

Developed in collaboration with the Wound Care Champions, Wound Care Specialists, Enterostomal Nurses, and South West Regional Wound Care Program (SWRWCP) members from Long Term Care Homes, Hospitals, and South West CCAC contracted Community Nursing Agencies in the South West Local Health Integration Network.



<p>Title</p>	<p>Guideline: Fiberglass Total Contact Casting, Removable Cast Walkers, and Irremovable Cast Walkers to Treat Diabetic Neuropathic Foot Ulcers</p>
<p>Background</p>	<ul style="list-style-type: none"> • Diabetes can lead to diabetic neuropathy causing muscle weakness and loss of protective sensation (LOPS) in the feet(1) • The combination of LOPS and increased pressure from shoes, trauma, or foot deformity can result in foot ulcers(1,2) • Elevated foot pressure that may result in ulceration can be caused by several factors, either individually or in combination, including the following: <ul style="list-style-type: none"> - Genetic or structural factors that result in pressure-induced ischemia, which occurs in tissue over bony, weight-bearing areas during ambulation and standing - Poor-fitting or inappropriate footwear - Poor walking pattern caused by neuropathy or other factors - Traumatic accident - Surgery(3) • Best practice for the management of diabetic foot ulcers (DFUs) includes managing the plantar pressures in the foot • This can be achieved by offloading (redistributing) pressure from high-pressure areas of the foot(4,5) • Patients with DFUs have recurrence rates between 30-40% within the first year(6,7) • Once an ulcer has formed, healing may be chronically delayed if the area is not effectively offloaded(8) • Non-removable offloading techniques are most effective in healing plantar forefoot DFUs(2,9,10) • Patients with DFUs have reported a preference for total contact casting (TCC) over removable cast walkers, largely because they perceive healing to be improved with TCC(11) • Failure to adequately offload the neuropathic foot is common and may result from the clinician’s lack of knowledge regarding the concept of an insensate foot or pressure, lack of resources to acquire proper footwear or orthotics, improper fit or inconsistent use of the offloading device (12) • Reduction of activity, reduction of walking speed and alternation of gait can also be used to decrease plantar pressures DFUs(13) • TCC supports the foot and lower leg and redistributes pressure over the entire plantar surface of the foot to reduce pressure over the ulcer area (14,15)

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	<ul style="list-style-type: none"> • Casts may also help control and reduce swelling and protect the foot from infection(16,17) • TCC may affect daily activities interfering with sleep, bathing and driving(18) • TCC must also be applied by a qualified health care professional and they can irritate the skin and lead to more ulcers if they are not applied appropriately(18) • Removable Cast Walkers (RCW) and Irremovable Cast Walkers (ICW) keep the ankle at a 90-degree angle, reducing pressure on the forefoot(19) • ICWs have been shown to be as effective as TCCs(8) • RCWs can be removed to allow for more frequent dressing changes and assessment of the DFU therefore they are appropriate for use with infected wounds • RCWs can be removed to allow patients to sleep and bathe, however this may result in poor patient adherence • RCWs can be made Irremovable by securing them in place with a cohesive bandage, plaster or fibreglass(18) enforcing adherence • RCWs and ICWs are not custom-made and therefore they may not fit all patients including those with very short legs, wide feet, or severe deformities(20)
	<p>NOTE: The use of “Guideline: Fiberglass Total Contact Casting, Removable Cast Walkers, and Irremovable Cast Walkers to Treat Diabetic Neuropathic Foot Ulcers” is one part of the integrated team management for DFUs.</p>
<p>Guideline</p>	<p>1. Recommendation: For patients with plantar forefoot DFUs without ischemia or uncontrolled infection, offload with a non-removable knee-high device with an appropriate foot-device interface (E.g. fiberglass TCC). (8)</p> <p>Advantages of non-removable knee-high device:</p> <ul style="list-style-type: none"> • Highest healing rates • Distributes pressure over the entire plantar aspect of the foot • Protects foot from trauma and infection • Controls edema • Accommodates severe foot and ankle deformities and acute Charcot foot • Maintains patient adherence due to its non-removable application <p>Disadvantages of non-removable knee-high device:</p> <ul style="list-style-type: none"> • Requires skilled and trained professional or orthopedic technologist

