



## Research Request – Oedema and Lymphoedema Management

<b>Brief</b>	Oedema and Lymphoedema. Best Practice Management.
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*Please note:*

*The research and literature reviews collated by our TAB Research Team are not to be shared external to the Branch. These are for internal TAB use only and are intended to assist our advisors with their reasonable and necessary decision making.*

*Delegates have access to a wide variety of comprehensive guidance material. If Delegates require further information on access or planning matters they are to call the TAPS line for advice.*

*The Research Team are unable to ensure that the information listed below provides an accurate & up-to-date snapshot of these matters.*

## SUMMARY

- Lymphoedema and oedema (American spelling: Lymphedema and edema) have similar symptoms, however understanding the difference between the two is crucial to ensuring the most suitable treatment.
- Research indicates that oedema appears not to be a permanent condition and can be managed successfully with appropriate treatment. However this depends on what might be causing the condition.
- Research indicates that lymphoedema appears to be a permanent condition and that management of the condition focuses on reducing the swelling and controlling the pain.
- Best practice management of lymphoedema has a holistic, multidisciplinary approach, and Australian best practice management relies largely on the "[International Lymphoedema Framework: Best practice in the Management of Lymphoedema](#)".
- The aims of lymphoedema management are to prevent progression of the condition, to reduce odema and then maintain the improvement.
- Whilst there are several standard management interventions for lymphoedema, *compression garments* are recognised as a long term management intervention.
- High costs to the patient are associated with compression garments, however most Australian states offer a subsidy scheme.

- Although *Lymphatic Massage* and *Intermittent Pneumatic Compression* form a standard intervention practice, research suggests that there is a lack of data to support their use and effectiveness.
- Other non-standard treatments used in the management of lymphoedema, require further research and evaluation as to efficacy. They are drug treatments, breathing exercises, taping, hyperbaric oxygen and laser therapy.

## DIFFERENCE BETWEEN OEDEMA AND LYMPHOEDEMA

Lymphedema and oedema have similar symptoms, however understanding the difference between the two is crucial to ensuring the most suitable treatment.

Oedema and lymphedema aren't necessarily overlapping conditions. Both lymphedema and oedema are conditions that involve swelling, but they have different causes and therefore need different treatment. The following table gives a simple overview of the similarities and differences: <sup>1</sup>

Oedema	Lymphoedema
<i>Oedema</i> is the body's normal response to an injury such as a sprain. As healing progresses, the excess fluid leaves the area and the swelling goes down.	<i>Lymphoedema</i> is condition that occurs when the lymphatic system is impaired to the extent that the amount of lymphatic fluid within a given area exceeds the capacity of the lymphatic transport system to remove it.
<i>Oedema</i> is usually caused by excess tissue fluid that had not yet returned to the circulatory system.	<i>Lymphoedema</i> is swelling caused by excess protein-rich lymph trapped within the tissues.
<i>Oedema</i> due to an injury, such as bumping into something, is caused by additional tissue fluid coming into the area to help with healing.	<i>Lymphoedema</i> impaired tissues respond to injury with slow healing and/or a potentially serious infection.
<i>Oedema</i> is also caused by circulatory system problems, such as chronic venous insufficiency, and this swelling usually occurs in the lower areas of the body.	<i>Lymphoedema</i> is caused by damage to the lymphatic system and this swelling occurs near the affected area.
<i>Oedema</i> swelling does not leave a mark when a finger is pressed into it. This is known as non pitting oedema.	<i>Lymphoedema</i> swelling leaves a mark when a finger is pressed into it. This is known as pitting edema. This occurs only in the early stages of Lymphoedema.
<i>Oedema</i> due to some causes can be relieved with diuretics.	<i>Lymphoedema</i> is harmed, not helped, by treatment with diuretics.

<sup>1</sup> Hand Therapy Group, "Lymphedema and Oedema: What's the difference?", [website], 2016, <http://handtherapy.com.au/lymphedema-and-oedema-whats-the-difference>, (accessed 6 January 2020)

# OEDEMA

## What is Oedema?

Oedema is a build-up of fluid in the body, which causes swelling. (Fluid Retention).

Fluid regularly leaks into body tissues from the blood. The lymphatic system is a network of tubes throughout the body that drains this fluid (called lymph) from tissues and empties it back into the bloodstream. Fluid retention (oedema) occurs when the fluid isn't removed from the tissues.

There are two broad categories of oedema:

- **Generalised oedema**, when swelling occurs throughout the body, and
- **Localised oedema**, when particular parts of the body are affected. <sup>2</sup>

There are several types of oedema:

Types of Oedema <sup>3</sup>	
Peripheral oedema	Affecting the feet and ankles (the most common type)
Cerebral oedema	Affecting the brain
Pulmonary oedema	Affecting the lungs
Macular oedema	Affecting the eyes
Idiopathic oedema	Term used to describe cases where the cause is unable to be found.

## Causes

Mild cases of oedema may result from:

- Sitting or staying in one position for too long
- Eating too much salty food
- Having premenstrual signs and symptoms
- Being pregnant

However, oedema may be a sign of a more serious underlying medical condition. The Mayo Clinic outlines the following potential causes of oedema: <sup>4</sup>

<sup>2</sup> Better Health Channel, "Fluid retention (oedema)", [website] 2018, <https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/Fluid-retention-oedema>, (accessed 7 January 2020)

<sup>3</sup> Your.MD, "Oedema", [website] 2020, <https://www.your.md/condition/oedema>, (accessed 7 January 2020)

<sup>4</sup> Mayo Clinic, "Oedema", [website] 2020, <https://www.mayoclinic.org/diseases-conditions/edema/symptoms-causes/syc-20366493>, (accessed 7 January 2020)

