Bandage Uses

- keeping a dressing in place
- supporting an injured joint
- assisting venous return by compression

Crepe Bandages

- These bandages have some compression however 40 - 60% reduction of pressure within 30 minutes. This bandage is not considered appropriate for the management of leg ulcers of venous disease.

Retention Bandages

- There are a number of dressings that still require being held in place and often the use of adhesive tape is not appropriate due to friable skin. For this purpose, light weight cohesive bandages or elasticated tubular stocking bandages are the most appropriate.

Tubular Bandages

- Tubifast
- Peha-haft
TubiFast

Tubular Bandages

A bandage with some compression however uniform in nature. They can be used as a support bandages and in multiple layers as a compression bandage. Each layer provides 8mm of mercury.

Shaped Tubular Bandages

Provides graduated compression. Application of a single layer will produce 18 to 24 mm of mercury. They both may also be used in multiple layers.

Support Bandages/Tubular Bandages

Support bandages are of a heavier construction containing elastomers, such as rubber or lycra combined with natural and/or synthetic fibres. These maintain a pressure level nearer to that immediately following the application than with an elasticated bandage. Strong support bandages can be used singularly or in combination to restrict movement, to prevent oedema or act as a mechanism of support following soft tissue repair and recovery.

What is safe in aged care facilities

- Tubular bandage
- 2-3 layers of straight tubular bandage cut at different lengths
- Graduated tubular Bandage
- Compression socks/stockings up to 20mmHg
- If unsure get advice!!!!!!!

Compression Therapy

- Includes
  - Bandages
  - Hosiery
- Prevents or treats some pathologies resulting in peripheral oedema
  - Chronic venous insufficiency (CVI)
  - Venous Leg Ulcers (VLU)
  - Lymphoedema
- Diagnose oedema cause prior to using compression
- Compression might not suitable for some oedemas
  - Cardiac oedema, low protein oedema, medication related oedema (i.e. calcium channel blockers)
Compression Therapy & VLU

- Controls the effects of chronic venous insufficiency
- At full extension, compression forms a rigid to semi-rigid to rigid covering around the leg
- Exclude significant peripheral arterial disease before applying compression
  - Can reduce arterial flow leading to ischaemia

The Mechanics of Compression

- Forces excess fluid in the interstitial tissues (oedema) back into the venous & lymphatic systems
- Provides a physical barrier to prevent fluid leaking into the interstitial tissues
- Changes in calf muscle during walking (heel-toe action) are resisted, increasing venous pressure
- Enhances action of the calf muscle pump to improve venous return
- Supports incompetent valves in the superficial veins

Required Elements

Ideally, compression must be

- Graduated – to push fluid up the leg
  - Highest pressure at the ankle, gradually decreasing up the leg
  - Achieved by having a normal shaped leg
- Adequate – to enhance venous return
  - Elastic or multi-layer systems require at least 18mmHg pressure at the ankle
  - Inelastic systems require high ‘stiffness’
- Sustained – to maintain effect

Compression Bandages

The action of these bandages is to enclose the leg with pressure firm enough to compress the distended veins enabling the blood to flow by increasing the velocity of the venous blood stream and normalizing the returned flow of blood to the heart. Accumulated fluid and waste products are removed from the affected tissue by the accelerated rate of flow resulting from the application of a pressure bandage.

Effective therapeutic compression starts with a sub-bandage pressure of 18mm of mercury at the ankle. Anything giving a lower value whilst appropriate for support is not considered appropriate in the treatment of leg ulcers. The most effective method is to apply graduated compression The highest pressure should be exerted at the ankle gradually falling to 50% at the knee.
Pressure

Compression – the direct application of pressure to a limb – is measured in mmHg. It is commonly applied using bandaging, though other forms include hosiery and intermittent pneumatic compression (IPC). The required amount of pressure (sub-bandage pressure) is determined by the underlying pathologies as well as the patient’s ability to tolerate the compression. In practice, sub-bandage pressure may vary and tends to be lowest when the patient is lying down (resting pressure), with higher peaks of pressure occurring during exercise (working pressure).