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	<ul style="list-style-type: none"> • Requires close monitoring • Affects sleeping and bathing • Requires window to access wound or prevents daily wound monitoring • Exacerbated postural and balance instability • Can be associated with iatrogenic re-ulceration if not carefully monitored • Time consuming to apply <p>Determine if a non-removable offloading device is appropriate</p> <p>Indications:</p> <ul style="list-style-type: none"> • non-infected neuropathic foot ulcer without deep structure involvement • Charcot foot <p>Contraindications:</p> <ul style="list-style-type: none"> • DFU infection • Untreated osteomyelitis with copious drainage • Eschar in the wound • Exposure of tendon, joint capsule or bone • Ulcer that is deeper than it is wide • Excessive leg or foot swelling and fragile skin • Vascular status that is not adequate for healing- Ankle Brachial Pressure Index (ABPI) < 0.5 • Unable to eliminate risk for falls with offloading device • Allergy to casting material • Patient does not consent to device or need for frequent visits with offloading device application <ul style="list-style-type: none"> • Once a patient with a DFU is assessed to be appropriate for TCC or ICW, the following integrated team members are required: Prescriber, Fitter, and Monitor (Appendix A) <p>2. Recommendation: When a non-removable knee-high device is contraindicated or not tolerated by the patient, consider offloading with a removable knee-high walker with an appropriate foot-device interface to heal a neuropathic plantar forefoot ulcer, however there must be an expectation of patient adherence(E.g. RCW) (8)</p> <p>3. When a knee-high device is contraindicated or cannot be tolerated by the patient, consider offloading with a forefoot</p>
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	<p align="center">offloading shoe, cast shoe, or custom-made temporary shoe (E.g. half shoe) (8)</p>
<p>Procedure</p>	<p>NOTE: The use of the following procedure is but one part of the holistic management of an individual admitted with or presenting with a healable DFU that is appropriate for pressure offloading.</p> <p>Assessment</p> <ol style="list-style-type: none"> 1. Thoroughly review the person’s available medical records: <ol style="list-style-type: none"> a. To determine if the patient is appropriate for TCC or RCW b. Review patient orders for wound care, wound debridement and application of topical agents c. To ensure the wound is healable and that all patient-centered concerns (including PAIN) and risk factors for wound healing have been addressed d. To determine if the person has any allergies that may affect the implementation of offloading devices 2. Review orders and recommendations from the Prescriber of the offloading device <ol style="list-style-type: none"> a. A prescriber must have wound care assessment expertise, gait assessment expertise, and be familiar with biomechanics of the lower limb to assess balance and mechanics with overall knowledge of offloading devices b. Refer to Appendix A for further prescriber details <p>Planning</p> <ol style="list-style-type: none"> 1. Expected outcomes: <ol style="list-style-type: none"> a. Information from the patient’s chart, the person and/or their substitute decision maker (SMD)/power of attorney for personal care (POA C), and your assessment will allow for accurate selection of appropriate offloading candidates b. The patient reports minimal discomfort with use of the offloading device and adherence to the device (if removable) c. The offloading device is assessed and no observed strike through of exudate or damage to the offloading device d. Patient reports safe ambulation with use of the device e. Registered nursing staff, in collaboration with other integrated health care team members, the person with the wound and/or their SDM/POA C (if applicable) will use the information from the reassessment to determine if continued use of the offloading device remains appropriate 2. Explain the procedure and its purpose to the person and/or their SDM/POA C and obtain informed verbal or implied consent 3. Assess the need for analgesia prior to the offloading device removal and wound care treatment

