

Swollen legs

A diagnostic and management update

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Chronic limb oedema can have a wide variety of causes. An accurate diagnosis can guide effective management. In addition to the treatment of any underlying cause, the principles of lymphoedema management can be applied to improve symptoms, reduce complications and improve quality of life for patients, regardless of the cause of chronic oedema.

The causes of swollen legs are numerous. Diagnostically, most of these can be evaluated for by clinical assessment (including medical and family history, and physical examination) and investigations guided by the clinical assessment. Conversely, disease progression and decline in quality of life can occur in patients if there is a lack of an accurate diagnosis; dismissal of patient concerns; misunderstanding of the physical, psychological and social impacts of the swelling; and default use of diuretics without understanding the cause.^{1,2} Lower limb lymphoedema in cancer survivors is also associated with additional negative impacts on quality of life.³

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KEY POINTS

- Chronic oedema is defined as persistent swelling that is present for more than three months, regardless of its cause.
- Chronic leg oedema is a prevalent health condition that impacts on patients' function and quality of life, and is associated with complications such as chronic wounds and cellulitis.
- The lymphatic system has a key role in interstitial fluid homeostasis and chronic oedema.
- An accurate diagnosis of the cause of chronic lower limb swelling is necessary to guide management.
- When chronic oedema persists despite treatment of the causative condition, other effective management strategies can reduce complications and improve quality of life.

Globally, chronic oedema and lymphoedema have been neglected healthcare issues.⁴ LIMPRINT, a 2019 epidemiology study in Australia, suggested that about a quarter of patients in hospitals and community aged care services have chronic limb swelling. In wound treatment centres, 100% of participants were found to have swelling.⁵ More than 50% of cases involved the lower limbs, and almost 20% of people had experienced at least one episode of cellulitis in the past year. Interestingly, more than 90% of cases are not cancer-related lymphoedema. Despite these high prevalence rates, most Australian medical graduates still perceive their understanding of chronic oedema and lymphoedema to be low.^{6,7}

Swelling is a manifestation of physiological haemodynamic dysfunction, both as a symptom and consequence of physiological changes that require a definitive objective diagnosis and targeted response. Modern advancements in science and research have altered our understanding of the key role of the lymphatic system in the return of interstitial fluid to the vascular system. These

changes need to be recognised to holistically manage a person with chronic oedema or lymphoedema.

This article differentiates between the terms chronic oedema and lymphoedema, and provides an update on contemporary evidence for the assessment, investigation and diagnosis of patients with lower limb swelling to ensure effective management and to reduce or avoid the secondary consequences of chronic oedema or lymphoedema. This article also discusses investigation and management of lymphoedema in more detail.

How and why a patient may present with swollen legs

Patients with peripheral oedema may present with a variety of symptoms, such as leg swelling, heaviness, tightness or aching (Table 1). The presenting symptoms and their severity, duration and location may differ between patients, as may any associated symptoms and the impact of the swelling on the patient's life. Some patients will present with clear evidence of a causative condition (e.g. cardiac, renal or hepatic dysfunction), whereas others may simply present with worsening leg symptoms. Patients may report physical challenges because of the swelling, such as difficulties putting on shoes, fitting into clothing or walking. Symptoms may be relatively new or longstanding. Some patients may not present until they have a complication from the swelling, such as wounds, cellulitis or a leakage from the skin of the affected leg (lymphorrhoea).

The complaint of leg swelling should not be ignored or trivialised. It could be a sign of an underlying condition requiring treatment and it is also a condition in and of itself, with management options that can improve the patient's quality of life. Chronic oedema can have negative psychosocial impacts on patients in both the cancer and non-cancer populations. Patients may experience psychological distress, anxiety, depression, adjustment difficulties and self-image concerns.^{8,9}

Lymphoedema and chronic oedema: what is the difference?

The definition and understanding of the term lymphoedema have been numerous and variable over the years, with instances of it being used as a clinical diagnosis for cases of chronic swelling. It is a chronic condition caused by impaired lymphatic system function that is characterised by the accumulation of lymphatic fluid in the affected body part (typically legs or arms).¹⁰ It can be primary (when a person is born with a lymphatic malformation) or secondary (acquired, e.g. following cancer treatments).

