

# Chronic oedema

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easy

## Introduction

Chronic oedema is an umbrella term for soft tissue swelling that has been present for at least three months, most commonly due to problems with the venous and lymphatic systems. This ‘made easy’ will focus on chronic oedema in the lower limb and will highlight the importance of early recognition of skin changes that may proceed or accompany chronic oedema. These changes may indicate early lymphovenous disease, which if not managed appropriately may lead to ongoing and deteriorating problems (Timmons and Bianchi, 2008). Timely and appropriate intervention, including skin care and compression therapy, can improve patient outcomes.

*Authors: Bianchi J, Vowden K, Whitaker J*

### WHAT IS CHRONIC OEDEMA?

Chronic lower limb oedema is a persistent, abnormal swelling of the leg caused by an increase in fluid in the tissue. In the microcirculation of a normal limb, fluid containing oxygen, proteins and nutrients is released by the capillaries into the interstitial space and is reabsorbed into either the bloodstream or the lymphatic system to maintain fluid balance.

When an imbalance occurs due to underlying venous or lymphatic disease, the drainage of fluid is impaired, resulting in oedema (EWMA, 2003). Swelling that has been present for more than three months is considered to be ‘chronic’ (Moffatt et al, 2003). Chronic oedema has an ongoing effect on the structure and viability of the skin, leading to complications such as infection, cellulitis, fluid leakage and ulceration (Lymphoedema Framework, 2006).

### WHAT CAUSES CHRONIC OEDEMA?

Determining the cause of lower limb swelling is an important part of patient management. If the underlying condition is not managed, the oedema will not improve. The most common cause in older people is venous disease (Moffatt et al, 2003) or cardiac failure. However, patients may also present with lower limb swelling due to less common causes, such as a pelvic tumour. The more common causes are shown in Table 1.

### HOW CHRONIC OEDEMA PROGRESSES

In the early stages, the oedema is usually ‘pitting’ (indenting after pressure) and reduces overnight or with elevation. Without

appropriate treatment to reduce the swelling, the tissues become hard due to the accumulation of waste products and the failure of the lymphatic system to drain excess fluid (Timmons and Bianchi, 2008). Over time, the affected tissues become increasingly hard, fibrosed and non-pitting and the oedema fails to reduce on elevation. A diagnostic test for this is Stemmer’s sign, which is when a fold of skin cannot be pinched or picked up from the base of the second toe (ISL, 2009). By this stage, the symptoms will be severe and are usually irreversible.

### IDENTIFYING CHRONIC OEDEMA

In an epidemiological study conducted in south east London, Moffatt et al (2003) found chronic oedema to be a common problem in the community (1.33/1000), with the prevalence increasing in those aged over 64 years (5.4/1000). However, chronic oedema is often under-recognised and, until recently, its management has been a relatively specialist area of practice, with patients often only being treated once the condition has progressed to an advanced stage.

The patient’s skin can give vital clues to the duration of the condition and the underlying cause of the oedema. For example, in the early stages of venous disease patients may present with spider veins (ankle flare). As the disease progresses it can lead to more apparent and severe skin changes (eg haemosiderin staining) due to chronic venous insufficiency (Timmons and Bianchi, 2008). Accurate and prompt assessment to identify signs and symptoms of chronic oedema and early treatment with compression therapy and skin care to minimise complications are vital (Muldoon, 2011).

**Table 1 Causes of chronic oedema**

<b>Venous</b>	Venous hypertension History of deep vein thrombosis/ post-thrombotic syndrome Phlebitis Trauma (eg damage to veins) Severe varicose veins Chronic venous insufficiency
<b>Lymphatic (primary and secondary)</b>	Congenital abnormalities Trauma (eg orthopaedic surgery, extensive burns) Changes caused by chronic venous insufficiency
<b>Other</b>	Cardiac disease Renal disease Hypoproteinaemia Cancer/cancer treatments (eg radiotherapy) Medications Obesity Immobility Limb dependency Lipoedema

## ASSESSMENT OF CHRONIC OEDEMA

A holistic assessment will involve:

### Taking a patient history

A detailed history should include past medical and surgical history, history of limb trauma and skin infection, medications (eg steroids), concurrent illnesses and a family history of venous disease or limb swelling. The causes of chronic oedema should be considered and the underlying disease process identified (Lymphoedema Framework, 2006).

