with compression therapy. Short-stretch compression bandaging can be applied. However, this should not be continued in the long term without a clear rationale. Bandaging should be started with reapplication ideally taking place daily, but realistically, three times a week. In the event that bandaging is not achievable at the required frequency, a wrap compression system can be considered as an alternative.

As the oedema reduces, lymphorrhoea will also reduce. A change may be seen within seven days of bandaging, but greater improvement may take longer in some cases.

#### **Failure to treat lymphorrhoea can be seen as an omission of care.**



**Figure 15.**

*Lymphorrhoea can only be managed effectively using compression therapy to address the underlying cause.*

### **Reflect on your practice**

What are the consequences of failing to acknowledge the importance of skin care in the management of chronic oedema?

Do you know how to differentiate between red legs and cellulitis?

Do you need to change the way you manage patients with lymphorrhoea?



Exercise and movement have benefits for people with chronic oedema, as they help to:

- ▶ Improve lymphatic flow and clearance of fluid from tissues
- ▶ Improve venous return
- ▶ Reduce limb volumes
- ▶ Reduce weight
- ▶ Increase range of movement
- ▶ Improve quality of life.

General health benefits also include:

- ▶ Cardiovascular fitness
- ▶ Stress relief
- ▶ Improved flexibility / range of movement
- ▶ Weight management (Public Health England, 2016).

Exercise is a vital component of chronic oedema management. Any exercise that increases foot and muscle pump action and improves venous return and lymphatic drainage can help reduce swelling (Linnitt, 2005).

However, the typical demographic of patients with chronic oedema

## Encourage movement and exercise according to ability and set realistic goals.

— those with polymorbidity, inactivity, elderly, obesity — may not be the most active, and the degree of oedema present may restrict movement further (Newton, 2011).

Therefore, exercise recommendations should always be realistic and take into account disease severity, age and physical condition (Timmons and Bianchi, 2008). For example:

- ▶ Can the patient walk?
- ▶ What is the extent of their mobility / dexterity?
- ▶ Can the patient perform chair-based exercise?
- ▶ Can the patient balance during an up and down activity (Figure 16)?



Figure 16.

Simple exercises that activate the calf-foot pump, such as standing on tiptoes, can help the lymphatics to reduce swelling.

Fluid movement by exercise is maximised if it is done when wearing compression (Doherty et al, 2008).

**It is important to remember that even simple calf pump exercises and elevation can help to alleviate swelling (Doherty et al, 2008).**

A crucial factor in the community setting is encouraging leg elevation to the level of the heart to aid fluid return, since many patients are armchair-based with gravity worsening the effects of their oedema. If elevation is not possible, encouraging a period of rest on the bed during the day and sleeping in bed at night may help to alleviate swelling in some patients (Newton, 2011).

## About lymphatic drainage

There are two types of lymphatic drainage, manual and simple.

### Manual lymphatic drainage

Manual lymphatic drainage (MLD) is a type of specialised massage aimed at encouraging the flow of lymph around the body (Bertelli et al, 2013). It can be useful to ease congestion and reduce limb volume in the intensive/decongestion phase of treatment. It helps to move extra lymph fluid from the tissues of the affected area so it can drain normally. It is usually used in conjunction with compression bandaging or hosiery to improve the efficacy of these treatments. MLD should be carried out by a trained practitioner; it is available via specialist services for some patients, but is not a principle of care within a community setting.

### Simple lymphatic drainage

Simple lymphatic drainage (SLD) can be taught to patients or their carer and can form part of their daily skin care routine. However, it is not a routine part of community care. If used, success will depend on the patient's willingness to participate. The patient must be central to deciding to incorporate SLD into their care, and support should be provided.



Compression therapy is seen as one of the principles of management for chronic oedema, for both the intensive phase of limb volume reduction and long-term maintenance (Moffatt, 2007). It can make a valuable contribution to the management of oedema, as well as improving patients' quality of life (World Union of Wound Healing Societies [WUWHS], 2009; Butterfield, 2013).

Compression therapy is applied using bandaging, hosiery or wraps. Clinicians should consider the following when selecting which type of compression to use for patients with chronic oedema:

- ▶ **Patient preference, dexterity, and lifestyle:** compression choice should fit in with the patient's circumstances and level of activity, otherwise long-term therapy is unlikely to be successful (WUWHS, 2009)
- ▶ **Frequency of application needed:** is the resource available to deliver care at the frequency required? For example, is a competent practitioner available to apply compression bandaging?
- ▶ **Clinician expertise:** is a competent healthcare professional available to deliver care for as long as needed?
- ▶ **Size and shape of the leg:** the presence of an irregular limb shape and/or skin folds may require padding applied beneath bandages, whereas a larger/smaller limb may require a made-to-measure garment
- ▶ **If a wound is present:** ensure the right type of compression is selected, since not all compression choices will accommodate large wounds with large dressings.

