WATERLOO WELLINGTON
INTEGRATED WOUND CARE PROGRAM

Waterloo Wellington Integrated Wound Care Program
Evidence-Based Wound Care

Diabetic Foot Ulcer Clinical Pathway

0-7 Days Expected Outcomes	Notes	
Most Responsible Physician(MRP)/Nurse Practitioner (NP) identified/informed	• **Refer patient to 'Care Connects' if no responsible practitioner currently involved with patient** • **Determine if MRP/NP is part of Family Health Team (FHT) or Community Health Centre (CHC) and consider additional supports available**	
Holistic Patient and Wound Assessment Completed		
Medical/surgical history and co-morbidity management considered within care plan	**Risk factors include:** **Physiological** • **Sub-optimal glycemic control/monitoring** • **Advanced diabetes** 1. **Neuropathy** • **Autonomic (e.g. bladder, BP, temp, digestion, sexual function)** • **Sensory (lack of protective sensation)** • **Motor (e.g. Dropfoot)** 2. **Retinopathy** 3. **Nephropathy** • **Osteoporosis** • **Hypertension** • **Heart disease** • **Hyperlipidemia** • **Collagen vascular diseases (e.g. Ankylosing spondylitis, Dermatomyositis, Polyarteritis nodosa, Psoriatic arthritis, Rheumatoid arthritis, Scleroderma, Systemic lupus erythematosus** • **Gout** • **Use of immunosuppressant medications** • **Advanced age** • **History of deep vein thrombosis** • **History of foot infections or osteomyelitis** • **Decreased cognitive ability** • **Alcohol/drug abuse**	• **Peripheral artery disease (PAD)** • **Venous stasis disease (Insufficiency)** • **Glycosylation of tissues** • **Congenital abnormalities** • **Vasculitis (Angilitis)** • **Previous ulceration** **Physical Limitations** • **Obesity** • **Deformity (Charcot foot, hammer toes, bunions, claw toes, non-union fractures, fixed ankle joint)** • **Presence of toe infections (fungal or bacterial), callous and/or corns** • **Limited joint mobility** • **Visual disturbances** • **Amputation** • **Trauma** **Socioeconomic/Lifestyle** • **Smoking** • **Unsafe home environment** • **Inadequate foot wear/offloading devices** • **Inadequate hygiene** • **Lack of awareness for self-care** • **Financial insecurity** • **Decreased level of activity** • **Nutritional deficits**

Medication reconciliation and their impact on wound healing reviewed	• **Prescription, non-prescription, naturopathic and illicit drug use (including e-cigarettes, inhaled substances and nicotine replacement therapy)** • **Medications that can affect healing include: chemotherapy, anticoagulants, antiplatelets, corticosteroids, vasoconstrictors, antihypertensives, diuretics and immunosuppressive drugs** • **Other medications used to treat acute episodic illnesses may affect healing (eg. antibiotics, colchicine, anti-rheumatoid arthritics)** • **Vitamin and mineral supplementation**
Recent blood work and other diagnostic test results reviewed and implications for wound healing considered **Encourage patients to have A1C drawn every 3 months as per Canadian Diabetes Association recommendations**	• **Determine bloodwork** ➢ **Blood Sugar** ➢ **A1C** ➢ **Albumin** ➢ **CBC** ➢ **Kidney Function** ➢ **Colesterol level** • **Any diagnostic tests done previously i.e: Vascular Segmental Studies, UltraSound Doppler** • **Retinal Eye Examination (Dilated) – every 1 -2 years**
Home Glycemic Control and Monitoring	• **Blood Sugar (BS) and A1C are within recommended range** • **Use of glucose log book (Diabetes Passport/ Diabetic Log Book)** • **Adequate insulin supplies** • **Glucometer and required supplies** • **Assess for barriers in monitoring glycemic control**
Patient's nutritional status optimized	• **Ascertain patient recording in Diabetes Passport/Diabetic Log Book recent blood work results with recent A1C and fasting blood sugar (recommended every 3 months)** • **Ensure Albumin/Urine creatinine ratio done during this time period** • **Calculate Body Mass Index (BMI)** • **Determine recent weight loss/gain** • **Recent dietary consult** • **Complete Mini Nutritional Assessment (MNA) http://www.mna-elderly.org/forms/mini/mna_mini_english.pdf** ➢ **If screening section results ≤ 11 = complete assessment section** ➢ **If Assessment section results ≤ 24 = Registered Dietician referral required** • **Identify barriers or risk factors to healthy eating**
Physical assessment performed	• **Baseline B/P, Pulse and respiration** • **Baseline weight and height, BMI**
Wound and periwound assessment completed	**Complete:** • **Measure and document size of wound in Bates-Jensen Wound Assessment Tool (BWAT) OR**