The International Lymphedema Framework have recommended to adopt the term chronic oedema as an umbrella term to describe all persistent oedema that has been present for more than three months, regardless of its cause.^{4,10,11} The concept of chronic oedema lymphatic deficiency recognises that all persistent swelling has a lymphatic component and acknowledges the

TABLE 1. SYMPTOMS OF CHRONIC LOWER LIMB OEDEMA AND LYMPHOEDEMA

Category	Symptoms
Symptom-based complaints	<ul style="list-style-type: none"> • Swelling • Heaviness • Tightness • Warmth or heat in the area of swelling • Aching • Dry skin and other secondary skin changes • Mild paraesthesia in the area of swelling • Painful joints and reduced joint range of motion
Function-based complaints	<ul style="list-style-type: none"> • Difficulty or restricted walking • Difficulty fitting shoes and socks • Difficulty fitting trousers or pants
Presentation of complications	<ul style="list-style-type: none"> • Cellulitis • Chronic or non-healing wounds • Dry skin or other skin changes resulting from chronic swelling • Lipodermatosclerosis • Lymphorrhoea (serous weeping from the skin)
Associated psychological concerns	<ul style="list-style-type: none"> • Self-image concerns • Adjustment difficulties • Anxiety • Depression • Distress • Social and financial impacts

role of the lymphatic system in interstitial fluid homeostasis.¹² This idea is best described by the Revised Starling Principle.^{13,14}

The Revised Starling Principle

The Starling Principle first described how microvascular fluid exchange occurred at the capillary bed. Earnest Starling's original theory involved gradient-based movement of fluid through semi-permeable capillaries because of differences in hydrostatic and oncotic pressures, with filtration of fluid into the interstitium from the arterioles and reabsorption of interstitial fluid into the venules. The lymphatic system was responsible for collecting any residual interstitial fluid back into circulation. However, a major element that was missing in Starling's principle was the endothelial glycocalyx.¹⁵⁻¹⁷ This carbohydrate-rich layer within the capillary bed resists reabsorption of interstitial fluid into the capillary. Therefore, the lymphatic system is almost entirely responsible for collecting and returning all interstitial fluid back into cardiovascular circulation and is more important in maintenance of fluid homeostasis than first postulated.¹⁸ The Revised Starling Principle takes this new finding into account.¹⁸

TABLE 2. CAUSES OF CHRONIC OEDEMA IN THE LOWER LIMB*^{9,19-21}

High output oedema (dynamic insufficiency)	Low output oedema (mechanical insufficiency)
<ul style="list-style-type: none"> • Vascular <ul style="list-style-type: none"> – venous insufficiency, venous hypertension, history of DVT or vein stripping, peripheral vascular disease • Obesity (BMI >40 kg/m²) <ul style="list-style-type: none"> – associated with increasing venous hypertension and swelling • Poor mobility <ul style="list-style-type: none"> – associated with stasis- or dependent-oedema • Cardiac failure <ul style="list-style-type: none"> – causing circulatory fluid overload • Renal failure <ul style="list-style-type: none"> – causing circulatory fluid overload • Liver failure <ul style="list-style-type: none"> – causing circulatory fluid overload • Medication side effects <ul style="list-style-type: none"> – e.g. calcium channel blockers, steroids, anti-epileptics, antidepressants • Peripheral and central neurological conditions <ul style="list-style-type: none"> – causing loss of motor function in limb(s) • Thyroid disease[‡] <ul style="list-style-type: none"> – e.g. hypothyroidism causing pre-tibial myxoedema • Rheumatological[‡] <ul style="list-style-type: none"> – e.g. inflammatory arthritis, scleroderma • Hypoalbuminaemic conditions[‡] 	<ul style="list-style-type: none"> • Age-related changes <ul style="list-style-type: none"> – lymph node senescence and reduced lymph pump pressure can contribute to leg oedema in older age • Secondary lymphoedema (acquired) <ul style="list-style-type: none"> – cancer (e.g. melanoma, gynaecological, prostate, lymphoma, sarcoma) and related treatments[†] (including lymph node dissection and radiotherapy) – trauma (e.g. fractures, accidents) and tissue damage (e.g. burns, surgery or tethered scarring) – infection (e.g. recurrent cellulitis) – toxins (e.g. spider bite) – filariasis (the most common cause of lymphoedema worldwide but rare in Western countries) • Primary lymphoedema^{‡§} (idiopathic) <ul style="list-style-type: none"> – early onset (presenting before the age of 2 years) or late onset (presenting later in life)

Abbreviations: BMI = body mass index, DVT = deep vein thrombosis.