▼ **Compression therapy can be delivered using bandaging, wraps or hosiery to reduce and maintain oedema.**

**Involving patients in the choice of which compression therapy to use can help them feel empowered and encourage them to follow their treatment plan long term.**

**Intensive phase: compression bandaging or wrap system?**

In the intensive phase of treatment, the aim is to reduce limb swelling to a point where it remains stable. In this phase of therapy, short-stretch (inelastic) compression bandaging or a compression wrap system can be used. Both of these options can accommodate the reduction in size of the limb as oedema is moved from the tissues back into the circulation.

**Short-stretch bandaging**

The traditional way of delivering compression to the limb during the intensive phase is by using bandaging. Bandaging allows for correction of distorted limb shape using padding, and can be reapplied and adjusted as the limb reduces in size as swelling alleviates.

There are a number of bandages available, that are categorised by their construction, elasticity and the level of compression that they apply. Short-stretch bandages, also known as inelastic bandages, are recommended for the intensive phase



**Figure 17.**

*Short-stretch bandaging, including toe bandaging.*

of management since they provide a rigid casing around the limb, providing resistance to the calf and foot muscle pumps helping to drive fluid from the tissues, back into the lymphatic system (Figure 17).

In limbs that are graduated in shape, the decrease in pressure from ankle to knee automatically occurs. However, if the limb is misshapen, for example, due to severe oedema or the presence of bulky dressings,

## ▼ How compression therapy works

Compression therapy delivers external pressure to the limb so that on contraction of the calf-muscle pump, blood and lymph within the limb are squeezed from the tissue back into the circulation via the lymphatics (Moffatt, 2007). The amount of pressure delivered to a limb is measured in millimetres of mercury (mmHg).

Compression therapy should be applied in a graduated way, with pressure that is greatest at the ankle gradually decreasing towards the knee, with further reduction to the thigh if compression is applied to the full length of the leg. This graduation allows the venous blood to be pushed back up the leg towards the heart (Anderson, 2006; Grey et al, 2006).

Compression affects the volume of blood in veins and arteries and fluid in the tissues to varying degrees, depending on the amount of pressure delivered (which in turn is influenced by the type of compression material used and how it is applied) (Moffatt, 2007).

## Avoiding common compression mistakes

Don't keep doing the same thing, just because it is what you or your colleagues have always done... engage with the patient and question if the compression choice is right for them.

Do not apply reduced compression thinking that this is kinder for the patient and that you can build up the compression gradually; getting it right first time and helping the patient to understand and engage in therapy is more likely to achieve successful outcomes.

Don't just apply compression below the knee and above the ankle if swelling extends beyond here; all areas of swelling need to be contained or else it will worsen around the compressed area.

Do not recommend that the patient stops wearing compression if they have been doing so without any complaint for a while — swelling will recur while awaiting an investigation or new garment.

Bandage the feet and toes if swelling extends there; if not bandaged, they should be monitored for signs of swelling. The application of toe-caps to prevent swelling is recommended.

If bandaging slips while using short-stretch bandaging (providing slippage is not a result of poor application), or if a wrap compression system becomes looser, this is a positive sign indicating that swelling is reducing. Switching to a long-stretch bandaging system will not help to reduce the oedema.

padding will need to be used beneath compression bandaging to restore a regular limb shape.

Frequent re-application of short-stretch bandaging — approximately every 1–3 days for a period of 2–4 weeks — is needed in the intensive phase of management.

**As long as the bandage has been correctly applied, slippage can be a positive sign that oedema is reducing. The bandage will need frequent reapplication to ensure it remains therapeutically effective.**

It is therefore important to consider if there is available resource to deliver the level of care required, and if the frequent reapplication of bandaging is compatible with the patient's lifestyle. The frequency of reapplication needed will, however, decline as reduction in swelling stabilises.

From a patient's perspective, compression bandaging can restrict ankle movement and as a result, movement. It can also be bulky and limit the patient's choice of footwear

and clothing, and ability to wash when they wish. These difficulties are known to contribute to poor concordance and thus poor healing outcomes (Ashby et al, 2014).

There may be a limited number of clinicians who are trained to apply compression bandaging within the community team. Resource should therefore be a consideration before committing to compression bandaging for the intensive phase of chronic oedema treatment.

When bandaging is used, it should not be considered a lifelong solution. Although effective at reducing swelling, it has a number of disadvantages which mainly impact on the patient's quality of life but can prove labour-intensive for the clinician too. Thus, it is important to reassess the limbs for improvement and re-evaluate treatment options if no improvement is seen.

### Compression wrap systems

Compression wrap systems (Figure 18) can be used in both phases of management; they may be preferable

to bandaging since they promote self-care, and as long as competent, there is no need for qualified nurse application after initial fitting and instruction. The application of a compression wrap system is simple and does not require training or competency to the same extent as bandaging. This can result in a reduction of nursing time needed to deliver care, with associated cost savings (see box below).

Wraps have been shown to be a clinically and cost-effective alternative to traditional bandaging to reduce oedema (Damstra and Partsch, 2013; Elvin, 2015; Mosti et al, 2015; Wicks, 2015).