Cause	Description
Congestive heart failure	One or both of your heart's lower chambers lose their ability to pump blood effectively. As a result, blood can back up in legs, ankles and feet, causing edema. Congestive heart failure can also cause swelling in abdomen. Sometimes, this condition can cause fluid to accumulate in lungs (pulmonary edema), which can lead to shortness of breath.
Cirrhosis	Fluid may accumulate in abdominal cavity (ascites) and in legs as a result of liver damage (cirrhosis).
Kidney disease	With kidney disease, extra fluid and sodium in your circulation may cause edema. The edema associated with kidney disease usually occurs in legs and around your eyes.
Kidney damage	Damage to the tiny, filtering blood vessels in your kidneys can result in nephrotic syndrome. In nephrotic syndrome, declining levels of protein (albumin) in your blood can lead to fluid accumulation and edema.
Weakness or damage to veins in legs	With chronic venous insufficiency, the one-way valves in leg veins are weakened or damaged, which allows blood to pool in leg veins and causes swelling. Sudden onset of swelling in one leg accompanied by pain in calf muscle can be due to a blood clot (deep vein thrombosis, or DVT) in one of your leg veins.
Inadequate lymphatic system	The body's lymphatic system helps clear excess fluid from tissues. If this system is damaged — for example, by cancer surgery — the lymph nodes and lymph vessels draining an area may not work correctly, and edema can occur.
Severe, long-term protein deficiency	An extreme lack (deficiency), of protein in diet over a long period of time can lead to fluid accumulation and edema.
Side effect of some medications	Including: High blood pressure medications, Nonsteroidal anti-inflammatory drugs, Steroid drugs, Estrogens, Certain diabetes medications called thiazolidinediones
Thyroid disease <sup>5</sup>	Such as hypothyroidism
Arthritis <sup>6</sup>	Joints affected by some types of arthritis tend to swell with fluid
Allergic reaction <sup>7</sup>	In susceptible people, the body tends to swell in response to particular allergens, such as an insect bite. In some cases, the reaction is severe (anaphylaxis) and requires urgent medical attention. this swelling is short-lived rather than ongoing

<sup>5</sup> Better Health Channel, "Fluid retention (oedema)", [website] 2018, <https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/Fluid-retention-oedema>, (accessed 7 January 2020)

<sup>6</sup> ibid

<sup>7</sup> ibid

Cause	Description
Autoimmune diseases <sup>8</sup>	Such as lupus.

## Management

Mild oedema usually subsides. More-severe oedema may be treated with drugs that help the body expel excess fluid in the form of urine (diuretics). One of the most common diuretics is furosemide (Lasix).

Long-term management typically focuses on treating the underlying cause of the swelling. If edema occurs as a result of medication use, a check for an alternative medication that doesn't cause edema could be sought. <sup>9</sup>

The following lifestyle interventions are suggested by the [Mayo Clinic](#):

- **Movement.** Moving and using the muscles in the part of your body affected by edema, especially legs, may help pump the excess fluid back toward the heart.
- **Elevation.** Holding the swollen part of the body above the level of the heart several times a day. In some cases, elevating the affected body part while sleeping may be helpful.
- **Massage.** Stroking the affected area toward the heart using firm, but not painful, pressure may help move the excess fluid out of that area.
- **Compression.** If one limb is affected by edema, a practitioner may recommend wearing compression stockings, sleeves or gloves, usually worn after the swelling has gone down, to prevent further swelling from occurring. These garments keep pressure on the limbs to prevent fluid from collecting in the tissue.

See also "Lymphoedema: Compression Garments (Long Term Management)" below.

- **Protection.** Keeping the affected area clean, moisturized and free from injury. Dry, cracked skin is more prone to scrapes, cuts and infection. Always wear protection on the feet if that's where the swelling typically occurs.
- **Reduce salt intake** as salt can increase fluid retention and worsen edema.

<sup>8</sup> ibid

<sup>9</sup> Mayo Clinic, "Oedema", [website] 2020 <https://www.mayoclinic.org/diseases-conditions/edema/diagnosis-treatment/drc-20366532>, (accessed 8 January 2020)

## Functional Capacity

Depending on the extent of the condition (including category and type), functional capacity for those suffering from oedema will be comparable to that of those suffering from Lymphoedema. See “Lymphoedema: Functional Capacity” below.

## Permanency & Early Intervention

Research indicates that oedema may not be a permanent condition and can be managed successfully with appropriate treatment. However this depends on what might be causing the condition:

“If there is an underlying cause for the dependent edema, then treating the condition may resolve the edema. Sometimes, these conditions are not curable such as in the case of heart failure, so people may need to manage the edema to limit its symptoms and reduce the risk of complications”.

<sup>10</sup>

# LYMPHOEDEMA

## What is Lymphoedema?

Lymphoedema is a chronic swelling of one or more limbs or body regions, such as the arms, legs and neck, breast or genitals. Lymphoedema occurs when there is an imbalance in the transportation and/or production of fluid in the interstitial tissues, resulting in the accumulation of extracellular fluid. It may be a congenital malformation of the lymphatic system (primary lymphoedema) and/or due to damage, trauma or interference with the lymphatic vessels or nodes, for example after cancer treatment (secondary lymphoedema). While lymphoedema starts as a fluid focused condition, for some, it can progress to accumulation of adipose and/or fibrotic tissue in affected regions. This change in tissue composition is also known as staging, with lymphoedema currently divided into four stages depending on the progression of the tissue change. <sup>11</sup>

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<sup>10</sup> Medical News Today, "What is dependent edema?", [website], 2020, <https://www.medicalnewstoday.com/articles/320986.php>, (accessed 10 January 2020)

<sup>11</sup> NSW Government, Agency for Clinical Innovation, "Lymphoedema: A guide for clinical services", 2018, [https://www.aci.health.nsw.gov.au/data/assets/pdf\\_file/0008/477998/lymphoedema-guide.pdf](https://www.aci.health.nsw.gov.au/data/assets/pdf_file/0008/477998/lymphoedema-guide.pdf)

Lymphoedema Tissue Composition Staging <sup>12</sup>	
Stage 0	A subclinical state where swelling is not evident despite impaired lymph transport. This stage may exist for months or years before oedema becomes evident.
Stage I	This represents early onset of the condition, where there is accumulation of tissue fluid that subsides with limb elevation. The oedema may be pitting at this stage.
Stage II	I Limb elevation alone rarely reduces swelling and pitting is manifest.
Late Stage II	There may or may not be pitting as tissue fibrosis is more evident.
Stage III	The tissue is hard (fibrotic) and pitting is absent. Skin changes such as thickening, hyper pigmentation, increased skin folds, fat deposits and warty overgrowths develop.

