



Offloading the High Risk Foot

A document to support informed decision making to deliver evidenced-based best practice

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Section 1

1.1 Introduction

The Total Contact Cast (TCC) is recognised as the gold standard offloading technique for plantar foot wounds in the 2011 National evidenced based guidelines for the prevention, identification and management of diabetic foot complications. (1) However there are contraindications and considerations when deciding if a TCC is the best offloading option for your patient. TCCs are not always available due to the skill / experience required to apply them. Other forms of offloading may be more appropriate for particular patients, easier to access in certain circumstances and still be very effective at offloading wounds.

This document is to help health professionals make an informed choice when identifying what type of offloading method or device to use for their patient. Wherever possible it is advised to consult an experienced Podiatrist or wound care consultant especially for chronic and / or complex cases.

1.2 Factors influencing healing

There are many factors that influence the healing of a foot ulcer. Offloading the wound is only one of many that need to be addressed to ensure optimal healing.

In conjunction with offloading the following should also be assessed, monitored and managed by a multidisciplinary team:

- Control of any underlying medical conditions e.g. Diabetes / Blood Glucose Level (BGL)
- Vascular perfusion of the foot / leg
- Lifestyle factors e.g. Smoking, Alcohol, Nutrition
- Presence and type of Infection (soft tissue, abscess or osteomyelitis, organisms involved and resistance)
- Medications e.g. Steroids, Warfarin, Antibiotics
- Excessive oedema
- Wound environment / dressings
- Foreign body
- Neuropathy
- Footwear
- Foot deformity
- Patient knowledge and compliance with management plan
- Geographical location and access to services
- Psycho-social factors
- Home and occupational factors

If any of these factors are overlooked it may mean the wound is very slow to heal, static or deteriorates resulting in increased cost to the health service, a higher chance of hospitalisation and ultimately reduced health and quality of life for the patient.

1.3 What is offloading and how does it work?

Mechanical protection of the foot is essential for healing with consideration for either completely removing weight from the foot or the wound altogether (un-weighting) or the more practical alternative of re-distributing the body weight away from the wound to elsewhere on the foot/leg while still enabling the patient to stand and walk i.e. offloading (2) Removing pressure from wounds to promote healing is not a new idea. As far back as 1920 reference was made to unloading the foot to heal foot wounds.

“Perforating ulcers of the foot...Pressure should be removed from the surrounding area...” Scholl W.1920 (3)

More recently the following phrase has been commonly stated by clinical leaders in relation to healing foot ulcers

**It's not what you put on the wound that is important...
it's what you take off it!**

The statement mainly refers to offloading but can also be applied to the importance of addressing adequate debridement and wound bed preparation as well.

Guzman (4) et al outlined a number of 'ideal' characteristics of successful pressure relieving strategies :

- Effective pressure reduction from the ulcer at all times
- Wide application to all patients
- Causes no side effects or secondary lesions
- Easily applied
- Encourages patient compliance
- Cost effective.
- Allows the pursuit of other treatment goals

1.3.1 Force and pressure

Force or pressure is applied to the body at the point where the foot meets the sock, shoe or ground. The type and amount of pressure applied is directly related to the angle at which the force it hits the surface, how big the surface is and the size of the body at the end of the leg.

Assuming the same amount of force hits the weight bearing surface at 90 degrees, the greater the area the smaller the pressure and vice versa, the smaller the area the higher the pressure.

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

All types of offloading should reduce pressure either by reducing the force applied on the foot during the gait cycle and/or by increasing the area that the force is applied to. This applies to shear forces as well as direct pressure. Shear has a considerable impact upon foot ulcer formation. Shear force is a force can be in any direction such as a side to side motion, backwards / forwards motion or distortion and stretching of the tissue.

Any weight bearing activity which causes stress on the tissue will lead to trauma to the skin. When repetitive stress is coupled with neuropathy and the body's natural signalling mechanism of pain is lost, the person is unaware of the extent of the damage occurring as they continue to weight bear through the area.

1.3.2 Gait cycle

The gait cycle is defined by the period of time from which the heel of one leg strikes the ground to the time at which the same leg contacts the ground again. Throughout the cycle each leg alternates between two phases stance and swing (5). Stance phase is when all the weight of the body is distributed through the limb and foot. Swing phase is when the leg is non-weight bearing.

How we influence the weight bearing during stance phase influences how we can offload the foot ulcer.

Each stance phase can be broken down into 3 more defined phases - contact, midstance and propulsive phases.

