# Offloading and Pressure Redistribution Devices for the Foot

| Key components to consider when selecting off-loading modalities: | |
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| • Location and type of ulcer<br>• Effectiveness of device<br>• Ability to remove pressure from ulcer<br>• Pulse, Infection, Neuropathy<br>• Range of motion at the ankle joint<br>• Balance and baseline mobility<br>• Foot deformity | • Local wound care and adjunctive therapies<br>• Support devices and mobility aides<br>• Patient adherence<br>• Ease of use and/or skill required for the application of the device<br>• Cost and funding<br>• Support for activities of daily living |

| Device Name | Advantages | Disadvantages | Other |
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| **Total Contact Cast (TCC)**<br><br>A minimally padded well molded cast that maintains contact with the entire foot and lower leg<br><br>** funded by the MOH when provided by a publicly funded health care provider | • Distributes pressure over the entire plantar aspect of the foot<br>• Protects foot from trauma and infection<br>• Controls edema<br>• Accommodates severe foot and ankle deformities & Charcot foot<br>• Maintains patient adherence due to its non-removable application | • Requires skilled and trained professional or orthopedic technologist<br>• Requires close monitoring<br>• Affects sleeping and bathing<br>• Requires window to access wound or prevents daily wound monitoring<br>• Exacerbates postural and balance instability<br>• Can be associated with iatrogenic pre-ulceration if not carefully monitored<br>• Time consuming to apply in clinic | • Indicated for use on the non-infected plantar forefoot to midfoot ulceration<br>• Can be modified with window or stirrup brace<br>• First application requires 2-3 day follow-up<br>• Requires weekly follow-up thereafter<br>• May require mobility aid |

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| **Removable Cast Walker (RCW) & Irremovable Cast Walker (ICW)**<br><br>Commercially manufactured cast boot that reduces plantar pressure<br><br>** funded by the MOH when provided by a publicly funded health care provider | • Removable cast allowing for local wound inspection and care<br>• Can be modified to an ICW with plaster or adhesive wrap<br>• Insole can be added to improve pressure redistribution<br>• Can be used for infected wounds when removable<br>• Can accommodate adjunctive therapies<br>• Reusable | • Removable feature reduces patient adherence<br>• Requires fitting<br>• Increases heel plantar pressure and therefore not appropriate for heel wounds<br>• Uneven height on contralateral limb<br>• Limited ability to accommodate deformity | • Pneumatic models contain air or gel bladders to inflate or deflate for adjustable compression and fit<br>• Liner can be changed<br>• Velcro straps allow for adjustability<br>• Available in high or low height on the calf<br>• May require mobility aid |
| **Half Shoes**<br><br>Post-operative shoe designed to decrease plantar pressures. | • Inexpensive compared to other devices<br>• Easy to apply<br>• Three styles available | • Less effective at reducing plantar pressure<br>• Hampers gait and can be difficult to adhere to foot<br>• Can cause a falls risk<br>• Difficult to maintain balance and in some situations pressure may be increased to the ulcer area<br>• Requires insole or liner | • May Require mobility aid<br>• Requires patient to modify their gait pattern (limit stride length or patient may rock onto area that is requiring offloading |

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| **Healing/Offloading Shoe**<br><br>Commercially available shoe designed to accommodate minor deformity and dressings. | • Reusable, Velcro straps for adjustment<br>• Healing sandal has removable 4-layered insoles of differing densities<br>• Off-loading shoe has special insole to modify for specific ulcer downloading<br>• Easy to apply<br>• Rocker sole to facilitate ambulation in healing sandal<br>• Flat sole on off-loading shoe | • More expensive than half shoe<br>• Open toe design of healing sandal does not protect toes<br>• Healing sandal has rocker sole and requires modification of patients gait pattern<br>• Rocker sole can increase gait instability | • Sold in pairs<br>• May require mobility aid |
| **Ankle Foot Orthosis (AFO)**<br><br>Brace to help stabilize the foot and ankle. Clinical goal for patients who have a Charcot foot deformity.<br><br><u>Rigid AFO</u><br>For severe pronation and subluxation of the subtalar joint and/or ankle joint. May have some instability of the knee.<br><br><u>Articulated AFO</u> | • Light weight<br>• Custom fabricated to a modified plaster impression of the patients affected limb<br>• Prevents further breakdown<br>• Medial and lateral control of hindfoot<br>• Accommodates foot deformities<br>• Orthotic foot bed<br>• Provides stability and offloading to an unstable Charcot | • Easily removed by patient which may reduce adherence<br>• Must be worn with shoe<br>• May require custom footwear to accommodate<br>• Frequent follow-up required to monitor fit and function<br>• Prescribed by a Physician | • Requires skilled orthoptist<br>• Custom made device that is costly<br>• May be eligible for the assistive devices program (ADP funding) |