Types of Lymphoedema <sup>13</sup>	
Primary	Primary lymphoedema is the result of a congenital or genetic condition affecting the development of the lymphatic system and has been estimated to effect approximately one in 6,000 people at birth. However the onset can occur throughout life.
Secondary	Secondary lymphoedema is more common, most often results from cancer treatment. The treatments include removal of lymph nodes and radiotherapy for cancers including breast, melanoma, prostate, ovarian, cervical and other skin cancers. It can also be caused by other health conditions, such as venous hypertension and venous ulceration, immobility and obesity.

## Causes

**Primary lymphoedema** is caused by alterations (mutations) in genes responsible for the development of the lymphatic system.

**Secondary lymphoedema** develops in people who previously had a normal lymphatic system that then becomes damaged.

<sup>12</sup> Australasian Lymphology Association, "What is Lymphoedema?" [website], 2020, <https://www.lymphoedema.org.au/about-lymphoedema/what-is-lymphoedema>, (accessed 8 January 2020)

<sup>13</sup> Lymphoedema Action Alliance, Submission to The Standing Committee on Health: Inquiry into Chronic Disease Prevention and Management in Primary Health Care (Submission on the prevention and management of Lymphoedema in Primary Health Care, 2015, [https://www.cancercouncil.com.au/wp-content/uploads/2016/01/CCNSW-Submission\\_Inquiry-into-chronic-disease-prevention-and-mgmt-of-lymphoedema-in-primary-health-care\\_Lymphoedema-Action-Alliance\\_July-2015.pdf](https://www.cancercouncil.com.au/wp-content/uploads/2016/01/CCNSW-Submission_Inquiry-into-chronic-disease-prevention-and-mgmt-of-lymphoedema-in-primary-health-care_Lymphoedema-Action-Alliance_July-2015.pdf)



Some of the most common causes are below: <sup>14</sup>

Cause	Description
Surgery for cancer	Treatment for cancer can involve surgery to remove sections of the lymphatic system. The surgeon will try to limit damage to your lymphatic system, although this is not always possible. There's a particular risk of lymphoedema occurring after treatment for any cancer where lymph glands are removed. Some of the more common cancers where this happens are: breast cancer, skin cancer (melanoma), gynaecological cancers – such as cervical cancer and vulval cancer, genitourinary cancers – such as prostate cancer or penile cancer.
Radiotherapy	Radiotherapy uses controlled doses of high energy (radiation) to destroy cancerous tissue, but it can also damage healthy tissue. If radiotherapy is needed to destroy cancerous cells in your lymphatic system, there's a risk that the lymphatic system could become permanently damaged and unable to drain fluid properly.
Infections	An infection, such as cellulitis, can sometimes cause lymphoedema. Severe cellulitis can damage the tissue around the lymphatic system, causing it to become scarred. Filariasis can also cause lymphoedema. Lymphatic filariasis is a parasitic disease caused by microscopic, thread-like worms. The adult worms only live in the human lymphatic system and block lymph drainage. It's a common cause of lymphoedema worldwide.
Inflammation	Medical conditions that cause tissue to become red and swollen can also permanently damage the lymphatic system. Conditions that can cause lymphoedema include: rheumatoid arthritis and eczema.
Venous diseases	Diseases that affect the flow of blood through the veins can cause lymphoedema in some people. The abnormal or damaged veins can cause fluid to overflow from the veins into the tissue spaces. This overwhelms and eventually exhausts the parts of the lymphatic system responsible for draining this fluid. Some venous diseases that can lead to lymphoedema include: <b>DVT (deep vein thrombosis)</b> – a blood clot in 1 of the deep veins in the body, and <b>swollen and enlarged veins (varicose veins)</b> – where poor drainage of blood in the veins causes higher vein pressure and more fluid overflowing into the surrounding tissues.
Obesity	Obesity is another possible cause of secondary lymphoedema. People who are obese, particularly those who are severely obese, have an increased risk of developing swollen body parts. It's not clear exactly why this is, but it's been suggested that the extra fatty tissue affects the lymphatic channels in some way, reducing the flow of fluid through them. In these cases, weight loss is an important part of treatment and even just starting to lose weight can make a big difference to the swelling.

<sup>14</sup> NHS, Causes: Lymphoedema, [website], 2019, <https://www.nhs.uk/conditions/lymphoedema/causes>, (accessed 06 January 2020)

Cause	Description
Trauma and injury	In a small number of cases, lymphoedema can be caused by an accidental injury to the lymphatic system. For example, it can sometimes occur after a road traffic accident where there's extensive bruising or soft tissue loss.
Immobility	Movement and exercise help lymph drainage because muscle activity surrounding the lymphatic vessels massages fluid into and along them. Reduced movement can therefore lead to lymphoedema because the fluid in the lymphatic system does not get moved along. For example, people who have limited mobility for a long period of time as a result of an illness, nerve damage or arthritis may be at risk of lymphoedema.

## Management

The Australian based [Australasian Lymphology Association](#) (ALA) endorses the comprehensive International Lymphoedema Framework "[Best practice in the Management of Lymphoedema](#)", which asserts the best practice management of lymphoedema has a holistic, multidisciplinary approach which includes:

- **Exercise/movement** – to enhance lymphatic and venous flow
- **Swelling reduction and maintenance** – to reduce limb size/volume and improve subcutaneous tissue consistency through compression and/or massage, and to maintain improvements
- **Skin care** – to optimise the condition of the skin, treat any complications caused by lymphoedema and minimise the risk of cellulitis/erysipelas
- **Risk reduction** – to avoid factors that may exacerbate lymphoedema
- **Pain and psychosocial management.**

The precise form of management programme required will be determined by:

- The site, stage, severity and complexity of the lymphoedema, and
- The patient's psychosocial situation.
- Patients may require referral to a lymphoedema service, or for assessment of coexisting medical, functional or psychosocial problems.
- Successful management of lymphoedema relies on patients and carers playing an active role.

The aims of lymphoedema management are to prevent progression of the condition, to reduce odema and then maintain the improvement. This includes the alleviation of associated symptoms, prevention of infection and improvement of function and quality of life.