Fig 1:



Contact Phase (Heel strike)

As the foot tissues are loaded in contact phase there is a corresponding decelerating force heading towards the heel. In the contact phase of gait offloading devices can help to control the rate that the forefoot is loaded. By restricting the ankle joint range of motion, keeping the joint fixed at 90 degrees the foot is unable to quickly plantarflex and overload the forefoot. Rocker soles also help the foot to load smoothly and evenly.

Midstance Phase

In midstance the aim of offloading is to distribute pressure evenly across the whole of the plantar surface, in particular away from any deformity or prominent areas. All of the sole of the foot should be in contact with the surface of the insole / orthotic. In tall walkers some of this pressure and force is also distributed away from the foot and up the lower leg and onto the Tibia.

Propulsive Phase (Toe off)

As the forefoot is loaded in the propulsive phase there is a corresponding accelerating force heading towards the toes.

In the propulsive proportion of the stance phase offloading works by preventing or reducing plantar flexion at the ankle and preventing flexion of the metatarsal joints. These combined reduce the amount of force through the forefoot when propelling forwards. This can also be achieved with a very rigid flat sole or a rocker sole.

Combined general functions of all offloading methods and devices are to:

- Reduce plantar pressure, particularly on the forefoot
- Reduce walking cadence
- Shorten stride length
- Encourage rest

1.4 The role of wound debridement

Conservative sharp debridement of a wound has been proven to reduce pressure and promote healing.(6) Removing the devitalised tissue also has the benefit of reducing the bacterial load and allowing drainage, therefore reducing infection rates. Regular debridement of peri wound callus by a podiatrist or suitably trained wound care consultant is recommended in conjunction with providing an appropriate offloading device. A thorough assessment of the wound and its aetiology prior to debridement (7) is essential as it is not recommended to debride some types of wounds e.g. Ischaemic or dry necrosis.

1.5 The role of Felt padding

Felt / foam padding can be used as a short term measure to redistribute direct and shear pressure away from a wound (Figure 2). The pad should cover the largest surface area possible. Typically it is used as an interim solution in conjunction with an appropriate dressing and Velcro sandal or walker while waiting for customised orthotics to be made. It can also be used as part of the first layer of a football dressing or TCC. When ever it is used there must be room in the footwear, especially depth, to accommodate it without the toes hitting the top of the shoe.

Felt padding is not recommended to use in the long term, especially in the case of heavily exuding wounds and must be replaced at every dressing change (minimum on a weekly basis). There is some evidence that long term padding can actually cause an increase in shear and pressure at the edge of a plantar wound, especially if not bevelled correctly (8) Special consideration and extra caution must be given to patients with fragile skin as it is adhesive and can cause problems when it is removed Occasionally patients can be allergic to the adhesive or the skin can become macerated under the felt after several days. In these instances padding is not recommended even in the short term.

Figure 2



1.6 The role of orthotics

Total contact customised orthotics improve pressure redistribution and therefore will increase the effectiveness of any offloading device. Orthotics made from an impression (Figure 3) or cast of the foot are preferable to pre-made or flat insoles (see Figure 4, Figure 5) as they accommodate for deformity and conform immediately. It is recommended that where possible customised orthotics should be included with all offloading devices that can accommodate them.

Figure 3



Figure 4



Figure 5



1.7 Reviewing offloading

Offloading choice and client understanding of their role should be reviewed at every follow up appointment, especially if the wound is not improving. If all other factors that effect healing have been reviewed, thick callus is building up quickly and there has been no real change in measurable wound healing over a four week period, it is likely that the offloading provided could be inadequate or the client is not wearing the offloading device provided. Some simple questions can uncover if this is the case.

For example, the client may reveal that they have only been wearing their offloading device when they leave the house and “didn’t realise” it was to be worn inside as well. Be sure to stress to the client that they play a large role in offloading being successful, if they don’t wear it healing the wound will be almost impossible to achieve.

At each appointment check the offloading device for sole wear and tear, presence of debris on the linings etc as this may indicate how regularly the device is being worn.

If a client has had an offloading device for a long time, make sure the condition is reviewed regularly. Darco sandals / APB, walker liners and some orthotics can wear out quickly. Worn out offloading needs to be replaced as it may be sub-optimal, Consider a more durable option if possible.

Very frequently clients do not want a cast or a walker due to the “disruption” to their life and the fact that they are cumbersome. If a client declines “best practice” offloading for their wound e.g. a cast or a walker, they may need to be made aware that they are choosing sub-optimal offloading. At regular intervals the client should be given opportunities to “upgrade” their offloading to what is considered more appropriate for them. Consideration should be given regarding the use of written care plans between the patient and their care provider, with agreed goals and timelines relating to the use of offloading devices.