## Cost savings

Example of potential cost savings — case study:

- ▶ Patient was on caseload for over 12 months with chronic oedema and leg ulceration
- ▶ Original treatment plan was 2-layer compression kits applied by a band 6 nurse — 45-minute appointments three times per week
- ▶ Switching to a wrap compression system (foot and leg piece) changed appointments to one 20-minute appointment a week with a band 6 nurse.

Over 12 months, this would save an estimated **£4481** in product cost and **£4385** in nursing time: a total saving of **£8866.81** per year for this patient.



Figure 18.  
A compression wrap system.

Wraps can aid self-management, being readjusted by the patient or carer if they become loose.

**The ability to readjust as the limb reduces has shown that a compression wrap system is more effective in managing oedema over 24 hours and one week when compared with inelastic bandaging (Damstra and Partsch, 2013; Mosti et al, 2015).**

**On average, four weeks of intensive treatment for chronic oedema using bandaging or a wrap should be sufficient to reduce swelling and stabilise it. At this point, the majority of people can move into the maintenance phase of compression therapy using hosiery or a wrap.**

However, if after four weeks there is no resolution or progress, reassessment should be carried out.

#### Maintenance phase: compression hosiery or wrap?

Compression hosiery or wraps used in the maintenance phase need to continue to deliver the same amount of pressure used in the intensive phase of treatment or swelling may recur.

If a compression wrap has been used successfully for intensive treatment, the patient may be happy to continue to use in the maintenance phase. Maintenance with a wrap may also be beneficial where the patient cannot apply or tolerate hosiery, or where wound dressing changes are needed. Factors to be considered when selecting a compression garment for maintenance are outlined in *Table 5*.

Traditionally, hosiery is used for long-term management of chronic oedema and chronic venous insufficiency.

#### Compression hosiery

Hosiery is used to prevent recurrence or deterioration of swelling, once limb volume has initially been reduced with compression bandaging or a wrap.

When selecting compression hosiery it is important to give careful

consideration to the limb — the patient may fit into a standard garment, or may be better suited to a made-to-measure garment that fits exactly to the patient's limb shape.

There are several types of hosiery available and they are classified according to how they are made and the standards used to measure the amount of compression that they deliver.

**Circular- versus flat-knit hosiery**  
As their names suggest, circular- and flat-knit hosiery are produced using two different knitting techniques. Circular-knit garments (*Figure 19*) are produced as a seamless tube, whereas flat-knit garments (*Figure 20*) are constructed as a flat piece of fabric that is then sewn together, with a resulting seam. These differences in production influence the properties of the garment (see *box below*).

#### Compression class

Compression class is determined by the specified testing methods known as standards. Standards are used to determine how much compression is delivered in mmHg at the ankle by a garment. For example, all class 1 garments tested using the British standard will deliver between 14–17mmHg, whereas class 1 garments manufactured to the

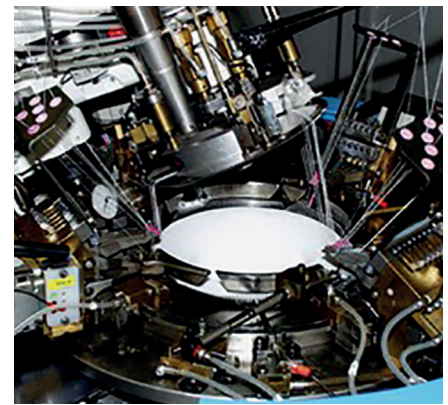


Figure 19.  
Circular knitting machine.



Figure 20.  
Flat knitting machine.

German standard, will deliver 18–21mmHg at the ankle (*Table 6*). To overcome possible confusion, it is recommended that garments are referred to by the mmHg they deliver, rather than the class.

Whatever the class, compression hosiery should:

- ▶ Be comfortable and fit well. It should not roll, cut in, or mark the skin
- ▶ Never cause blue digits, tingling, or pins and needles

### Circular- versus flat-knit garments

Circular-knit hosiery is elastic and contains oedema in the same way as a balloon holding water: the more fluid that is put into it, the more it will expand.

This means for severe swelling, a circular-knit garment may continue to expand and may roll or dig in, forming a tourniquet that can result in skin breakdown.



The elasticity can make them difficult to put on and remove in higher classes, but they are considered cosmetically acceptable to the patient.

Flat-knit hosiery, however, is more rigid, like a paper cup, and holds its shape to contain fluid. It is therefore more effective at containing stubborn oedema, and less likely to roll and form a tourniquet effect on the limb.



