Saving Limbs and Lives

Lower-Limb Wound Prevention and Treatment Strategies

An Accredited Education

WINDSOR
Family | Health | Team

WINDSOR REGIONAL HOSPITAL
OUTSTANDING CARE – NO EXCEPTIONS!

ONTARIO HEALTH TEAM
WINDSOR ESSEX

Acknowledgements

Windsor Essex Community Health Centre
Centre de santé communautaire de Windsor Essex
weCHC
Healthcare for You
Des soins de santé pour vous

Canadian Mental Health Association
Windsor-Essex County
Community well-being is our sole focus

Ontario Health

THE CITY OF WINDSOR
ONTARIO, CANADA

Land Acknowledgment

We respectfully acknowledge that the land we are presenting on is the traditional territory of the Peoria, Wyandot, Mississauga, Myaamia, Anishinabewaki, and Attiwonderonk peoples.

Indigenous peoples have cared for these lands for generations. We honour their connection to the land, water, and all living things, recognizing their ongoing presence and contributions.

We are committed to truth, reconciliation, equity, and fostering respectful relationships that support healing and justice.

Welcome!

POLL #1:

- What health profession do you represent?
- Where are you joining us from?

Speakers & Disclosure

Dr. Maher Sabalbal

MD, MSc, RPVI, FRCSC

- Vascular Surgeon at Windsor Vascular Care & Windsor Regional Hospital

- Relationship with financial sponsors:
  - Any direct financial relationships including receipt of honoraria: **None**
  - Patents for drugs or devices: **None**
  - Other: financial relationships/investments: **None**

Speakers & Disclosure

Dr. John R Coates

BSc, MD, CCFP, FCFP

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- Adjunct Professor - Department of Family Medicine, Schulich School of Medicine, Western University
- Primary care consultant to the Windsor-Essex Ontario Health Team Lower-Limb Preservation Strategy

- Relationship with financial sponsors:
  - Any direct financial relationships including receipt of honoraria: **None**
  - Patents for drugs or devices: **None**
  - Other: financial relationships/investments: **None**

Speakers & Disclosure

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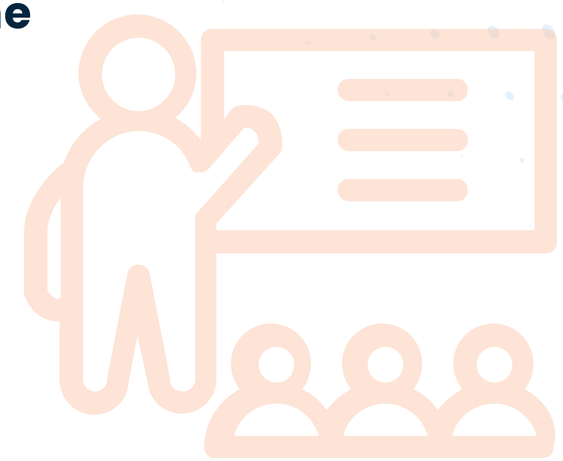
- Assistant Professor, Western University

- Relationship with financial sponsors:
  - Any direct financial relationships including receipt of honoraria: **None**
  - Patents for drugs or devices: **None**
  - Other: financial relationships/investments: **None**



Speakers & Disclosure

Harleen Sanghera

BScN, MN, NP-PHC

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- Relationship with financial sponsors:
  - Any direct financial relationships including receipt of honoraria: **None**
  - Patents for drugs or devices: **None**
  - Other: financial relationships/investments: **None**

Speakers & Disclosure

Christen Abraham

SSBBP, MBA, BS, BA

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- Relationship with financial sponsors:
  - Any direct financial relationships including receipt of honoraria: **None**
  - Patents for drugs or devices: **None**
  - Other: financial relationships/investments: **None**

Speakers & Disclosure

Harrison Tocco

Operations Manager

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- Relationship with financial sponsors:
  - Any direct financial relationships including receipt of honoraria: **None**
  - Patents for drugs or devices: **None**
  - Other: financial relationships/investments: **None**

Mitigation of Potential Bias & Disclaimer

- The facilitators are fully responsible for developing all content in this learning activity; to achieve scientific integrity, objectivity, and balance.

- Speakers are medical professionals or professionals who work directly and indirectly with patients experiencing lower limb wounds, including vulnerable populations such as those with chronic conditions like diabetes, individuals experiencing homelessness, and others at high risk. Speakers may also include healthcare providers with lived experience in addressing wound care challenges and interdisciplinary team collaboration.

- Each speaker has a minimum experience developing and delivering content in Ontario.

Mitigation of Potential Bias & Disclaimer

Potential for conflict(s) of interest:

- **Speaker Dr. Coates:** Honorarium for one advisory board consulting meeting of a pharmaceutical company (financial compensation).

Disclosure of Financial Support

- This program has been provided by the Windsor Family Health Team (WFHT) in collaboration with Windsor Regional Hospital and the Windsor-Essex Ontario Health Team.
- This program has not received financial or in-kind support from any sponsor.

Agenda

Pre-Session Assessment and Introduction (5:10pm - 5:27pm)

- Objectives
- Overview of the Importance of Lower-Limb Health and Pathway
- Overview of the Windsor-Essex Pathway

Case-Based Education: Basic and Intermediate Cases (5:27pm - 6:25pm)

- Lower-Limb Conditions
- Basic Tools and Assessments
- How to support a transient client base
- **Clinical Case 1:** Diabetic Foot Ulcer
- **Clinical Case 2:** Venous Ulcer Case
- Care Continuum

Agenda

Advanced Case Education and Vascular Insights (6:25pm - 6:45pm)

- Advanced Cases and Vascular Surgery Information
- **Clinical Case 3:** Peripheral Artery Disease (PAD)

Pathway Overview and Resources (6:45pm - 7:00pm)

- Overview of the Pathway
- Ontario-Specific Resources and Guides
- CE Credits Information
- Q&A
- Post-Session Evaluation and Closing

Objectives

To provide an overview of the current state of lower-limb amputation in Ontario.

To introduce the Lower Limb Prevention Strategy.

Provide clinical education on chronic conditions and lower limb health.

To demonstrate best practices in lower-limb assessment tools such as the Inlow's 60 Second Foot Screen and PWAT.

To offer valuable tips, practical guidance, and insights on lower limb presentation and treatments, along with resources to support and enhance your practice.

Pre-Assessment Evaluation

Lower-Limb Preservation: Overview of Chronic Disease Prevalence

Speaker: Christen Abraham, SSBBP MBA

Chronic Disease and Lower-Limb Health

Every 20 seconds worldwide a limb is lost to diabetes - 85% of these amputations are due to diabetic foot ulcers.

1.7 million people (11%) have diagnosed diabetes in Ontario.

Life-time risk of a diabetic foot ulcer is 25%. Risk factors contributing to foot ulceration include neuropathy, associated deformities, and resultant trauma.

Incidence of lower extremity amputation in those with a diabetic foot ulcer is 20%.

Peripheral arterial disease is present in 20% of people over age 70.

(Armstrong & Boulton, 2019)
(Ontario Wound Care, 2024)

Amputations in Ontario

310,000

People with Dm and PAD are at risk for amputations

20,000

Amputations per year - this number has risen over recent years

1,200

Major amputations (above the ankle) per year = 1 major amputation every 7 hours

$70,000

Cost per major amputation

$140 Million

Indirect amputation health care costs annually

5 year

Mortality rate for neuropathic diabetic foot ulcers approaches 50%

80% Mortality

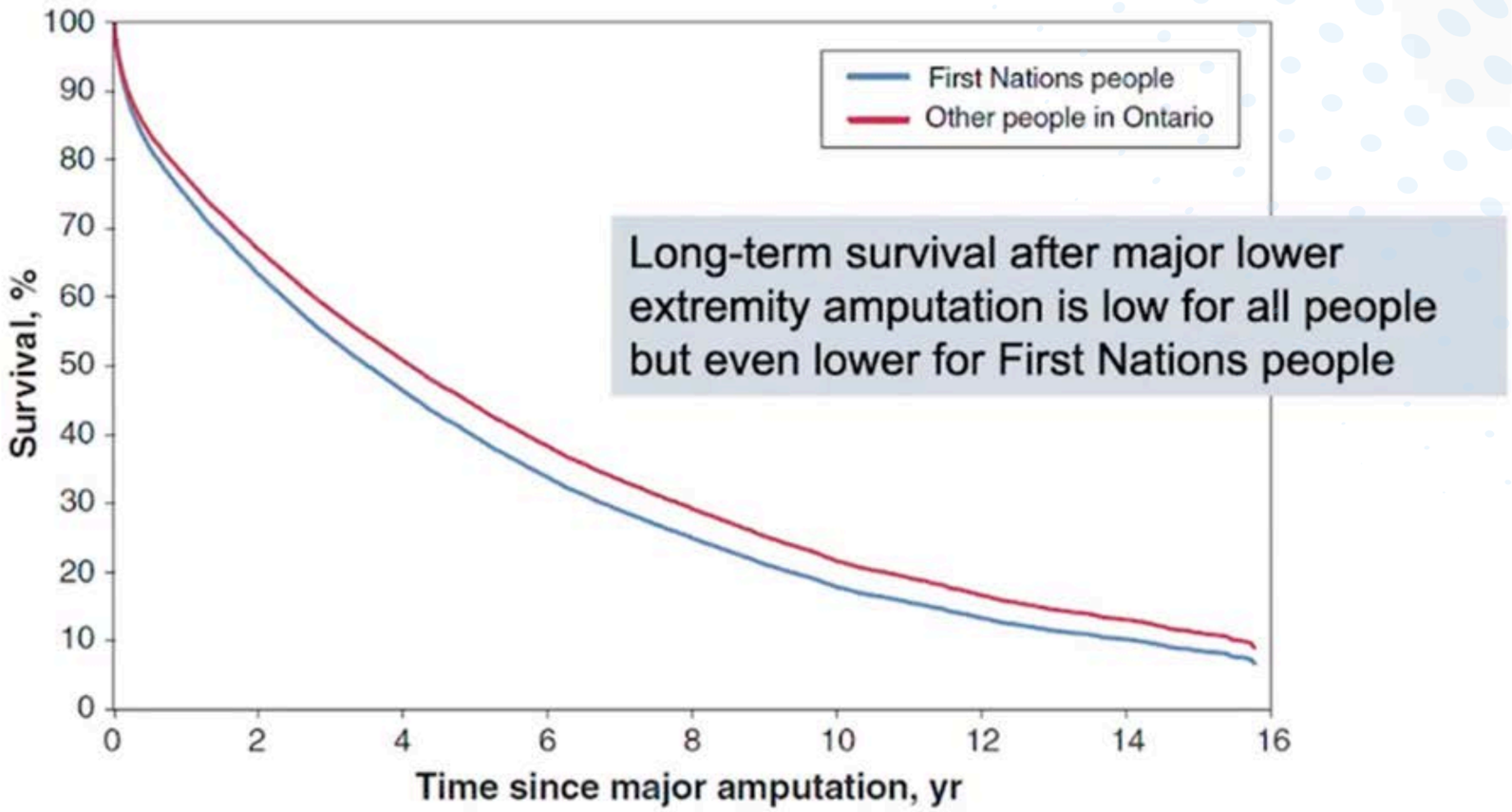
For major amputations within 5 years

(Armstrong & Boulton, 2019)
(Ontario Wound Care, 2024)

The Human Cost of Amputations

- Amputation has a devastating impact on the individual person and their family and places a heavy burden on health care resources.
- It is a barrier to reintegration into the home environment due to loss of mobility and independence.
- This is more likely to occur when amputation occurs with comorbidities.
- Amputation contributes to decline in functional status / adversely affects mental health / potential loss of employment.
- Diabetic foot ulcers are a serious and costly complication of diabetes.
- Profoundly affects quality of life.

Mortality Post Amputation



Shah, B. R., Frymire, E., Jacklin, K., Jones, C. R., Khan, S., Slater, M., Walker, J. D., & Green, M. E. (2019). Peripheral arterial disease in Ontario First Nations people with diabetes: A longitudinal population-based cohort study. CMAJ Open, 7(4), E700–E705. Incidence of lower extremity amputation in those with a diabetic foot ulcer is 20%.

Role of Screening and Prevention

- 85% of amputations related to Type 2 Diabetes Mellitus and Peripheral Arterial Disease are preventable with current medical treatments.
- These include screening, foot care and footwear education, a collaborative interprofessional team approach to prevention and chronic disease management, adequate perfusion, infection control, and pressure offloading.
- In Canada, only half of people with diabetes receive appropriate foot screening - most of these were likely not risk stratified.
- These interventions cost 10 to 40 times less than the current cost of amputation related hospital costs.
- A reduction of even 20% would result in 240 lower-limbs saved and a $16.8 million reduction in amputation costs.

(Canadian Institute for Health Information, 2025)

Lower-Limb Preservation: Overview of Integrated Clinical Pathway Projects

Speaker: Lyndsay Orr, PT, PhD

Lower Limb Amputation Rates in Ontario and Other Jurisdictions

Major and minor lower-limb amputation rates by LHIN among patients with diabetes or PAD in Ontario. Rates per 100,000 person-quarters.[1]

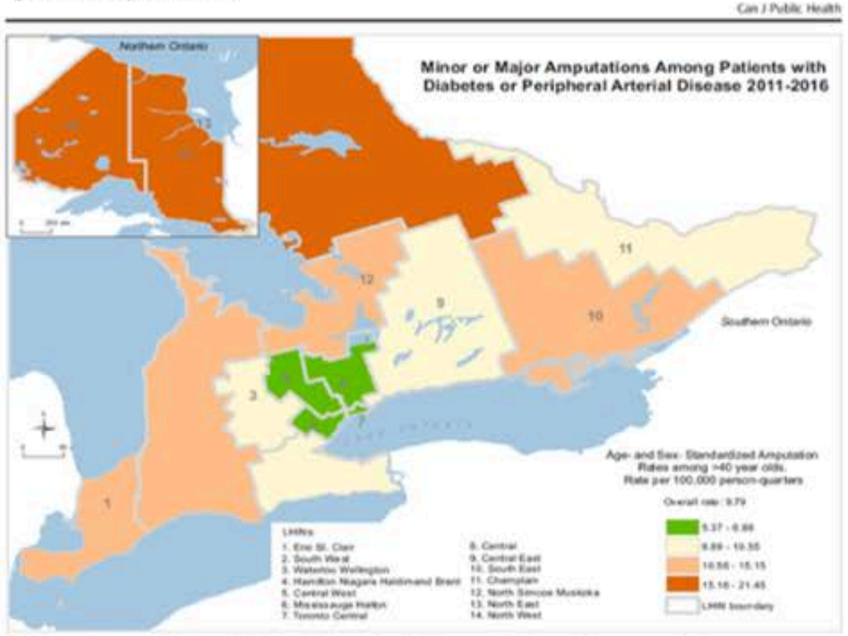
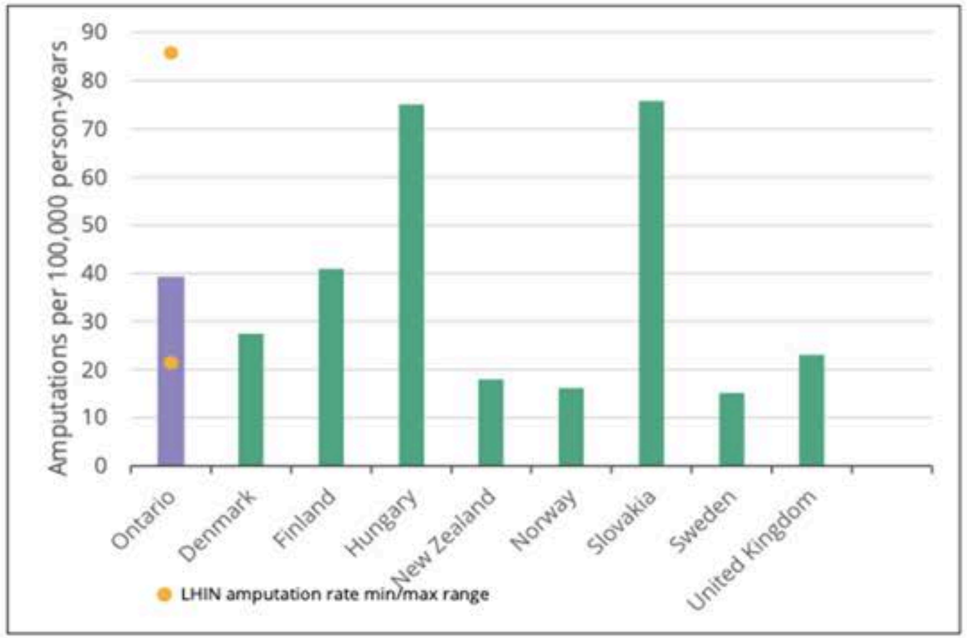


Fig. 1 Age- and sex-standardized rates of minor or major amputations for diabetes or peripheral arterial disease across Ontario

Major and minor lower-limb amputation rates among patients with diabetes or PAD in Ontario and other jurisdictions with publicly funded health care systems.[1,2]



Ontario data for years 2011-2016, other jurisdictions data for 2010-2014.

CorHealth Ontario

Average major & minor lower-limb amputation rate in Ontario is 39.2 per 100,000 person-years.
Across LHIN's the rates range from 21.5 – 85.5 per 100,000 person-years.

Lower-Limb Preservation

- Ontario has high diabetes-related lower-limb amputation rates compared to similar publicly-funded jurisdictions globally.

- Marginalized and Indigenous populations experience amputation rates up to seven times the provincial average.