1.8 Surgical options

If all factors effecting healing have been adequately addressed and the wound is still not improving, or if a healed ulcer site fails to remain healed once the patient is stepped down to a lesser offloading device (e.g. orthopaedic footwear and insoles), consideration should be given regarding the need to address any underlying bony deformity.

Sometimes improving the shape of the weight bearing area of the foot will help redistribute pressure more evenly (reducing peak plantar pressure) and prevent ulcer recurrence. For recurrent plantar forefoot wounds Achilles Tendon lengthening can be very successful in reducing forefoot pressures, especially in patients with less than 90 of ankle joint dorsiflexion. (9)

Corrective surgery is usually best performed by orthopaedic surgeons with extensive experience in the high risk foot. Cardio-vascular health and underlying medical conditions need to be very well controlled or managed before any surgery can be considered in this high risk group of patients.

Section 2

Types of offloading devices and methods of offloading

2.1 Total Contact Cast (TCC)

Evidence

- TCC is effective in treating a majority of non-infected, non-ischemic plantar diabetic foot wounds, with healing rates ranging from 72% to 100% over a course of 5–7 weeks (10-16)
- Consistent results in multiple studies (Grade B level evidence) TCC are recommended in guidelines for as the gold standard treatment for plantar neuropathic foot ulcers (1)

Method of offloading

Fixed ankle with a rocker or flat sole at 90 degrees prevents forward motion of the tibia during mid-stance and propulsion, this significantly reduces forefoot and mid foot loading. The plantar surface of the foot and the anterior Tibia is fully in contact with the cast spreading force evenly over a larger area.

Application instructions

- They can be made with plaster of Paris or fibreglass bandage. See figure 6 for examples
- Must be applied by a trained health professional
- Must be reviewed/ changed after 2-3 days for first application and then can be changed at up to one week intervals if no problems occur
- Specific instructions / advice to be provided to patient on application
 - Cannot drive vehicles
 - Contact health professional immediately if any concerns
 - Must be kept dry in shower / bath
 - Usually requires a simple post op sandal (or cast shoe) over the cast for ambulation

Advantages

- Can't be removed by the patient and therefore increased compliance
- Slows the patient down, reduced cadence of walking
- Custom made – allows for deformity
- Useful for non-infected, plantar, weight bearing, neuropathic ulceration (including ulceration relation to Charcot neuro-arthropathy)

Disadvantages / Contraindications

- Poorly applied cast can cause new problems –e.g. skin irritations especially in neuropathic foot
- Can increase maceration at wound site
- Difficult to monitor the wound / foot for infection, deterioration or subtle changes
- Wound only viewed once a week
- Impaired patient stability and mobility
- Contraindications
 - Patients with Peripheral Arterial Disease (PAD) with an Ankle Brachial Pressure Index (ABPI) less than 0.8
 - Active infection, cellulitis or osteomyelitis
 - Fever or other signs of systemic infection
 - Deep sinus tract
 - Extreme exudate
 - Active dermatitis or leg wounds
 - Excessive or fluctuating oedema (can be minimised with bi-valve cast)
 - High falls risk
 - Cast claustrophobia
 - History of non compliance / high non attendance rate

Considerations

- May cause a large difference between leg length. NB: A failure to address this difference may cause overloading and contribute to the development of new problems (ulceration / Charcot neuro-arthropathy on the opposite foot, especially in patients with advanced neuropathy. Consider providing an “even up” device or similar (see section 2.10 other devices)
- If the patient has mildly fluctuating oedema or there is a need to remove the cast easily if needed the cast can be made “bi-valve” This means to cut the cast length ways down both sides and pad/finish the edges with felt and tape. The two halves of the cast are held in place with Coban bandage over the top or several Velcro straps are applied. (See figure 7)
- Consider providing crutches
- If the patient has a traditional TCC they have to be able to attend clinic / hospital for it to be removed if concerned
- The cast can cause irritation to the other foot/leg (mainly while sleeping), ensure the other foot / leg is monitored at every appointment and the patient checks daily for problems.
- Variable patient tolerance

Figure 6: Examples of TCC with and without a cast shoe



Total Contact Cast



Figure 7: Bi-valve TCC



2.1.2 Other types of cast

(Slipper cast, Scotchcast boot, Leicester boot, Focused Rigidity Cast, Hope walking cast)

Evidence

- Scotchcast boots have expected healing times of neuropathic foot ulcers 8-12 weeks (17)
- Case studies have shown a reduction in plantar pressures by up to 80% with Focused Rigidity Casting (FRC)

The Hope Walking Cast (Williams 1994)

Method of offloading

The plantar surface of the foot is fully in contact with the cast spreading force evenly over a larger area.