**Table 5:** Criteria for compression product selection in the maintenance phase of treatment

Factor	Circular-knit hosiery	Wrap system	Flat-knit hosiery
Normal leg shape	Y	Y	Y
Distortion due to oedema	N	Y	Y
Mild-to-moderate swelling	Y	Y	Y
Risk of rebound oedema	N	Y	Y

**Table 6:** Different compression standards and the classes of compression delivered

	German standard RAL-GZ 387	British standard BS 661210	French standard ASQUAL	US compression levels
1	18–21mmHg	14–17mmHg	10–15mmHg	15–20mmHg
2	23–32mmHg	18–24mmHg	15–20mmHg	20–30mmHg
3	34–46mmHg	25–35mmHg	20–36mmHg	30–40mmHg
3 Forte	34–46mmHg			
4	49–70mmHg		>36mmHg	
Testing method	HOSY	HATRA	IFTH	

Adapted from: Lymphoedema Framework, 2006

Working with the patient to find a suitable garment can help to improve compliance (Gray, 2013). The patient should not be responsible for selecting the class of garment, or the fabric it is constructed from, since this influences therapeutic effect, but they can contribute their preferences such as if the garment has an open- or closed-toe, a silicone top band, or colour.

There are a number of aids available for patients to use to help apply and remove their garments. Furthermore, some garments have zips or Velcro fastenings that can alleviate difficulty with application and removal, which is especially beneficial for patients with fragile skin (Elwell, 2016).

### Prescribing

When completing a prescription for a compression garment, it is important to use the manufacturer's ordering instructions, measurements and codes to ensure the correct product is delivered (Figure 21).

As there is such a large range of products available, inaccuracies in prescription dispensing might occur (Woods, 2015), including:

- ▶ Inaccurate information recorded / missing from the prescription
- ▶ Dispensing difficulties leading to substituting of items
- ▶ Product codes not listed on electronic primary systems, therefore registering as unavailable.

It may be necessary to work with the medicines optimisation or management team within the clinical commissioning group (CCG) to overcome any repeated difficulties. Alternatively, the use of a dispensing appliance contractor (DAC) — a business contracted to the NHS and able to dispense prescriptions — with expertise in compression may help to reduce inaccuracies in dispensing (Elwell, 2016).

**Figure 21.**  
Example prescription.

- ▶ Cover the swollen area as far as possible, e.g. swelling to the knee requires thigh-length hosiery, while swelling to the thigh needs tights (Elwell, 2016).

### Garment selection

A wide range of compression hosiery is available in a variety of sizes, lengths, with open- and closed-toe, and in multiple colours.





It is important not to underestimate the negative impact of chronic oedema on patient wellbeing, self-esteem and body image (Linnitt, 2005; Keeley, 2008). The presence of swelling can make finding appropriate clothes and footwear very difficult (Green, 2008).

It is important to consider how patients are feeling and give them the opportunity to discuss their concerns (Board and Harlow, 2002; Gray et al, 2011).

Chronic oedema, with the accompanying swelling, pain and possible ulceration can have a negative impact and lead to anxiety, depression and social isolation (Mason et al, 2008). These psychosocial symptoms should be considered in any care plan. Patients are more likely to follow their treatment plan in the long term if:

- ▶ They are fully informed about their care and involved in decision-making which empowers them to be active participants in their treatment
- ▶ They have a say in their treatment regimen and are listened to during the decision-making process
- ▶ They are supported throughout treatment (Moffatt, 2004).

### Issues of concordance

Ongoing, comprehensive holistic assessment is vital if patients are to concord with treatment. In this way, healthcare professionals not

▶ **Talk to your patients about how their chronic oedema affects them, and discuss their concerns.**

only develop an understanding of the patient's physical status, but also of their skill, knowledge and motivation to concord, as well as any psychosocial issues that might prevent it (Moffatt, 2004).

There are many factors that affect concordance, including:

- ▶ **Previous bad experience of compression therapy:** patients who have had a previous poor experience of compression therapy may be reluctant to undergo treatment again. This may be because the bandage or garments prescribed were uncomfortable or ill-fitting
- ▶ **Knowledge about the condition and its treatment:** provision of education is important to ensure that patients understand why they need to continue compression therapy in the long term (Brown, 2011)
- ▶ **Pain while wearing compression:** pain inevitably leads to poor concordance with treatment (Douglas, 2001; Van Hecke et al, 2007). Garments should be assessed for correct fit (*Figure 22*), and pain controlled (Briggs, 2005)
- ▶ **Disturbed sleep:** this is common yet often overlooked (Moffatt, 2004), and can occur as a result of inadequately managed pain (Stevens, 2006), or incorrect product selection and application
- ▶ **Social pressures:** chronic oedema can impact significantly on quality of life,

particularly younger patients, or those who may have poor body image and low self-esteem and view compression therapy as a treatment only for older people (Green, 2008)

- ▶ **Social isolation:** chronic oedema can restrict patients' activities of daily living. Patients might feel too embarrassed to go out and to mix socially, which in turn can lead to low self-esteem, depression and anxiety.

### Improving concordance

Patients who fail to progress with their treatment may lose faith in their clinician and/or management decisions and become discouraged. Rather than labelling such patients as 'non-concordant', healthcare professionals should work with the patient to develop a positive relationship to ensure that a therapeutically correct treatment regimen is in place, with which the patient is also happy.