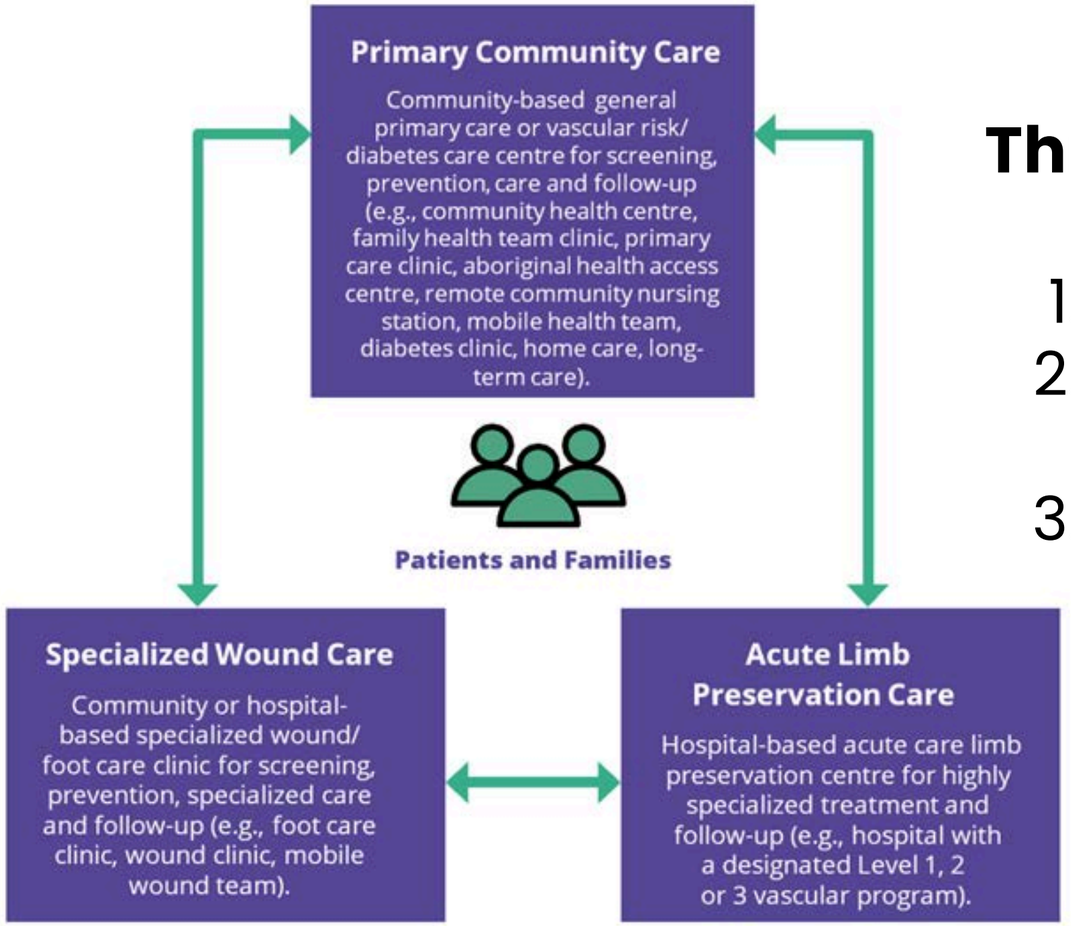
- Ontario Health partnered with an Advisory Committee to develop an Ontario Framework for Lower-Limb Preservation (LLP) to steward a more coordinated, integrated, and patient-centred approach to lower-limb preservation care in Ontario with the following goals:

    - Improve outcomes for patients at highest risk for lower-limb amputation (e.g., Indigenous, marginalized);

    - Reduce avoidable, non-traumatic major lower-limb amputations; and

    - Improve equitable patient access to best-practice early screening and identification, cardiovascular risk factor management, and integrated diabetes, lower-limb wound, and vascular care.

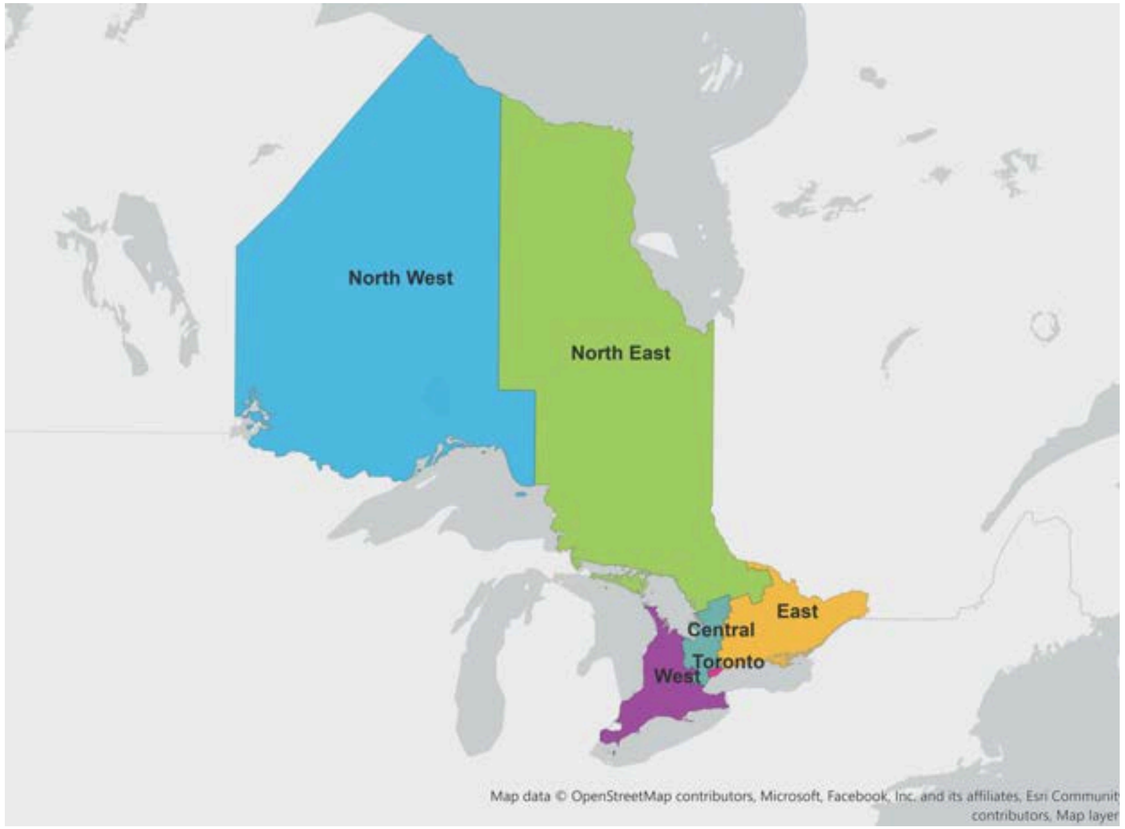
LLP Integrated Model of Care



Three Priorities for Action

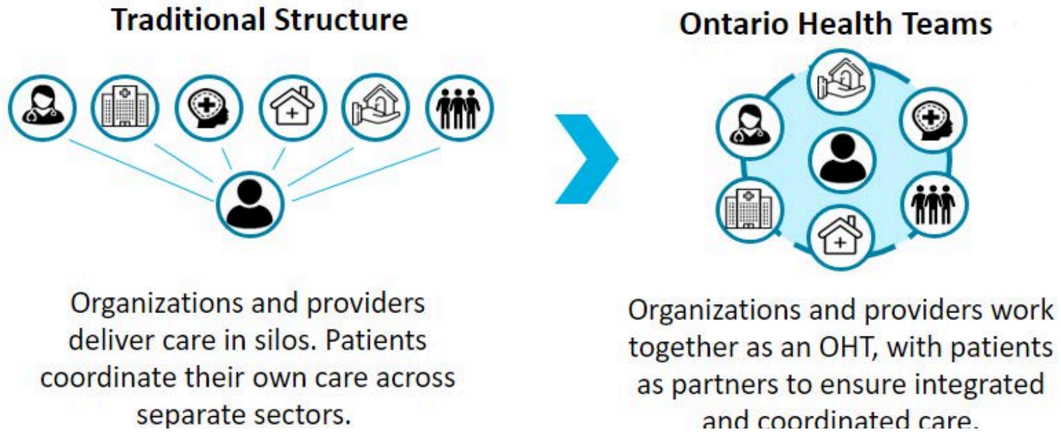
1. Integrated, Connected, Collaborative Care.
2. Early Identification & Preventative Management.
3. Coordinated and Consistent Wound Management.

The Ontario Health System Landscape



- Introduced in 2019, Ontario Health Teams (OHTs) are a model of integrated care delivery where **groups of health care providers and organizations work together as a team to deliver a full and coordinated continuum of care for patients**, even if they're not in the same organization or physical location.

- The goal is to provide better, more integrated care across the province.



LLP Integrated Care Pathway

Objective: Leverage the OHT model to demonstrate the impact of integrated and coordinated lower-limb preservation care pathways on diabetes and vascular-related lower-limb complications and amputations.

- OHT LLP demonstration programs will: identify, prioritize, implement, and measure the **impact of lower-limb preservation change initiatives.**
- Ontario Health provides support and guidance through knowledge transfer, establishing and supporting a Community of Practice, assist to reduce barriers, leading an evaluation of demonstration programs, and supporting the collection of patient reported outcome measures.
- Ontario Health Regions, with their strong expertise and relationships within and across OHTs, are key enablers of successful implementation of integrated clinical pathways.
- Lessons learned throughout the demonstration model will support the spread and scale towards broader provincial implementation of lower-limb preservation programs and the development of integrated funding models.

LLP Demonstration Programs

LLP Initiatives Implemented by October 2023

Region	OHT (Affiliated Vascular Program)
Central	Barrie and Area OHT (Royal Victoria Regional Health Centre)
	Central West OHT (William Osler Health System)
East	Hastings Prince Edward OHT (Kingston Health Sciences Centre/ Peterborough Regional Health Centre)
	Ottawa OHT (The Ottawa Hospital)
Northeast	Maamwesying OHT (Health Sciences North)
Northwest	Northwestern Ontario Regional Specialized Services Network (St. Joseph's Care Group/Thunder Bay Regional Health Sciences Centre)
Toronto	Downtown East Toronto OHT (Unity Health Toronto)
	Mid-West Toronto OHT (University Health Network)
West	Greater Hamilton Health Network (Hamilton Health Sciences Centre)
	Middlesex London OHT (London Health Sciences Centre)
	Indigenous Diabetes Health Circle/ De dwa da dehs nye>s Aboriginal Health Access Centre/ Fort Erie Native Friendship Centre (Niagara Health System)*
	Windsor Essex OHT (Windsor Regional Hospital)

LLP ICP Development

- Partner Engagement
- Environmental Scan/ Current State
- Desired State
- Gap Analysis
- Change Initiative Identification & Prioritization
- Measurement & Evaluation Plan

1. Increase Foot Screening.
2. Create defined referral/management for care escalation and de-escalation pathways.

Sample Demonstration Program Change Initiatives

Windsor OHT **Lower Limb Wound Prevention & Treatment Clinic**	Offering comprehensive care, including wound management, personalized treatment plans, and educational resources to support lower limb health.
Greater Hamilton Health Network OHT **Socks Off campaign**	“We’re encouraging primary care providers to routinely check these patients’ bare feet for cuts, blisters, cracks, callouses or other sores that could lead to a serious ulcer and amputation”.
Downtown East Toronto OHT **Putting Feet First**	Seeks to improve access and coordination to services for individuals in need of lower limb care and at risk for complications.
MidWest Toronto OHT **Open Door Program**	Pop-up health stations throughout the Mid-West Toronto OHT region that include foot care & access to chiropody services to all individuals including those without OHIP.
Barrie and Area OHT **Good Foot Forward Program**	Foot care clinics providing basic foot care services for people who have Diabetes or PAD and do not have private insurance or the ability to pay for services.
Hastings Prince Edward OHT **Lower Limb Preservation, Community Optimization Priority Project**	A cross-sector collaboration of partner organizations that focus on detecting early identifications of patients/clients at risk through standardized assessment and providing timely access to vascular surgery for high-risk patients.
Maamwesying OHT	Developing and implementing culturally-based diabetic foot ulcer management capacity and referral pathways for residents in the 11 Indigenous communities and urban Indigenous population in Sault Ste. Marie (through the Baawaating Family Health Team and Indian Friendship Centre).

The Windsor-Essex Lower-Limb Preservation Strategy

Speaker: Christen Abraham, SSBBP MBA

Lower-Limb Preservation in Windsor-Essex

- The Windsor-Essex Ontario Health Team was selected as a demonstration site for the CorHealth Lower-Limb Preservation (LLP) Integrated Clinical Pathway Project.
- Our strategy aims to:
  - Assess patients with diabetes and/or peripheral arterial disease with or without lower limb wounds.
  - Apply a health equity approach by risk stratifying patients from lower socioeconomic areas (i.e., clients of the Homelessness and Housing Help Hub (H4) and patients from certain high risk postal codes).
  - Divert high risk and urgent patients from busy Emergency Departments.
  - Increase access to assessment and treatment for lower limb.
  - Provide education to health care providers on best practices, tools and supports for patient's Lower Limb care.

Target Population

- Individuals experiencing:
  - Active lower leg wound(s)
  - Diagnosed with diabetes, peripheral artery disease, end stage renal disease
  - Unattached to primary care
  - Homeless and/or street involved individuals*
  - Resides in a high priority neighborhood
  - Has other social needs/barriers (e.g., transportation)

Note: WE is prioritizing homeless and marginalized individuals who disproportionately experience lower limb amputations due to chronic conditions, addictions and social/economic barriers.

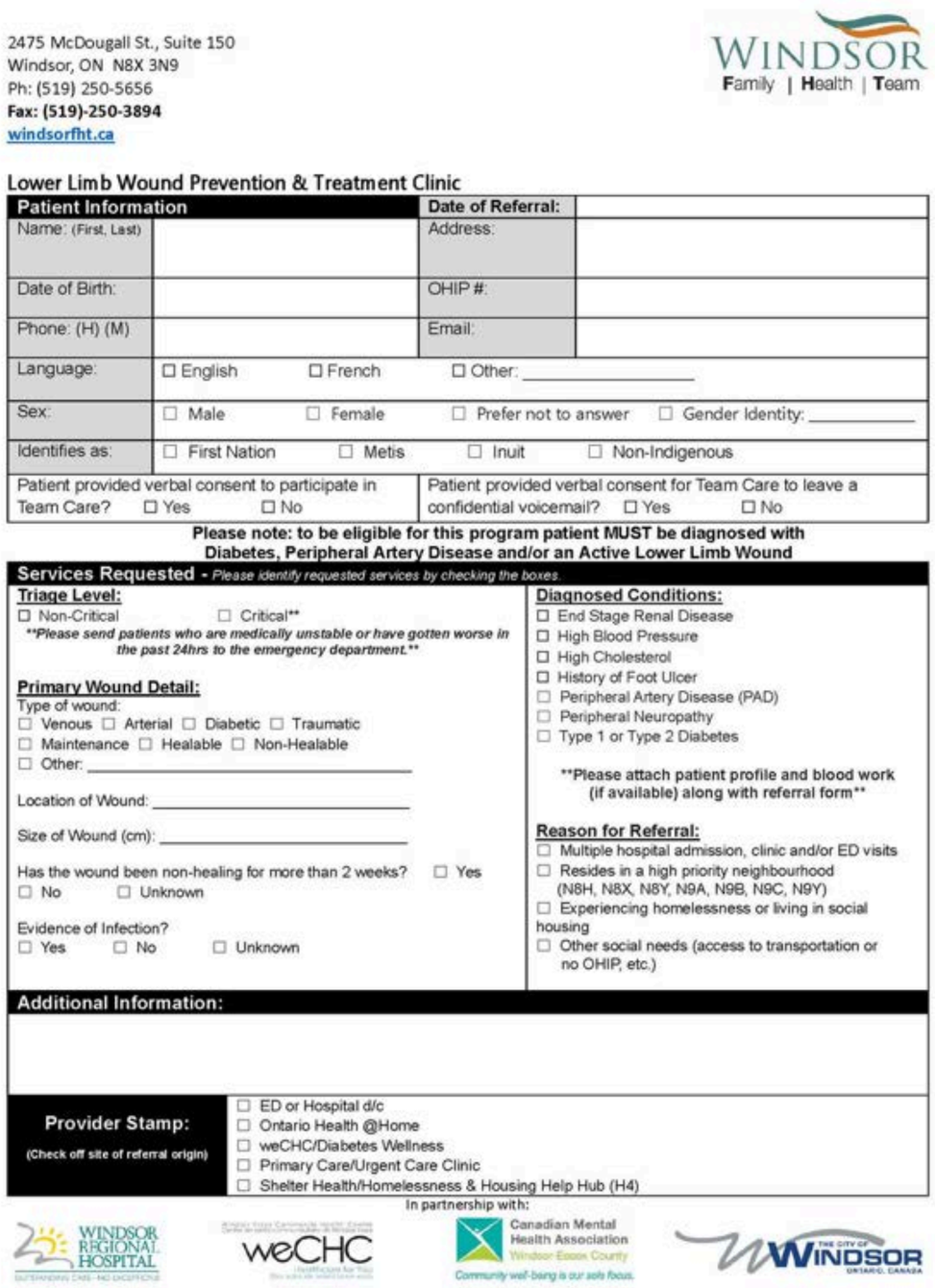
Lower Limb Wound Prevention & Treatment Clinic

- Services provided:
  - Lower limb assessment, wound prevention, and treatment.
  - Addresses loss of sensation, deformities, pain and discomfort, and other risk factors for lower limb wounds.
  - Access to foot care, diabetic socks, and foot wear.
  - Primary Care for related health conditions.
  - Referrals for diagnostics, labs, ongoing wound care, and other supports.
  - Follow up care to track and support progress with care.
  - Communications and coordination with circle of care.

Lower Limb Wound Prevention & Treatment Clinic

- Launched October 26, 2023.
- Operated by:
  - Windsor Family Health Team (via Team Care Centre)
- By appointment: 2475 McDougall St., Windsor.
- Via virtual consultation at Shelter Health sites in Windsor's core.
- Goal - 72hr access to an appointment post referral.

Note: attach patient profile, any pertinent investigations, consults, and notes.



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WINDSOR Family | Health | Team

Lower Limb Wound Prevention & Treatment Clinic

Patient Information		**Date of Referral:**	
Name: (First, Last)		Address:	
Date of Birth:		OHIP #:	
Phone: (H) (M)		Email:	
Language:	☐ English ☐ French ☐ Other: _____		
Sex:	☐ Male ☐ Female ☐ Prefer not to answer ☐ Gender Identity: _____		
Identifies as:	☐ First Nation ☐ Metis ☐ Inuit ☐ Non-Indigenous		
Patient provided verbal consent to participate in Team Care? ☐ Yes ☐ No		Patient provided verbal consent for Team Care to leave a confidential voicemail? ☐ Yes ☐ No	

Please note: to be eligible for this program patient MUST be diagnosed with Diabetes, Peripheral Artery Disease and/or an Active Lower Limb Wound

Services Requested - *Please identify requested services by checking the boxes.*

Triage Level:
☐ Non-Critical ☐ Critical**
Please send patients who are medically unstable or have gotten worse in the past 24hrs to the emergency department.