Application instructions

- They can be made with plaster of Paris or fibreglass bandage. See figure 8 for examples
- Must be applied by a trained health professional
- The edges of the dorsal opening must be padded and taped over. Velcro straps or Coban can be applied to keep the cast in place.
- Must be reviewed within a week of application and then can be worn continuously for as long as the cast is in good condition if no problems occur, this can be several months if it is made well.
- Specific instructions / advice to be provided to patient on application
 - Cannot drive vehicles
 - Contact health professional immediately if any concerns
 - Must be removed to have a shower / bath
 - Usually requires a simple post op sandal, APB or cast shoe over the cast for ambulation

Advantages

- Can be removed by the patient or health professional easily as required
- The foot is still on view so improvements and deterioration can be seen.
- Slows the patient down, reduced cadence of walking
- Custom made – allows for deformity
- Does not need to be replaced weekly as with the TCC, they can last many weeks or even months
- Suitable for many patients who are contraindicated to a lower leg TCC
- To be removed by the patient at night or when in the shower
- Patients often prefer them to a TCC and are generally tolerated more.
- Useful for non-infected, plantar, weight bearing, neuropathic ulceration (including ulceration relation to Charcot neuro-arthropathy)

Disadvantages / Contraindications

- Poorly applied cast can cause new problems –e.g. skin irritations especially in neuropathic foot
- Can increase maceration at wound site
- Impaired patient stability and mobility, increase falls risk.

Considerations

- May cause a large difference between leg length. NB: A failure to address this difference may cause overloading and contribute to the development of new problems (E.g. ulceration / Charcot neuro-arthropathy on the opposite foot, especially in patients with advanced neuropathy. Consider providing an “even up” device or similar (see section 2.10 other devices)
- Consider providing crutches
- Felt padding can be incorporated into the plantar area to increase offloading of a specific area or “windows” can be cut into the sole to reduce pressure over the wound site.

Figure 8: Slipper cast



Figure 9: Scotchcast boot with window



2.2 Instant Total Contact Cast (iTCC)

(Any kind of fixed ankle removable walker made irremovable)

Evidence

- Recent studies showed that patients wore their removable off-loading device for <30% of their total daily activity (14)
- Any device made non-removable and therefore “forcing compliance” can be as effective as a TCC (15-19)
- Healing rates of 82.6% in 12 weeks

Method of application

- Ensure that the device accommodates deformity well, particularly wide feet.
- Fit any appropriate fixed ankle walker (See section 2.3 and 2.4) Apply something around the body of the walker to make it difficult for the patient to remove, for example:
 - Cast plaster / fibreglass bandage (Figure 7)
 - Self adherent elastic wrap bandage (e.g. Coban or similar) (Figure 8)
 - Cable ties
 - Sports strapping tape
- TIP: Mark the overlapping edges of the bandage / tape with a permanent marker so it is clear to see if it has been removed or tampered with between appointments (Figure 8)
- The internal lining needs to be checked every time it is put on that it is lying flat, fitting correctly and not causing irritation



Figure 7: iTCC Plaster over a pneumatic walker



Figure 8 Coban around fixed ankle walker

Advantages

- Can't be removed easily by the patient and therefore higher compliance rate, but if they need to remove it, it is possible.
- Slows the patient down, reduced cadence of walking
- Less time and skill intensive, more cost effective than TCC
- Ideal to use in an environment where accesses to health professionals with experience in application of TCC / slipper casts are not available
- Can be used in some instances where a TCC is contraindicated
- Use pneumatic walker if compression of oedema is required

Disadvantages / Contraindications

- Must be kept dry in the shower
- Does not accommodate deformity well, especially very wide feet.
- New pressure areas / wounds can develop over bony prominences or near fastening straps
- Check that the internal weight bearing surface is flat as they can be angled / sloped from heel to toe causing additional loading on the forefoot.
- If the patient wants to remove it they can decreasing compliances
- Wound usually only monitored and dressing changed once a week