Treatment is individualized for each client and not all components of treatment may be necessary in all cases. Those with mild lymphoedema may only require education, exercise and skin care whereas for more severe cases treatment may be longer and require two phases. Phase I is an intensive treatment provided by a trained lymphoedema therapist followed by Phase II, which is self management that the client continues at home. With improved health education people are reporting early limb changes promptly and this is contributing to a reduction in the need for intensive treatments.

The Australasian Lymphology Association outlines the following phases of management:

**Phase I – Intensive treatment** consists of daily:

- Skin care to optimise the condition of the skin, reverse skin changes and treat infections.
- Manual Lymphatic Drainage (MLD) to enhance lymph flow. This precedes bandaging and directs lymph fluid to functioning lymphatic territories and helps to establish collateral drainage pathways.
- Application of multi-layer compression bandaging.
- Exercises to increase lymphatic and venous flow.
- Psychosocial support.
- A compression garment is prescribed, following a successful reduction. This is essential to preserve the reduction achieved by treatment and to help prevent progression of the lymphoedema.
- Education is incorporated to ensure that the client understands their condition and all parts of the intensive treatment as well as the importance of phase II.

**Phase II - Home maintenance programme**

- Patients are educated by their therapist in the need for self-management to maintain the results achieved in Phase I. Without the active involvement of the client, the successful outcome of treatment may not be sustained.
- The routine adopted may vary from person to person but will usually include daily skin care and prevention of infection, regular self massage, exercises and the wearing of the prescribed compression garment(s).
- Patients encouraged to practice self monitoring and adopt a healthy lifestyle that includes attention to diet, fitness and weight management.
- At times this treatment may be offered in a modified form to accommodate particular individual needs.

### *Skin Care and Cellulitis/erysipelas*

Swelling may produce deep skin folds where fungal and bacterial infections can develop. Chronic inflammation causes deposition of fibrin and collagen, contributing to skin thickening and firm tissue consistency. Reduced tissue compliance may further compromise lymph flow and increase the tendency to infection. Maintenance of skin integrity and careful management of skin problems in patients with lymphoedema are important to minimise the risk of infection. The general principles of skin care aim to preserve skin barrier function through washing and the use of emollients. Ordinary soaps, which usually contain detergents and no glycerin, should be avoided because they tend to dry the skin. Natural or pH neutral soap can be used. The perfumes and preservatives in scented products may be irritant or allergenic. In high concentrations, mineral and petrolatum based products may exacerbate dry skin conditions by occluding skin pores and preventing natural oils from surfacing.<sup>15</sup>

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<sup>15</sup> International Lymphoedema Framework, "International Consensus, Best Practice for the Management of Lymphoedema", p 24, 2006, [https://www.lympho.org/wp-content/uploads/2016/03/Best\\_practice.pdf](https://www.lympho.org/wp-content/uploads/2016/03/Best_practice.pdf)

## *Lymphatic Massage*

Manual lymphatic drainage (MLD) is a gentle massage technique that is recognised as a key component of decongestive therapy. MLD aims to encourage fluid away from congested areas by increasing activity of normal lymphatics and bypassing ineffective or obliterated lymph vessels. Although there is a wealth of clinical opinion advocating the benefits of MLD, there are little research data to conclusively support its use. The most appropriate techniques, optimal frequency and indications for MLD, as well as the benefits of treatment, all remain to be clarified. MLD remains a specialist skill that needs regular practice in order to maintain competence. Deep, heavy-handed massage should be avoided because it may damage tissues and exacerbate oedema by increasing capillary filtration.<sup>16</sup>

## *Intermittent Pneumatic Compression (IPC)*

Although there is considerable international debate over its effectiveness in lymphoedema, intermittent pneumatic compression (IPC) is widely used. It may form part of an intensive therapy regimen or long-term management in selected patients, and may be use.

IPC consists of an electrical air compression pump attached to an inflatable plastic garment that is placed over the affected limb. The garment is inflated and deflated cyclically for a set period, usually about 30-120 minutes. The pressure produced by the garment can be varied. Garments may be single chambered, or contain multiple chambers (usually three, five or 10) that are inflated sequentially to provide a peristaltic massaging effect along the length of the limb towards its root. The question of whether single or multichambered devices are more effective remains open. However, multichambered devices are used most frequently and randomised controlled trials have shown them to produce a faster effect. IPC is thought to reduce oedema by decreasing capillary filtration, and therefore lymph formation, rather than by accelerating lymph return. IPC is particularly effective in nonobstructive oedemas, eg those due to immobility, venous incompetence, lymphovenous stasis or hypoproteinaemia. In obstructive lymphoedema, ie lymphoedema resulting from lymphatic vessel/node damage or lymph node resection, SLD or MLD is recommended before IPC to stimulate lymphatic flow. It is important that compression therapy with garments or bandaging is continued after IPC to prevent rapid rebound swelling.<sup>17</sup>

## *Multi-layer Inelastic Lymphoedema Bandaging (MLLB)*

Multi-layer lymphoedema bandaging (MLLB) is a key element of intensive therapy regimens. For some patients it may also form part of their transition, long-term or palliative management. MLLB uses inelastic bandages that have low extensibility and that produce high working pressures and lower resting pressures, ie they create peak pressures that produce a massaging effect and stimulate lymph flow. In certain situations, elastic bandages may be used instead. Elastic bandages produce sustained compression with smaller variations during movement.

As well as reducing oedema, MLLB:

- restores shape to the limb/affected area
- reduces skin changes such as hyperkeratosis and papillomatosis
- supports overstretched inelastic skin
- eliminates lymphorrhoea

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<sup>16</sup> Ibid, p 29

<sup>17</sup> Ibid, p 31

- softens subcutaneous tissues. MLLB is indicated when skin changes are marked or limb distortion and skin folds preclude compression garments.

Contraindications to MLLB include severe peripheral arterial occlusive disease.

MLLB regimens can be adapted to individual patient's needs by varying the:

- pressure produced by the bandages
- frequency of bandage change
- bandage bulk
- type of bandage, eg using elastic bandages instead of inelastic bandages.

### *Compression Garments (Long Term Management)*

The main use of compression garments is in the long-term management of lymphoedema, usually following a period of intensive therapy. Compression garments are also used for prophylaxis or as part of initial treatment. They may provide the only form of compression used, or form part of a regimen that includes other types of compression. Some patients wear garments during waking hours only, for exercise only, or up to 24 hours per day. A wide variety of factors must be taken into account when determining whether a patient is suitable for compression garments.