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| For intact ankle with minimal deformity to the foot and ankle, foot is correctable. Motion may be limited or assisted.<br><br><u>Bivalved AFO</u><br>Rigid and articulated AFO's can be made into bivalve devices where edema control is needed and the ankle and subtalar joint require axial unloading. | foot/ankle for non-surgical patients<br>• Post-surgical protection and transition following foot or ankle reconstruction for the Charcot foot<br>• Can be adjusted to accommodate physiological changes | | |
| **Charcot Restraint Orthotic Walker (CROW)**<br><br>Combination of Rigid AFO and custom boot developed for patients with severe Charcot foot changes where the traditional treatments are not satisfactory. | • Custom formed to a modified plaster impression of the patients affected limb<br>• Sole of brace is lined with an accommodative custom foot orthotic<br>• Rocker bottom foot deformity is easily accommodated<br>• No shoe is required<br>• May add rocker sole<br>• Leg length discrepancies can be accommodated into the rocker sole<br>• Easy to don and doff<br>• Ease of monitoring foot condition | • Costly<br>• As with all bracing, frequent follow up is required to monitor fit and function<br>• Easily removed by patient which may affect adherence<br>• Bulky<br>• Visual impact<br>• Prescribed by Physician<br>• Requires specialist to customize and monitor<br>• Not appropriate for patient with changes in swelling or foot structure | • Requires skilled orthoptist<br>• May be eligible for the assistive devices program (ADP funding) |

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| | • Easily modified to accommodate physiological changes of the foot and ankle | | |
| **Orthopedic Footwear**<br><br>Commercially available shoes | • Appropriate for patients with healed ulcers<br>• Less expensive than custom made footwear<br>• Will accommodate minor foot deformities<br>• Can accommodate custom made orthotics<br>• Modifications can be made to footwear<br>• Uppers can be made of stretchy material or soft leathers<br>• Extra depth/double depth and wide widths up to 6E available | • Looks orthopedic in style<br>• Should be fitted by a footwear specialist<br>• Requires prescription for 3rd party coverage | |
| **Custom Footwear**<br><br>Custom fabricated shoes | • Will accommodate gross foot deformities<br>• Made from a mold of the patients foot<br>• Can accommodate custom made orthotics<br>• Sole can be customized to client's needs | • Very expensive<br>• Prescribed by physician to qualify for 3rd party funding<br>• Not appropriate for patients with active ulceration | |

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| | • Lifts can be added and hidden within the shoe design | | |
| **Off the Shelf Footwear** | • Less expensive alternative to orthopedic and custom shoes<br>• Indicated for patients who do not have gross foot deformity<br>• Not appropriate to redistribute pressure in patients with active ulcers | • Patient must find shoes that will accommodate his/her foot structure<br>• Proper width and depth of footwear may be problematic<br>• Easy to wear out<br>• Patient may not choose a shoe with proper design characteristics | |
| **Functional Orthosis**<br><br>Stiff orthosis custom made from a mold of the foot. | • Used when there is minimal deformity/deviation in the foot structure<br>• Foot orthosis can be used to eliminate excessive deforming forces<br>• Usually ¾ length<br>• Transferable from shoe to shoe | • Not appropriate for patients with ulcerations<br>• Will require regular adjustments<br>• Expensive<br>• Not ideal for forefoot deformities | |
| **Total Contact Insole-Accommodative Orthotic**<br><br>Custom made from a mold of the patients foot. | • The finished insole provides superior total contact protection<br>• Useful for healed ulcers | • Do not provide adequate pressure management during active ulceration | |

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| | • Can be used to offload areas of ulceration or bony prominence<br>• Custom made to patient's foot<br>• Transferable from shoe to shoe<br>• Offloading of forefoot deformities | • Will require regular adjustments<br>• Expensive<br>• Bulky<br>• Requires depth of footwear<br>• Devices should be replaced yearly due to soft material used in device | |
| **Over the Counter Insoles**<br><br>Purchased over the counter in shoe or drug stores. | • Less expensive than custom made orthotics<br>• Provides temporary relief and protection<br>• Provides some cushioning | • Many times the insole does not make total contact with the entire foot<br>• Does not provide optimal off-loading<br>• Does not provide much in support<br>• Frequent replacement is required | |
| **Felt Padding**<br><br>Felt pad cut to shape and applied to the foot. | • Temporary padding adhered to the skin or insole of the patients shoe<br>• Can be customized to accommodate different shapes<br>• Can be used with other forms of offloading and pressure devices | • Requires skilled practitioner<br>• Can increase pressure in adjacent tissue or to ulcer if not appropriately applied and monitored<br>• Frequent changes<br>• Not to be used in patients with known | • Used alone it does not provide adequate pressure redistribution for an active ulcer<br>• Sold in boxed of 4 sheets |

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| | • Cheap and easily accessible | skin allergy and in present of heavily exudating wounds | |
| **Wheelchair or Scooter** | • Able to attach elevating leg rests<br>• Complete offloading of lower extremity<br>• Manual or power available depending on patients' needs<br>• For indoor and outdoor use<br>• Indicated for bilateral leg weakness and decreased balance | • May not work well with existing home environment<br>• Patients perception of being in a wheelchair can decrease adherence<br>• Can contribute to deconditioning | • Batteries for power chairs generally last 1.5-2 years and daily charging is required |
| **Gait Aid**<br><br>Cane, walker, activator poles or crutches | • Can assist with balance impairment when using offloading device<br>• Assists with further offloading of the plantar surface<br>• Inexpensive and can achieve complete offloading | • Requires strength and endurance for full offloading<br>• May not be accessible in the patients home | |