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	<p>Implementation</p> <ol style="list-style-type: none"> 1. Initial application, removal, and re-application of the offloading device must be completed by a Fitter <ol style="list-style-type: none"> a. The fitter must have offloading device application training b. The fitter can also be the Prescriber and Monitor (Appendix A) c. Apply the offloading device as recommended by the manufacturer 2. Assessment and treatment of the DFU must be completed by a Monitor prior to application of the offloading device <ol style="list-style-type: none"> a. Refer to the SWRWCP website www.swrwoundcareprogram.ca for guidelines and procedures on the assessment, re-assessment and management of DFUs b. The Monitor must be able to undertake debridement and have the knowledge, skill, judgment and authority to do so safely and appropriately. The Monitor must have the tools in place to control for adverse events like bleeding, the ability to effectively manage pain associated with the procedure, and the organizational policies in place to support their practice c. The Monitor can also be the Prescriber and Fitter (Appendix A)
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	<p>loading regimen. <i>Diabetes Care</i> [Internet]. 2003 Sep [cited 2018 Jan 29];26(9):2595–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/12941724</p> <p>13. Orr L. Offloading of diabetic foot ulcers : as part of a multidisciplinary team. <i>Wounds Canada</i>. 2015;3(1):18–22.</p> <p>14. Armstrong DG, Lavery LA, Wu S, Boulton AJM. Evaluation of removable and irremovable cast walkers in the healing of diabetic foot wounds: a randomized controlled trial. <i>Diabetes Care</i> [Internet]. 2005 Mar [cited 2018 Jan 29];28(3):551–4. Available from: http://www.ncbi.nlm.nih.gov/pubmed/15735186</p> <p>15. Armstrong DG, Lavery LA, Nixon BP, Boulton AJM. It’s Not What You Put On, but What You Take Off: Techniques for Debriding and Off-Loading the Diabetic Foot Wound. <i>Clin Infect Dis</i> [Internet]. 2004 Aug 1 [cited 2018 Jan 29];39(Supplement_2):S92–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/15306986</p> <p>16. Miller J, Armstrong DG. Offloading the diabetic and ischemic foot: solutions for the vascular specialist. <i>Semin Vasc Surg</i> [Internet]. 2014 Mar [cited 2018 Jan 30];27(1):68–74. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25812760</p> <p>17. Wu SC, Armstrong DG. The Role of Activity, Adherence, and Off-Loading on the Healing of Diabetic Foot Wounds. <i>Plast Reconstr Surg</i> [Internet]. 2006 Jun [cited 2018 Jan 29];117(SUPPLEMENT):248S–253S. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16799393</p> <p>18. Armstrong DG, Isaac AL, Bevilacqua NJ, Wu SC. Wounds : a compendium of clinical research and practice. [Internet]. Vol. 26, <i>Wounds</i>. [Health Management Publications]; 2014 [cited 2018 Jan 30]. 13-20 p. Available from: https://arizona.pure.elsevier.com/en/publications/offloading-foot-wounds-in-people-with-diabetes</p> <p>19. Wu SC, Crews RT, Armstrong DG. The pivotal role of offloading in the management of neuropathic foot ulceration. <i>Curr Diab Rep</i> [Internet]. 2005 Dec [cited 2018 Jan 30];5(6):423–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16316592</p> <p>20. Lavery LA, Higgins KR, La Fontaine J, Zamorano RG, Constantinides GP, Kim PJ. Randomised clinical trial to compare total contact casts, healing sandals and a shear-reducing removable boot to heal diabetic foot ulcers. <i>Int Wound J</i> [Internet]. 2015 Dec [cited 2018 Jan 30];12(6):710–5. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24618113</p>
<p>Related Tools (NOTE: these tools and their instructions can be found on the SWRWCP’s</p>	<ul style="list-style-type: none"> ● The SWRWCP’s Diabetic/Neuropathic Foot Ulcer Assessment and Management Algorithm ● Guideline: The Initial Assessment of People with Diabetic/Neuropathic Foot Ulcers