Criteria indicating patient suitability for compression garments:

- Good dexterity
- Intact, resilient skin
- No or minimal shape distortion
- Absent or minimal pitting oedema
- Swelling that can be contained by compression garments
- Concordant and motivated
- Ability to tolerate and manage hosiery (+/- carer support)
- Ability to monitor skin condition and engage in prevention strategies
- Symptom-based management/palliative needs

Contraindications to compression garments:

- Arterial insufficiency - ABPI <0.5 in the lower limb
- Acute cardiac failure
- Extreme shape distortion
- Very deep skin folds
- Lymphorrhoea, or other weeping skin condition
- Extensive ulceration
- Severe peripheral neuropathy

Compression garments can be categorised according to method of fabric manufacture:

- **Circular knit garments** – the material is continuously knitted on a cylinder and has no seam, and is used mainly to make ready to wear garments. Garments are shaped by varying stitch height and yarn tension. Circular knit garments may be thinner and more cosmetically acceptable than flat knit garments.
- **Flat knit garments** – the material is firmer and thicker than that of circular knit garments. Garments are knitted as a flat piece that is shaped by adding or removing needles. The flat

piece is then joined by a seam to form the garment. Most custom made garments are made from flat knit material.<sup>18</sup>

In their position statement on the use of compression garments, the [Australasian Lymphology Association](#) suggest that different levels of compression are required for the different stages of lymphoedema. Clinical judgement is required to select the correct compression level for an individual. A guide to compression garment prescription based on international consensus is provided below.<sup>19</sup>

Level of lymphoedema	Level of compression	Equivalent compression class as per RAL standard
Subclinical/ early or mild	14-21mmHg	1
Moderate/ severe	23-32mmHg	2
Severe	34-46mmHg	3
Severe complex	49-70mmHg	4

Adapted from Lymphoedema Framework Template for practice: compression hosiery in lymphoedema. London: MEP Ltd, 2006. Page 16 (1)

### *Exercise/movement and Elevation*

Exercise/movement are common rehabilitative interventions used to reduce oedema. At present, there is little evidence to indicate which types, intensities and frequencies of exercise may be safely used in the management of lymphoedema.

Exercise improves muscular strength, cardiovascular function, psychological wellbeing and functional capacity. Gentle resistance exercise stimulates muscle pumps and increases lymph flow; aerobic exercise increases intra-abdominal pressure, which facilitates pumping of the thoracic duct.

Combinations of flexibility, resistance and aerobic exercise may be beneficial in controlling lymphoedema, and should be tailored to the individual patient. Physiotherapy referral is required for patients who have difficulty with mobility, joint function or joint movement.

Elevation of the affected limb, ideally to just above the level of the heart, is often advised to reduce swelling. It is thought that elevation acts by maximising venous drainage and by decreasing capillary pressure and lymph production. Anecdotal evidence suggests that limb elevation when the patient is sitting or in bed may be a useful adjunct to active treatment, but should not be allowed to impede function or activity. Patients should be encouraged not to sleep in a chair and to go to bed at night to avoid the development of 'arm chair' legs or exacerbation of lower limb lymphoedema.<sup>20</sup>

### *Psychosocial Support*

Psychosocial support is an important element of the holistic treatment of lymphoedema: it has the potential to have considerable influence on outcome by enhancing concordance, encouraging self management and maximising quality of life. Intervention involves planning and implementing

<sup>18</sup> Ibid, pp. 39-46

<sup>19</sup> Australasian Lymphology Association, "Position Statement: The Use of Compression Garments In the Management of Lymphoedema", 2012, <https://www.lymphoedema.org.au/public/7/files/Position%20Statements/ALA%20Poistion%20State%20on%20Compression%20Garments.pdf>

<sup>20</sup> Ibid, p 47

psychosocial care strategies that help patients and their family/carers to take a positive role in the management of their lymphoedema and to achieve as good a quality of life as possible. If psychosocial problems are not resolved within three months, the patient should be referred for specialist intervention.<sup>21</sup>

### *Palliative Care*

The needs of patients with lymphoedema who are otherwise ill with advanced disease and who require palliative care can be complex. This document can provide only an indication of supportive measures and treatments that may be helpful. Lymphoedema can produce distressing and debilitating symptoms that affect lifestyle and function. Patients with advanced disease may not be able to tolerate a full programme of assessment and treatment, but require a palliative approach in which assessment techniques are modified and individual treatments are selected to ease specific symptoms.<sup>22</sup>

### *Surgery*

Surgical treatment of lymphoedema can be divided into three main categories:

1. Surgical reduction
2. Procedures that bypass lymphatic obstructions
3. Liposuction.

Patients for surgery need to be selected carefully and counselled to ensure realistic expectations of likely outcome. Maintenance of any improvement gained requires long-term postsurgical compression therapy.

**Surgical reduction** (sometimes also known as debulking surgery) aims to remove excess subcutaneous tissue and skin, and may be useful in the symptomatic treatment of severe lymphoedema. However, the postsurgical morbidity of reduction operations may be considerable. In some cases, surgical reduction may be considered for lymphoedema of the eyelid or genitalia.

**Bypass operations** aim to restore lymphatic function through lymphovenous anastomoses and lymphatic or venous vessel grafting, or lymph node transplantation. Anastomosis of lymph vessels to the venous system may be attempted in patients with proximal lymphatic obstruction and patent distal lymphatics, and produces better results at earlier stages of lymphostatic disease. Lymphatic grafting and lymph node transplantation require microsurgical techniques, and show promising results in carefully selected patients.

**Liposuction** in patients with chronic lymphoedema, adipocyte proliferation (which may be related to an inflammatory process) may mean that conservative treatment or microsurgery do not completely resolve limb enlargement. Liposuction has been performed on patients with long-standing breast cancer related lymphoedema. It removes excess fat tissue and is considered only if the limb has not responded to standard conservative therapy. Liposuction does not correct inadequate lymph drainage and is not indicated when pitting is present. Where concordance with compression garments after treatment is high, results have been maintained. Liposuction has also been used for primary and secondary leg lymphoedema with promising results.<sup>23</sup>

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<sup>21</sup> Ibid, p 48

<sup>22</sup> Ibid, p 49

<sup>23</sup> Ibid, p 50

## *Other Treatments*<sup>24</sup>

A variety of other treatment modalities may be used to treat lymphoedema; many require further evaluation:

### Drug Treatment

Two main groups of drug have been used in the treatment of lymphoedema: benzopyrones and diuretics.