**Figure 22.**

*Pressure damage from poorly fitting compression garments can lead to pain, discomfort and non-concordance.*

▶ **Reflect on your practice**

Do you give your patients the opportunity to discuss their concerns about their condition, or do you focus solely on treatment of the limb?

Do you involve your patients in the decision-making process, for example, giving them choice about which compression garment style they prefer?

Do you label patients as non-concordant without considering the reasons behind the behaviour? Do you try to address non-concordance?



If following assessment and discussion the patient is willing/able to engage with self-management, the following should be done:

- ▶ Show empathy and take time to understand the family dynamic (if relevant). Understanding the impact of these on the patient enhances the nurse/patient relationship (Mayor, 2006)
- ▶ Establish that support systems are in place for self-management (Piller, 2012)
- ▶ Provide information on the cause of chronic oedema, factors that help and hinder improvement, and circumstances that need further nursing input (Todd, 2014)
- ▶ Give the patient information on what to do, e.g. skin care, how to apply and remove compression garments, exercises, etc (Todd, 2014)
- ▶ Provide written literature in addition to verbal instructions, to help the patient retain the information (Todd, 2014)
- ▶ Provide continual support; more nursing input may be needed at varying times. For example, if ulceration occurs during an episode of general ill-health, if infection occurs, or if the patient becomes unwilling to self-care (Piller, 2012)
- ▶ Plan a self-management strategy that is patient-led at all times. Try to make the self-management transition occur smoothly (Todd, 2014; Table 7)

## Engaging the patient in their own care can result in successful outcomes in the long term.

- ▶ Providing a named healthcare contact for times of need provides reassurance; initially maintain periodic contact until the patient is confident in self-caring
- ▶ Self-care can be supported at all levels of chronic oedema management, depending on the stage of management, level of empowerment, physical and mental ability and willingness to take ownership of their care.

Within the community setting, there are a number of important things that the patient can do to enhance their self-care of chronic oedema. These include being able/willing to:

- ▶ Sleep in bed
- ▶ Apply and remove compression garment/wrap
- ▶ Mobilise/exercise, even if seated
- ▶ Modify lifestyle factors — nutrition, lifestyle, smoking, drinking, etc
- ▶ Lose weight either independently or with assistance and accept referral to bariatric services as indicated.

It is important to have realistic expectations of the patient and not to implement too many changes at once; for example, gentle exercise or encouraging movement when tv commercials come on is realistic and achievable. Once this change is embedded, introduce another.

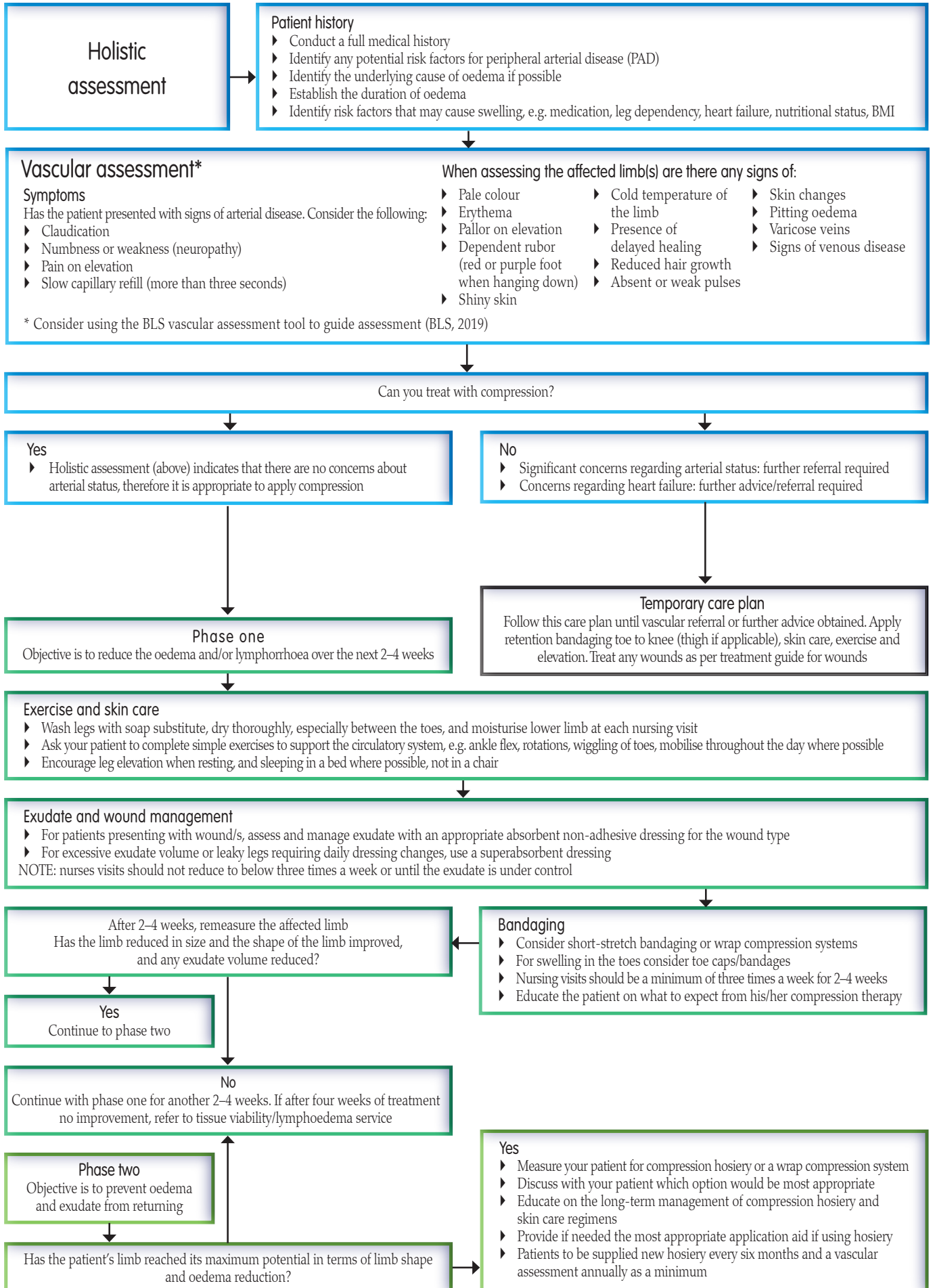
**Table 7:** Self-management actions according to management phase (adapted from Todd, 2014)