Signs and Symptoms Specific to Diabetic Foot Infection

*** Usual signs and symptoms of infection (swelling, pain, heat, low grade fever, redness) may be more subtle in patients with diabetes**
*** Elevated blood sugars from patient's baseline**
*** Increase in pain level (new pain is a red flag in patients with altered sensation)**
*** Generalized malaise**
*** Wound probes to bone (likely osteomyelitis)**

Pressure Ulcer Scale for Healing (PUSH)

- **Confirm wound etiology**
  - ➢ **Results of LLA and ABPI/TBPI**
  - ➢ **May have components of other etiologies (e.g. poor vascular flow either arterial or venous or both, pressure, friction, shear)**
- **If callous is present, referral needed for callous debridement (reduction) by qualified professional and re-visit to offloading specialist recommended**
- **Assessment for infection**
  - ➢ **NERDS – Any 3 or more of the following indicate HIGH superficial infection**
  - ➢ **STONEES - Any 3 or more of the following indicate HIGH superficial infection in deep compartment (Require Urgent Medical Attention)**
  - ➢ **Ensure X-ray is done and if a Swab C&S is taken to determine osteomyelitis and the microorganism for antibiotic therapy.**
- **Obtain photos following best practice as per framework for individual organization policies and procedures.**

Suggest following publication as guideline: http://mydigitalpublication.com/publication/?i=206722

Pain management considered and initiated

Pain Red Flags

Possible Infection

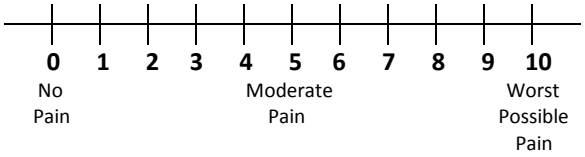
- **Increase in pain level (new pain in patients with altered sensation)**

Possible Arterial Involvement

- **Pain on walking (caused by intermittent claudication)**
- **Pain with elevation of lower limbs**
- **Rest pain**
- **Nocturnal pain**

Complete:

- **Use 0 – 10 Numeric Pain Rating Scale**



- **Identify and document type of pain**
  1. **Neuropathic Pain (described as burning, stinging, shooting, stabbing or hyperesthesia – sensitivity to touch). Suggested pharmaceutical treatment: Second generation tricyclic agents – e.g. Nortriptyline or Desipramine. If pain is not relieved try using Gabapentin or Pregabalin.**
  2. **Nociceptive Pain (described as sharp, aching or throbbing). Suggested pharmaceutical treatment: Non-Opioids – e.g. ASA or Acetaminophen**
     Mild Opioids – e.g. Codeine
     Strong Opioids – e.g. Morphine or Oxycodone
- **Obtain MRP/NP orders for pharmaceutical treatments (opioids and non-opioids)**
- **Non-pharmacological pain control options**

Lower Limb Assessment Completed

Bilateral lower leg assessment (LLA)completed

Right ABPI/TBPI: Highest Right Ankle/Toe Pressure / Highest Brachial = _____

Left ABPI/TBPI: Highest Left Ankle/Toe Pressure / Highest Brachial = _____

Complete:

1. **ABPI/TBPI completed within last 3 months and results documented**
2. **Repeat ABPI/TBPI assessment every 3 months if healing is not progressing**
3. **If unable to obtain ABPI/TBPI, referral to medical imaging for Vascular Segmental Studies is recommended**

Patients with advanced diabetes may have Peripheral Arterial Disease (PAD) (see guidelines for PAD)