International variations exist in the classification of pressures. The following standard has been suggested recently:
- mild (<20mmHg),
- moderate (≥20–40mmHg),
- strong (≥40–60mmHg),
- very strong (>60mmHg).

While pressures ≥40mmHg are generally recommended for the treatment of VLU2,4, resting pressures >40mmHg may not be appropriate as patients are often frail or elderly. Resting pressures ≥60mmHg should, in general, be reserved for the treatment of lymphoedema. For some patients, factors such as arterial insufficiency, neuropathy or cardiac failure render strong compression unsafe or painful, and mild or moderate compression may be required.

FACTORS AFFECTING SUB-BANDAGE PRESSURE

Bandage factors
It is important to be aware of the factors that affect these principles, for example the washing of elastic bandages may alter their elastomeric properties, resulting in reduced tension.
High Stretch Compression Bandages

Application methods vary from the simple spiral method after having applied the bandage with a figure of 8 at the ankle and continuing up the limb in a spiral application covering 50% of the previous bandaged area. This method is used with High Stretch compression bandages.

High Stretch Bandages

Short Stretch Bandages

These have an extension of 30 - 90%, a low elasticity, low to slight resting pressure but high to very high working pressure. They exert their effects mainly deep within the limb. They are indicated for venous oedema and lymphoedema.

Short Stretch Bandages

Application methods is a figure of 8 method continues overlapping as the bandage is wound up the leg so that is applied in one direction and then the opposite direction producing a V shape in the bandage as it is wound up the leg.
Short Stretch Bandage Application

Leg Measurement

High Stretch Bandage Application

LaPlace’s Law

For a given vessel radius and internal pressure, a spherical vessel will have half the wall tension of a cylindrical vessel.

Compression Bandages Precautions

Where the leg has a small Ankle & large calf known As champagne bottle leg It is essential to pad the Ankle with an orthopedic wool to prevent damage to the skin by excess Pressure over the bony area.

Multiple Layer Bandage Systems

These systems generally combine padding and elastic or inelastic materials, systems and are widely accepted as being effective in achieving strong compression. The number of components used and the sub-bandage pressure achieved varies considerably.
Multiple Layer Bandage Systems

The so-called four-layer bandage is an example of a multi-component elastic system and is designed to apply a sustained sub-bandage pressure of 35–40mmHg at the ankle for patients with an ankle circumference of 18–25cm. It comprises a padding bandage (orthopaedic wool), a crepe (inelastic) bandage (to create a base for the compression), and two mild to moderate compression elastic bandages although the number of components in these systems varies considerably, most achieve strong compression.

Choosing a Compression System

- “Compression increases the healing rates of venous leg ulcers compared to no compression”
- “Multi-component bandage systems achieve better healing outcomes than single-component bandages” (O’Meara et al, Cochrane Library 2012)
- High compression is more effective than low compression
- Some compression is better than none
  (AWMA 2011)
Application of Compression

- Use low profile dressings that wick fluid away
  - Avoid bulky absorbent dressings under compression – will reduce pressure & effectiveness
- Consider limb size & shape
- Adequate padding is essential
  - More than one layer may be necessary
  - Extra padding might be required to achieve ideal limb shape
- Launder bandages only if appropriate & according to manufacturer’s instructions
- Replace bandages/garments according to manufacturer’s instructions

Managing Compression Therapy

- Might need frequent re-application initially
  - Monitor patient response & accommodate oedema reduction
- Once established compression bandages usually changed weekly
  - Compression can be worn overnight
  - Commence with light compression & build up to high compression in 1-2 weeks
  - On commencement discomfort might increase but should be comfortable within 1-2 weeks
  - If oedema &/or exudate is not controlled in 2-3 weeks reassess therapy