* Conditions of chronic oedema may coexist with or progress to include lymphatic dysfunction and lymphoedema.

[†] If there is suspicion of an active or recurrent cancer, referral to appropriate oncology services should be prioritised.

[‡] Less common causes.

[§] The St George's Classification Algorithm of Primary Lymphatic Anomalies (Gordon et al, 2021) outlines a clinical process for the diagnosis of primary lymphoedema.

Approach to diagnosis

To determine the cause of chronic oedema, one approach is to consider whether a patient has excessive capillary filtration into the interstitial space (high output oedema or dynamic insufficiency, e.g. right heart failure), affected lymphatic absorption or flow (low output oedema or mechanical insufficiency, e.g. primary or secondary lymphoedema), or a combination of both (mixed oedema or combined insufficiency).^{4,9}

It is important to undertake a detailed history about presenting symptoms and their onset, as well as to identify risk

factors for potential causes. In Australia, over 90% of cases of chronic lower limb oedema are from non-cancer-related causes, with venous disease being the most common, followed by immobility and obesity.⁵ Table 2 summarises the common and less common causes of chronic oedema in the lower limb. In general, cases of high output oedema are more common than low output oedema. Systemic causes of peripheral oedema more often result in bilateral leg swelling (e.g. congestive cardiac failure, medication side effects), whereas anatomical or localised causes more often result in unilateral leg swelling

(e.g. venous insufficiency, deep vein thrombosis). Taking a travel history and family history is also important, as detailed further in Table 2.

A full physical examination should be performed, tailored to the patient's presentation and findings on clinical history. Several special tests to perform during physical examination of patients with chronic oedema are as follows:

- observation for skin changes (e.g. pigmentation, varicose veins, atrophie blanche, ankle flare venous eczema, lipodermatosclerosis, skin hardening, lymphorrhoea and mossy foot)
- pitting test: the thumb is used to apply pressure on the affected area for 30 to 60 seconds and then the depth of the pit assessed
- pinch test: the thumb and index finger are used to pinch the skin; the inability of the skin to be lifted and pinched is suggestive of subcutaneous oedema
- bow-tie test: the thumb and index finger are used to pinch the skin with force applied obliquely, creating a twist ('bow tie'), assessing for the presence of wrinkles
- Stemmer's sign: the skin of the dorsal surface at the base of the second digit is pinched. A positive test (a sensitive predictor for lymphoedema), is one in which the skin cannot be pinched. A negative test does not exclude lymphoedema.

Age-related lymphatic changes

As with other body systems, lymphatics also experience age-related changes. The lymphatic collector vessels contain endothelial cells, smooth muscles and collagen fibres with fibroblasts in its walls, which contract rhythmically. Along with the vessels' one-way valves, this propels lymph flow unidirectionally.²² As a person ages, there is remodelling of the vessel wall, with decreased muscle cells and increased lymphatic diameter, resulting in contractile dysfunction.

TABLE 3. RED FLAGS IN PATIENTS PRESENTING WITH SWOLLEN LEGS

Presentation	Clinical pearl
Young person	Also consider less common causes (Table 2), including primary lymphoedema if no clear risk factors or triggers identified
Sudden acute onset or worsening of swelling	Suggestive of acute conditions (e.g. DVT, cellulitis, cardiac decompensation)
Pain as the principal complaint	Consider rheumatological conditions or localised injury. The character of pain can provide more diagnostic clues (e.g. the presence of claudication or positional pain and the location of the pain)
Paraesthesia or other neurological features as the principal complaint	Consider neurological causes
History of cancer that has been unmonitored	Cancer recurrence (or new cancer) screening required. Also consider DVT if it is an active or recurrent cancer
Skin colour changes	Generally an indication of a primary vascular abnormality or cellulitis
Lumps, sores and ulcers	Ulceration and skin breakdown can be a complication of chronic leg swelling (although if appearance is atypical, consider other causes)
Unilateral swelling	Consider localised causes (e.g. DVT or lymphoedema)
Leg pain on elevation	Consider ischaemic causes of pain

Abbreviation: DVT = deep vein thrombosis.