Prevention	<ul style="list-style-type: none"> <li>▶ Provide information on where to seek help if swelling occurs in at-risk people</li> <li>▶ Give advice on skin care to maintain integrity</li> <li>▶ Emphasise the impact of lifestyle choices, healthy body mass index (BMI), role of exercise</li> </ul>
Intensive	<ul style="list-style-type: none"> <li>▶ Some aspects of the intensive phase can be self-managed, e.g. exercise, weight management, skin care, avoidance of compounding factors, such as dependency of the limb</li> </ul>
Maintenance	<ul style="list-style-type: none"> <li>▶ Support and review treatment plan according to patient's changing needs</li> </ul>

## Re-evaluate

- ▶ Re-evaluate your management choices regularly. Remember that a variety of methods may be tried before a suitable option is found that will ensure good clinical outcomes and with which the patient is happy.
- ▶ The success of long-term management is heavily dependent on selecting the correct compression product for the patient, so they commit to wearing it in the long term.
- ▶ Do not be disheartened if the first garment you select doesn't fit the patient's needs. This is common and once you work in partnership with your patient to find out about their individual circumstances and preferences, a good fit can be found.
- ▶ Make sure you inform the patient about the importance of the key components of their management plan.

## Chronic oedema and wet legs pathway



## References

- Anderson I (2006) Aetiology, assessment and management of leg ulcers. *Wound Essentials* **1**: 20–37
- Anderson I (2017) Leaky legs: strategies for the treatment and management of lower-limb lymphorrhoea. *Nurs Times* **113(1)**: 50–3
- Atkins L (2014) Lower-limb oedema: assessment, treatment and challenges. In: *Chronic Oedema. Br J Comm Nurs Suppl Oct*: S22–8
- Atkins L, Bučko Z, Conde E, et al (2019) Implementing TIMERS: the race against hard-to-heal wounds. *J Wound Care* **23(3)**: <https://www.magonlineibrary.com/doi/full/10.12968/jowc.2019.28.Sup3a.S1>
- Ashby RL, Gabe R, Ali S, Adderley U (2014) Clinical and cost-effectiveness of compression hosiery versus compression bandages in treatment of venous leg ulcers (Venous leg Ulcer Study IV, VenUS IV): a randomised controlled trial. *Lancet* **8;383(9920)**: 871–9. doi: 10.1016/S0140-6736(13)62368-5. Epub 2013 Dec 6
- Bayliss EA, Ellis JL, Steiner JF (2007) Barriers to self-management and quality of life outcomes in seniors with multiple morbidities. *Am Fam Med* **5(5)**: 395–402
- Bertelli DF, de Oliveira P, Gimenes AS, Moreno MA (2013) Postural drainage and manual lymphatic drainage for lower limb edema in women with morbid obesity after bariatric surgery: a randomized controlled trial. *Am J Phys Med Rehabil* **92(8)**: 697–703
- Best Practice Statement (2008) *The Management of Lymphoedema*. MEP, London
- British Dermatological Nursing Group (2012) *Best Practice in Emollient Therapy. A Statement for Healthcare Professionals, December 2012*. British Dermatological Nursing Group, London
- Best Practice Statement (2018) *Improving Holistic Assessment of Chronic Wounds*. Wounds UK, London
- British Lymphology Society (2019) Position Paper for Ankle Brachial Pressure Index (ABPI). *Informing Decision-making before the Application of Compression Therapy*. <https://thebls.com/public/uploads/documents/document-20621539855354.pdf> (date last accessed 29/8/2019)