Factors such as the date of onset and duration of swelling, its distribution (bilateral or unilateral) and any associated symptoms that may point to the underlying disease process or skin changes should be noted and guide the selection of appropriate diagnostic tests, referrals and treatment decisions.

Chronic oedema can cause considerable distress and it is important to include wellbeing and quality of life in any chronic oedema assessment (Keeley, 2008). In addition, lifestyle factors such as occupation, interests and limitations to daily activities should be assessed in order to manage patient expectations of treatment outcomes.

### Assessing the lower limbs

The patient's general mobility and ankle movement should be assessed. Venous and lymphatic return is dependent on the contraction and relaxation of the muscles of the lower leg and patients with lower limb oedema often have reduced mobility or limited ankle movement, which can prevent the calf muscle pump from working properly, decreasing the amount of fluid moving up the leg (Timmons and Bianchi, 2008).

Assessment must include measurement of limb circumference and volume, even with mild swelling (Timmons and Bianchi, 2008). The shape of both limbs should also be assessed to check whether the swelling is generalised, unilateral or bilateral, and whether swelling is confined to the feet or they remain unaffected (as seen in lipoedema). It is also useful to note whether there are any deepened skin folds and whether the level of the oedema extends above the knee, the thigh or involves the trunk. Any limb scarring should be recorded and related to previous surgery or trauma.

### Assessing the circulation

The prevalence of arterial disease increases with age (Burns et al, 2003). All patients must therefore be assessed to establish their vascular status with frequent reassessment to ensure that there is adequate arterial blood flow in the limb. **If there is any doubt about the patient's peripheral arterial status, a specialist vascular opinion should be sought. Compression should not be used if there is significant arterial disease (SIGN, 2010).**

Doppler ankle brachial pressure index (ABPI) is the standard tool for vascular assessment (CREST, 1998; RCN, 2006; SIGN, 2010). However, very oedematous limbs may make this difficult to carry out. Suitable alternatives include pulse oximetry or the Lanarkshire Oximetry Index (LOI), which can be performed in specialist centres (Bianchi, 2005; SIGN 2010). Toe brachial

pressure index (TBPI) can be considered if the ankle is unsuitable for cuff inflation. All these tests require the application of a blood pressure cuff that is appropriate for the limb circumference to ensure accurate assessment and ease of use by the clinician (Vowden and Vowden, 2001).

### Assessing the skin

The general condition of the patient's skin should be assessed for:

- Hydration (eg dryness)
- Pigmentation/lipodermatosclerosis
- Fragility
- Redness/pallor/cyanosis
- Warmth/coolness
- Signs of cellulitis
- Broken or ulcerated skin
- Fungal infections (eg tinea pedis).

Any skin changes should be noted as these may provide an indication of venous or lymphatic disease (Table 2).

It is important that patients and carers inspect the skin daily for any breaks in the skin, signs of infection (eg increased temperature or tenderness) and rashes. Particular attention should be given to areas where there is reduced sensation, under skin folds and between the toes. Patients with chronic oedema are at increased risk of cellulitis, which may require referral to a dermatologist or hospital admission in acute cases (BLS/LSN, 2006).

## MANAGEMENT OF CHRONIC OEDEMA

The best practice management of chronic oedema is a holistic, multidisciplinary approach that includes:






- Treatment of underlying medical conditions
- Swelling reduction and maintenance using compression
- Exercise/movement to enhance lymphatic and venous flow
- Skin care to optimise the condition of the skin
- Rehabilitation and advice to manage the long-term condition.