ABPI 0.5 to 0.8 **TBPI 0.64 to 0.7**

Suggest Transcutaneous Oxygen Pressure ($TcPo_2$),
Laser Doppler Flowmetry,
Doppler Arterial Waveforms or
Segmental Doppler Pressure Studies

ABPI <0.5 **TBPI <0.64**

Acute arterial occlusion is a life and limb-threatening situation which requires immediate emergency intervention. Urgent vascular surgical consult needed

Signs and symptoms that may become severe may be associated with the following:

- **Pale or blue skin**
- **Skin cold to the touch**
- **Sudden decrease in mobility**
- **No pulse where one was present prior to this**
- **Sudden and severe pain**

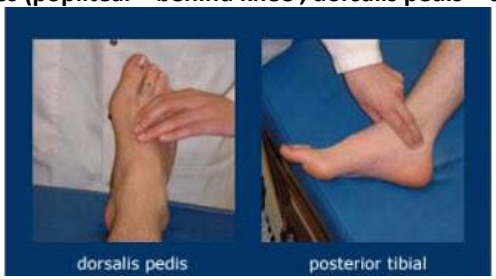
Caution:

- **This should not be the sole diagnostic test performed**
- **In patients with diabetes, ABPI results can be unreliable (falsely negative) due to calcification of the arterial vessels**

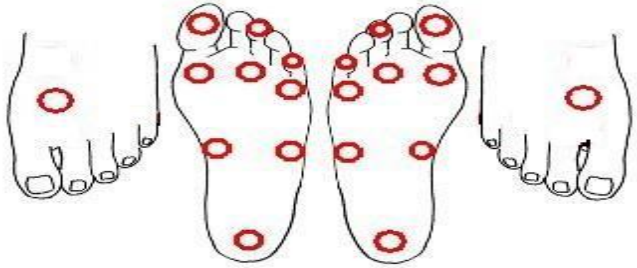
4. **60 Second diabetic foot screen assessment including monofilament test**
   http://www.diabetes.ca/CDA/media/documents/clinical-practice-and-education/professional-resources/60-second-diabetic-foot-screen-tool.pdf
5. **Texas Diabetic Foot Risk Classification score**
   http://www.nhsgrampian.org/guidelines/diabetes/topics/Figu1UnivOfTexaClasSystForDiabFo.html
   OR
   International Working Group Diabetic Foot Risk Classification score
   http://swrwoundcareprogram.ca/Uploads/ContentDocuments/IWDGF%20Risk%20Classification%20and%20Associated%20Interventions.pdf
6. **Bilateral lower leg assessment that includes:**
   - **Leg measurements (foot, ankle, calf, thigh)**
   - **Nail changes (thicker, dry, crumbly, presence of fungal infection)**
   - **Assess interdigital spaces**
   - **Presence of callous and corns**
   - **Presence of varicosities (varicose veins)**
   - **Ankle flare**
   - **Drainage on socks**

7. **NEUROLOGICAL Bilateral lower leg assessment includes:**
   Autonomic Assessment

- **Assess pulses (popliteal – behind knee , dorsalis pedis – top of foot , posterior tibial – medial ankle)**



- **Measurement of edema (ankle, calf and thigh)**
- **Assess capillary refill (normal less than 3 seconds)**
- **Colour (dependent and on elevation)**
- **Assess dermatological changes due to impaired blood flow & poor sweat gland function (dry, cracked skin, fissures, maceration and hyperhidrosis – excessive sweating)**
- **Presence of hair on lower leg, feet and toes**

	Motor Assessment • **Range of motion (ROM) of knee, ankle and foot** • **Proprioception (patient awareness of joint position) of hallux (great toe)** • **Foot deformities (bony and soft tissue changes e.g. Charcot)** • **Gait assessment with appropriate off-loading footwear** • **Examination of footwear (foreign objects, wear pattern, pressure points, presence of wound drainage)** • **Activities of daily living** • **Safety of transfers** **Sensory Assessment** • **Monofilament testing (Monofilament size 5.07 or 10 gm)**  • **Soft touch (cotton ball)** • **Temperature difference using an infrared thermometer to compare both legs(2 degree Celsius difference indicates possible infection present)** • **Presence of pain** **8. Determine cause of the wound** **Suggested reading:** **Diabetes, Healthy Feet and Your Patients. How healthy are YOUR patients' feet? Brochure** **http://cawc.net/images/uploads/downloads/Clinicial_brochure_FINAL%20v2.pdf**
Correct Outcome Based Pathway Confirmed	
Wound etiology and appropriate pathway established	• **Identify initial cause of wound** • **Results of lower leg assessment** • **ABPI/TBPI** • **Results of wound assessment** • **Vascular Segmental Studies results**
Pressure Redistribution Measures Initiated	
Footwear/Offloading	**Offloading is for life**