Primary Wound Detail:
Type of wound:
☐ Venous ☐ Arterial ☐ Diabetic ☐ Traumatic
☐ Maintenance ☐ Healable ☐ Non-Healable
☐ Other: _____

Location of Wound: _____

Size of Wound (cm): _____

Has the wound been non-healing for more than 2 weeks? ☐ Yes ☐ No ☐ Unknown

Evidence of Infection?
☐ Yes ☐ No ☐ Unknown

Diagnosed Conditions:
☐ End Stage Renal Disease
☐ High Blood Pressure
☐ High Cholesterol
☐ History of Foot Ulcer
☐ Peripheral Artery Disease (PAD)
☐ Peripheral Neuropathy
☐ Type 1 or Type 2 Diabetes

Please attach patient profile and blood work (if available) along with referral form

Reason for Referral:
☐ Multiple hospital admission, clinic and/or ED visits
☐ Resides in a high priority neighbourhood (N8H, N8X, N8Y, N9A, N9B, N9C, N9Y)
☐ Experiencing homelessness or living in social housing
☐ Other social needs (access to transportation or no OHIP, etc.)

Additional Information:

Provider Stamp:
(Check off site of referral origin)

☐ ED or Hospital d/c
☐ Ontario Health @Home
☐ weCHC/Diabetes Wellness
☐ Primary Care/Urgent Care Clinic
☐ Shelter Health/Homelessness & Housing Help Hub (H4)

In partnership with:
Windsor Regional Hospital · weCHC · Canadian Mental Health Association Windsor Essex County · The City of Windsor

Marginalized Populations

- Outreach weekly walk-in clinic at Homelessness and Housing Help Hub (H4 at former Water World site, Windsor) during demonstration.
- Services include:
  - Education on foot care, and can provide diabetic socks, shoes, and foot orthotics on walk in basis (at all risk levels).
  - Delivered by an NP and wound care nurse (collaboratively provided by the Windsor Family Health Team and Mobile Medical Support via WE-OHT).
  - Patients are prescribed medications as needed (e.g. antibiotics or analgesics).
  - Pharmacotherapy is available on-site for the homeless patients without health cards.
  - Arranges free transportation to appointments for referred services.

Standardized Assessment and Risk Stratification

- The Lower Limb Wound Prevention & treatment Clinic utilizes a standardized foot assessment and risk stratification tool - the **InLow's 60 Second Diabetic Foot Screen**.
- All diabetic patients require early assessment of their feet by a health practitioner utilizing this tool.

LIMB LOSS AND LIMB DIFFERENCE

AWARENESS MONTH APRIL 1-30, 2025

Speaker: Dr. J.R. Coates, BSc, MD, CCFP, FCFP

amputee coalition

Complications of the Diabetic Foot

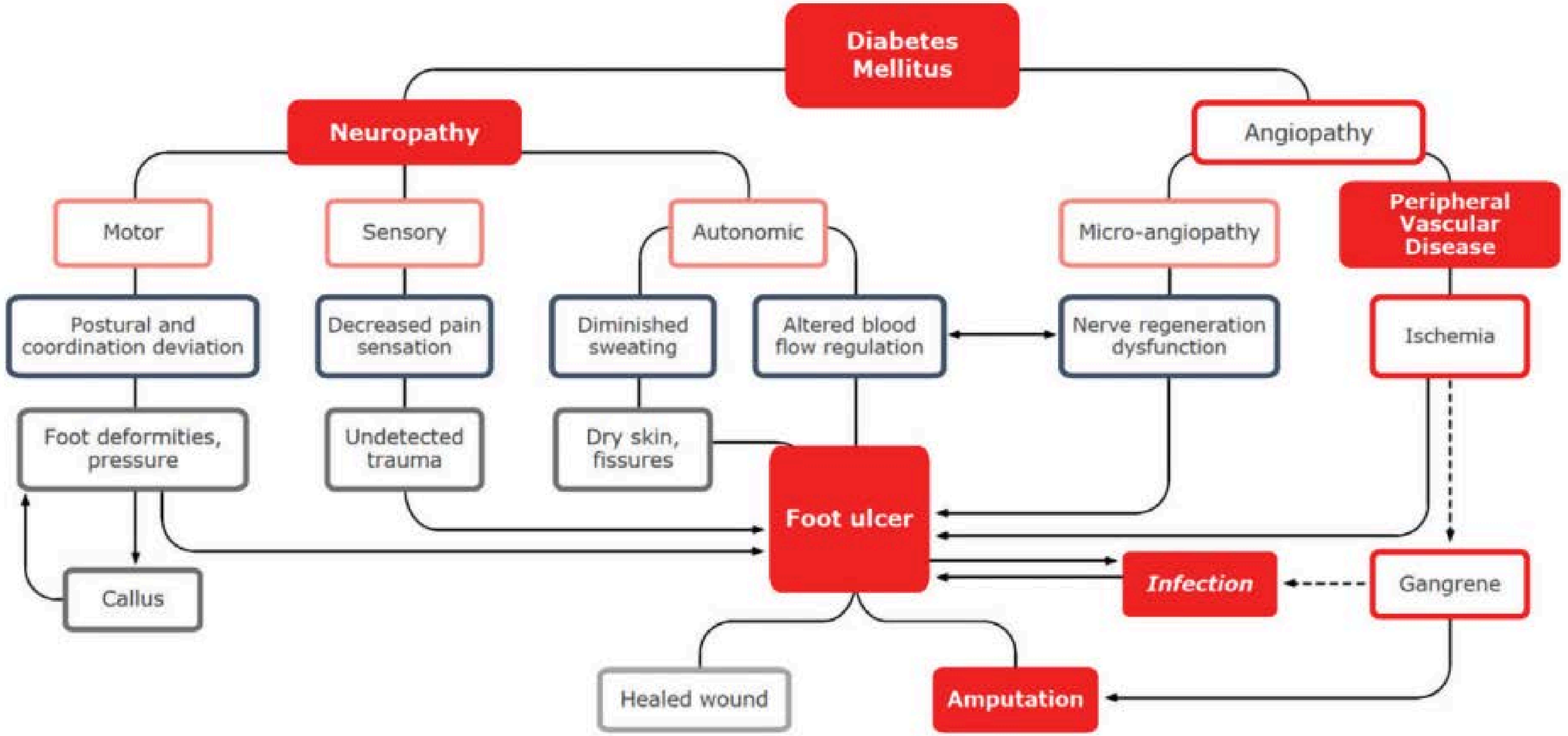
Peripheral Neuropathy

- Lifetime prevalence of 50% in adults with diabetes.
- Peripheral nerve dysfunction due to both metabolic and vascular factors in the setting of chronic hyperglycemia.
- Symmetric polyneuropathy characterized by pain and paresthesia, or can be asymptomatic, along with sensory, motor, and autonomic deficit.
- **Sensory neuropathy** leads to loss of proprioception, pain, and temperature sensation (loss of protective sensation - LOPS), which predisposes to unrecognized minor trauma and contributes to abnormal gait.
- **Motor neuropathy** causes muscle wasting mainly affecting the extensors
- The resulting flexor-extensor imbalance leads to foot deformities such as equinus deformity and clawed toes, abnormal gait, and abnormal pressure distribution that creates new pressure points at risk for ulceration.
- **Autonomic neuropathy** results in reduced sweating that causes dry, fragile skin prone to cracking, reduced sympathetic nerve-induced vasoconstriction, and microvascular dysregulation of the skin that contributes to local edema and impaired healing.

Diabetic Foot Ulcers

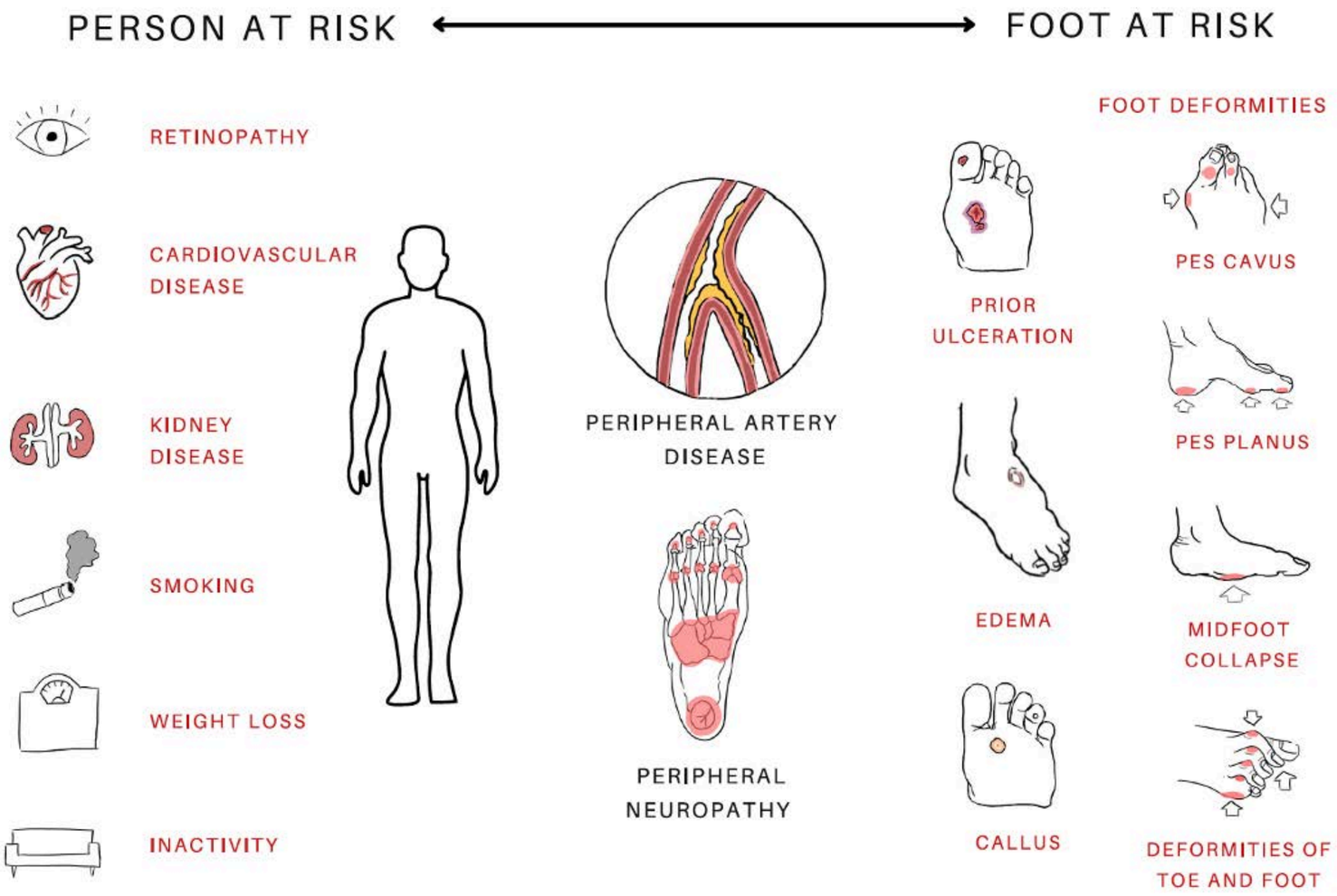
- Ulcers are open sores on the body caused by broken skin that fails to heal.
- Diabetic foot ulcers are a frequent complication of diabetes mellitus.
- Risk factors contributing to foot ulceration in diabetics include:
  - Peripheral Neuropathy
  - Associated deformities
  - Resultant trauma
  - Peripheral Arterial Disease

Factors Leading to Diabetic Foot Ulcers



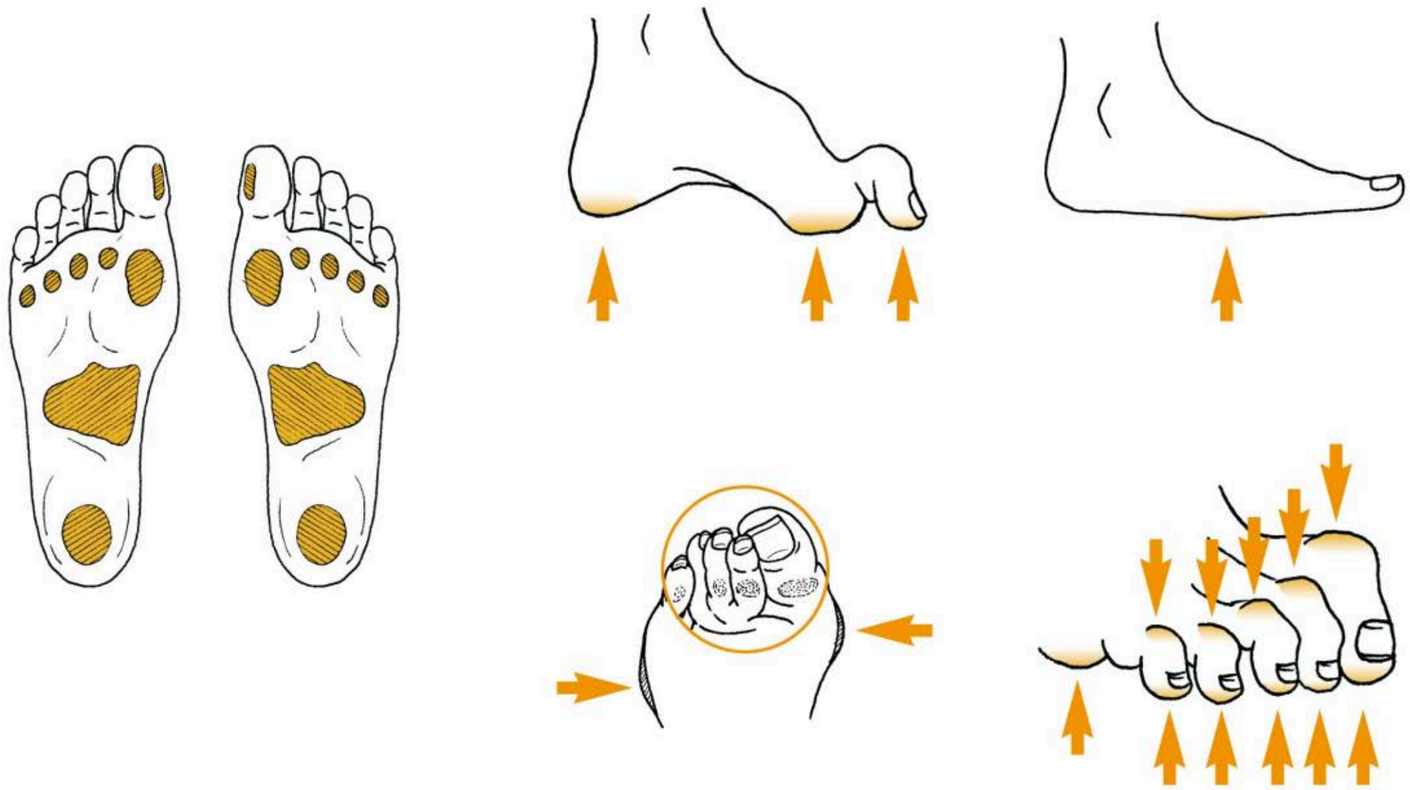
Frykberg RG, Zgonis T, Armstrong DG, Driver VR, Giurini JM, Kravitz SR, et al. Diabetic foot disorders. A clinical practice guideline (2006 revision). J Foot Ankle Surg. 2006;45(5 Suppl):S1–66.

Person and Foot Factors Leading to Diabetic Foot Ulcers



McDermott, K., Fang, M., Boulton, A. J. M., Selvin, E., & Hicks, C. W. (2023). Etiology, epidemiology, and disparities in the burden of diabetic foot ulcers. Diabetes Care, 46(1), 209–221. https://doi.org/10.2337/dci22-0043

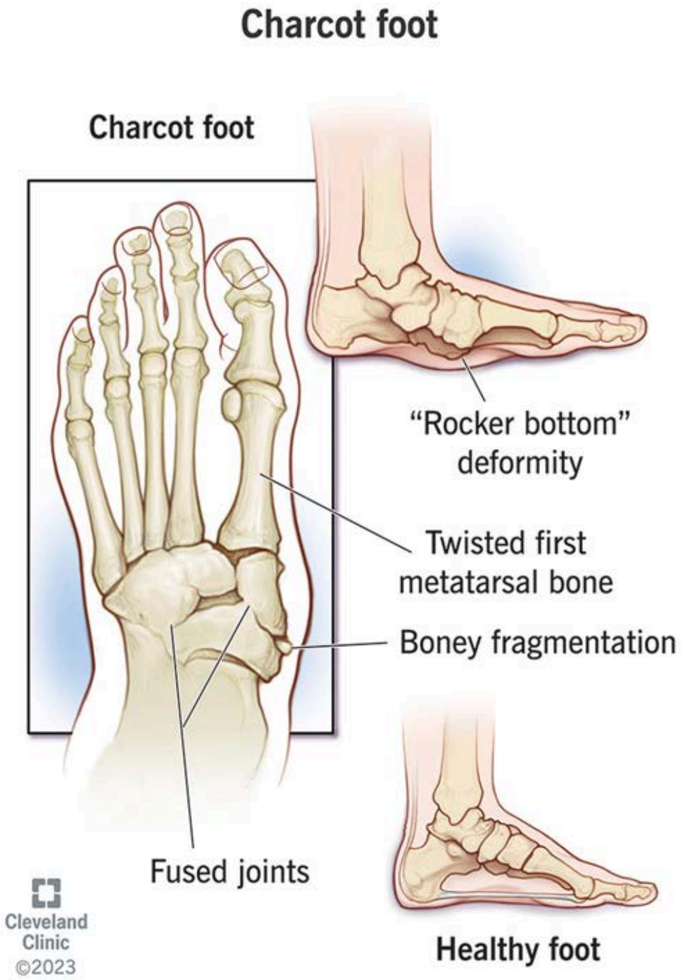
Foot Deformities that Increase Risk of DFUs



International Working Group on the Diabetic Foot. (2023). IWGDF Guidelines 2023. Foot Deformities that Increase Risk of DFUs

Charcot Foot

- A rare, but more severe condition.
- Charcot neuroarthropathy (CN) is a rare inflammatory disease involving the musculoskeletal system of the foot and ankle caused by an inability to sense injuries.
- The disease process ultimately results in deformity of the foot or ankle due to collapse, fracture and destruction of structures under significant pressure.
- Once this occurs the foot will be altered for the rest of the person's life and at very high risk for ulceration and amputation.
- Conventional footwear will lead to further damage and treatment requires off-loading with total contact casts or special boots (Charcot Restraint Orthotic Walker or CROW boot).
- Early signs of Charcot include a painful foot that is hotter and redder than the other.