Table 3 shows the importance of identifying skin changes and the need for appropriate treatment strategies at different stages of the disease process. **No element of chronic oedema management should be delivered in isolation, but used in combination to prevent disease progression.**

**Table 2 Skin changes associated with chronic oedema (for further information go to: [www.healthy-legs.co.uk](http://www.healthy-legs.co.uk))**

<b>Venous disease</b>	Spider veins/ankle flare Dermatitis Haemosiderin staining Atrophie blanche Oedema Lipodermatosclerosis Hyperkeratosis Ulcer in the gaiter area or evidence of healed ulcer
<b>Lymphatic disease</b>	Papillomatosis Lymphangectasia Lymphorrhoea Deepened skin folds Hyperkeratosis

**Table 3 Identifying chronic oedema and appropriate treatment approaches (adapted from www.healthy-legs.co.uk)**

Clinical presentation					
Diagnosis	Varicose veins and swelling due to venous insufficiency. Patient may have 'heavy legs' with oedema that reduces on elevation	Venous dermatitis with mild swelling due to early lymphovenous disease. Skin may be a brown or purple colour. Skin trauma or breakdown may lead to ulceration. One or both legs may be swollen	Venous ulceration, with swelling due to more severe venous insufficiency. Wound forming on lower leg between ankle and calf and may be associated with pain and/or exudate	Lipodermatosclerosis due to lymphovenous disease with dependency oedema. There may be thickening of the skin, pigmentation and associated swelling in one or both legs with changes in limb shape (eg 'inverted champagne bottle').	Advanced changes due to lymphovenous disease. There may be hardening of the skin, due to long-term unresolved oedema. Skin may be dry, flaky and fragile with skin folds. There may be swelling of the legs and a high risk of recurrent infections and cellulitis
Treatment plan	<b>Compression:</b> British Standard (BS) Class 1 or 2 compression garments European Class 1 or 2 depending on whether oedema is present and severity <b>Other measures:</b> Skin care + emollients Simple exercises	<b>Compression:</b> European Class 1 or 2 <b>Other measures:</b> Skin care + emollients Simple exercises and short walks/limb elevation	<b>Compression:</b> Full-leg compression bandaging followed by European Class 1 or 2 off-the-shelf compression garments for maintenance therapy <b>Other measures:</b> Skin care + emollients Simple exercises and short walks/limb elevation	<b>Compression:</b> Full-leg compression bandaging followed by European Class 2 or 3 made to measure flat-knit garment for maintenance therapy <b>Other measures:</b> Manual lymphatic drainage/simple massage Skin care + emollients Exercise/limb elevation	<b>Compression:</b> Full-leg compression bandaging followed by European Class 2 or 3 made to measure flat-knit garment for maintenance therapy <b>Other measures:</b> Manual lymphatic drainage/simple massage Skin care + emollients Exercise/limb elevation

For patients with an open ulcer, it is important to follow local wound care protocols appropriate for the amount of exudate and infection status.

**Compression therapy**

Compression therapy can help to improve skin integrity, restore the limb to a normal shape and enhance the patient's quality of life (Osborne, 2009).

The most common forms of compression are multilayer, inelastic (short-stretch) bandages or hosiery. Inelastic bandaging is most appropriate for chronic oedema due to the massaging effect on the lymphovenous system. If a cohesive inelastic bandage is used, this can help overcome bandage slippage. Compression can also contribute to ulcer healing and help to prevent further deterioration of the skin (EWMA, 2003).

Compression should be used with caution in patients with:

- Acute cellulitis
- Uncontrolled cardiac oedema
- Acute deep vein thrombosis
- Latex allergies/sensitivities
- Untreated trunk or genital oedema
- Arterial insufficiency
- Diabetes and rheumatoid arthritis
- Severe peripheral neuropathy (Osborne, 2009).

Assessment of the extent of the swelling, limb shape and skin condition will help to determine whether below-knee or full-leg bandaging is appropriate. In some instances where the toes are swollen or at risk of swelling, bandages should be applied to the individual toes (Osborne, 2009). Depending on the presentation, different levels of compression can be applied (Table 4). It is