**Benzopyrones** are based on a variety of naturally occurring substances. Examples include flavonoids, oxerutins, escins, coumarin, and ruscogen combined with hesperidin. There is little evidence to support the use of these drugs in lymphoedema. There is some data, however, that flavonoids may stabilise swelling by reducing microvascular filtration.

**Diuretics** encourage the excretion of salt and water, and by reducing blood volume might be expected to reduce capillary filtration and lymph formation. There is no evidence that diuretics encourage lymph drainage. A diuretic is likely to be prescribed on a pragmatic basis for anyone with oedema almost irrespective of cause.

### Breathing Exercises

Breathing exercises are recommended by some clinicians as a preliminary manoeuvre that may help to clear the central lymphatics prior to interventions that promote lymph drainage from the peripheries. However, other clinicians question the physiological basis of breathing exercises as there are no experimental data in humans to confirm that variations in intrathoracic pressure due to breathing assist central lymphatic drainage into the venous system.

### Lymphoedema taping

Lymphoedema taping is an emerging form of treatment for lymphoedema. It involves the application of narrow strips of elastic tape to the affected area, and can be used in combination with compression garments or bandaging. It is thought to improve muscle function and lymph flow and may have a role to play in the treatment of midline and peripheral swelling. However, evidence is lacking of its efficacy in lymphoedema.

### Hyperbaric oxygen

Hyperbaric oxygen therapy is known to promote healing in bone that has become ischaemic following radiotherapy. In patients with upper limb lymphoedema following radiotherapy, two small studies have indicated that hyperbaric oxygen may improve lymph flow and reduce limb volume in the short-term. Further research is required to establish whether benefits can be demonstrated in randomised trials and in the long-term.

### Laser Therapy

Low level laser therapy has shown potential for the treatment of lymphoedema, particularly of the upper limb, where it has reduced limb volume and tissue hardness<sup>101</sup>. Further research is required to establish the benefits of treatment and the optimal regimen.

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<sup>24</sup> Ibid, p 50



## Other recent management investigations

### Hydrotherapy

A recent 2017 clinical review paper suggests that there is a role for Contrast Hydrotherapy in the management of lymphoedema. The paper suggests that "The majority of conventional treatments for the management of lymphoedema are conservative, with their primary aim being a reduction in the volume of the affected limb, to restore function and quality of life"

The paper outlines that whilst the concept is theoretical based, hydrotherapy may prove to be an effective treatment for lymphoedema, and that clinical investigation with pilot trials is warranted.<sup>25</sup>

Another case study research article suggests that hydrotherapy effectiveness results from the ability of water's hydrostatic pressure to remove fluid and of self-massage and exercises to promote protein removal and clearance through use of healthy lymphotomes. The activities that patients follow as they treat themselves include muscular exercise, which contrasts with conventional treatments that use passive techniques.<sup>26</sup>

## Costs of Lymphoedema Management

In 2012, the International Lymphoedema Framework Australia conducted the largest lymphoedema stakeholder survey ever done internationally. It identified the following key issues to improve the treatment and management of lymphoedema in Australia:<sup>27</sup>

- A need for education about lymphoedema, especially for medical professionals, allied health professionals, and the community.
- The lack of services to meet patient's needs, including the availability of services, time taken to access services, as well as rural and public services. This included the lack of links between the medical profession and therapists, (referral process and maintenance of patients care), inadequate pathways to service, and limited resources that prevent patients from getting timely and appropriate access to services.
- High cost of treatment including lack of government funding of treatments and general cost of accessing appropriate treatment.
- High cost of compression garments.

<sup>25</sup> P. Baker, "Is there a role for contrast Hydrotherapy", Journal of Lymphoedema, Vol 6, No 2, 2011, [https://www.woundsinternational.com/uploads/resources/content\\_11212.pdf](https://www.woundsinternational.com/uploads/resources/content_11212.pdf)

<sup>26</sup> D. Tidhar et al., "Aqua Lymphatic Therapy in Managing Lower Extremity Lymphedema", J Support Oncol, Vol 5, pp. 179-183, 2007, [http://www.aqua-lymphatic-therapy.com/files/Aqua\\_Lymphatic\\_Therapy\\_in\\_Managing\\_Lower\\_Extremity\\_Lymphedema.pdf](http://www.aqua-lymphatic-therapy.com/files/Aqua_Lymphatic_Therapy_in_Managing_Lower_Extremity_Lymphedema.pdf)

<sup>27</sup> Lymphoedema Action Alliance, Submission to The Standing Committee on Health: Inquiry into Chronic Disease Prevention and Management in Primary Health Care (Submission on the prevention and management of Lymphoedema in Primary Health Care, 2015, p8, [https://www.cancercouncil.com.au/wp-content/uploads/2016/01/CCNSW-Submission\\_Inquiry-into-chronic-disease-prevention-and-mgmt-of-lymphoedema-in-primary-health-care\\_Lymphoedema-Action-Alliance\\_July-2015.pdf](https://www.cancercouncil.com.au/wp-content/uploads/2016/01/CCNSW-Submission_Inquiry-into-chronic-disease-prevention-and-mgmt-of-lymphoedema-in-primary-health-care_Lymphoedema-Action-Alliance_July-2015.pdf)

## Compression garment costs

According to a 2015 Macquarie University study<sup>28</sup>, for patients with moderate or severe breast cancer related lymphoedema the average yearly cost of complex lymphoedema care including compression garment costs was approximately \$1400.24.<sup>29</sup>

## Compression garment schemes in Australia

Some states offer compression garment funding:

State	Name and link to subsidy	Eligibility	Subsidy	Limit	Prescriber Guidelines
ACT	<a href="#">ACTES (ACT Equipment Scheme)</a>	1) Lymphoedema diagnosis 2) Means test - Commonwealth pension and/or health care card holder	100%	Two sets of Compression garments every six months	Public or private lymphoedema trained health professional
NSW	<a href="#">EnableNSW</a>	1) Lymphoedema diagnosis 2) Centrelink, or full pension holders eligible 3) Means tested for those in receipt of an income with some co-contribution for those on a low income	100% \$100 Co-payment required annually	Two sets of compression garments every six months.	Lymphoedema therapist registered with the Australasian Lymphology Association - National Lymphoedema Practitioners Register – Level 1 (or eligible for registration)
VIC	<a href="#">Lymphoedema compression garment program (LCGP)</a>	1) Lymphoedema diagnosis 2) Low or middle income 3) Centrelink, Pension or healthcare card holders eligible	40-60% of cost of garment	Limit of 6 garments per year	Lymphoedema therapist registered with the Australasian Lymphology Association – National Lymphoedema Practitioners Register – level 1 (or eligible for registration)
QLD	<a href="#">Compression garments for lymphoedema</a>	Compression garment scheme for adults with lymphoedema  1) Scheme available for people diagnosed with lymphoedema 2) Aged over 16 years 3) Pension or healthcare card holders eligible	100%	Limit of 2 sets of garments per 6 month period.	Lymphoedema therapist registered with the Australasian Lymphology Association – National Lymphoedema Practitioners Register – level 1 (or eligible for registration)
TAS	<a href="#">CES (Community Equipment Scheme)</a>	1) Lymphoedema diagnosis 2) Centrelink, Pension or	100% \$50 co-payment	Limit of 2 sets of garments per 6 month period	Public or private lymphoedema trained health professional

<sup>28</sup> Koelmeyer, Louise A. My body and myself: the impact of lymphoedema on women's body and self image 25th World Congress of Lymphology (Sept 7- 11, 2015)

<sup>29</sup> Lymphoedema Action Alliance, Submission to The Standing Committee on Health: Inquiry into Chronic Disease Prevention and Management in Primary Health Care (Submission on the prevention and management of Lymphoedema in Primary Health Care, p. 24, 2015, [https://www.cancercouncil.com.au/wp-content/uploads/2016/01/CCNSW-Submission\\_Inquiry-into-chronic-disease-prevention-and-mgmt-of-lymphoedema-in-primary-health-care\\_Lymphoedema-The International Lymphoedema Framework, "International Consensus, Best Practice for the Management of Lymphoedema" suggests that assessment and management of lymphoedema should be carried out by practitioners with specialist training. Action-Alliance July-2015.pdf](https://www.cancercouncil.com.au/wp-content/uploads/2016/01/CCNSW-Submission_Inquiry-into-chronic-disease-prevention-and-mgmt-of-lymphoedema-in-primary-health-care_Lymphoedema-The International Lymphoedema Framework, ))

State	Name and link to subsidy	Eligibility	Subsidy	Limit	Prescriber Guidelines
		healthcare card holders eligible	required annually		
WA	<a href="#">CAEP (Community Aids and Equipment Programme)</a>	Centrelink, Pension, healthcare card, or Commonwealth seniors healthcare card holders eligible	Contact the WA Disability Services Commission for this information	Limit of 2 sets of garments annually	Public lymphoedema trained health professional
NT	Lymphoedema Compression Garment Subsidy (accessed through the Occupational Therapy Department, Royal Darwin Hospital) (08) 8922 8888	Lymphoedema diagnosis	100%	Limit of 2 sets of garments per 6 month period	Public or private lymphoedema trained health professional
SA	NONE				

## Training in Lymphoedema Management

The International Lymphoedema Framework, "International Consensus, Best Practice for the Management of Lymphoedema" suggests that assessment and management of lymphoedema should be carried out by practitioners with specialist training.

Success relies on self management by patients and carers, with appropriate and effective education, training, and medical and psychosocial support. It involves:

- daily skin care
- exercise/movement
- compression – compression garments,
- bandaging or an inelastic adjustable compression device
- limb elevation
- SLD performed by the patient or a trained carer/relative
- self monitoring

Long-term management requires that the practitioner has appropriate training, and access to a practitioner with specialist training.

Appropriate training is required for all practitioners who deliver intensive therapy programmes.<sup>30</sup>

The Australasian Lymphology Association's (ALA) maintains a [National Lymphoedema Practitioners Register](#). ALA has created the [guidelines for the recognised level one and two courses](#).

<sup>30</sup> International Lymphoedema Framework, "International Consensus, Best Practice for the Management of Lymphoedema", p. 26, 2006, [https://www.lympho.org/wp-content/uploads/2016/03/Best\\_practice.pdf](https://www.lympho.org/wp-content/uploads/2016/03/Best_practice.pdf)

The following courses are open to Medical Practitioners, Physiotherapists, Occupational Therapists, Registered Nurses, and Remedial Massage Therapists, and are provided by various ALA registered training providers:

- Level 1 courses provide the practitioner with the basic skills/knowledge to assess and treat uncomplicated lymphoedemas.
- Level 2 courses provide the practitioner with the training to assess and treat all forms of lymphoedema including complex presentations.<sup>31</sup>

## Functional Capacity

### *Mobility and functional assessment*

The International Consensus on best practice management of lymphoedema suggests that the assessment of a patient's mobility and functional status will contribute to the formulation of a management plan, and determine whether referral for further assessment is necessary.

Functional assessment of lymphoedema affecting the head, neck, trunk or genitalia should be undertaken by a lymphoedema specialist. Functional assessment of limbs will include:

#### **ARM:**

- range of joint movement
- ability to use fastenings, eg buttons, bra fastenings
- ability to put on or remove underwear/compression garments or bandaging
- hand grip and pincer movement
- effect of lymphoedema on activities of daily living
- use of any aids

#### **LEG:**

- range of joint movement
- ability to get up from sitting or lying
- ability to walk; gait analysis
- ability to lift individual legs
- posture when sitting and standing
- ability to put on and take off footwear/compression garments or bandaging
- suitability of footwear
- effect of lymphoedema on activities of daily living
- use of any aids

### *Psychological Functioning*

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<sup>31</sup> Australasian Lymphology Association, "Training in Lymphoedema Management", [website], 2020, <https://www.lymphoedema.org.au/the-register/lymphoedema-training-courses>, (accessed 6 January 2020)