Living with Compression Therapy

- Patient education & support is vital
- Explain why compression is necessary & consequences of not having compression
- Address common concerns
  - Showering
  - Footwear
- Advise patients regarding
  - Elevation of leg when resting
  - Benefits of walking (with heel-toe action)
  - Avoiding prolonged standing & leg dependence

Complications of Compression

- Exacerbation of PAD, ischaemia, necrosis
- Slippage
- Pain
- Tourniquet effect
- Oedema
  - Particularly above & below bandage/garment
- Ridging, bunching up
- Trauma, Skin loss, Pressure injuries
- Heat, itching

Patients must report
- Pins & needles
- Loss of feeling in toes
- Blue or purple toes
- Pain
- Bandage slippage
- Soiled or wet bandages

www.worldwidewounds.com
www.vascularcarecentre.com
Strong compression hosiery can be used as a first-line treatment, particularly for patients with small, uncomplicated ulcers who wish to self care, who require daily skin care, or who find bandages too hot or bulky. A two-component system is safer and easier to use than a single stocking: the first stocking (10–24mmHg) holds the dressing in place and the second stocking (20–30mmHg) can be removed at night.

Due to the lack of padding it is not a practical option for patients at high risk of pressure damage, with large ulcers or high exudate levels. Self application can be difficult even with the use of an application device. Care must be taken not to harm the wound bed or surrounding skin and to ensure delivery of adequate compression.

Patients whose underlying CVI cannot be surgically corrected are likely to require monitored lifelong compression to prevent ulcer recurrence. This is often achieved using hosiery that gives a mild to moderate pressure of at least 18–25mmHg, and preferably up to 35mmHg if tolerated.

Anti-embolic Stockings
May also be used alone or in conjunction with Low Molecular Weight Heparin for the prevention of DVT. The stockings are worn by Non-ambulatory patients in hospital pre and post surgery. NB. Once ambulatory the use of a stocking that provides 18-24mm Hg is indicated.

Stockings
An alternate method of applying graduated pressure to the leg is by the use of compression Stockings. Stockings may be used as part of the treatment of venous leg ulcers, as an ongoing Management modality of venous disease and for the prevention of venous stasis or to prevent DVT’s. Anti-embolic Stockings (TED’s) are used pre & post op to prevent DVT’s however once ambulatory they do not work they are of no benefit once the patient is up and walking and have no place
Stockings
for longer term use.

NEW JOBST UlcerCARE – Liner & Stocking

- JOBST UlcerCARE Liner
  - Helps hold wound dressing in place
  - Provides mild compression for non-ambulatory patients
  - Facilitates easier donning of outer stocking
  - May be worn 24 hours a day
  - Helps manage lower leg oedema during bed rest

- The Stocking
  - Zipper available on left or right side
  - Integrated heel/open toe (unchanged)
  - Washable at 40°C (unchanged)
  - Softer fibers
  - More modern style

COMPLICATIONS OF COMPRESSION
DIFFICULTY TOLERATING COMPRESSION
Some patients may have difficulty accepting compression due, for example, to its effect on factors such as work, bathing/showering or choice of clothing or footwear. Climate and cultural factors are also important considerations. All options should be explored with the patient and the compression system chosen should encourage concordance. It is important that future developments in compression should focus on improving access to therapies that are both acceptable to patients and effective.

COMPLICATIONS OF COMPRESSION
Pain
Pain has a major impact on a patient’s ability to tolerate compression and a proper assessment, including noting pain scores/patient’s diary comments and detecting any increase/change in pain sensation, is important. Compression, when applied appropriately, should reduce pain. However, the introduction of effective compression may not alleviate pain initially and may cause anxiety and discomfort.