Total Contact Cast (TCC) or Prefabricated Removable Walking Casts (rendered irremovable) is GOLD STANDARD of care	• **Ensure appropriate footwear/offloading including winter footwear referrals have been arranged to a qualified offloading specialist (if patient does not have)** • **Explain regarding initial and ongoing callous reduction as part of offloading** • **Review long term goals of offloading (i.e. transition from cast to shoes, foot orthoses, etc.)** • **Teach patient to assess for secondary complications** ➢ **Check for red marks, blisters, skin abrasions, etc. caused by offloading device.** • **Assess barriers to appropriate offloading** • **Check for availability for financial compensation (e.g. private insurance, veterans medical benefits, Ontario Disability Support Program –ODSP, Non-Insured Health Benefits -NIHB and Southern Ontario Aboriginal Diabetes Initiative – SOADI for First Nations people and Inuit)**
Wound Therapy Initiated	
Wound treatment plan determined in accordance to treatment goal (healable, maintenance or non-healable)	• **Arrange for MRP/NP orders as required to begin plan of care including agreeance to professional referral recommendations** • **Identify need for debridement of callous or corns** • **Identify any potential barriers to wound treatment plan** • **Identify appropriate footwear and offloading options** • **Consider required referrals and further follow-up with previous professional referrals** • **Consider compression if venous insufficiency/edema present and if ABPI/TBPI is within normal range** • **Utilize toolkit to determine wound cleansing, debridement and dressing selection (South West Region Wound Care Program: Wound Cleansing Table and Dressing Selection and Cleansing enablers and CAWC Product Picker chart)**
Patient Discharge Planning Initiated for Patient Independence and Prevention	
Patient and caregiver concerns and goals integrated into the care plan and shared with care team	**Complete:** • **Cardiff Wound Impact Questionnaire** • **Ensure all patient/caregiver goals and concerns been addressed**
Patient counselled on the benefit of activity and rest for comfort measures and wound healing	• **Recent changes in overall activity level** • **Daily routine** • **Personal assistance available to perform activities of daily living** • **Ankle range of motion allowing for calf muscle pump to function** • **Determine where patient sleeps at night** • **Safety of transfers** • **Wearing offloading device** • **Assess barriers to sleeping in bed** • **Mobility and dexterity aids currently being used** • **Recommendations for exercise**
Coping strategies implemented into plan of care	• **Patient's concerns and fears (including practitioner dependence)**

	• Signs of anxiety or other mental health issues (eg. delusions, hallucinations, paranoid behaviour) • Depression screen using Geriatric Depression Scale assessment form –GDS15 • Suicide assessment if applicable • ETOH and illicit /recreational drug use
Family and caregiver support identified and incorporated into plan of care	• Family/caregiver actively able to participate in treatment plan
Social supports/community resources currently utilized is integrated into plan of care	• Family support • Check for availability for financial compensation (e.g. private insurance, veterans medical benefits, Ontario Disability Support Program –ODSP/Ontario Works, Non-Insured Health Benefits -NIHB and Southern Ontario Aboriginal Diabetes Initiative – SOADI for First Nations people and Inuit) • Community/health resources Link to Waterloo Wellington Diabetes Directory can be found at http://www.waterloowellingtondiabetes.ca/userContent/documents/Public-Resource%20Library/Waterloo%20Wellington%20Diabetes%20Directory%202015%20-%20proof%204.pdf • Caregiver conflicts • Respite Care and Adult Day Program • Confirm that ongoing medication coverage is arranged Link to Trillium Drug Benefits http://www.health.gov.on.ca/en/public/programs/drugs/programs/odb/opdp_trillium.aspx
Professional referrals are initiated	• Ensure referrals done according to patient's needs • Refer to guideline for list of health care professionals • Consider referrals to ET/WCS if required to ensure appropriate treatment plan.
21-28 Days Expected Outcomes	**Notes**
20 – 30% reduction in wound size	
Reassess, measure and document size of wound	Complete: • Calculation: The two most important points are that measurements are done weekly, and using a standardized method within each organization. $\frac{V\ (Initial) - V\ (Current)}{V\ (Initial)} \times 100 = \%$ reduction in volume (V = volume of wound calculated as Longest Length x Perpendicular Widest Width x Depth straight in) (Adapted from Sussman and Bates-Jensen 2007) • Review adherence to plan • Review medical/surgical history and co-morbidity management for changes • Review medication for changes • Review recent blood work, diagnostic test results and home gylcaemic control