Cleveland Clinic. (2023). Charcot foot [Photograph]. Cleveland Clinic. https://my.clevelandclinic.org/health/diseases/15836-charcot-foot

Common Misdiagnoses of Acute Charcot Foot

Inflammatory:

- Acute arthritis
- Gout
- Pseudogout

Infection:

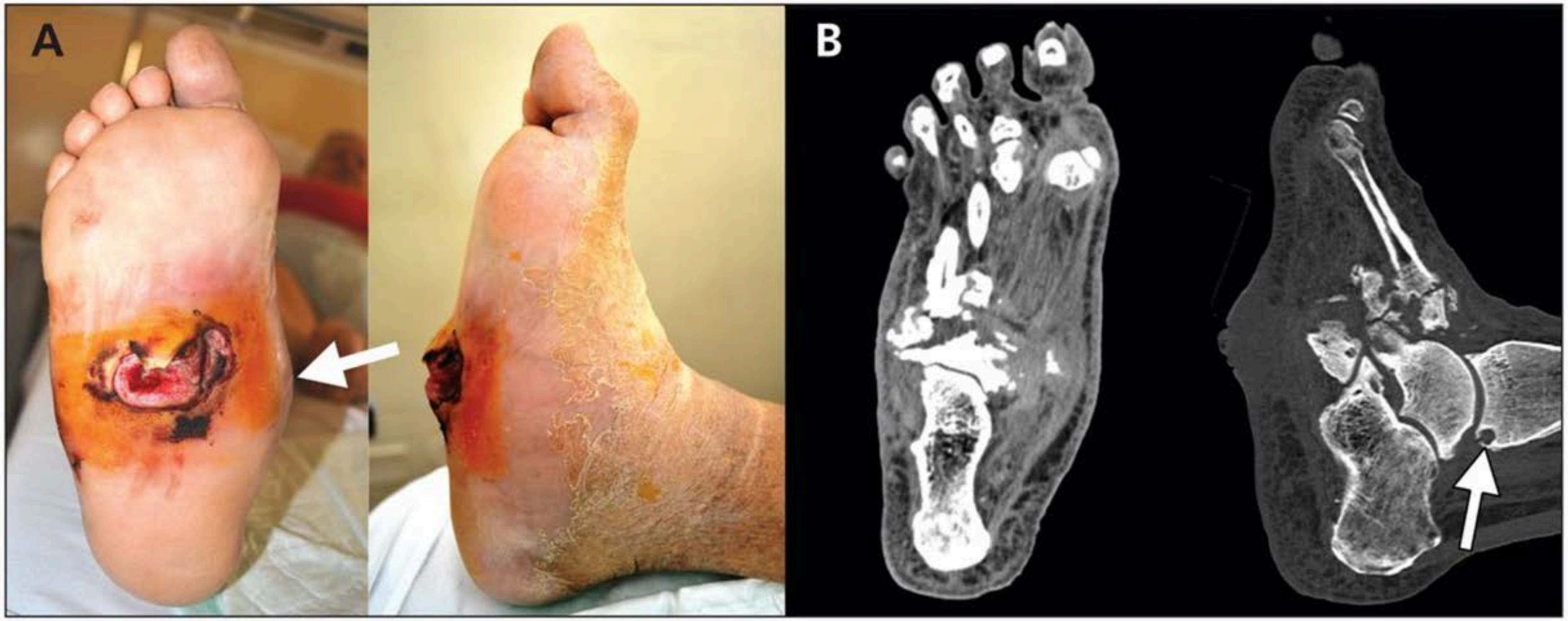
- Cellulitis
- Septic arthritis
- Osteomyelitis

Other:

- Deep vain thrombosis
- Sprain/Strain
- Fracture

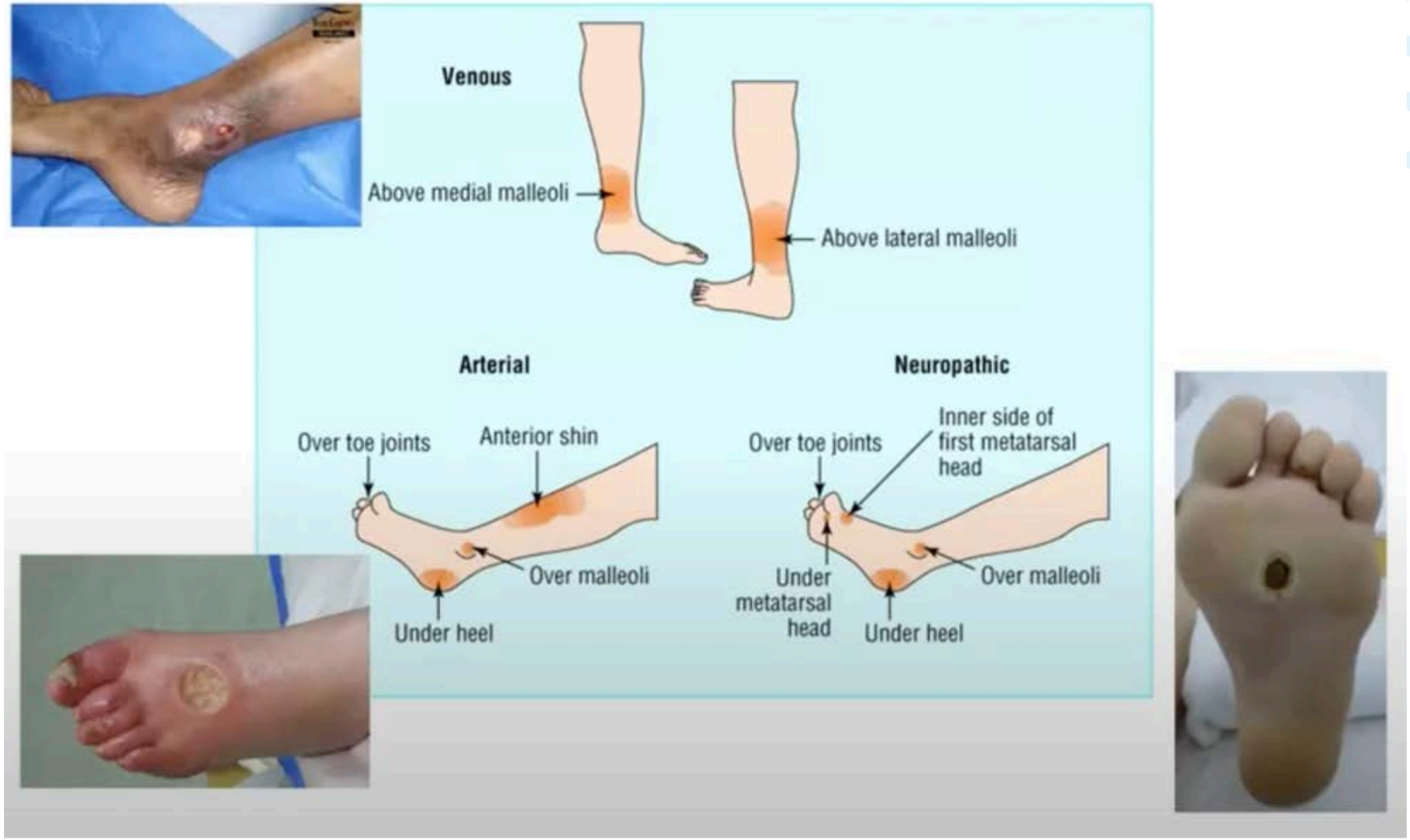
Charcot Foot: An Overview Evans and Botros. Wound Care Canada. Vol 17, No 1. Spring 2019

Severe Charcot Foot with DFU



Mumoli, N., & Camaiti, A. (2012). [Photograph of Charcot foot]. CMAJ: Canadian Medical Association Journal, 184(12), 1392. Severe Charcot Foot with DFU

What Type of Ulcer?



BMJ Publishing Group. (2000, June 10). Clinical review ABC of arterial and venous disease: Ulcerated lower limb. BMJ, 320(7249), 1589. What Type of Ulcer?

Wound Infections & Osteomyelitis

- Diabetic foot infection usually occurs as:
  - Cellulitis
  - Deep skin and soft tissue infections
  - Acute osteomyelitis
  - Chronic osteomyelitis
- Cultures should only be taken from clinically infected wounds.
  - Most common organisms are Staph aureus, Streptococcus, & Pseudomonas aeruginosa.

Diabetic Osteomyelitis

- Suspected on:
  - Prolonged or recurrent ulcer
  - Deep ulcer - especially if probes to bone
  - Difficult to heal ulcer (> 2 months) despite optimal treatment
- X- Ray may not diagnose in early stages (consider bone scan, MRI)

Sepsis

- Fever, rigors, chills
- Hypotension
- Multiple organ failure
- Death

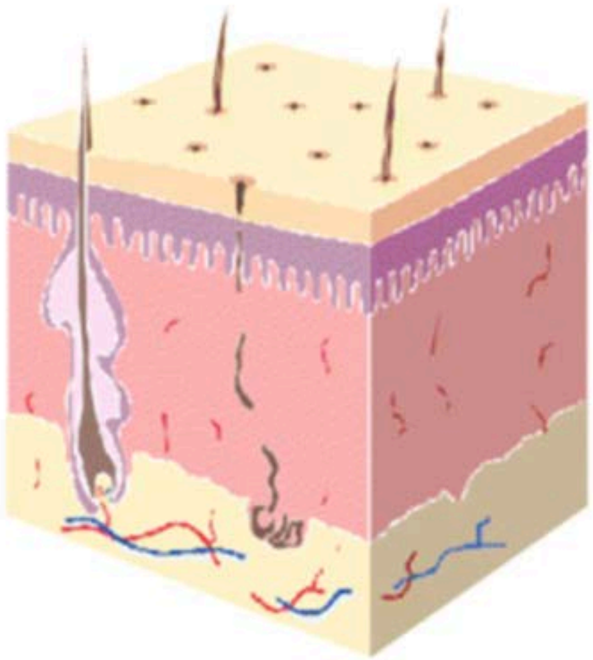
Mycotic Infections

- Tinea pedis
- Onychomycosis

NERDS and STONEES

Superficial:
Treat topically

Deep & surrounding:
Treat Systemically



Modified from © Sibbald & Ayello 2006

N	Non-healing
E	Exudate
R	Red Friable tissue - bleeding
D	Debris
S	Smell

S	Size is bigger
T	Temperature increases
O	Os/Bone (probes, exposed)
N	New breakdown
E	Exudate
E	Erythema and/or Edema
S	Smell

Sibbald, R. G., Woo, K., & Ayello, E. A. (2006). Increased bacterial burden and infection: The story of NERDS and STONES. Advances in Skin & Wound Care, 19(8), 447–461.

Letter		Key Information to Know	Comments
N	Nonhealing wound 	• The wound is nonhealing despite appropriate interventions (healable wound with the cause treated and patient-centered concerns addressed). • Bacterial damage has caused an increased metabolic load in the chronic wound creating a proinflammatory wound environment that delays healing.	• To determine a healing trajectory, the wound size should decrease 20% to 40% after 4 weeks of appropriate treatment to heal by week 12. • If the wound does not respond to topical antimicrobial therapy, consider a biopsy after 4 to 12 weeks to rule out an unsuspected diagnosis, such as vasculitis, Pyoderma gangrenosum, or malignancy
E	Exudative wound 	• An increase in wound exudate can be indicative of bacterial imbalance and leads to periwound maceration. • Exudate is often clear before it becomes purulent or sanguineous.	• Increased exudate needs to trigger the clinician to assess for subtle signs of infections. • Protect periwound area using the LOWE© memory jogger (Liquid film-forming acrylate; Ointments; Windowed dressings; External collection devices) for skin barrier for wound margins.
R	Red and bleeding wound 	• When the wound bed tissue is bright red with exuberant granulation tissues and bleeds easily, bacterial imbalance can be suspected.	• Granulation tissue should be pink and firm. The exuberant granulation tissue that is loose and bleeds easily reflects bacterial damage to the forming collagen matrix and an increased vasculature of the tissue.

Sibbald, R. G., Woo, K., & Ayello, E. A. (2006). Increased bacterial burden and infection: The story of NERDS and STONES. Advances in Skin & Wound Care, 19(8), 447–461.

D	Debris in the wound 	• Necrotic tissue and debris in the wound is a food source for bacteria and can encourage a bacterial imbalance.	• Necrotic tissue in the wound bed will require debridement in the presence of adequate circulation. • Debridement choice needs to be determined based on wound type, clinician skill, and resources.
S	Smell from the wound 	• Smell from bacterial byproducts caused by tissue necrosis associated with the inflammatory response is indicative of wound related bacterial damage. *Pseudomonas* has a sweet characteristic smell/green color; anaerobes have a putrid odor due to the breakdown of tissue.	• Clinicians need to differentiate the smell of bacterial damage from the odor associated with the interaction of exudate with different dressing materials, particularly some hydrocolloids. Odor may come from superficial or deep tissue damage, and this should not be relied on along with exudate alone as the only signs of increased superficial bacterial burden.

Sibbald, R. G., Woo, K., & Ayello, E. A. (2006). Increased bacterial burden and infection: The story of NERDS and STONES. Advances in Skin & Wound Care, 19(8), 447–461.

Letter		Key Information to Know	Comments
S	Size is bigger 	• Size as measured by the longest length and widest width at right angles to the longest length. Only very deep wounds need to have depth measured with a probe. • An increased size may be due to deeper and surrounding tissue damage by bacteria or alternately because the cause has not been treated or there is a systemic or local host factor impairing healing.	• Clinicians need to have a consistent approach to measurement. • An increased size from bacterial damage is due to the bacteria spreading from the surface to the surrounding skin and the deeper compartment. This indicates that the combination of bacterial number and virulence has overwhelmed the host resistance.
T	Temperature increased 	• With surrounding tissue infection, temperature is increased. This may be performed crudely by touch with a gloved hand or by using an infrared thermometer or scanning device. There should be a high index of suspicion for infection if >3° F difference in temperature exists between 2 mirror-image sites.	It is important to distinguish between infection and the other 2 potential causes of temperature change: • A difference in vascular skin supply (decreased circulation; is colder) • Inflammatory conditions are not usually as warm, but they can demonstrate a marked increase temperature with extensive deep tissue destruction (acute Charcot joint).

Sibbald, R. G., Woo, K., & Ayello, E. A. (2006). Increased bacterial burden and infection: The story of NERDS and STONES. Advances in Skin & Wound Care, 19(8), 447–461.

O	Os (probes to or exposed bone) 	• There is a high incidence of osteomyelitis if bone is exposed or if the clinician can probe to the bone in a person with a neurotrophic foot ulcer. • An MRI is probably the most discriminating diagnostic test when available and considered necessary for diagnostic dilemmas.	• Radiographs and bone scans are less reliable for diagnosis of osteomyelitis with loss of bone mass that occurs with neuropathy. Radiographs of well-calcified bone, such as pressure ulcers of the pelvis, may be more reliable. The majority of ulcers that probe to bone in other locations are less likely to be associated with osteomyelitis
N	New areas of breakdown 	• Note the satellite areas of skin breakdown that are separated from the main ulcer. • It is important to remember this may be due to the cause of the wound, infection, or local damage being left uncorrected.	• Search for the cause of the satellite areas of breakdown and the need to correct the cause. • Check for local damage and consider infection, increased exudate, or other sources of trauma.

Sibbald, R. G., Woo, K., & Ayello, E. A. (2006). Increased bacterial burden and infection: The story of NERDS and STONES. Advances in Skin & Wound Care, 19(8), 447–461.

E	Exudate, erythema, edema 	• All of the features here are due to the inflammatory response. With increased bacterial burden, exudate often increases in quantity and transforms from a clear or serous texture to frank purulence and may have a hemorrhagic component. The inflammation leads to vasodilatation (erythema), and the leakage of fluid into the tissue will result in edema.	• For exudate control, determine the cause and then match the absorbency of the dressing (none, low, moderate, heavy) to the amount of exudate from the wound. • Assess surrounding skin to evaluate for maceration. Again, use the LOWE© memory jogger (Liquid film-forming acrylate; Ointments; Windowed dressings; External collection devices) for skin barrier for wound margins. • For erythema and edema control, the cause or the tissue infection needs to be treated.
S	Smell 	• Bacteria that invade tissue have a ''foul'' odor. There is an unpleasant sweet odor from *Pseudomonas* Gram-negative organisms and anaerobe organisms can cause a putrid smell from the associated tissue damage.	• Make sure the smell is from organisms and not from the normal distinct odor from the interaction of exudate with some of the dressing material. • Systemic antimicrobial agents are indicated that will treat the causative organisms, and devitalized tissue should be aggressively debrided in wounds with the ability to heal.

Sibbald, R. G., Woo, K., & Ayello, E. A. (2006). Increased bacterial burden and infection: The story of NERDS and STONES. Advances in Skin & Wound Care, 19(8), 447–461.

Table 1: The classification system for defining the presence and severity of an infection of the foot in a person with diabetes[a]

Clinical classification of infection, definitions	IWGDF/IDSA classification
No systemic or local symptoms or signs of infection	1 / Uninfected
Infected: At least two of these items are present: • Local swelling or induration • Erythema > 0.5 but < 2 cm[b] around the wound • Local tenderness or pain • Local increased warmth • Purulent discharge And, no other cause of an inflammatory response of the skin (e.g., trauma, gout, acute Charcot neuro-arthropathy, fracture, thrombosis, or venous stasis)	2 / Mild
Infection with no systemic manifestations and involving: • erythema extending ≥ 2 cmb from the wound margin, and/or • tissue deeper than skin and subcutaneous tissues (e.g., tendon, muscle, joint, and bone)	3 / Moderate
Infection involving bone (osteomyelitis)	Add "(O)"
Any foot infection with associated systemic manifestations (of the systemic inflammatory response syndrome [SIRS]), as manifested by ≥ 2 of the following: • temperature, > 38°C or < 36°C • heart rate, > 90 beats/min • respiratory rate, >20 breaths/min, or PaCO2 < 4.3 kPa (32 mmHg) • white blood cell count >12,000/mm³, or < 4G/L, or > 10% immature (band) forms	4 / Severe
Infection involving bone (osteomyelitis)	Add "(O)"

Note: The presence of clinically significant foot ischaemia makes both diagnosis and treatment of infection considerably more difficult.