There are further age-related chemical changes associated with the regulation of nitrous oxide, which also has a role in lymphatic contractility. Nitrous oxide is important in the self-regulatory adjustment of lymphatic vessels to adapt lymphatic filling and contraction activity based on the body's demands. With age, lymphatic vessels have reduced adaptability to manage increased lymphatic load.²³

Other additional age-related cellular changes are proposed to cause hyperpermeability of lymphatic vessels and affect the ability to recruit immune cells in response to infection and acute inflammation.²⁴ Lymph node senescence, referring to the structural changes of aged lymph nodes, may further explain why older adults have reduced ability to fight infections and prevent the development of metastases.^{25,26}

Red flags

There are certain presentations of leg swelling that should warrant concern for more urgent investigation of potential complications or serious pathology. These are summarised in Table 3.

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Clinicians also have an important role in antibiotic stewardship and avoiding over-prescribing of antibiotics. Differentiating between different skin conditions, which may appear similar to the patient but are treated quite differently (e.g. cellulitis, lipodermatosclerosis and red leg syndrome), will guide appropriate and effective treatment.^{26,27}

Investigations

There are numerous pathology and imaging investigations to consider for patients with peripheral oedema. Deciding and prioritising which tests are relevant depends on the findings of the clinical history and physical examination. Investigations are aimed at confirming or

ruling out the more common causes of unilateral or bilateral chronic lower limb oedema (Flowchart). Lymphoedema may become the final diagnosis of exclusion. Investigations to assist in diagnosing lymphoedema are described in Table 4, and examples of lymphoscintigraphy and indocyanine green lymphography are provided in Figures 1 and 2, respectively. The NSW Agency for Clinical Innovation offers a decision-making and investigative framework for clinicians to make the diagnosis of lymphoedema. We have adapted this framework with updates on recommended investigations (Flowchart). Although this framework assists with diagnosing lymphoedema, the algorithm also includes assessment and

consideration of more common causes of swollen legs, and considers if the person has a cancer history.

Management of persistent chronic oedema and lymphoedema

It is important to treat any causes that are reversible. However, in the setting of persistent chronic oedema, when leg swelling is not curable or when residual swelling remains despite treating the cause, the focus then shifts to the management of symptoms and prevention of complications. In these cases, the principles of lymphoedema management can be applied. The techniques developed for lymphoedema are applicable to chronic oedema because of the key role of the

TABLE 4. IMAGING TECHNIQUES TO CONFIRM LYMPHOEDEMA DIAGNOSIS

Imaging technique	Imaging modality	Description
Diagnostic imaging	Lymphoscintigraphy (Figure 2)	<ul style="list-style-type: none"> • A nuclear medicine procedure using a radiotracer to demonstrate lymphatic morphology • Images are taken at specific time intervals, usually up to 1-2 hours • In lower limb oedema, it can be used to identify the number of lymphatic vessels, points of lymphatic blockage and characterise lymphatic flow and course, and it may also comment on deeper lymphatic anatomy
	Indocyanine green (ICG) lymphography (Figure 3)	<ul style="list-style-type: none"> • An imaging technique using ICG dye under infrared light to provide real-time imaging of superficial lymphatic vessels • In lower limb oedema, it can be used for lymphatic mapping to identify the number of lymphatic vessels, points of lymphatic blockage and to characterise lymphatic flow and course (including compensatory superficial lymphatic pathways) • ICG is also used in decision-making for microsurgery and as a therapeutic tool to tailor and optimise non-surgical management of chronic oedema and lymphoedema
Structural imaging	Ultrasound	<ul style="list-style-type: none"> • May be used to identify skin thickness, subcutaneous oedema and tissue fibrosis
	Dual emission x-ray absorptiometry	<ul style="list-style-type: none"> • May identify secondary soft tissue changes in advanced lymphoedema (e.g. thickening of subcutaneous tissue)
	MRI*	<ul style="list-style-type: none"> • May identify subcutaneous oedema, fluid/fat proportion and tissue fibrosis or skin thickness changes
Tissue or interstitial fluid measurement devices	Tissue dielectric constant	<ul style="list-style-type: none"> • A hand-held device that gives a non-invasive measure to assess local tissue water content • Measures are an index, which are compared to either the unaffected limb or assessed as a ratio of a reference point
	Bioimpedance spectroscopy	<ul style="list-style-type: none"> • A device using low-level electrical signal passing through the body, measuring resistance from different tissues and cells of the electric current • Provides a non-invasive measure to assess an index of extracellular fluid in the affected limb(s) compared with the non-affected limb(s) • Can also be used to assess body composition