- Board J, Harlow W (2002) Lymphoedema 2: classification, signs, symptoms and diagnosis. *Br J Nurs* **11(6)**: 389–95
- Briggs SL (2005) Leg ulcer management: how addressing a patient's pain can improve concordance. *Prof Nurse* **20(6)**: 39–41
- Brown A (2011) Achieving concordance with compression therapy. *Nurs Residential Care* **13(11)**: 537–40
- Burr S, Penzer R (2005) Promoting skin health. *Nurs Stand* **19(360)**: 57–65
- Butterfield H (2013) The use of compression hosiery in mixed aetiology ulceration and palliative care. *J Comm Nurs* **27(4)**: 60–5
- Cox N (2002) Management of lower leg cellulitis. *Clin Med JRCPL* **2**: 23–7
- Clinical Resource Efficiency Support Team (2005) *Guidelines on the Management of Cellulitis in Adults*. Crest, Belfast. Available online at: [www.crestni.org.uk/publications/cellulitis/cellulitis-guide.pdf](http://www.crestni.org.uk/publications/cellulitis/cellulitis-guide.pdf) &91
- Damstra R, Partsch H (2013) Prospective, randomised, controlled trial comparing the effectiveness of adjustable compression Velcro wraps versus inelastic multicomponent compression bandages in the initial treatment of leg lymphoedema. *J Vasc Surg Venous Lymphat Disord* **1(1)**: 13–9
- Department of Health [DH] (2012) Report. *Long-term conditions compendium of information*. Third Edition.
- Doherty D, Hill T, Worboys F (2008) How should we manage patients with oedema? *Wounds UK* **4(2)**: 85–90
- Douglas (2001) Living with a chronic leg ulcer: an insight into patients' experiences and feelings. *J Wound Care* **10(9)**: 355–60
- Dowsett C, Bielby A, Searle R (2014) Reconciling increasing wound care demands with available resources. *J Wound Care* **23(11)**: 552–62
- Eagle M (2009) Wound assessment: the patient and the wound. *Wound Essentials* **4**: 14–24
- Elvin S (2015) Cost efficacy of using Juxta CURES and UCS Debridement cloths. *J Comm Nurs* **29(2)**: 62–5
- Elwell R (2016) An overview of the use of compression in lower-limb chronic oedema. *Br J Comm Nurs* **21(1)**: 36–42
- Evans NS, Ratchford EV (2016) The swollen leg. *Vasc Med* **21(6)**: 562–4
- Fletcher J (2010) Development of a new wound assessment form. *Wounds UK* **6(1)**: 92–9
- Gorman WP, Davis KR, Donnelly R (2001) Swollen lower limb: general assessment and deep vein thrombosis. *West J Med* **174(2)**: 132–6
- Grady PA, Gough LL (2014) Self-management: a comprehensive approach to management if chronic conditions. *Am J Public Health* **104(8)**: 25–31
- Gray D, Boyd J, Carville K et al (2011) Effective wound management and wellbeing: guidance for clinicians, organisations and industry. *Wounds UK* **7(1)**: 86–90
- Gray D (2013) Achieving compression therapy concordance in the new NHS: a challenge for clinicians. *J Comm Nurs* **27(4)**: 107–10
- Green T (2008) Understanding body image in patients with chronic oedema. *Br J Community Nurs* **13(4)**: S4–S10
- Grey JE, Enoch S, Harding KG (2006) Venous and arterial leg ulcers. In: *ABC of Wound Healing*. BMJ Books, Blackwell Publishing, Oxford: Chapter 2, 5–8
- Keeley V (2008) Quality of life assessment tools in chronic oedema. *Br J Community Nurs* **13(10 suppl)**: S22–S27
- Lawton S (2010) Addressing the skin-care needs of older people. *Nurs Residential Care* **12(4)**: 175–81
- Levick JR, Michel CC (2010) Microvascular fluid exchange and the revised Starling Principle. *Cardiovasc*