[a] infection refers to any part of the foot, not just of a wound or an ulcer.

[b] in any direction, from the rim of the wound.

[c] if osteomyelitis is demonstrated in the absence of ≥ 2 signs/symptoms of local or systemic inflammation, classify the foot as either grade 3(O) (if <2 SIRS criteria) or grade 4(O) if ≥ 2 SIRS criteria) (see text).

Schaper, N. C., van Netten, J. J., Apelqvist, J., Bus, S. A., Hinchliffe, R. J., Lipsky, B. A., & International Working Group on the Diabetic Foot. (2024). Practical guidelines on the prevention and management of diabetes-related foot disease (IWGDF 2023 update). Diabetes/Metabolism Research and Reviews, 40(3), e3657. Management of DFUs: VIPS

Severity of infection	Target Bacteria and Examples of Antibiotic Choices & Scenarios (Classes of antibiotic examples in notes below)	
Mild Treatment duration: 1–2 weeks	**Gram positive cocci: S. aureus, beta-hemolytic streptococci**	cephalexin[c], cloxicillin[g]
	Beta-lactam allergy	clindamycin, moxifloxacin[j], levofloxacin[j], trimethoprim-sulfamethoazole, doxycycline
	Gram positive cocci and Gram-negative rods – if recent antibiotic exposure	amoxicillin/clavulanate[b], ampicillin/sulbactam[b], trimethoprim-sulfamethoazole, levofloxacin[j], moxifloxacin[j].
	High risk for MRSA	trimethoprim-sulfamethoxazole, clindamycin, doxycycline, levofloxacin[j], moxifloxacin[j] (depends on sensitivities), linezolid
Moderate to Severe Treatment duration: 3–4 weeks; osteomyelitis: 6 weeks Oral antibiotic should not be used with severe infection, except to switch once infection has improved. Consider consult with infectious disease specialist Urgent surgical and vascular consult should be considered	**No complicating features: Gram positve cocci +/– Gram negative rods**	amoxicillin/clavulanate[b], ampicillin/sulbactam[b], cefuroxime, cefotaxime, ceftriaxone
	Recent antibiotic exposure: Gram positve cocci +/– Gram negative rods	Ticarcillin/clavulanate, pipercillin/tazobactam, cefuroxime[f], cefotaxime[d], ceftriaxone[e], ertapenem[h]
	Macerated ulcer or warm climate	Gram negative rods including Pseudomonas sp: Pipercillin/tazobactam[k], ticarcillin/clavulanate[k], Cloxicillin[g] + Ceftazidime or ciprofloxicin, meropenum[i] or imipenem[i]
	Ischemic/ Necrosis/ Gas forming: Gram positive cocci +/– Gram negative rods +/– strict anaerobes	amoxicillin/clavulanate[b], ampicillin/sulbactam[b], ticarcillin/clavulanate[k], pipercillin/tazobactam[k], ertapenem[h], meropenem[i], imipenem[i] Cefuroxime[f] or cefotaxime[d] or ceftriaxone[e] + clindamycin or metronidazole.
	MRSA risk – add or substitutes	vancomycin[l], linezolid, daptomycin, fusidic acid, trimethoprim-sulfamethoxazole, doxycycline, daptomycin
	Risk factors for resistant Gram negative rods: Extended-spectrum beta-lactamase	ertapenem[h], imipenem[i], meropenem[i], ciprofloxicin[j], amikacin[a], colistin.

Schaper, N. C., van Netten, J. J., Apelqvist, J., Bus, S. A., Hinchliffe, R. J., Lipsky, B. A., & International Working Group on the Diabetic Foot. (2024). Practical guidelines on the prevention and management of diabetes-related foot disease (IWGDF 2023 update). Diabetes/Metabolism Research and Reviews, 40(3), e3657. Management of DFUs: VIPS

Management of DFUs: VIPS

V Vascular supply is adequate

I Infection control is adequate

P Pressure offloading

S Sharp/surgical debridement

Inlow, S., Orsted, H., & Sibbald, R. G. (2000). Best practices for the prevention, diagnosis and treatment of diabetic foot ulcers. Ostomy/Wound Management, 46(11), 55-68.

Peripheral Arterial Disease (PAD)

- PAD is atherosclerosis affecting the peripheral arteries which may cause stenosis or occlusion of the arteries.
- PAD is very prevalent and has a high morbidity and mortality. 1 in 3 diabetics over age 50 years and 1 in 5 adults over age 60 have PAD.
- It has an insidious onset with most patients being initially asymptomatic. 50% of people with PAD are asymptomatic, 40% present with Intermittent Claudication (IC), and about 10% with Chronic Limb-Threatening Ischemia (CLTI).
- **Intermittent Claudication** is pain, heaviness, or cramping in the legs that occurs with walking the same distance, and is relieved within 10 minutes of rest.
- **Chronic Limb-Threatening Ischemia** or CLTI is a severe progression of PAD with severely compromised blood flow to the leg. It presents with rest pain plus or minus a foot wound. The pain is defined to be present for greater than 2 weeks.
- A common physical finding is dependent rubor, where the affected foot may appear dusky red when the foot is below heart level. Elevating the foot causes loss of color and worsens ischemic pain.
- 25% of patients with CLTI require an amputation within 1 year. The mortality rate of IC is 30% at 5 yrs, CLTI is 25% at 1 year and 60% at 5 years. This is higher than most types of cancer.

Gornik HL, Aronow HD, Goodney PP, et al. 2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS Guideline for the Management of Lower Extremity Peripheral Artery Disease: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation. 2024;149(24):e1313-e1410. doi:10.1161/CIR.0000000000001251

Edinburgh Claudication Questionnaire

1. **Do you get a pain or discomfort in your leg(s) when you walk?**
2. **Does this pain ever begin when you are standing still or sitting?**
3. Do you get it if you walk uphill or hurry?
4. Do you get it when you walk at an ordinary pace on the level?
5. **What happens to it if you stand still?**

   Usually continues more than 10 minutes.

   Usually disappears in 10 minutes or less.

6. Where do you get this pain or discomfort?

Sensitivity 91.3% (95% CI)

Specificity 99.3% (95% CI)

Answers to the questions in green should be YES

Answers to the questions in red should be NO

Gornik, H. L., Aronow, H. D., Goodney, P. P., Arya, S., Brewster, L. P., Byrd, L., ... & Wilkins, L. R. (2024). 2024 ACC/AHA/AACVPR/APMA/ABC/SCAI/SVM/SVN/SVS/SIR/VESS guideline for the management of lower extremity peripheral artery disease: a report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Journal of the American College of Cardiology, 83(24), 2497-2604.

Ankle-Brachial Pressure Index

A guide to interpreting ABPI investigations:

Value	Interpretation	Clinical Correlation
> 1.40	Interpret with caution; may indicate calcified vessels	• Be aware of possible falsely elevated measures.
1.0 - 1.40	Normal arterial flow	• Pulses palpable and no signs of arterial disease.
0.91 - 0.99	Borderline arterial flow	• Pulses palpable and no signs of arterial disease.
0.70 - 0.90	Mild impairment of arterial flow	• Often have no symptoms and no clinical signs of arterial disease.
0.41 - 0.69	Moderate impairment of arterial flow	• Abnormal exam • May give history of claudication pain
< 0.40	Severe impairment of arterial flow (critical limb ischemia)	• Abnormal exam • May give history of rest pain

Thurston, B., & Dawson, J. (2019). Ankle Brachial Pressure Index: An update for the vascular specialist and general practitioner. Vascular, 27(5), 560-570.

Acute Limb Ischemia

- Acute limb ischemia is a vascular emergency due to an acute occlusive event more typically caused by thrombus rather than by embolus. This event may lead to irreversible ischemia, permanent neuromuscular damage, or major amputation regardless of therapy. The clinical features of acute limb ischemia include the **6 "P's":**

Pain
Pallor
Paresthesia
Paralysis
Pulselessness
Poikilothermia (perishingly cold)

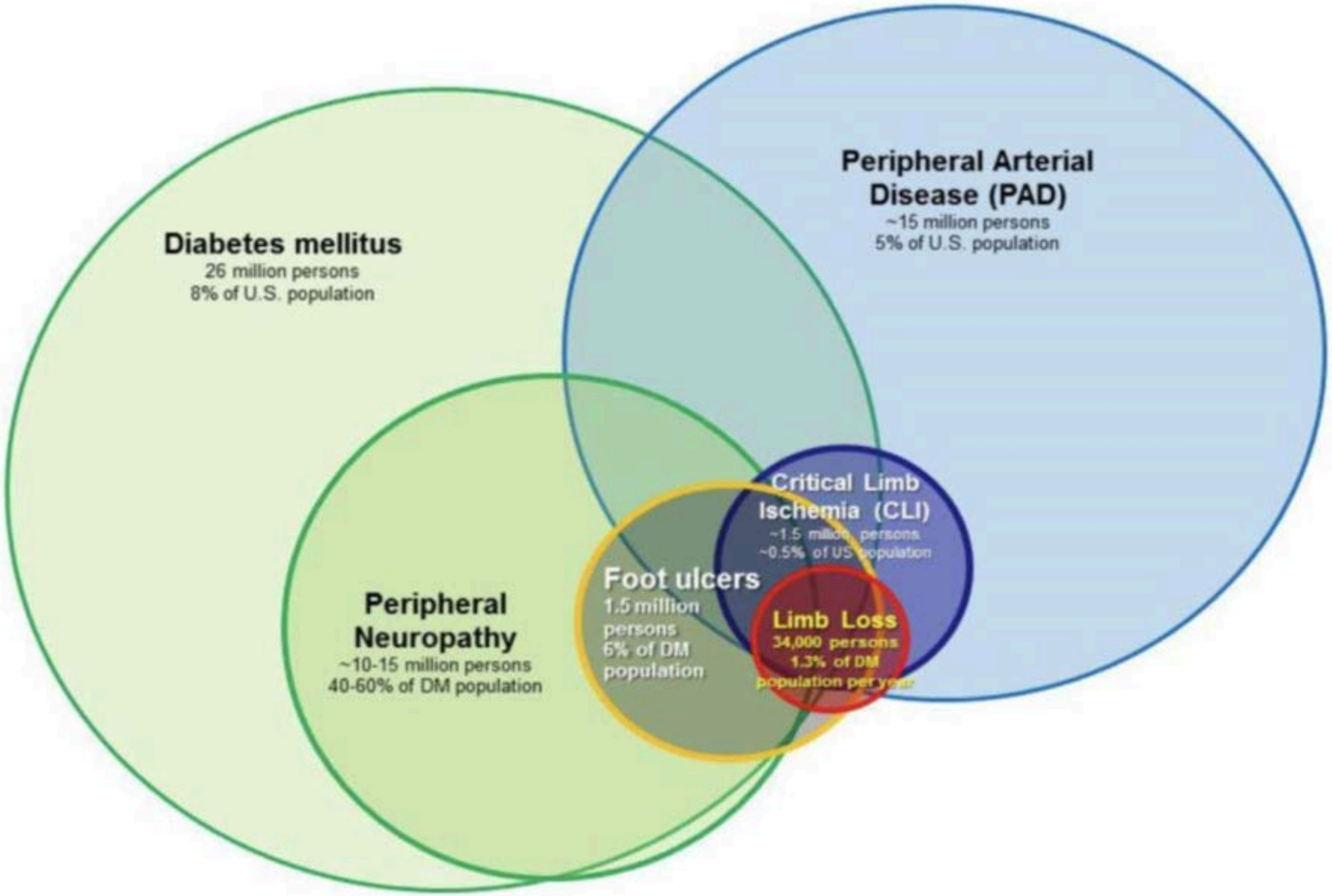
Björck M, Earnshaw JJ, Acosta S, et al. Editor's Choice - European Society for Vascular Surgery (ESVS) 2020 Clinical Practice Guidelines on the Management of Acute Limb Ischaemia. Eur J Vasc Endovasc Surg. 2020;59(2):173-218. doi:10.1016/j.ejvs.2019.09.006

Acute Limb Ischemia

- ALI carries a very high risk of morbidity and mortality.
- 20% of patients require amputation. The 30-day mortality rate is 10-15%, and the 1-year mortality rate is 40%.
- Suspected cases of ALI should be referred immediately to vascular surgery as imaging prior to referral may delay limb-saving procedures.
- The golden window for limb salvage is considered to be 4-6 hours after symptom onset.

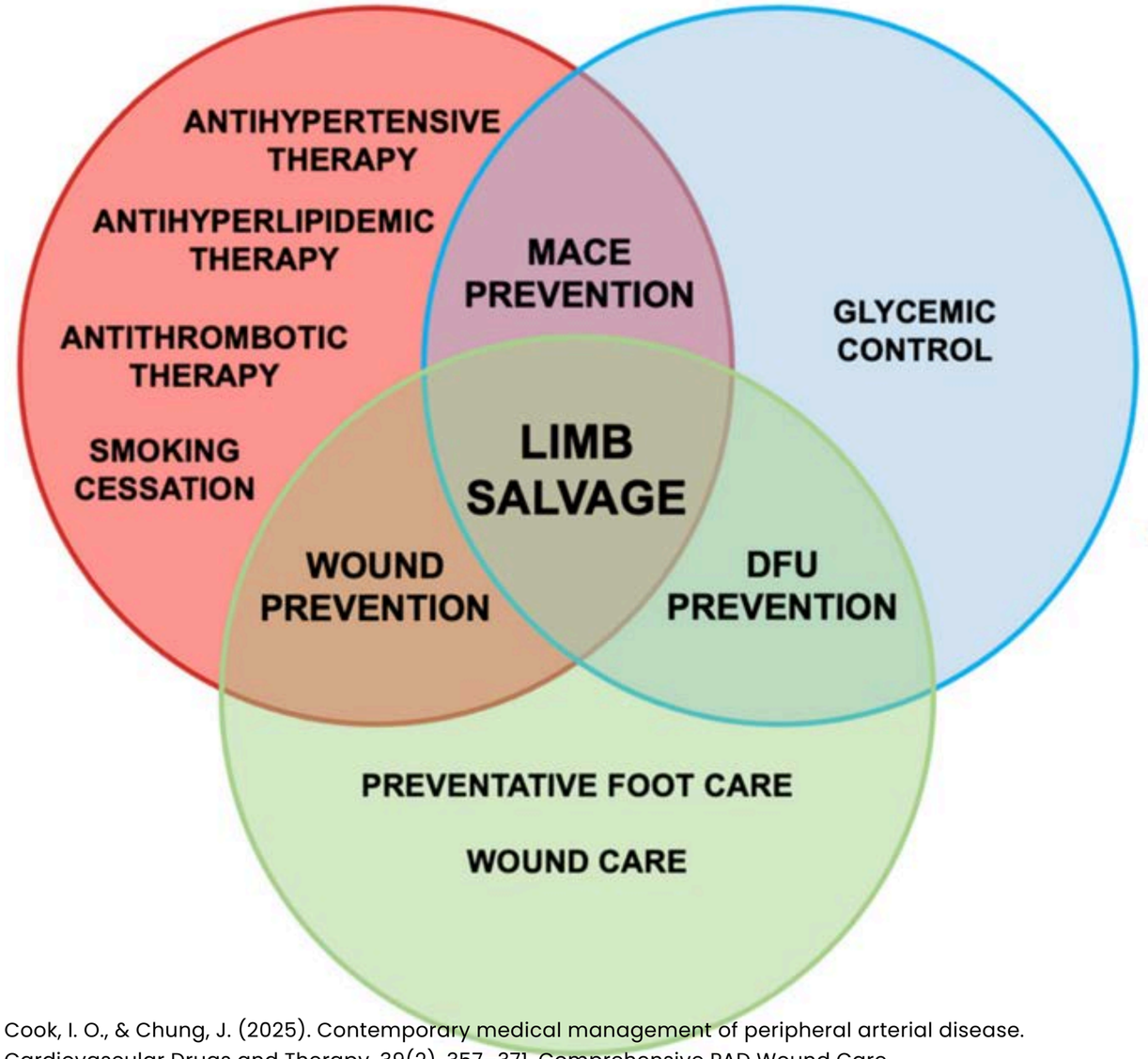
Björck M, Earnshaw JJ, Acosta S, et al. Editor's Choice - European Society for Vascular Surgery (ESVS) 2020 Clinical Practice Guidelines on the Management of Acute Limb Ischaemia. Eur J Vasc Endovasc Surg. 2020;59(2):173-218. doi:10.1016/j.ejvs.2019.09.006

Risk Factors for Lower Limb Loss



Barshes, N. R., Sigireddi, M., Wrobel, J. S., Robbins, J. M., Kougias, P., Armstrong, D. G., & Mills, J. L. (2013). The system of care for the diabetic foot: Objectives, outcomes, and opportunities. Diabetic Foot & Ankle, 4, 21847. Risk Factors for Lower Limb Loss