* Note that MRI lymphangiography techniques are in development.

LYMPHOEDEMA DIAGNOSIS CLINICAL ALGORITHM

Patient presents with symptoms of leg swelling:

- persistent swelling
- heaviness
- pain or tension
- tightness or fullness

Is there a history of cancer?

Yes

No

Evaluate other relevant information, including:

- surgeries performed
 - including lymph node removal or biopsy and other surgeries
 - any post-operative complications (e.g. infection or DVT)
- radiotherapy treatment history
- chemotherapy treatment history
 - including taxol-based agents

Consider differential diagnoses:

- tumour recurrence
- DVT
- cellulitis

Perform physical examination and arrange investigations

Is there evidence of tumour, DVT or cellulitis?

Yes

No

Treat as appropriate

Does swelling persist despite treatment?

Yes

No

Secondary (cancer-related) lymphoedema

Exclude other causes of oedema, including:

- cardiac failure
- renal failure
- hepatic failure
- venous disorders (e.g. DVT, insufficiency, chronic ulcers)
- chronic neurological disorders
- obesity
- immobility
- medication side effects
- thyroid disease
- rheumatological disease (e.g. arthritis, Baker's cyst)
- new malignancy
- lymphadenopathy or obstructing mass (pelvic or abdominal)
- surgery
- burns

Following exclusion of above causes of oedema, consider the following medical history:

- trauma to limb
- past history of cellulitis, infection, insect bites, ulcers
- travel history
- family history of limb swelling

Perform a full physical examination, including:

- assessment of skin condition and any skin changes
- assessment of the degree of pitting oedema
- assessment for the presence of Stemmer's sign
- recording of limb circumference

Arrange investigations, including (as appropriate):

- pathology
 - blood tests (FBC, EUC, LFTs, TFT, CRP, ESR)
 - HbA_{1c} (or OGTT) for patients with a BMI ≥ 35 kg/m²
 - other tests as clinically appropriate (e.g. D-dimer, urinary protein and ACR, NT-proBNP levels)
- electrocardiogram
- imaging (as clinically appropriate):
 - venous/arterial doppler or duplex ultrasound scan
 - USS or CT of abdomen and pelvis (including venous studies)
 - chest x-ray
 - transthoracic echocardiogram
 - MRI
 - lymphatic imaging (LSG, ICG or USS)

Non-cancer related lymphoedema (primary, secondary or mixed)

Abbreviations: ACR = albumin-creatinine ratio; CRP = C-reactive protein; DVT = deep vein thrombosis; ESR = erythrocyte sedimentation rate; EUC = electrolytes, urea, creatinine; FBC = full blood count; HbA_{1c} = glycated haemoglobin; ICG = indocyanine green lymphography; LSG = lymphoscintigraphy; OGTT = oral glucose tolerance test; NT-proBNP = N-terminal pro-brain natriuretic peptide; LFTs = liver function tests; USS = ultrasound scan.

Adapted from NSW Agency for Clinical Innovation. Lymphoedema: a guide for clinical services. Chatswood: ACI; 2018. Available online at: https://aci.health.nsw.gov.au/___data/assets/pdf_file/0008/477998/ACI-Lymphoedema-guide.pdf.