- May cause a large difference between leg length. NB: failure to address this difference may cause overloading and contribute to the development of new problems (ulceration / Charcot neuroarthropathy on the opposite foot, especially in patients with advanced neuropathy. Consider providing an “even up” device or similar (see section 2.10 Other devices)
- Consider providing crutches

Contraindicated for patients with

- High falls risk especially frail, elderly, poor eyesight
- Highly exudating wounds
- Active dermatitis or leg wounds

2.3 Pneumatic walkers

(E.g. XP Air Cast, , Nextep contour with air)

Evidence

- Healing rates of 51.9% in 12 weeks (17)

Method of application – Follow manufactures instructions

- Sit the patient down on a chair with their knee and ankle at 90 degrees
- Apply long sock up to the knee
- Fit appropriate size (XS – XL) ensuring length and width are adequate with the heel all the way to the back
- Follow manufacturers instructions on inflating air bladders as some are specific in pressure and order of inflation.



Advantages

- Slows the patient down, reduced cadence of walking
- Air bladders provide compression and are ideal for people with mild to moderate oedema
- Can be used to reduce and stabilise oedema before TCC
- Quick to apply and dispense
- Some brands the toes are enclosed offering more protection
- Good durability, therefore good for longstanding chronic wounds
- Easily access to foot for frequent dressing changes and monitoring of wound

Disadvantages / Contraindications

- Not recommended with low ABPI / PAD due to compression
- Can be complicated for some to put on and off as the pressure of the airbladders needs to be checked daily (good eyesight required)
- Doesn't accommodate deformity well, particularly wide feet
- New pressure areas / wounds can develop over boney prominences or near to the fastening straps
- Easily removable by client therefore compliance may be lower
- Contraindicated
 - High falls risk especially frail, elderly, poor eyesight
 - Active dermatitis or leg wounds

Considerations

- Standards sizes XS, S, M, L, XL
- May cause a large difference between leg length. NB: failure to address this difference may cause overloading and contribute to the development of new problems (ulceration / Charcot neuroarthropathy on the opposite foot, especially in patients with advanced neuropathy. Consider providing an "even up" device or similar (see section 2.10 other devices)
- Check that the internal weight bearing surface is flat as they can be angled / sloped from heel to toe causing additional loading on the forefoot
- Consider providing crutches
- Some brands come in both tall and short versions



2.4 Fixed ankle walkers

(E.g. CAM, Bledsloe, Walkabout, OAPL walker)



Evidence

- Healing rates of 51.9% in 12 weeks (18-19)

Method of application

- Sit the patient down on a chair with their knee and ankle at 90 degrees
- Fit appropriate size (XS – XL) ensuring length and width are adequate with the heel all the way to the back
- Remove padded liner from the walker and wrap around the leg with Velcro fastening down the front of the tibia
- Place wrapped foot into the walker, ensure knee and ankle at 90 degrees. When leg is in line with the side brackets remove plastic sleeves or pull tabs off the Velcro and press firmly on to the liner to attach the Velcro
- Fasten Velcro strap at the ankle first then dorsal foot ensuring foot is all the way to the back
- Wrap Velcro straps around the leg and fasten with tabs on the lateral side
- Ask patient to stand slowly and take a few steps, check straps and readjust as necessary

Advantages

- Value for money compared to air walkers
- Quick and easy to apply and dispense
- Patients find them easy to put on and take off
- Trousers legs can sometimes fit over them, therefore a little more discrete than other types.

Disadvantages / Contraindications

- Liners can wear out or tear and need replacing after a few months
- Toes are often exposed
- Check that the internal weight bearing surface is flat as they can be angled / sloped from heel to toe causing additional loading on the forefoot.
- Doesn't accommodate deformity well, particularly wide feet.
- New pressure areas / wounds can develop over bony prominences (medial lateral foot) or where the straps fix to the base
- Contraindicated
 - High falls risk especially frail, elderly, poor eyesight
 - Active dermatitis or leg wounds

Considerations

- Standards sizes XS, S, M, L, XL
- May cause a large difference between leg length. NB: failure to address this difference may cause overloading and contribute to the development of new problems (ulceration / Charcot neuroarthropathy on the opposite foot, especially in patients with advanced neuropathy. Consider providing an "even up" device or similar (see section 2.10 other devices)
- The internal lining needs to be checked every time it is put on that it is lying flat, fitting correctly and not causing irritation
- Check that the internal weight bearing surface is flat as they can be angled / sloped from heel to toe causing additional loading on the forefoot
- Some brands come in both tall and short versions
- Consider providing crutches