Comprehensive PAD Wound Care



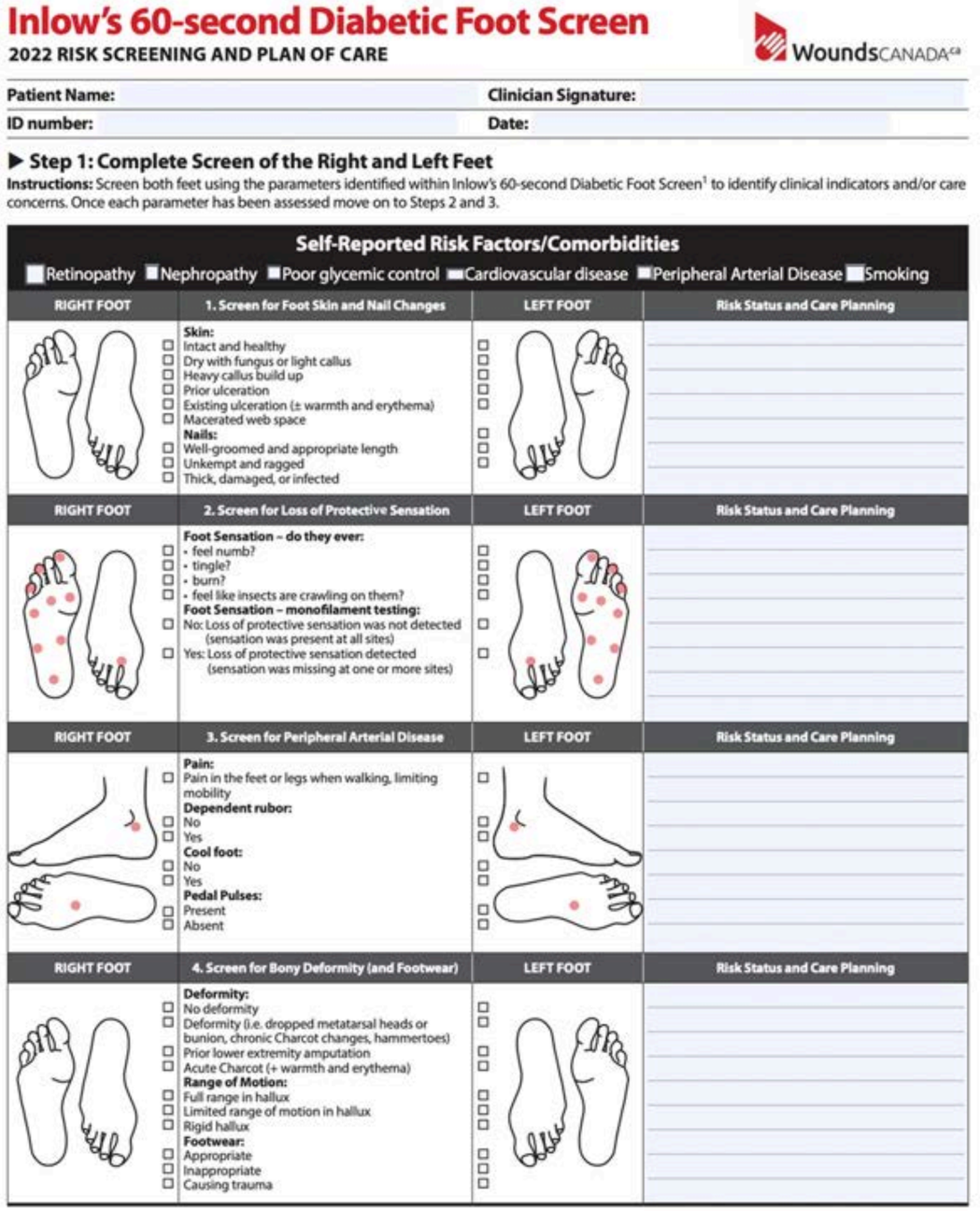
Cook, I. O., & Chung, J. (2025). Contemporary medical management of peripheral arterial disease. Cardiovascular Drugs and Therapy, 39(2), 357–371. Comprehensive PAD Wound Care

Clinical Best Practices and Tools

Speaker: Harleen Sanghera, BScN, MN, NP-PHC

InLow's Diabetic Foot Screen

- All diabetic patients require early assessment of their feet by a health practitioner utilizing this best practice tool.



Inlow's 60-second Diabetic Foot Screen

2022 RISK SCREENING AND PLAN OF CARE

WoundsCANADA

Patient Name: **Clinician Signature:**

ID number: **Date:**

▶ Step 1: Complete Screen of the Right and Left Feet

Instructions: Screen both feet using the parameters identified within Inlow's 60-second Diabetic Foot Screen[1] to identify clinical indicators and/or care concerns. Once each parameter has been assessed move on to Steps 2 and 3.

Self-Reported Risk Factors/Comorbidities

☐ Retinopathy ☐ Nephropathy ☐ Poor glycemic control ☐ Cardiovascular disease ☐ Peripheral Arterial Disease ☐ Smoking

RIGHT FOOT	1. Screen for Foot Skin and Nail Changes	LEFT FOOT	Risk Status and Care Planning
	Skin: ☐ Intact and healthy ☐ Dry with fungus or light callus ☐ Heavy callus build up ☐ Prior ulceration ☐ Existing ulceration (± warmth and erythema) ☐ Macerated web space **Nails:** ☐ Well-groomed and appropriate length ☐ Unkempt and ragged ☐ Thick, damaged, or infected		

RIGHT FOOT	2. Screen for Loss of Protective Sensation	LEFT FOOT	Risk Status and Care Planning
	Foot Sensation – do they ever: ☐ • feel numb? ☐ • tingle? ☐ • burn? ☐ • feel like insects are crawling on them? **Foot Sensation – monofilament testing:** ☐ No: Loss of protective sensation was not detected (sensation was present at all sites) ☐ Yes: Loss of protective sensation detected (sensation was missing at one or more sites)		

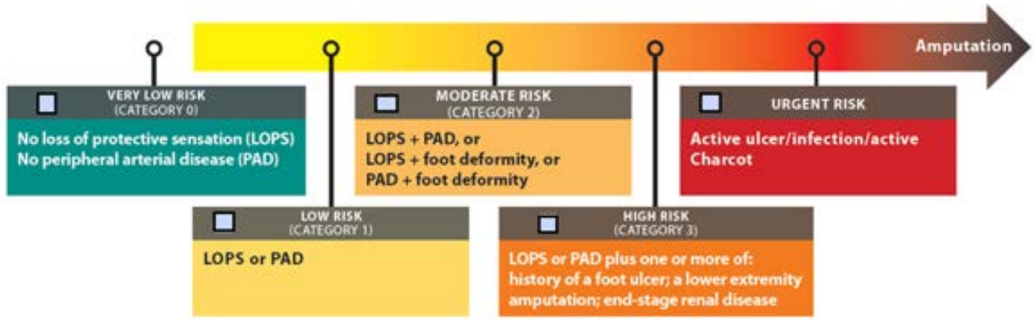
RIGHT FOOT	3. Screen for Peripheral Arterial Disease	LEFT FOOT	Risk Status and Care Planning
	Pain: ☐ Pain in the feet or legs when walking, limiting mobility **Dependent rubor:** ☐ No ☐ Yes **Cool foot:** ☐ No ☐ Yes **Pedal Pulses:** ☐ Present ☐ Absent		

RIGHT FOOT	4. Screen for Bony Deformity (and Footwear)	LEFT FOOT	Risk Status and Care Planning
	Deformity: ☐ No deformity ☐ Deformity (i.e. dropped metatarsal heads or bunion, chronic Charcot changes, hammertoes) ☐ Prior lower extremity amputation ☐ Acute Charcot (+ warmth and erythema) **Range of Motion:** ☐ Full range in hallux ☐ Limited range of motion in hallux ☐ Rigid hallux **Footwear:** ☐ Appropriate ☐ Inappropriate ☐ Causing trauma		

Wounds Canada. (2025). Clinical tools. https://www.woundscanada.ca/health-care-professional/resources-health-care-pros/library

InLow's Diabetic Foot Screen

- Risk Stratification guide



Risk Category	Clinical Indicators	Screening Frequency	Recommendations and Actions**
Very Low Risk (Category 0)	No loss of protective sensation (LOPS) and no peripheral arterial disease (PAD)	Screen every 12 months	☐ Education on: risk factors; daily foot inspection; appropriate footwear and foot- and nail-care;[1] when/how to seek medical attention if needed ☐ Daily inspection of feet ☐ Appropriate foot and nail care ☐ Well-fitting footwear ☐ Exercise as able
Low Risk (Category 1)	LOPS or PAD	Screen every 6–12 months	☐ Education on: risk factors (including LOPS or PAD); daily foot inspection; appropriate footwear and foot- and nail-care; when/how to seek medical attention if needed ☐ Daily inspection of feet ☐ Professional foot and nail care, including treatment of onychomycosis and Tinea pedis if present ☐ Well-fitting, sensible footwear with custom, full-contact foot orthoses and diabetic socks ☐ Vascular studies ± referral to a vascular investigation +/- vascular surgeon ☐ Pain management for ischemic pain, if present ☐ Recommend non-weight bearing exercise program https://www.diabetes.ca/nutrition—fitness/exercise—activity
Moderate Risk (Category 2)	LOPS + PAD, or LOPS + foot deformity, or PAD + foot deformity	Screen every 3–6 months	☐ Education on: risk factors (including LOPS ± PAD ± foot deformity); daily foot inspection; appropriate footwear and foot- and nail-care; when/how to seek medical attention if needed ☐ Daily inspection of feet ☐ Professional foot and nail care, treatment of onychomycosis and Tinea pedis if present ☐ Well-fitting, orthopaedic footwear with custom full-contact total contact casted foot orthoses and diabetic socks. Footwear must accommodate any deformities present ☐ Vascular studies ± referral to a vascular surgeon ☐ Pain management for ischemic or neuropathic pain ☐ Referral to a general, orthopedic or foot surgeon, if indicated, surgically manage foot deformities ☐ Recommend non-weight bearing exercise program https://www.diabetes.ca/nutrition—fitness/exercise—activity
High Risk (Category 3)	LOPS or PAD plus one or more of: • history of a foot ulcer • a lower extremity amputation • end-stage renal disease	Screen every 1–3 months	☐ Education on: risk factors (including LOPS ± PAD ± foot deformity); risk of ulcer recurrence; daily foot inspection; appropriate footwear and foot- and nail-care; when/how to seek medical attention if needed ☐ Daily inspection of feet ☐ Professional foot and nail care, including treatment of onymycosis and Tinea pedis, if present ☐ Well-fitting, orthopedic footwear with custom full-contact total contact casted foot orthoses and diabetic socks. Footwear must accommodate any deformities present ☐ Modified footwear and/or prosthesis based on level of amputation ☐ Vascular studies ± referral to a vascular surgeon ☐ Pain management for ischemic or neuropathic pain ☐ Recommend non-weight bearing exercise program https://www.diabetes.ca/nutrition—fitness/exercise—activity
Urgent Risk	Active ulcer/infection/ active Charcot	Urgent care required	☐ Education on: signs of wound infection and wound care; risk factors (LOPS ± PAD ± foot deformity); risk of ulcer recurrence; daily foot inspection; appropriate footwear and foot- and nail-care; when/how to seek medical attention ☐ Daily inspection of feet ☐ Professional foot and nail care, including treatment of onymycosis and Tinea pedis, if present ☐ Offloading with total contact cast, removable cast walker or wound shoe to close ulcers and/or to immobilize Charcot foot ☐ Vascular studies ± referral to vascular surgeon or limb preservation clinic, as indicated ☐ Pain management for ischemic pain or neuropathic pain ☐ Referral to a general, orthopedic or foot surgeon, if indicated, to surgically manage foot deformities ☐ Referral to infectious diseases to manage infection, if indicated, and/or to a general, orthopedic or foot surgeon to debride infectious tissue ± bone, if indicated

Wounds Canada. (2025). Clinical tools. https://www.woundscanada.ca/health-care-professional/resources-health-care-pros/library

Quick Diabetic Foot Assessment – Abnormal

Photographic Wound Assessment Tool (PWAT)

- For tracking of progress in wound healing.
- Ideally used in conjunction with photographs taken at time of each assessment.
- Note: some EMRs have photo upload capability to for use with mobile apps (e.g. PS Suites).

Item	Assessment			Score
1. Size	0 = wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 = 0.3 to 2.0 cm^2 2 = 2.0 to 10.0 cm^2 3 = 10.0 to 20.0 cm^2 4 = greater than 20.0 cm^2			0
2. Depth	0 = wound is healed (skin intact) or nearly closed (<0.3cm^2) 1 = full thickness 2 = unable to judge because majority of wound base is covered by yellow/black eschar 3 = full thickness involving underlying tissue layers 4 = tendon joint capsule visible/bone present in wound base			0
3. Necrotic Tissue Type	0 = None visible or wound is closed (skin intact) or nearly closed (<0. 3cm^2) 1 = majority (>50%) of necrotic tissue is thin white/grey or yellow slough 2 = majority of necrotic tissue is thick white yellow slough or fibrin 3 – majority of necrotic tissue is white/grey devitalized tissue or eschar 4 = majority of necrotic tissue is hard grey to black eschar			0
4. Total Amount of Necrotic Tissue	0 = None visible in open wound or wound is closed (skin intact) or nearly closed(0.3cm^2) 1 = less than 25% of wound bed covered 2 = 25% to 50% of wound covered 3 = greater than 50% and less than 75% of wound covered 4 = 75% to 100% of wound covered			0
5. Granulation Tissue type	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 = majority (>50%) of granulation tissue is healthy looking (even bright red appearance) 2 = majority of granulation tissue is unhealthy (eg. pale, dull, dusky, hypergranulation) 3 = majority of granulation tissue is damaged, friable, degrading 4 = there is no granulation tissue present in the base of the open wound (all necrotic)			0
6. Total Amount of Granulation Tissue	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 = 75% to 100% of open wound is covered with granulation tissue 2 = greater than 50% and less than 75% of open wound is covered with granulation tissue 3 = 25% to 50% of wound bed is covered with granulation tissue 4 = less than 25% of wound bed is covered with granulation tissue			0
7. Edges (directly touching and within 0.5cm of wound edge)	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) or edges are indistinct, diffuse, not clearly visible because of re-epithelialization 1 = majority (>50%) of edges are attached with an advancing border of epithelium 2 = majority of edges are attached even with wound base (not advancing) 3 = majority of edges are unattached and/or undermined 4 = majority of edges are rolled, thickened or fibrotic (do not include callus formation)			0
8. Periulcer Skin Viability (consider skin visible in photo or within 10 cm of wound edge)	Number of factors affected 0 = None 1 = One only 2 = Two or Three 3 = Four or Five 4 = six or more	- callus - dermatitis - maceration - desiccation or cracking - bright red or erythemic - purple or bruised	- edema - excoriation - skin tearing/irritation r/t wound dressing or tape - hypo/hyper pigmentation - other: _____	0
TOTAL SCORE				*

Visit Type: *

Wounds Canada. (2025). Clinical tools. https://www.woundscanada.ca/health-care-professional/resources-health-care-pros/library

Semmes - Weinstein Monofilament

- Single use screening device used to assess diabetic peripheral neuropathy or the loss of protective sensation.
- Technique: Press and bend filament.

Semmes Weinstein 5.07 (10g)
Sensory Testing Monofilaments

Helpful Tools

Hand Held Doppler

- Vascular Doppler uses high-frequency sound waves to measure the amount of blood flow through your arteries and veins, usually those that supply blood to your arms and legs.
- Helps to screen for Peripheral Arterial Disease.

Disposable Paper Wound Measuring Tool

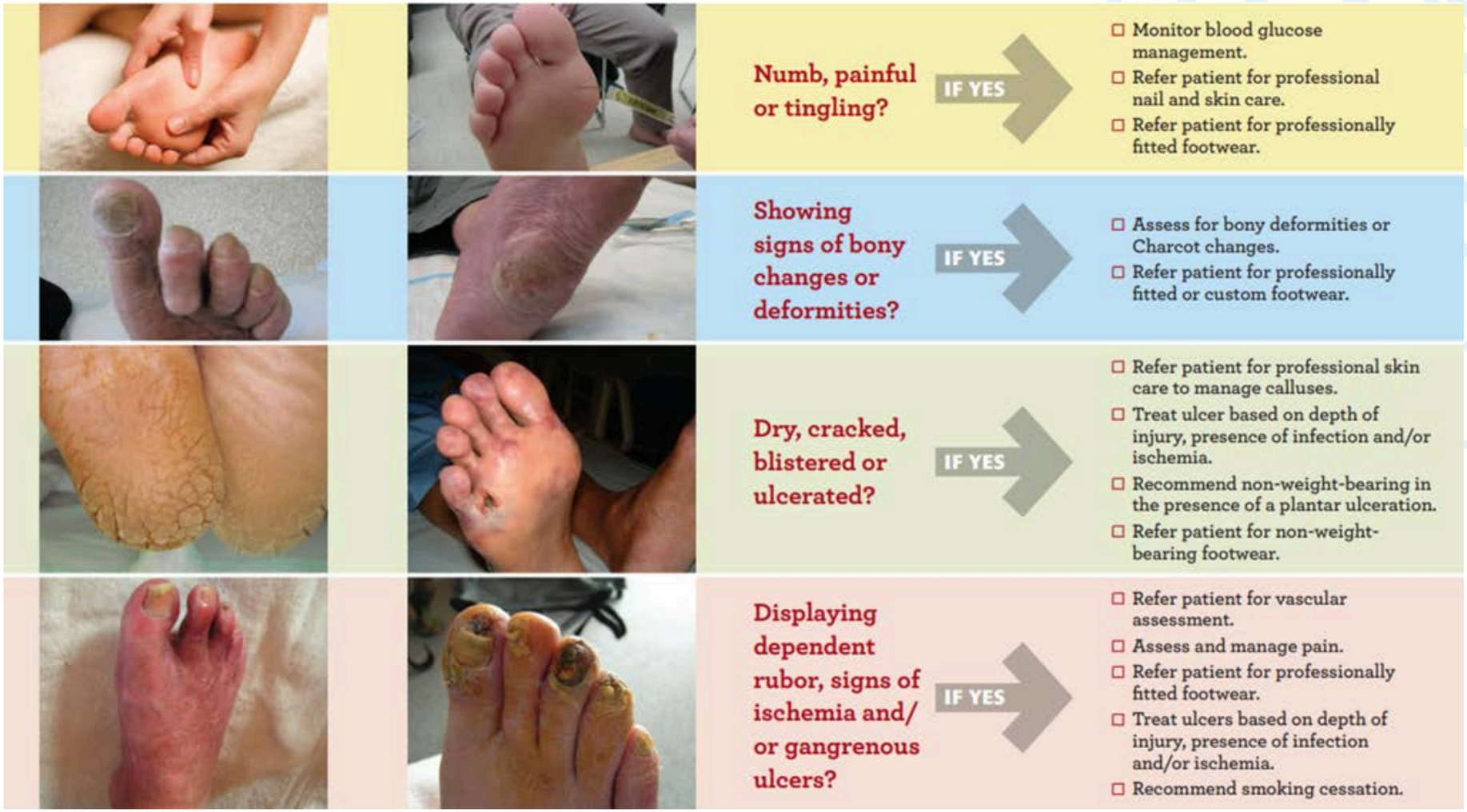
- Single use paper rulers used by clinicians to measure wounds. Useful aid in wound photography and to assist in monitoring the progress of wound healing over time.