- Res **87(2)**: 198–210. Doi:10.1093/cvr/cvq062
- Linnitt N (2005) Lymphoedema: recognition, assessment and management. *Br J Comm Nurs* **10(3 Suppl)**: S20–26
- Lipoedema UK (2019) Lipodema advice and support. <https://www.lipoedema.co.uk>
- Lymphoedema Network Wales (2017) The chronic oedema 'wet leg' (lymphorrhoea) pathway. <http://www.gpone.wales.nhs.uk/sitesplus/documents/1000/Lymphoedema%20Network%20Wales%20%2D%20The%20Chronic%20Oedema%20Wet%20Leg%20%28Lymphorrhoea%29%20Pathway%20v1%20%20FINAL%2002%2005%2017.pdf> (date last accessed 29/8/2019)
- Lymphoedema Framework (2006) *Best Practice for the Management of Lymphoedema*. International Consensus. MEP, London
- Mason VL, Upton D, White D et al (2008) The psychological impact of primary lymphoedema. *J Lymphoedema* **3(2)**: 50–6
- Mayor V (2006) Long term conditions. 3. Being an expert patient. *Br J Comm Nurs* **11(2)**: 59–63
- Moffatt CJ, Franks PJ, Doherty DC et al (2003) Lymphoedema: an underestimated health problem. *QJM* **96(10)**: 731–8
- Moffatt C (2004) Factors that affect concordance with compression therapy. *J Wound Care* **13(7)**: 291–4
- Moffatt C, Martin R, Smithdale R (2007) Improving concordance. In: *Leg Ulcer Management*. Blackwell Publishing: Chapter 11: 260–80
- Moffatt CJ, Keeley V, Franks PJ, Rich A, Pinnington LL (2017) Chronic oedema: a prevalent problem for UK health services. *Int J Wounds* **14**: 772–81
- Moffatt CJ, Gaskin R, Sykorova M et al (2019) Prevalence and risk factors for chronic oedema in UK community nursing services. *Lymphatic Research and Biology* **17(2)**: 147–54
- Mortimer P, Rockson S (2014) New developments in clinical aspects of lymphatic disease. *J Clin Invest* **124(3)**: 915–21
- Mosti G, Cavezzi A, Partsch H, et al (2015) Adjustable Velcro compression devices are more effective than inelastic bandages in reducing venous oedema in the initial treatment phase: a randomised controlled trial. *Eur J Vasc Endovasc Surg* **50(3)**: 368–74
- Nazarko L (2009) Selecting and using appropriate compression hosiery. *Nurs Residential Care* **11(5)**: 229–32
- Newton H (2011) chronic oedema of the lower limb: pathophysiology and management. *Br J Comm Nurs* **16(4)**: S4–12
- NHS England (2019) *NHS Long-term Plan*. <https://www.england.nhs.uk/long-term-plan/>
- Office of National statistics (2017) <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/july2017>
- Opuku F (2015) Ten top tips: improving the diagnosis of cellulitis in the lower limb. *Wounds International* **6**: 1, 4–9
- Partsch H, Mortimer P (2015) Compression for leg wounds. *Br J Dermatol* **173**: 359–69
- Phillips T, Stanton B, Provan A, Lew R (1994) A study of the impact of leg ulcers on quality of life: financial, social and psychologic implications. *J Am Acad Dermatol* **31**: 49–53
- Piller NP, Keeley V, Hayes S, Ridner S (2009) Early detection — a strategy to reduce risk and severity? *J Lymphodema* **4(1)**: 89–95
- Piller N (2012) We need to help patients to help themselves. *J Lymphoedema* **7(1)**: 6
- Posnett J, Franks PJ (2008) The burden of chronic wounds in the UK. *Nurs Times* **104(3)**: 44–5
- Public Health England (2016) *Health Matters: Getting every adult active everyday*. <https://www.gov.uk/government/publications/health-matters-getting-every-adult-active-every-day/health-matters-getting-every-adult-active-every-day>
- Rich A (2007) How to care for uncomplicated skin and keep it free of complications. *Lymphoedema* supplement S6–9
- Stevens H (2006) The impact of venous ulcer pain: what can the patient teach us? *Br J Community Nurs* **11(12 suppl)**: S27–S30
- Timmons J, Bianchi J (2008) Disease progression in venous and lymphovenous disease: the need for early identification and management. *Wounds UK* **4(3)**: 59–71
- Todd M (2014) Self-management of chronic oedema in community. *Br J Comm Nurs* **19(4)**: S30–6
- Todd M (2016) The challenges of caring for people with chronic oedema. *Nurs Res Care* **18(4)**: 198–200
- Todd (2018) Self-care for chronic oedema. *LZ JCN* **32(4)**: 51–6
- Upton D (2013) Emotional and financial costs associated with stress and pain in two chronic leg ulcer patients. *Wounds UK* **9(2)**: 83–5
- Van Hecke A, Grypdonck M, Defloor T (2007) Interventional to enhance patient compliance with leg ulcer treatment: a review of the literature. *J Clin Nurs* **17(1)**: 29–39
- Voegeli D (2008) The effect of washing and drying practices on skin barrier function. *J Wound Ostomy Continence Nurs* **35(1)**: 84–90
- Wicks G (2015) An alternative to compression bandaging in venous leg ulcers. *J Comm Nurs* **29(4)**: 40–6
- Woods M (2015) Follow-up audit of the process and outcome of requesting compression garments on prescription for the management of lymphoedema. Oral presentation at the British Lymphology Society Conference: 4–6 October, Birmingham, UK
- World Union of Wound Healing Societies [WUWHS] (2009) *Compression in venous leg ulcers: a WUWHS consensus document*. Wounds International, London
- Zulkowski K (2017) Understanding moisture-associated skin damage, medical adhesive-related skin injuries and skin tears. *Adv Skin Wound Care* **30(8)**: 372–81

## Notes