2.5 Football dressing

Evidence

- Mean healing time of 2.91weeks (\pm 2.11weeks) – consistent with TCC and iTCC (20)

Method of application

(Equipment required: Padding / soft ban, gauze / crepe bandage, tape and Coban or similar)

- Apply primary / secondary dressing as usual
- Measure cast padding from dorsal ankle to plantar heel, double back the whole roll approx 4-5 times
- Fold one third of padding back on it self, double thickness is placed under the ball of the foot, the rest on the dorsum of the foot (see Figure 9)
- Wrap the padding with a second layer of padding, up to the ankle to anchor it. Use a whole roll, ensuring the entire foot is covered and there are no big creases or lumps (see Figure 10)
- Wrap the entire foot with non-stretch gauze / crepe bandage to hold together, secure at the ankle (see Figure 11)
- Wrap the entire foot again with self adherent elastic wrap – under no tension, ensuring no creases or lumps, secure at the ankle (see Figure 12)
- Fit a Velcro Darco style sandal over the top (see Figure 13)
- Ask the client to stand slowly and carefully and take a few steps with support

Advantages

- Patient can't remove it easily, but if the wound needs to be viewed it can be taken off without having to go to hospital
- Extremely cost effective
- Good for non-infected neuropathic forefoot wounds especially if the patient can't use a walker / TCC
- Slows the patients walking cadence down
- Not as bulky or obvious as a walker, iTCC or TCC
- Unlikely to cause damage to the other foot or create new wounds

Disadvantages / Contraindications

- Must be kept dry in shower
- Can increase wound and surrounding skin maceration
- Usually only replaced once a week and therefore difficult to monitor for changes in wound and infection
- Contraindications:
 - Heavily exuding wounds
 - Deep infection or deteriorating wounds
 - Ischaemic wounds
 - High falls risk

Considerations

- Dorsiflexes the foot, transfers load back onto the heel therefore patients can feel unsteady
- If dressing too bulky it can be difficult to fit an appropriate sandal / shoe with the dressing
- May need non adherent cover (e.g. pillow case, nylon sock) over the foot at night due to bed clothes sticking to the self adherent elastic wrap.



Figure 9



Figure 10



Figure 11



Figure 12



Figure 13

2.6 Offloading shoes

(E.g. Procure Diabetic shoe, Fior and Gentz Oslo Sandal, Podalux, Darco Wound care shoe, Footworx H-fit and T-fit)

Evidence

- Little evidence to support the long term use in offloading plantar ulceration
- Rocker soles have been shown to reduce forefoot pressure by approx 25-30% (21)
- Slows walking cadence

Method of application

- Fit like a normal shoe
- Ensure straps are firm when weight bearing to prevent foot slipping forward when walking
- Usually require a customised orthotic as well

Advantages

- Easy to accommodate customised orthotics, most come with removable inlay
- Useful as a step down device between a walker or cast and customised footwear
- A lot more hard wearing than simple post op shoe or an All Purpose Boot (APB) (See section 2.8 and 2.9)
- Easy access to the foot for dressing changes and monitoring
- Velcro fastening accommodate bulky dressings and / or oedema

Disadvantages / Contraindications

- Toes can be open, reducing protection
- Straps can rub dorsal / lateral toes if they are done up too tightly
- If rocker or stiff sole may not be appropriate for elderly, frail or unstable clients

Considerations

- Usually a temporary solution for offloading unless the patient has significant falls risk
- Often require a pair
- May cause a large difference between leg length. NB: failure to address this difference may cause overloading and contribute to the development of new problems (ulceration / Charcot neuroarthropathy on the opposite foot, especially in patients with advanced neuropathy. Consider providing an “even up” device or similar (see section 2.10 Other devices)

Examples of offloading shoes

Podalux



Darco Wound care shoe



Procure Diabetic shoe



Fior and Gentz Oslo shoe



Sunrise Footworx H-fit



2.7 Forefoot and Heel reliever shoes

(E.g. Darco forefoot reliever, Heel relief, Half shoe, Fior and Gentz Marseille shoe)

Evidence

- Forefoot reliever shoe reduces plantar forefoot pressure by 38.5% (21, 22)

Method of application

- Fit like a normal shoe
- Ensure heel is right to the back
- Ensure straps are done up well when weight bearing

Advantages

- Simple method of offloading
- Cost effective
- Usually space for customised orthotic
- Easy access to foot to monitor, treat and re-dress