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<p>website: swrwoundcareprogram.ca)</p>	<ul style="list-style-type: none"> • The SWRWCP’s Dressing Selection and Cleansing Enabler - HEALABLE • Guideline: Wound Debridement (excluding conservative sharp wound debridement) • Guideline: Conservative Sharp Wound Debridement • Guideline: The Assessment and Management of Moisture in Acute and Chronic Wounds • Guideline: The Assessment and Management of Bacterial Burden in Acute and Chronic Wounds • The SWRWCP’s Dressing Selection and Cleansing Enabler – MAINTENANCE/NON-HEALABLE • Criteria for Interdisciplinary Referrals • WHO Pain Ladder with Pain Management Guidelines • Guideline: The Assessment and Management of Bacterial Burden in Acute and Chronic Wounds • Bacterial Burden in Chronic Wounds Tool • Procedure: Bacterial Burden in Chronic Wounds Tool • Procedure: Quantitative Wound Swab Technique • International Working Group on the Diabetic Foot Diabetic Foot Risk Classification System with Associated Interventions • My Diabetic Foot Ulcer pamphlet • The Importance of Nutrition in Wound Healing pamphlet • Guideline: Wound Re-Assessment and Consideration of the Use of Adjunctive/Advanced Therapy • NPUAP PUSH Tool 3.0 • Procedure: NPUAP PUSH Tool 3.0 • Comprehensive Assessment of Chronic Pain in Wounds • Procedure: Comprehensive Assessment of Chronic Pain in Wounds Tool • Cardiff Wound Impact (Quality of Life) Questionnaire • Procedure: Cardiff Wound Impact (Quality of Life) Questionnaire • Initial Wound Assessment Form • Interdisciplinary Diabetic/Neuropathic Foot Assessment Form
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Appendix A

Role for Service Implementation

Description:

Prescriber:

Must have expertise and familiarity with wound care assessment, gait assessment, biomechanics of the lower limb to assess balance and mechanics, and overall knowledge of offloading devices.

Fitter:

Must have offloading device application training

Monitor:

Must be able to undertake debridement and have the knowledge, skill, judgment and authority to do so safely and appropriately, the tools in place to control for adverse events like bleeding, the ability to effectively manage pain associated with the procedure, and the organizational policies in place to support their practice.

Role	Integrated Team Member Qualifications
Prescriber	<ul style="list-style-type: none">• Chiropodists with wound care training• Podiatrists with wound care training• Occupational Therapist (OT) & Physiotherapist (PT) with wound care training• Physiatrists (Physical Medicine and Rehabilitation Physicians) with wound care training• Family Physicians with wound care training• Orthopaedic Surgeon and Vascular Surgeon with wound care training• Nurse Practitioner (NP) with training in gait assessment and wound care
Fitter	<ul style="list-style-type: none">• Chiropodists with wound care training & device application training• Podiatrists with wound care training & device application training• OT & PT with wound care training & device application training• Pedorthists with wound care training & device application training

	<ul style="list-style-type: none"> • Physiatrists/ Orthopaedic surgeon with wound care training & device application training • Family physicians with wound care training & device application training • Health Care Professionals with Certified Enterostomal Nurse Therapist [CETN(C)]; The International Interprofessional Wound Care Course (IIWCC); Western University’s Masters of Clinical Science (Wound Healing) (MCISc); Cardiff University’s Masters of Science (Wound Healing and Tissue Repair) with device application training • RN & NP with wound care training & device application training • Cast technician (Ortho Techs) with device application training
Monitor	<ul style="list-style-type: none"> • Chiropodists with wound care training • Podiatrists with wound care training • OT & PT with wound care training • Pedorthists with wound care training • Physiatrist/ Vascular surgeon/ Orthopaedic surgeon with Wound Care training • Cast technician (Ortho Techs) with wound care training • Family Physicians with wound care training • RN & ET & NP with wound care training • Health Care Professionals with CETN(C) & IIWCC; MCISc; MSc

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