	• **Review recent dietary consult if applicable** • **Re- Assessment for infection (NERDS and STONEES)** • **Identify need for debridement of callous or corns** • **Identify any potential barriers to wound treatment plan** • **Identify appropriate footwear and offloading options** • **Obtain photos following best practice as per framework for individual organization policies and procedures** • **Consider required referrals to ET/WCS/MRP/Surgeon/NP and further follow-up with previous professional referrals if healing percentage is not achieved** • **Consider compression if venous insufficiency/edema present If ABPI/TBPI is within normal range** • **Utilize toolkit to determine wound cleansing, debridement and dressing selection (South West Region Wound Care Program: Wound Cleansing Table and Dressing Selection and Cleansing enablers and CAWC Product Picker chart)**
Chronic Disease Self- Management Plan Initiated	
Patient/caregiver educational needs reviewed using 'teach-back' method 'Teach-back' method is a way of ascertaining patients understanding about what they need to know or do regarding their health. Patients are asked to state in their own words what they understand to be important. It is a way to confirm that things have been explained in a manner that the patient understands.	**Safety** • **Emergency signs and symptoms of Peripheral Arterial Disease that require immediate medical attention (refer to lower leg assessment section)** • **Prevention of injury – avoid extremes (hot/cold, loose/tight)** • **When to call primary care giver (eg. signs and symptoms of infection, deep vein thrombosis, cellulitis, impaired blood flow, difficulties with compression)** **Offloading** • **Offloading is required 'for life'** • **Understands need of debridement/callous reduction** • **Encourage appropriate footwear should be worn at all times when weight bearing as discussed with foot care specialist** • **Examination of footwear, orthotics and offloading devices for foreign objects, wear pattern, pressure points and presence of wound drainage** **Compression** • **Compression 'for life' if applicable** • **Risks of compression** • **Compression application and removal** • **Remove compression stockings at bedtime when legs are elevated and re-apply before ambulating in a.m.** **Lifestyle** • **Smoking and e-cigarette cessation with goal to be nicotene-free** **Smoking Cessation Best Practice Guidelines can be found at:** **http://rnao.ca/sites/rnao-ca/files/Integrating_Smoking_Cessation_into_Daily_Nursing_Practice.pdf** • **Pain management** • **Rest/Activity** **Dietary** • **Dietary requirements as per dietician directions**