Helpful Tools

Sterile Cotton-Tipped Applicators

- For wound depth measurement.

Wounds Canada: Diabetes, Healthy Feet & Your Patients



Wounds Canada. 2021 Diabetes, healthy feet and your patients [Brochure]. https://www.woundscanada.ca/docman/public/diabetes-healthy-feet-and-you/dhf-brochures/933-brochure-diabetes-healthy-feet-and-your-patients-en/file

Patient Education & Self Management

Tips for Patients

- Check feet DAILY!
- Check for ulcers, sores, cuts, redness, bruises, calluses.
- Use a mirror to see the bottom of the feet.
- Wash with soap & warm water.
- Cut nails straight across.
- Moisturize (not between the toes).
- Wear will-fitting footwear indoors and outdoors.

Patient Education & Self Management

Basic Skin and Nail Care for Your Feet

SET UP:

1. Get comfortable in a location with good lighting.
2. Arrange your tools: a pumice stone (single use), nail file (preferably single use), a straight-edge nail clipper and a mild pH-balanced, non-scented moisturizer.

CLEAN:

3. Look at your feet and wash them with lukewarm water, a mild pH-balanced soap, and a soft washcloth **(a).** Dry well, especially between the toes. **Do not soak your feet.**
4. Carefully clean under the exposed or free edge of the nail with the file **(b).**

TRIM AND CONDITION:

5. Clip your nails straight across, leaving a 3 mm (1/8 inch) free edge across the top of the nail **(c).**
6. Pumice or file the nail corners so they are not sharp.
7. Decrease callus build-up carefully with a pumice stone **(d).**
8. Moisturize your feet if they are dry, but not between your toes.

FINISH:

9. Take note of anything unusual (and/or take a photo).
10. Clean all reusable tools with soap and warm water and let them air dry. Once dry, disinfect the tools with 70% isopropyl alcohol by wiping.

Figures a–d: Start with a clean foot, clean under free edge, pumice thickened skin

Important:

Do not cut your nails too short. Leave a 3 mm (1/8 inch) free edge.

CAUTION:

If you have diabetes, you are at higher risk for foot complications than the average person. If you do your own skin and nail care, injuries can happen that can lead to serious harm. If your health-care provider has told you that your risk for complications is low and you can do your own skin and nail care, follow the steps above. However, if you are at high risk, only a trained professional should do the skin and nail care for your feet, beyond daily foot washing, drying and moisturizing.

Daily Foot Exam Worksheet

Make copies of this worksheet and follow these instructions to record the condition and progress of your feet every week:

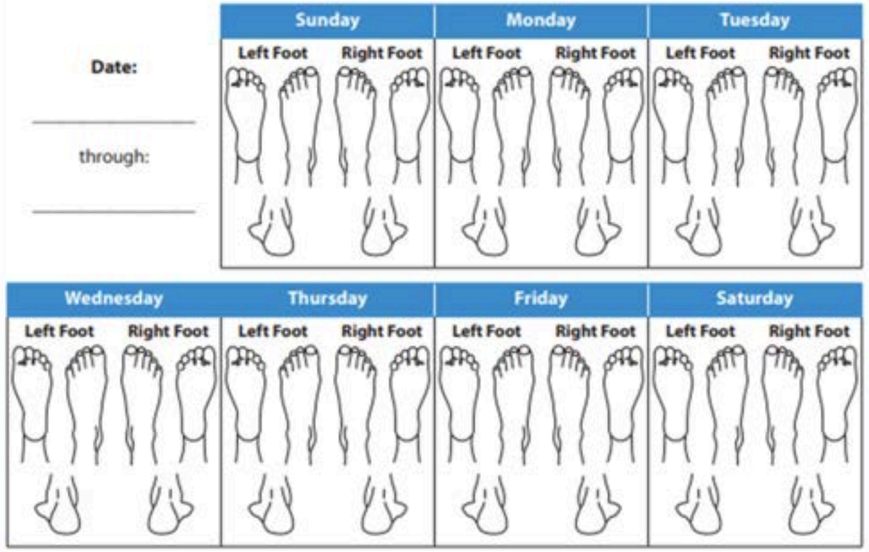
a. Examine all parts of your feet daily, including the areas between your toes and the top, sides and bottom. Use a mirror, if you need to, to examine the bottoms of your feet. Look for any changes, such as redness, blistering, callus, scratches and any areas of shape change. Mark these on the drawings below:
   - Mark any areas of **redness** with an **R**
   - Mark any **callus** areas with a **C**
   - Mark any **scratches, blisters or ulcers** (ulcers are wounds or breaks in the skin) with a **U**
   - Mark any **shape change** of your foot with an **S**

b. Examine all your toenails to ensure they are the proper length and have no rough edges.

c. Measure the temperature of your feet using a personal infrared thermometer to detect signs of temperature change that can alert you to early signs of complication. Infrared thermometers can be ordered online and are available at most auto supply and hardware stores and pharmacies.

Date: _____

through: _____



Wounds Canada. (2023.). Home safe: Diabetic foot care (1942E). https://www.woundscanada.ca/docman/public/patient-or-caregiver/1728-home-safe-df-care-1942e/file

Supporting Transient Population Bases

- **Build trust through non-judgmental, trauma-informed care:**
  - Meet clients where they are by prioritizing realistic treatment plans, harm reduction strategies, and culturally sensitive communication to overcome stigma and mistrust in medical systems.

- **Adapt care for instability and limited access:**
  - Address barriers like lack of housing, transportation, and healthcare coverage by offering mobile care.
  - Provide clean wound supplies.
  - Coordinate with housing/case workers.
  - Advocate for clients who cannot follow up.

CASE #1 WITH POLL QUESTIONS

Diabetic Foot Ulcer

CASE #1 – Mr. P

- 52 year old male presented to his primary care practitioner's urgent care clinic on Oct 26, 2024 with c/o blister on left 5th toe.

- Onset of blister many months prior then after a long walk the blister burst and there was purulent discharge. Patient went to a WIC on Oct 25, 2024 where "the doctor refused to prescribe or do anything!"

- **Past Medical History** – DM2 dx 2000, diabetic retinopathy, diabetic peripheral neuropathy, hypertension, hypercholesterolemia, obesity with bariatric surgery 2014, OSA, MDD, and a smoker.

- **Medications** - Gabapentin, Xigduo, Januvia, Coversyl, Zoloft, Wellbutrin, and Percocet.

- **O/E –** small ulcer between 4th and 5th toes; 5th toe appeared macerated and edematous; erythema, heat, and edema present and spreading 3 cm up dorsum of the foot.
  - (Pulses, cap refill, sensation were not documented)

- **A/P –** Infected diabetic foot ulcers on 4th & 5th toes with cellulitis - r/o osteomyelitis.
  - C&S swab taken, started on oral Clavulin and topical Fucidin, x-ray foot and labs ordered.
  - Advised to f/u with PCP within 1 week.

Q1: Which of these assessments and/or interventions are not recommended?

A. Applying a protective dressing to the wound.

B. Advising exercise to improve circulation to the foot.

C. Inspecting the patient's foot wear for appropriate fit / any defect in shoe that could cause trauma.

D. Asking the patient about the presence of pain, it's location, onset, duration, quality, worsening/relieving factors, and severity.

E. None of the above.

Q1: Which of these assessments and/or interventions are not recommended?

A. Applying a protective dressing to the wound.

B. Advising exercise to improve circulation to the foot.

C. Inspecting the patient's foot wear for appropriate fit / any defect in shoe that could cause trauma.

D. Asking the patient about the presence of pain, it's location, onset, duration, quality, worsening/relieving factors, and severity.

E. All the above.

Q2: What parts of the physical examination were not assessed nor documented adequately by the urgent care physician?

A. Peripheral vascular exam (pedal pulses, capillary refill).

B. Sensation (with use of monofilament).

C. Description of wound - size (length, width, depth), appearance of wound bed, presence of exudate, debris, odour.

D. Vital signs.

E. All the above.

Q2: What parts of the physical examination were not assessed nor documented adequately by the urgent care physician?

A. Peripheral vascular exam (pedal pulses, capillary refill).

B. Sensation (with use of monofilament).

C. Description of wound - size (length, width, depth), appearance of wound bed, presence of exudate, debris, odour.

D. Vital signs.

E. All the above.

Q3: What interdisciplinary referrals might the urgent care physician have made for this patient?

A. Referral to a lower limb preservation site/clinic.

B. Referral to vascular surgeon.

C. Referral to Ontario Health @ Home Wound Care Clinic.

D. Advise the patient to follow up with their PCP.

E. All the above.

Q3: What interdisciplinary referrals might the urgent care physician have made for this patient?

A. Referral to a lower limb preservation site/clinic.

B. Referral to vascular surgeon.

C. Referral to Ontario Health @ Home Wound Care Clinic.

D. Advise the patient to follow up with their PCP.

E. All the above.

Investigations

- C&S swab grew Strep group B and Staph Aureus
- CBC normal
- ESR – 47
- CRP –124.7
- A1C – 9.4
- Random glucose –13.6

Patient was assessed by his PCP on Oct 30, 2024

O/E – pt. looked well – temp 36.7 HR: 100
- left foot was hot to touch, edematous, with erythema present; area affected had progressed up dorsum of foot over the lateral malleolus and anterior aspect of ankle.
- pedal pulses excellent, cap refill normal.
- fine touch via monofilament testing was absent up to mid foot.
- excoriated skin opposite callous between 4th and 5th toes.
- ulcer lateral aspect of 5th toe.

A/P – Infected diabetic foot ulcer L 5th toe with cellulitis r/o osteomyelitis.
- to ER for IV antibiotics – urgent referral to Ontario Health atHome - Wound Care Clinic.
- offloading – pt works at U-Haul – lots of walking/lifting involved – so off work Oct 30-Dec 1 .

ER visit Oct 30, 2024

- ER physician started IV Ceftriaxone 2 g daily x 14 days.
- X-ray not performed due to “no indication of osteomyelitis”.

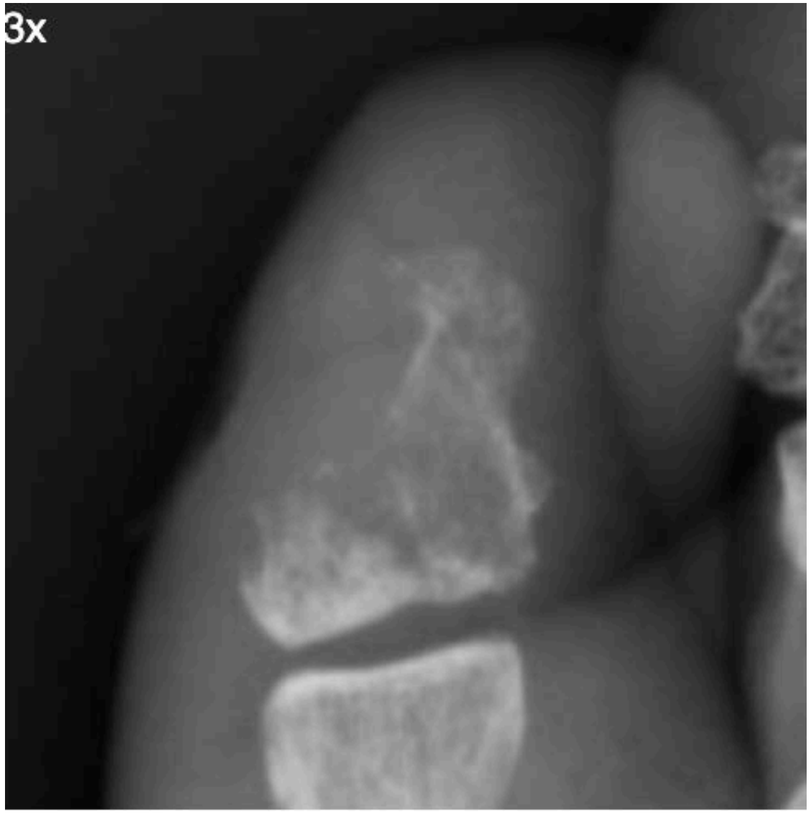
X-Ray Foot (previously ordered by urgent care MD) done Oct 31, 2024 showed:

- Distraction of the middle phalanx with some bone fragmentation associated with an underlying bone expansion and pathological intra-articular fracture extending at the base of the middle phalanx at the PIP joint.

- Resorption of bone at lateral aspect is seen. Marked diffuse soft tissue swelling. Bone abnormality and destruction involves the terminal phalanx as well. Unable to visualize the DIP joint consistent with joint distraction. Findings in keeping with septic arthritis and osteomyelitis.

- Surgical opinion recommended. Proximal phalanx appears intact; 5th MTP joint intact.


L
5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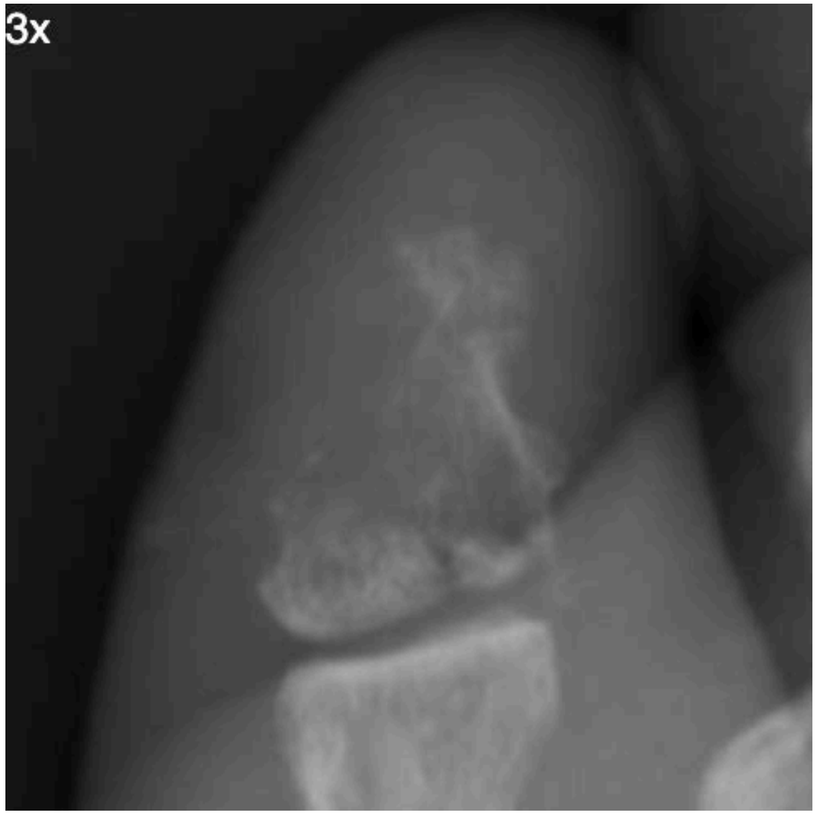
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Follow-up visit with PCP November 1st, 2024

- The area of cellulitis had improved by 1/3
- The IV Ceftriaxone was extended to 4 weeks due to the osteomyelitis seen on x-ray
- Best practice wound-care and offloading by Wound Care Clinic was requested
- Referral to vascular surgeon; booked for Nov 7, 2024
- Referral to Windsor Lower Limb Wound Prevention & Treatment Clinic

Vascular surgeon consult Nov 7, 2024

- The ulcer was debrided and revealed healthy pink skin underneath
- IV antibiotics were continued
- Follow up in 4-6 weeks to re-evaluate

LLPS Consult Nov 18, 2024

- Cellulitis and ulcer greatly improved

O/E – See Inlow's, photo, and PWAT

- No erythema, no pain, warm to touch, bilateral pulses excellent

Case 1: Mr. P.

Inlow's 60-second Diabetic Foot Screen

HS

2022 RISK SCREENING AND PLAN OF CARE

WoundsCANADA[ca]

▶ Step 1: Complete Screen of the Right and Left Feet

☑ Patient seen at ED for lower limb concern since last visit

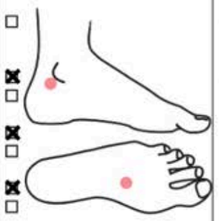
Instructions: Screen both feet using the parameters identified within Inlow's 60-second Diabetic Foot Screen[1] to identify clinical indicators and/or care concerns. Once each parameter has been assessed move on to Steps 2 and 3.

Self-Reported Risk Factors/Comorbidities

☐ Retinopathy ☐ Nephropathy ☐ Poor glycemic control ▬ Cardiovascular disease ☐ Peripheral Arterial Disease ☐ Smoking

RIGHT FOOT	1. Screen for Foot Skin and Nail Changes	LEFT FOOT	Risk Status and Care Planning
	**Skin:** ☐ Intact and healthy ☒ Dry with fungus or light callus ☐ Heavy callus build up ☐ Prior ulceration ☐ Existing ulceration (± warmth and erythema) ☒ Macerated web space **Nails:** ☒ Well-groomed and appropriate length ☐ Unkempt and ragged ☐ Thick, damaged, or infected		

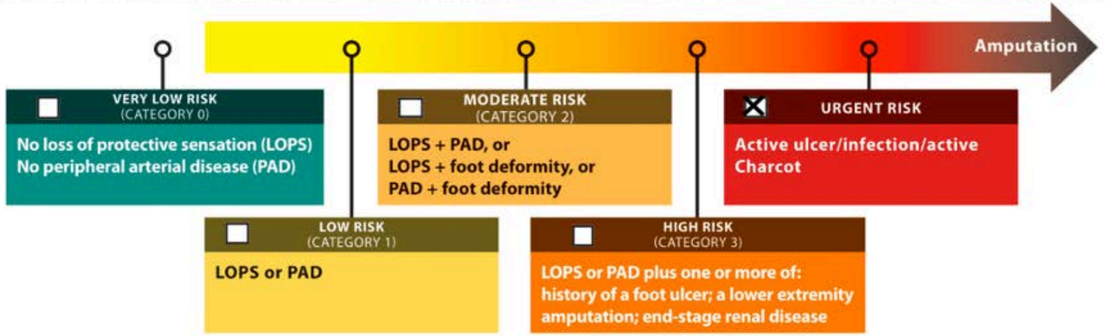
RIGHT FOOT	2. Screen for Loss of Protective Sensation	LEFT FOOT	Risk Status and Care Planning
	**Foot Sensation – do they ever:** ☒ • feel numb? ☒ • tingle? ☐ • burn? ☐ • feel like insects are crawling on them? **Foot Sensation – monofilament testing:** ☐ No: Loss of protective sensation was not detected (sensation was present at all sites) ☒ Yes: Loss of protective sensation detected (sensation was missing at one or more sites)		right foot - black areas are loss of sensation unable to assess left foot - in dressing but does c/o neuropathy symptoms

RIGHT FOOT	3. Screen for Peripheral Arterial Disease	LEFT FOOT	Risk Status and Care Planning
	**Pain:** ☐ Pain in the feet or legs when walking, limiting mobility **Dependent rubor:** ☒ No ☐ Yes **Cool foot:** ☒ No ☐ Yes **Pedal Pulses:** ☒ Present ☐ Absent		

RIGHT FOOT	4. Screen for Bony Deformity (and Footwear)	LEFT FOOT	Risk Status and Care Planning
	**Deformity:** ☐ No deformity ☒ Deformity (i.e. dropped metatarsal heads or bunion, chronic Charcot changes, hammertoes) ☐ Prior lower extremity amputation ☐ Acute Charcot (+ warmth and erythema) **Range of Motion:** ☒ Full range in hallux ☐ Limited range of motion in hallux ☐ Rigid hallux **Footwear:** ☐ Appropriate ☒ Inappropriate ☐ Causing trauma		+pes planus on bil feet wears doc marten boots - may be causing damage ?