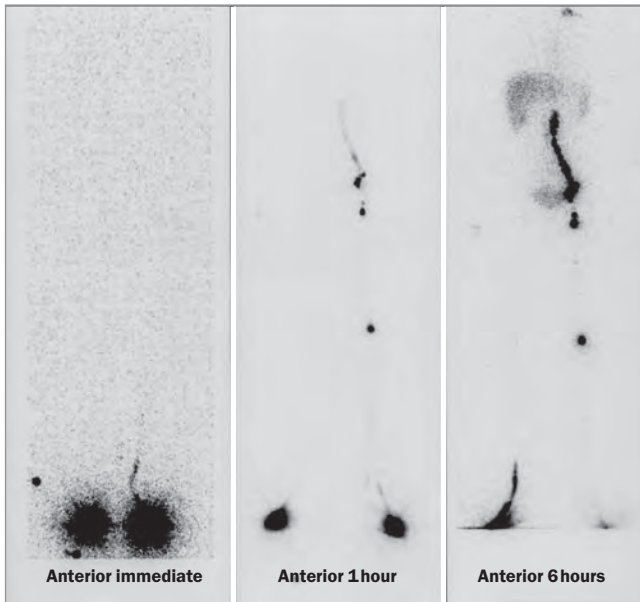


Figure 1. Lymphoscintigraphy of a 14-year-old patient with primary lymphoedema of the right leg. Six hours after radioactive colloid injection between the toes, there is no transit of the colloid via the lymphatic vessels to the lymph nodes in the right groin, and reduced transit on the left.

As with most chronic conditions, empowering the patient to self-manage their condition is key to the long-term care of patients with chronic lower limb oedema. Providing a clear diagnosis, patient education and effective management strategies are pivotal in developing a patient’s self-management skills.²⁸

The management of lymphoedema mainly involves non-surgical conservative strategies to reduce tissue fluid load

Adequate management of tissue and lymphatic fluid accumulation and movement can also reduce the risk of cellulitis, improve skin condition associated with chronic swelling and assist with chronic wound healing in an area of chronic oedema.^{29,30} An accredited lymphoedema practitioner (<https://www.lymphoedema.org.au/accreditation-nlpr/find-a-practitioner/>) can assist in all aspects of management, including providing patient education, skin care, exercise plan, decongestive massage, pneumatic pump assistance, other adjunct treatments and compression garment recommendations. A summary of conservative management strategies is outlined in Table 5.

The surgical options available for patients with lymphoedema are limited, as outlined in Table 6. Surgery can enhance or support existing conservative management, reduce the frequency of cellulitis in those prone to cellulitis recurrence and may reduce the likelihood of disease progression in patients with early lymphoedema, although it is not currently considered curative.

Clinicians have an important role in educating patients with chronic oedema about the importance of maintaining good skin care to reduce dry skin, prevent loss of skin integrity, manage fungal infections and minimise the risk of cellulitis. Additionally, regular exercise and weight management will also have

lymphatics in all chronic oedemas.

The management of lymphoedema mainly involves non-surgical conservative strategies to reduce tissue fluid load (interstitial fluid). The underlying principles are:

- to facilitate movement of interstitial fluid into lymphatic vessels

(thereby becoming lymph)

- to enhance lymphatic transit
- to move lymphatic fluid from areas of congestion to areas of functioning lymphatics, thereby increasing lymphatic transportation
- to reduce and manage the reaccumulation of interstitial fluid.



Figure 2. Indocyanine green lymphography of a patient with oedema in the left lower limb. (a, left) The finding of dermal backflow on lymphography is a diagnostic sign of lymphoedema. (b, right) Skin markings made by the technician during the real-time study indicate the direction and course of lymphatic flow, and the extent of lymphatic congestion.