COMPLICATIONS OF COMPRESSION
Pressure damage & Loss of calf muscle
- Apply extra padding over bony prominences.
- Ensure bandaging is not too tight and that overlap is even. ‘At risk’ areas include the ankle, dorsum of the foot and the calf.
- At each dressing change look for signs of pressure damage such as erythema, blistering or altered limb shape. If dependent oedema is present encourage limb elevation.
- Ask the patient if he/she is experiencing any discomfort.
- Ensure the bandage allows good knee and ankle mobility. When applying the bandage, ask patients to flex their ankle to 90 degrees or as near as possible, in order to allow optimal ankle movement.
- Ensure flat, comfortable shoes are worn to allow good ankle flexion.
- Encourage participation in an exercise and rehabilitation programme.
Care must be exercised when applying compression bandages to ensure that there is adequate arterial blood flow. The application of compression can cause the following:

- Skin necrosis
- Trauma / ulceration
- Amputation (may result from damage caused by lack of arterial blood in the area)

Applying Compression Hosiery

- Apply in the morning prior to getting out of bed when oedema is least
- Avoid applying moisturiser immediately prior
  - Hosiery will not slide over freshly moisturised skin
- Always wear dishwashing gloves
  - Will assist with grip against the hosiery
- If applying on someone else hold them rather than at their feet
- Do not pull from the top
- Ensure no creases & heel positioned correctly

Precautions

<table>
<thead>
<tr>
<th>Observation</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot temperature</td>
<td>Warm</td>
<td>Cold</td>
</tr>
<tr>
<td>Foot colour</td>
<td>Pink</td>
<td>White</td>
</tr>
<tr>
<td>Toe refill after squeezing</td>
<td>Fast</td>
<td>Slow</td>
</tr>
<tr>
<td>Foot pulse</td>
<td>Present</td>
<td>Absent</td>
</tr>
</tbody>
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Sub-bandage pressure required for specific conditions

- Prevention DVT
  - Superficial/early Varices: 18 to 24 mm Hg
  - Medium Varices: 25-35 mm Hg
  - Gross Varices: 35-45 mm Hg
  - Gross Oedema: 35-50 mm Hg

- Ulcer prevention
  - Mild Oedema: 25-35 mm Hg
  - Ulcer Treatment: 35-45 mm Hg
  - Lymphoedema: 35-50 mm Hg

Stocking measurement

The measurement should be taken with the patient standing and as early in the day as possible after the leg has been rested and when the tendency for the leg to swell is a minimum. If this is not possible, and particularly if there is evidence of oedema, the limb should be raised in a horizontal position until the swelling has subsided. If oedema is a severe problem the patient may need to be re-measured for a smaller sized stocking when the swelling is reduced.
INTERMITTENT PNEUMATIC COMPRESSION (IPC)

Evidence suggests that IPC – a ‘boot’ comprising air-filled chambers attached to an electric pump – used in combination with compression bandaging may be more effective than bandaging alone. The sequential inflation and deflation of the chambers creates intermittent pressure peaks, mimicking the effect of the calf muscle pump and offering a number of benefits.

Zinc Paste Bandages

- applied full-length or patches
- ease venous eczema, inflammation
- stimulate epithelial growth
- soothing, comfortable
- can apply up to 6mmHg of compression
Zinc Paste Bandages

- Zinc has been used in medicine for hundred's of years, although little early published date of its pharmacology is available. Zinc is an important trace element in many functions of the body in wound healing it is essential in cell proliferation and tissue regeneration and being involved in collagen synthesis and epithelialization.

Method of Application

Most Zinc Paste Bandages are applied from Toe to Knee or as a patch. The Flexible types are applied in a circumferential manner as they expand and contract as the limb changes. The ones composed with a rigid gauze base should be applied by overlapping each layer and then reversing the bandage.

Zinc Paste Bandages under Compression

- If it has been clearly demonstrated by Doppler and/or Duplex scanning that if a true venous pathology exists then compression bandaging is used in combination with the Zinc Paste Bandage. Either the use of a high stretch compression bandage or a low stretch compression bandage or a tubular bandage.