Disadvantages / Contraindications

- Easily removed by patient
- Some people find forefoot reliever shoes uncomfortable to walk in as they can't move their ankle to the required angle and therefore this will affect compliance rates
- Not appropriate for elderly, frail or mechanically unstable clients

A selection of examples of styles available:

Forefoot reliever style shoes



Heel reliever shoes



2.8 All Purpose Boot (APB)

(E.g. Darco with rocker or flat sole + ankle strap)

Evidence

- Rocker sole reduced forefoot pressures by approx 25-30% (21)
- Little evidence to support long term use
- Reduce cadence and shorten stride length
- Reduce propulsion

Method of application

- Fit like a normal shoe
- Ensure heel is right to the back
- Ensure straps are done up well when weight bearing

Advantages

- Low cost
- Soft material
- Higher patient compliance than some other methods of offloading
- Space for bulky dressings / oedema / adjustable
- Space for customised orthotics, many come with removable inlay
- Useful immediately after surgery when the patients may have Negative Wound Pressure Therapy (NWPT) in place
- Useful as a step down device between a walker or cast and customised footwear
- Easy access to the foot for dressing changes and monitoring
- Most are on a straight last and can be made to look left or right by turning Velcro flap and strap around

Disadvantages / Contraindications / Considerations

- Can wear out after quite quickly especially if constant wear / larger client. Needs monitoring carefully and regularly for signs they are wearing out
- Low cost to buy but the foot may take longer to heal than more effective form of offloading – false economy
- Ankle can still move
- No rear foot support - not good for people with flat or “rolled in” feet
- Some have rocker soles while others are stiff / flat soled
- Some offer closed toe protection, others are open increasing the risk of injury

A selection of examples of styles of all purpose boots available:



2.9 Simple Post operative shoe

(E.g. flat sole, dorsal fastening only)

Evidence

- Little evidence to suggest they provide any offloading the plantar foot when walking, mainly used to accommodate bulky dressings and relieve pressure from tight footwear, especially around the toes
- Reduces propulsion
- Reduce cadence and shorten stride length

Method of application

- Fit like a normal shoe
- Ensure heel is right to the back
- Ensure straps are done up well when weight bearing
- If the client tends to slip forwards try crossing the straps for more security.

Advantages

- Low cost
- Soft material
- Higher patient compliance than some other methods of offloading
- Space for bulky dressings / oedema / adjustable
- Easy access to the foot for dressing changes and monitoring
- Useful short term post operative option for non-weight bearing wounds (e.g. toe amputations) that are expected to heal quickly.
- Useful immediately after surgery when the patients may have Negative Wound Pressure Therapy (NWPT) in place
- Can be shortened easily to reduce falls risk.

Disadvantages / Contraindications / Considerations

- Only temporary measure, wear out quickly
- Don't fit everyone well especially narrow feet
- Feet often slide forward and heel slips at the rear
- Can wear out after quite quickly especially if constant wear / larger client. Needs monitoring carefully and regularly for signs they are wearing out
- Low cost to buy but the foot may take longer to heal than more effective form of offloading – false economy
- Ankle can still move
- No rear foot support - not good for people with flat or “rolled in” feet
- Little protection, usually open toed

A selection of examples of styles available:



2.10 Heel pressure injury offloading devices

(E.g. Bed heel elevator, Wedge cushion, Heel holder, Prevalon, PRAFO, Heel lift suspension boot)

Evidence

- There is insufficient evidence available on devices specifically used to prevent heel pressure injuries, No one device has been found to be reliably more effective than another (23)
- Repositioning and skin care management are still required
- Constant low pressure or alternating pressure mattresses should be used for those at high risk of pressure injuries

Method of application

- Various - some are simple foam with Velcro straps while other involve inflation of the device
- Ensure straps are not done up too tight, especially with oedema or neuropathy
- Only to be worn at rest, not for ambulation

Advantages

- Most are easy to fit and use
- Multiple styles available

Disadvantages / Contraindications / Considerations

- Corrugations, dimples, “egg shells” are all potential sources of increased pressure at the edges of wounds. The more dense the foam, the greater the pressure
 - This means that simple foam heel wrap style of device are no longer recommended for use in many public hospitals.
- For heavily exuding wounds avoid open cell foam devices as they can soak up exudate and can not be cleaned.
- Widely variable cost range depending on the device

A selection of examples of styles of devices available:



2.10 Other devices

- When fitting any offloading device to one foot only, consider the height difference between the shoe and the device. If there is a large difference consider using an “Evenup” to equalise the height.