**Table 4: Types of compression therapy to be considered for each treatment stage**

<b>Prevention and early intervention</b>	Compression hosiery (usually below-knee) may be used in the early stages to prevent disease progression. A lighter-weight garment can be used for those without oedema (eg BS Class 1–3) or a stiffer medical garment (eg European Class 1–3) for those with oedema.
<b>Early and medium intervention</b>	Multilayer compression bandaging, either elastic or inelastic, is often used in the initial phase of treatment to reduce swelling. Inelastic bandages work by creating a semi-rigid casing around the limb, which can help to improve the function of the veins and lymphatics (EWMA, 2003). An inelastic bandage will generate high intermittent pressure peaks when the patient is mobilising to stimulate lymph flow, but low pressure when resting, which permits lymph vessel refilling and assists with venous return (Mortimer and Levick, 2004).
<b>Advanced intervention and maintenance therapy</b>	Full-leg compression should be used in the intensive treatment phase. Once the oedema is reduced and/or the ulcer has healed, compression (eg European Class 2 or 3) may be used to maintain the limb volume reduction and prevent recurrence of oedema. This treatment should be continued long term with regular checks on the arterial circulation to ensure continued safety. Checks on correctly fitting hosiery are important as the shape of the leg can change over time. <b>Elastic (also known as long-stretch) bandages alone or BS hosiery, which are not as stiff as European Class compression, are not recommended as they may not control oedema.</b>

important to re-apply bandages regularly in the early stages of treatment as the fluid shifts or reduces, resulting in a reduction in limb circumference. Regular re-application of the bandages will ensure that the correct level of compression is applied (Lymphoedema Framework, 2006).

### Exercise/movement and leg elevation

An exercise regimen should be implemented to reduce oedema and tailored to the patient's level of mobility. For those patients who spend long periods at rest, even simple ankle exercises can improve muscle tone and circulation, reducing the swelling in the lower limbs. In the early stages of the condition, one of the best ways to reduce leg swelling, improve venous return and drain the fluid, is to elevate the affected limb, ideally to just above the level of the heart. This may be done when the patient is resting, either sitting in a chair or lying down, although individuals need to be discouraged from sleeping in a chair at night. Some patients may find it difficult to elevate their legs for extended periods and compression therapy can be used in conjunction with elevation to offer a more comprehensive regimen (Doherty et al, 2008).

### Skin cleansing and emollient therapy

Skin care is vitally important and a good daily skin care regimen should be encouraged to help maintain skin integrity, reduce the risk of the development of hard or dry skin and minimise the risk of infection (Lymphoedema Framework, 2006). This may involve cleansing of the skin daily or at each dressing change using an appropriate soap substitute and/or emollient. After cleansing, the skin should be gently patted dry with particular attention paid to skin folds and between the toes to avoid fungal infections. Where lower limb hyperkeratosis is a problem, the use of a gentle debriding agent (eg Debrisoft®, Activa Healthcare) can be effective (Vowden, 2012).

## ONGOING MANAGEMENT

Prevention of complications and recurrence of swelling is the aim of ongoing management. Long-term use of European Class hosiery or the application of inelastic multilayer compression bandages is key. These are also less bulky than other compression systems and may improve patient concordance. Comfort and acceptability of the compression system is essential and clinicians need to work with patients to ensure they are included in treatment decisions.

As part of this process, patients should be reviewed regularly. Patients' limbs should be re-measured every four to six months and new compression garments prescribed as appropriate (Lymphoedema Framework, 2006). Further education on

### AUTHOR DETAILS

#### Bianchi J<sup>1</sup>, Vowden K<sup>2</sup>, Whitaker J<sup>3</sup>

1. Medical Education Specialist and Honorary Lecturer, College of Medical, Veterinary and Life Science, Glasgow University
2. Nurse Consultant, Wound Care, Bradford Teaching Hospitals NHS Trust and the University of Bradford
3. Director and Nurse Consultant, Northern Lymphology Ltd and Senior Lecturer, University of Lancashire

good skin care, exercise, diet, smoking cessation, and practical aspects of protecting their legs and stockings (ie keeping toe and finger nails short) can also be provided. Patients should be advised to examine their legs for skin breaks, swelling and other changes and report these to their healthcare practitioner. When healthcare practitioners work closely with patients, this can lead to improvements in health, independence and quality of life (Keeley, 2008).

## PREVENTING DISEASE PROGRESSION

It is important that clinicians recognise the early changes associated with venous and lymphatic disease and implement appropriate treatment strategies. Treatment may vary from simple interventions such as low level compression therapy and skin care, to daily exercise regimens and multilayer compression bandaging. If the early signs and symptoms of chronic oedema are assessed accurately, treatment can commence promptly to prevent disease progression (Timmons and Bianchi, 2008).

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