Psychological assessment will include asking the patient how their swelling makes them feel about themselves alongside assessment for:

- depression – eg low mood, loss of interest, low energy, changes in weight, appetite or sleep patterns, poor concentration, feelings of guilt or worthlessness, suicidal thoughts
- anxiety – eg apprehension, panic attacks, irritability, poor sleeping, situation avoidance, poor concentration
- cognitive impairment – may contribute to lack of motivation and inability to be independent
- lack of motivation
- ability to cope
- understanding of disease and concordance with treatment. <sup>32</sup>

### *Social Functioning*

Social factors assessed include:

- accommodation – accessibility, general living standards, heating/cooling
- support – involvement of carers, effect of lymphoedema on personal relationships, social isolation
- employment – ability to work, effect of work on lymphoedema
- education – ability to attend educational establishment and study
- financial status – benefit entitlement, medical insurance
- recreational activities, exercise, sport. <sup>33</sup>

### *Other functional impacts on the patient*

#### Physical

- Lymphoedema can cause pain, and decreased limb movement and mobility.
- It can cause problems with dressing and other activities of daily living.
- Oversized clothing and footwear, needed to accommodate a swollen limb or body part, present fall risks and significant difficulties in mobilisation.
- Lymphoedema may also cause chronic skin changes, reducing the skin's ability to act as a barrier to infections (cellulitis) and increasing the challenges of treating wounds.
- Left untreated, patients with lymphoedema are twice as likely to develop cellulitis requiring hospitalisation and intravenous antibiotic therapy. <sup>34</sup>
- Impaired mobility - edematous limb shifts center of gravity which when combined with difficulty finding footwear result in limits range of motion, impaired footwear, increased fall risk. <sup>35</sup>

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<sup>32</sup> ibid

<sup>33</sup> ibid

<sup>34</sup> NSW Government, Agency for Clinical Innovation, "Lymphoedema: A guide for clinical services", 2018, p 4,

[https://www.aci.health.nsw.gov.au/data/assets/pdf\\_file/0008/477998/lymphoedema-guide.pdf](https://www.aci.health.nsw.gov.au/data/assets/pdf_file/0008/477998/lymphoedema-guide.pdf)

<sup>35</sup> S. Ehmann and K. Bock, "Functionality to measure outcomes for safety, effectiveness and cost implications" (New Frontiers in Wound Management New Frontiers in Wound AND Edema Management, EWMA), 2018, <https://ewma.org>

## Psychological

- Resulting in negative body image, emotional disturbances, anxiety and depression, as well as social isolation.
- In a national survey, supported by Breast Cancer Network Australia, a diagnosis of lymphoedema impacted work, family life, self-image and feelings.
- The greater the severity of lymphoedema, the higher the impact on the individual.
- Adolescents and young people with lymphoedema also experience issues with social inclusion and participation with peers, poor self-image and emotional disturbances.
- Further challenges identified for the families of children with lymphoedema include: altered relationships between parents and children with lymphoedema (moving between being a parent, an advocate, and a proxy health professional), as well as altered relationships between siblings (jealousy and time availability, also increased expectations of responsibility and maturity, particularly for older siblings without lymphoedema).<sup>36</sup>

## Economic

- People living with lymphoedema describe the cumulative costs of practitioner fees, compression garments and skin and wound care products.
- People with lymphoedema also report needing to take leave from work or having their employment affected.
- More serious cases can result in long-term disability and unemployment.
- Hospital admissions for cellulitis requiring intravenous antibiotic therapy result in substantial, and potentially avoidable, costs to the health care system.<sup>37</sup>

# Permanency & Early Intervention

The majority of the literature sourced suggests that lymphedema is permanent, and that treatment focuses on reducing the swelling and controlling the pain.

“Lymphoedema is a chronic condition that is not curable at present, but may be alleviated by appropriate management; if ignored, it can progress and become difficult to manage”.<sup>38</sup>

Research indicates that early diagnosis and treatment intervention of lymphoedema allows improved quality of life:

“Early diagnosis of lymphedema translates to more treatment options; less edema, smaller limbs, improvement in joint aches, and reduced muscle pain and tightness; a decreased infection rate;

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<sup>36</sup> NSW Government, Agency for Clinical Innovation, "Lymphoedema: A guide for clinical services", 2018, p 4, [https://www.aci.health.nsw.gov.au/data/assets/pdf\\_file/0008/477998/lymphoedema-guide.pdf](https://www.aci.health.nsw.gov.au/data/assets/pdf_file/0008/477998/lymphoedema-guide.pdf)

<sup>37</sup> NSW Government, Agency for Clinical Innovation, "Lymphoedema: A guide for clinical services", 2018, p 4, [https://www.aci.health.nsw.gov.au/data/assets/pdf\\_file/0008/477998/lymphoedema-guide.pdf](https://www.aci.health.nsw.gov.au/data/assets/pdf_file/0008/477998/lymphoedema-guide.pdf)

<sup>38</sup> International Lymphoedema Framework, "International Consensus, Best Practice for the Management of Lymphoedema", p. 2, 2006, [https://www.lympho.org/wp-content/uploads/2016/03/Best\\_practice.pdf](https://www.lympho.org/wp-content/uploads/2016/03/Best_practice.pdf)

increased patient desire to continue treatment; decreased medical costs; and an improved quality of life.”<sup>39</sup>

The International Lymphoedema Framework, best practice guidelines suggest that:

“People at risk of lymphoedema should be identified early during routine assessment, monitored and taught self care, and that patients and carers should have early active involvement in the management of lymphoedema”.<sup>40</sup>

“It is our goal to prevent lymphoedema occurring or at least detect it early to avoid long term problems. Prevention and early detection are the keys to success and there are things that can be done to help reduce the risk”.<sup>41</sup>

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<sup>39</sup> A. Soran et al., "Lymphedema Prevention and Early Intervention: A Worthy Goal", MJH Life Sciences, Vol 26, No 3, 2012, <https://www.cancernetwork.com/articles/lymphedema-prevention-and-early-intervention-worthy-goal>

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<sup>41</sup> Westmead Breast Cancer Institute., "Fact Sheet: Lymphedema", [website], 2014, <https://www.bci.org.au/breast-cancer-information/fact-sheets/lymphoedema>, (accessed 10 January 2020)

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