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an impact on lymphatic function, and on the progression and severity of a patient’s chronic oedema and lymphoedema.²¹

Referral of a patient with chronic limb oedema to a specialist lymphoedema medical clinic may be warranted if:

- the diagnosis of lymphoedema is unclear and requires a specialist assessment

TABLE 5. SUMMARY OF CONSERVATIVE MANAGEMENT STRATEGIES FOR CHRONIC LOWER LIMB OEDEMA

Management strategies	Details
Comprehensive lymphoedema management	<ul style="list-style-type: none"> • In moderate to severe cases of lymphoedema, compression bandaging is an intensive technique used to quickly reduce limb swelling. The aims are to restore limb shape, reduce limb size/volume, improve skin condition and manage any exudate. This intensive treatment may be done before prescription of long-term compression therapy (described below).
Compression therapy	<ul style="list-style-type: none"> • May come in the form of compression garments or adjustable compression devices (e.g. wraps); a lymphoedema therapist can assist with garment measurement and prescription of the most suitable type of compression therapy for each patient • Sequential intermittent pneumatic compression devices are electronic pump devices consisting of a variable number of pneumatic chambers that can assist lymphatic fluid movement and may be a cost-effective adjunct therapy in oedema management • Compression therapy is useful both for chronic oedema of numerous causes and lymphoedema
Skin care	<ul style="list-style-type: none"> • Daily skin care and moisturising is important to maintain the skin barrier and reduce the risk of cellulitis
Exercise, nutrition and weight management	<ul style="list-style-type: none"> • Exercise can help the lymphatic system function more effectively • Deep breathing also has an impact on deep lymphatic function • Obesity is associated with both chronic oedema and the risk of developing lymphoedema • Nutritional considerations are important in not only weight management but also skin health and wound healing
Facilitative Manual Lymphatic Drainage (also known as decongestive massage)	<ul style="list-style-type: none"> • A slow and firm massage used in lymphoedema, which facilitates movement of dermal backflow (lymphatic fluid in lymphatic capillaries) • An adjunctive strategy that should be used in conjunction with compression and other therapy
Low-level laser therapy	<ul style="list-style-type: none"> • Suggested to trigger biochemical changes (including alteration of fibroblasts, osteoblasts, lymphocytes and smooth cells) to facilitate tissue repair • Can be used in conjunction with compression therapy
Negative pressure therapies (e.g. kinesiology tape and LymphaTouch)	<ul style="list-style-type: none"> • Suggested to support lymphatic flow by pulling on the skin and increasing the space between the dermis and fascia, encouraging flow of the superficial lymphatics • Can be used in conjunction with compression therapy

TABLE 6. SUMMARY OF SURGICAL TREATMENT OPTIONS FOR THE MANAGEMENT OF LYMPHOEDEMA

	Surgical treatment option	Comments
Early stage lymphoedema	<ul style="list-style-type: none"> • Lymphovenous anastomosis (connecting a blocked lymph vessel in the affected limb to a nearby vein to bypass the damaged area and restore lymph flow back to the venous system) • Vascular lymph node transfer (transferring lymph nodes from an unaffected region to the lymphoedema-affected area) 	In the early and early to moderate stages of lymphoedema, microsurgery may help to reduce the lymphatic load in congested areas
Late stage lymphoedema	<ul style="list-style-type: none"> • Liposuction (removing excess subcutaneous adipose tissue to restore limb volume; can also improve compression therapy effects) • Debulking surgery (removal of damaged skin and tissue) 	In moderate to advanced stages of lymphoedema, the aim of surgery is to manage excess adipose tissue that develops with the progression of lymphoedema. Debulking surgery is usually only done in extreme and advanced cases of lymphoedema in regions that are hard to apply compression to (e.g. abdominal, pelvic and genital areas)

- the patient is experiencing complications of chronic oedema such as skin breakdown, chronic non-healing wounds or recurrent cellulitis
- there is difficulty establishing adequate oedema control
- the patient is interested in exploring surgical options.

Conclusion

The contemporary understanding of lymphatic function in maintenance of fluid homeostasis confirms that all chronic oedema represents a functional or structural impairment of lymphatic drainage. Successful management of the patient presenting with persistent lower limb swelling first requires an accurate diagnosis, based on findings

from a detailed history, examination and relevant investigations. Any reversible underlying cause requires treatment; however, chronic oedema requires management itself to prevent consequent disabling skin deterioration, risk of cellulitis and function effects of reduced mobility and quality of life. Conservative management remains the cornerstone of lymphoedema management and also has a role in chronic oedema management. **MT**

References

A list of references is included in the online version of this article (www.medicinetoday.com.au).

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Aside from lymphoedema, list at least four other causes of chronic oedema of the lower limbs.



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Swollen legs

A diagnostic and management update

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