	• **Blood glucose testing and recording in diary** • **Link to EatRight Ontario to talk to dietician www.eatrightontario.ca 1-877-510-5102** **Diagnostic Tests** • **Diagnostic testing (target ranges for A1C, Blood sugar and cholesterol levels)** **Skin Care** • **Wound self care** • **Skin care (avoid soaking feet, clean and gently dry well between and under toes, avoid using cream between toes unless antifungal)** • **Nail care (suggest use of foot care specialist)** • **Encourage use of laundered white diabetic socks – to be changed daily** **Foot Inspection** • **Self foot and lower-leg assessment done daily (encourage use of mirror) 'Diabetes, Healthy Feet and You Brochure' can be found at: http://cawc.net/images/uploads/downloads/WoundCare_ENGLISH_AUG_2011.pdf** • **Encourage caregiver to assist in inspection** • **Remove shoes and socks of both feet at all medical visits to allow for professional foot inspection** **Community Supports** • **Community support groups (eg. Diabetic education and self- management sessions, walking groups, Southern Ontario Aboriginal Diabetes Initiative - SOADI)** • **Link to Waterloo Wellington Diabetes Directory can be found at http://www.waterloowellingtondiabetes.ca/userContent/documents/Public-Resource%20Library/Waterloo%20Wellington%20Diabetes%20Directory%202015%20-%20proof%204.pdf** • **Other _____**
Ability to self-manage optimized	**Review for independence or need for ongoing assistance with the following:** • **Barriers to participate (poor eyesight, physical limitations, transportation, socioeconomic, social environment, cognitive ability, other co-morbidities)** • **Review importance and potential barriers to smoking cessation at every visit** • **Offloading** • **Adequate hygiene** • **Daily foot inspection with mirror(including bottom of foot and between toes)** • **Ongoing footcare arranged** • **Environment** • **Wound care** • **Compression application and removal if prescribed** • **Link to Waterloo Wellington Diabetes Directory can be found at http://www.waterloowellingtondiabetes.ca/userContent/documents/Public-Resource%20Library/Waterloo%20Wellington%20Diabetes%20Directory%202015%20-%20proof%204.pdf**

	• **Social/medical/family/employment obligations** **Suggested website for review** **http://www.wwselfmanagement.ca/** • **Other _____**
Referral Initiated for Long-Term Pressure Redistribution System	
Footwear/Offloading **Total Contact Cast (TCC) or Prefabricated Removable Walking Casts (rendered irremovable) is GOLD STANDARD of care** **Contraindications for Total Contact Casting (TCC)** • Patients with documented lower-extremity arterial disease • Patients with an active wound infection or a sinus tract with deep extension into the foot which requires daily wound access for topical wound management • Patients with unstable gait • Patients with cast claustrophobia or previously known non-adherence to treatment plan • Patients with fluctuating leg edema or active skin disease • Inadequately trained clinical staff • Restless leg syndrome or conditions which cause leg tremors **See guidelines for offloading options when TCC is contraindicated or not available**	• **Ensure appropriate footwear/offloading has been prescribed by a qualified offloading specialist (if patient does not have) and available.** • **Review weartime of offloading device as per treating practitioner's directions** • **Review adherence to using appropriate footwear and/or offloading device(s)** • **Initial and ongoing callous reduction as part of offloading** • **Assess and reinterate patient for secondary complications of offloading and refer concerns to treating practitioner** ➢ **look for redmarks, blisters, skin abrasions** ➢ **ask about knee, hip or back issues (including contralateral limb) due to height difference of offloading device** ➢ **check for unsafe gait (are they stable, using appropriate aids, etc)** • **Check gait aids such as walker, cane, crutches** • **Review long term goals of offloading (i.e. transition from cast to shoes, foot orthoses, etc.)** • **Assess barriers to appropriate offloading** • **Discuss winter footwear with appropriate offloading specialist** **Check for availability for financial compensation (e.g. private insurance, veterans medical benefits, Ontario Disability Support Program –ODSP, Non-Insured Health Benefits -NIHB and Southern Ontario Aboriginal Diabetes Initiative – SOADI for First Nations people and Inuit)**
77-84 Days Expected Outcomes	**Notes**
Wound is closed by 12 weeks	
	• **Ensure wound is closed.** • **Assess for callous formation over the closed wound.** • **If wound is not closed, move to most appropraite pathway i.e: Maintenance Pathway or Non-healing Pathway**
Patient has obtained and is adhering to pressure redistribution system	
Footwear/Offloading	• **Ensure patient is using appropriate footwear/offloading devices(s) and adhering to the pressure redistribution system.** • **Ensure weartime of offloading device are as per treating practitioner's directions** • **Ensure patient has scheduled follow-up with Chiropodist/Podiatrist/Foot Care Nurse for ongoing callous reduction as part of offloading** • **Review patient's knowlegde regarding secondary complications of offloading.** **- look for redmarks, blisters, skin abrasions** • **Reiterate to patient the long term goals of offloading (i.e. transition from cast to shoes, foot orthoses, etc.)**