- If a client has a foot drop consider the use of an Ankle Foot Orthoses (AFO) (See Figure 14) or a “Foot up” device (Figure 15 and 16)

Figure 14 Spring leaf AFO



Figure 15 Foot Up with shoe



Figure 16 Foot up without shoe

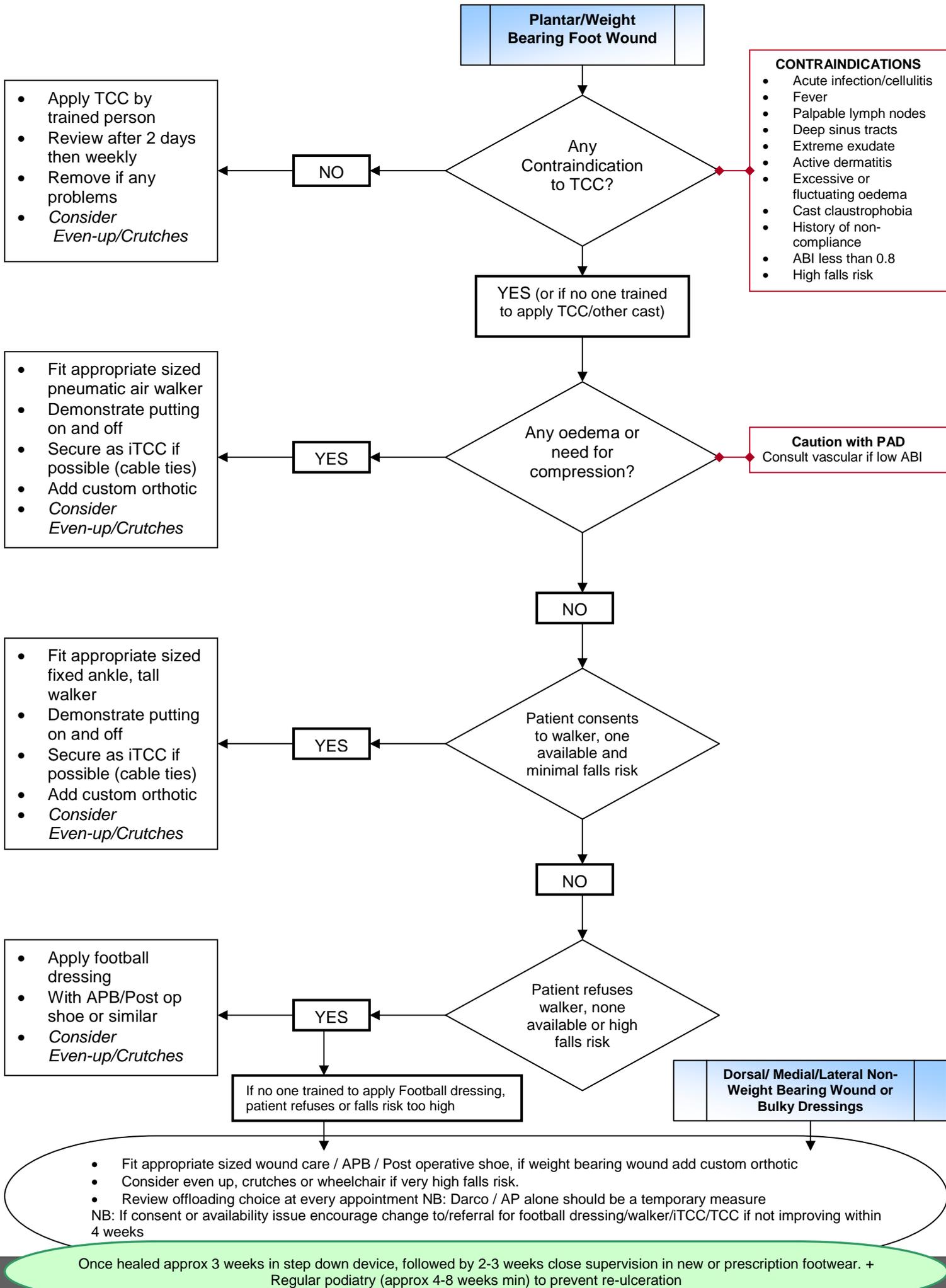


- Charcot Restraint Orthotic Walker (CROW) is a fully customised knee high walker made from a cast of the leg. They are specifically designed for patients who require long term offloading and stability for a chronic Charcot foot, who are unable to use an off the shelf walker due to severe foot deformity and instability.

Examples of a CROW



Offloading Decision Making Guideline



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