▶ Step 2: Determine the Risk for Ulceration and Amputation

Instructions: Review the results from Inlow's 60-second Diabetic Foot Screen to identify parameters that put the patient at risk. *Very low risk involves no loss of protective sensation, peripheral arterial disease or related comobidities/risk factors. If comorbidities exist, consider increasing to Category 1.



▶ Step 3: Create a Plan of Care with Your Patient Based on Identified Risks

Instructions: Based on the risk classification and clinical indicators develop a plan of care with your patient that best meets their needs.

Risk Category	Clinical Indicators	Screening Frequency	Recommendations and Actions**
Very Low Risk (Category 0)	No loss of protective sensation (LOPS) and no peripheral arterial disease (PAD)	Screen every 12 months	☐ Education on: risk factors; daily foot inspection; appropriate footwear and foot- and nail-care;† when/how to seek medical attention if needed ☐ Daily inspection of feet ☐ Appropriate foot and nail care ☐ Well-fitting footwear ☐ Exercise as able
Low Risk (Category 1)	LOPS or PAD	Screen every 6–12 months	☐ Education on: risk factors (including LOPS or PAD); daily foot inspection; appropriate footwear and foot- and nail-care; when/how to seek medical attention if needed ☐ Daily inspection of feet ☐ Professional foot and nail care, including treatment of onychomycosis and Tinea pedis if present ☐ Well-fitting, sensible footwear with custom, full-contact foot orthoses and diabetic socks ☐ Vascular studies ± referral to a vascular investigation +/- vascular surgeon ☐ Pain management for ischemic pain, if present ☐ Recommend non-weight bearing exercise program https://www.diabetes.ca/nutrition—fitness/exercise—activity
Moderate Risk (Category 2)	LOPS + PAD, or LOPS + foot deformity, or PAD + foot deformity	Screen every 3–6 months	☐ Education on: risk factors (including LOPS ± PAD ± foot deformity); daily foot inspection; appropriate footwear and foot- and nail-care; when/how to seek medical attention if needed ☐ Daily inspection of feet ☐ Professional foot and nail care, treatment of onychomycosis and Tinea pedis if present ☐ Well-fitting, orthopaedic footwear with custom full-contact total contact casted foot orthoses and diabetic socks. Footwear must accommodate any deformities present ☐ Vascular studies ± referral to a vascular surgeon ☐ Pain management for ischemic or neuropathic pain ☐ Referral to a general, orthopedic or foot surgeon, if indicated, surgically manage foot deformities ☐ Recommend non-weight bearing exercise program https://www.diabetes.ca/nutrition—fitness/exercise—activity
High Risk (Category 3)	LOPS or PAD plus one or more of: • history of a foot ulcer • a lower extremity amputation • end-stage renal disease	Screen every 1–3 months	☐ Education on: risk factors (including LOPS ± PAD ± foot deformity); risk of ulcer recurrence; daily foot inspection; appropriate footwear and foot- and nail-care; when/how to seek medical attention if needed ☐ Daily inspection of feet ☐ Professional foot and nail care, including treatment of onymycosis and Tinea pedis, if present ☐ Well-fitting, orthopedic footwear with custom full-contact total contact casted foot orthoses and diabetic socks. Footwear must accommodate any deformities present ☐ Modified footwear and/or prosthesis based on level of amputation ☐ Vascular studies ± referral to a vascular surgeon ☐ Pain management for ischemic or neuropathic pain ☐ Recommend non-weight bearing exercise program https://www.diabetes.ca/nutrition—fitness/exercise—activity
Urgent Risk	Active ulcer/infection/ active Charcot	Urgent care required	☒ Education on: signs of wound infection and wound care; risk factors (LOPS ± PAD ± foot deformity); risk of ulcer recurrence; daily foot inspection; appropriate footwear and foot- and nail-care; when/how to seek medical attention ☒ Daily inspection of feet ☒ Professional foot and nail care, including treatment of onymycosis and Tinea pedis, if present ☒ Offloading with total contact cast, removable cast walker or wound shoe to close ulcers and/or to immobilize Charcot foot ☒ Vascular studies ± referral to vascular surgeon or limb preservation clinic, as indicated ☐ Pain management for ischemic pain or neuropathic pain ☐ Referral to a general, orthopedic or foot surgeon, if indicated, to surgically manage foot deformities ☐ Referral to infectious diseases to manage infection, if indicated, and/or to a general, orthopedic or foot surgeon to debride infectious tissue ± bone, if indicated

Photographic Wound Assessment Tool (PWAT)

Item	Assessment			Score
1. Size	0 = wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 = 0.3 to 2.0 cm^2 2 = 2.0 to 10.0 cm^2 3 = 10.0 to 20.0 cm^2 4 = greater than 20.0 cm^2			1
2. Depth	0 = wound is healed (skin intact) or nearly closed (<0.3cm^2) 1 = full thickness 2 = unable to judge because majority of wound base is covered by yellow/black eschar 3 = full thickness involving underlying tissue layers 4 = tendon joint capsule visible/bone present in wound base			1
3. Necrotic Tissue Type	0 = None visible or wound is closed (skin intact) or nearly closed (<0. 3cm^2) 1 = majority (>50%) of necrotic tissue is thin white/grey or yellow slough 2 = majority of necrotic tissue is thick white yellow slough or fibrin 3 – majority of necrotic tissue is white/grey devitalized tissue or eschar 4 = majority of necrotic tissue is hard grey to black eschar			2
4. Total Amount of Necrotic Tissue	0 = None visible in open wound or wound is closed (skin intact) or nearly closed(0.3cm^2) 1 = less than 25% of wound bed covered 2 = 25% to 50% of wound covered 3 = greater than 50% and less than 75% of wound covered 4 = 75% to 100% of wound covered			2
5. Granulation Tissue type	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 = majority (>50%) of granulation tissue is healthy looking (even bright red appearance) 2 = majority of granulation tissue is unhealthy (eg. pale, dull, dusky, hypergranulation) 3 = majority of granulation tissue is damaged, friable, degrading 4 = there is no granulation tissue present in the base of the open wound (all necrotic)			1
6. Total Amount of Granulation Tissue	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 = 75% to 100% of open wound is covered with granulation tissue 2 = greater than 50% and less than 75% of open wound is covered with granulation tissue 3 = 25% to 50% of wound bed is covered with granulation tissue 4 = less than 25% of wound bed is covered with granulation tissue			1
7. Edges (directly touching and within 0.5cm of wound edge)	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) or edges are indistinct, diffuse, not clearly visible because of re-epithelialization 1 = majority (>50%) of edges are attached with an advancing border of epithelium 2 = majority of edges are attached even with wound base (not advancing) 3 = majority of edges are unattached and/or undermined 4 = majority of edges are rolled, thickened or fibrotic (do not include callus formation)			1
8. Periulcer Skin Viability (consider skin visible in photo or within 10 cm of wound edge)	Number of factors affected 0 = None 1 = One only 2 = Two or Three 3 = Four or Five 4 = six or more	- callus - dermatitis - maceration - desiccation or cracking - bright red or erythemic - purple or bruised	- edema - excoriation - skin tearing/irritation r/t wound dressing or tape - hypo/hyper pigmentation - other: _____	2
TOTAL SCORE				* 11

Visit Type: * Initial

Management

- Wound care provided; foot care education provided at all visits
- PICC line arranged and off loading boot per LLPS corridor consult with vascular surgeon
- Referral for foot orthotics, orthopedic shoes, hammer toe splint, diabetic socks issued
- Referral to smoking cessation program
- Foot Care Nurse to be seen after wound better healed

Follow-up with PCP on Nov 26th, 2024

- Toe healing well – Amputation seems unlikely
- Off work extended to Jan 1, 2025

Follow-up with PCP on December 12, 2024

O/E – Almost completed healed!

- Mild swelling, redness, no heat, small scab on dorsolateral distal phalange noted clawing of toes and 5th toe crossing under 4th

- Off work extended to February 2

Follow-up with vascular surgeon on December 12th, 2024

- Osteomyelitis was resolved and patient discharged

Follow-up with LLPS on Dec 16th, 2024

- Almost completely healed (PWAT = 4)
- Foot care education provided again and advised to continue with orthopedic shoes
- Referral to Foot Care Nurse
- Follow-up q 1-3 months per Inlow's Screening High Risk

PWAT = 4
December 16, 2024

Follow-up with LLPS on January 13th, 2025

- Wound opened slightly! (PWAT = 5)
- Wound care provided with normal saline, iodine stick and Inadine dressing, dry dressing on top
- Referred back to Ontario Health atHome Wound Care Clinic - keep covered and change q 2-3 days
- Diabetic off loading boot provided & fitted for size large
- Advised to wear daily to allow wound to heal
- Advised to f/u sooner if any concerns, otherwise start back with Ontario Health atHome Wound Care Clinic and f/u in 4 weeks.

PWAT = 5
January 13th, 2025

Follow-up with PCP on January 26th, 2025

- 5th toe wound open again; very shallow superficial ulcer
- Follows with LLPS & Wound Care

PCP suggested referral to orthopedic surgery re toe deformities – regarding any ideas for offloading and possible surgical interventions for claw foot / hammer toes to prevent future DFUs.

Per the IWGDF 2023 Guidelines - orthopedic procedures such as flexor tenotomy, achilles tendon lengthening should be considered to prevent development/recurrence of foot ulcers.

PWAT = 4
February 10, 2025

PWAT = 3
March 10, 2025

CASE #2 WITH POLL QUESTIONS

Venous Ulcer Case

Case 2: Mr. J.

82 year old male presented to the emergency department on September 25, 2024 regarding a large blister on the left lower leg. The blister was lanced and drained during ER visit. Patient reported pain, area warm to touch, and erythema was present. Moderate serosanguinous drainage noted.

Patient referred to Ontario Health atHome Wound Care; Inadine and gauze dressing applied. Patient was also referred to LLPS.

Past Medical History: Chronic lymphocytic leukemia, severe OA right knee, gout, pedal edema, hypoandrogenism.

Medications: Venetoclax, Allopurinol, Zopiclone, Lasix, Spironolactone, Tylenol ES prn, Testosterone injections.

Allergies: Tetanus, Penicillin in childhood (but no reaction to penicillin taken in adulthood).

Initial Visit with LLP Clinic on September 30, 2024

O/E – Left lower leg presenting with mild pitting edema, erythema, tenderness present with a wound bed 7x7 cm, warm to touch. Pulses were present bilaterally.

- PWAT score 9

A/P – Venous wound infection with cellulitis

- C&S swab obtained
- **Wound care:** Bactigras nonadherent foam applied, wrapped in gauze, and patient encouraged to frequently elevate legs above heart level when resting
- (Wound C&S came back positive for Staph Aureus and treated with Cloxacillin PO per sensitivities)

PWAT = 9
September 30, 2025

Photographic Wound Assessment Tool (PWAT)

Item	Assessment			Score
1. Size	0 = wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 = 0.3 to 2.0 cm^2 2 = 2.0 to 10.0 cm^2 3 = 10.0 to 20.0 cm^2 4 = greater than 20.0 cm^2			2
2. Depth	0 = wound is healed (skin intact) or nearly closed (<0.3cm^2) 1 = full thickness 2 = unable to judge because majority of wound base is covered by yellow/black eschar 3 = full thickness involving underlying tissue layers 4 = tendon joint capsule visible/bone present in wound base			1
3. Necrotic Tissue Type	0 = None visible or wound is closed (skin intact) or nearly closed (<0. 3cm^2) 1 = majority (>50%) of necrotic tissue is thin white/grey or yellow slough 2 = majority of necrotic tissue is thick white yellow slough or fibrin 3 – majority of necrotic tissue is white/grey devitalized tissue or eschar 4 = majority of necrotic tissue is hard grey to black eschar			1
4. Total Amount of Necrotic Tissue	0 = None visible in open wound or wound is closed (skin intact) or nearly closed(0.3cm^2) 1 = less than 25% of wound bed covered 2 = 25% to 50% of wound covered 3 = greater than 50% and less than 75% of wound covered 4 = 75% to 100% of wound covered			0
5. Granulation Tissue type	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 = majority (>50%) of granulation tissue is healthy looking (even bright red appearance) 2 = majority of granulation tissue is unhealthy (eg. pale, dull, dusky, hypergranulation) 3 = majority of granulation tissue is damaged, friable, degrading 4 = there is no granulation tissue present in the base of the open wound (all necrotic)			1
6. Total Amount of Granulation Tissue	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 = 75% to 100% of open wound is covered with granulation tissue 2 = greater than 50% and less than 75% of open wound is covered with granulation tissue 3 = 25% to 50% of wound bed is covered with granulation tissue 4 = less than 25% of wound bed is covered with granulation tissue			0
7. Edges (directly touching and within 0.5cm of wound edge)	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) or edges are indistinct, diffuse, not clearly visible because of re-epithelialization 1 = majority (>50%) of edges are attached with an advancing border of epithelium 2 = majority of edges are attached even with wound base (not advancing) 3 = majority of edges are unattached and/or undermined 4 = majority of edges are rolled, thickened or fibrotic (do not include callus formation)			1
8. Periulcer Skin Viability (consider skin visible in photo or within 10 cm of wound edge)	Number of factors affected 0 = None 1 = One only 2 = Two or Three 3 = Four or Five 4 = six or more	- callus - dermatitis - maceration - desiccation or cracking - bright red or erythemic - purple or bruised	- edema - excoriation - skin tearing/irritation r/t wound dressing or tape - hypo/hyper pigmentation - other: _____	3
TOTAL SCORE				* 9

Visit Type: * Initial

LLPS Follow-up visit October 10, 2024

- Wound improved significantly
- Wound care clinic on M, W, F

O/E – Wound reduced in size to 4 x 4 cm, scant-moderate serosanguinous drainage, surrounding skin intact, edema decreased

- PWAT score 6

A/P - LLE venous wound infection improving

- Cloxacillin PO extended 3 more days
- Continue wound care with inodine for wound bed and daily dressing changes

PWAT = 6
October 10, 2024

LLPS Follow-up visit October 17, 2024

S – Left lower leg wound continues to improve

O/E – Wound measuring 2 x 3 cm with scant serosanguinous discharge with surrounding skin intact and edema resolved

- PWAT score 4

A/P - Referred to Windsor Team Care Centre foot care nurse

PWAT = 4
October 17, 2024

LLPS Follow-up visit October 21, 2024

S - Wound care nurse was concerned regarding LLL red and swollen
- No new wound but tender medial aspect L foot

O/E – 2+ pitting edema, tenderness present, hot to touch; pedal pulses difficult to palpate due to edema

A/P - ? Cellulitis vs DVT

- To ER to r/o DVT and to initiate IV antibiotics if indicated
- Note past history of DVT 10 yrs prior during chemo

LLPS Follow-up visit October 25, 2024 *(Phone Consult)*

- To LDMH ER – Patient started on IV Rocephin on Oct 22, 2024
- Venous doppler was negative for DVT

LLPS Follow-up visit October 30, 2024

S – much better on current antibiotics – erythema, pain, edema improved, venous ulcer improved

O/E – wound continues to decrease in diameter 2 x 1 cm – minimal to no drainage

- PWAT score = 2

A/P – Venous ulcer and cellulitis improving.

PWAT = 2
October 30, 2024

LLPS Follow-up visit November 7, 2024

S - Continued improvement noted; completed IV antibiotics.

O/E – Left lower leg venous wound is non-tender, decreased edema, minimal erythema, skin intact, no drainage present.

- PWAT 1

A/P – Cellulitis resolved – venous ulcer virtually healed.

- Referral to Koonar Physio for BLE compression stockings 20-30 mmHg to treat the venous insufficiency and thus avoid venous ulcers going forward. Patient encouraged to continue to elevate legs when resting.
- Saw vascular surgeon who recommended compression stockings and ordered arterial doppler ultrasound.

PWAT = 1
November 7, 2024

LLPS Follow-up visit December 9, 2024

- PWAT score 0

A/P – Venous ulcer and cellulitis **resolved**; chronic venous insufficiency

- Recommend compression stockings, exercise 30 min per day (especially walking), and continue elevating lower extremities when resting.
- F/u in 3 months

Q4: What additional workup would be appropriate?

A. Assess gait and ankle mobility for abnormalities that may impair calf muscle pump function.

B. Venous insufficiency doppler ultrasound / vein mapping.

C. Investigate other co-existing medical conditions that can contribute to pedal edema (eg. CHF, rheumatoid arthritis, lymphedema).

D. Ankle-brachial pressure index/arterial duplex ultrasound.

E. All the above.

Canadian Consensus Statement on the Management of Venous Leg Ulcers. Evans, Loney, Sibbald, Stacey. Wound Care Canada, Vol 22, No 2, Winter 2024.

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Q5: Which of the following interventions is <u>not</u> recommended for the treatment of venous leg ulcers?

A. Muscle pump activator

B. Compression therapy (wraps, stockings)

C. Offloading and rest until venous ulcer heals

D. Foot elevation above heart level daily

E. Best practice wound care (may include negative pressure wound therapy)

F. Venous ablation therapy

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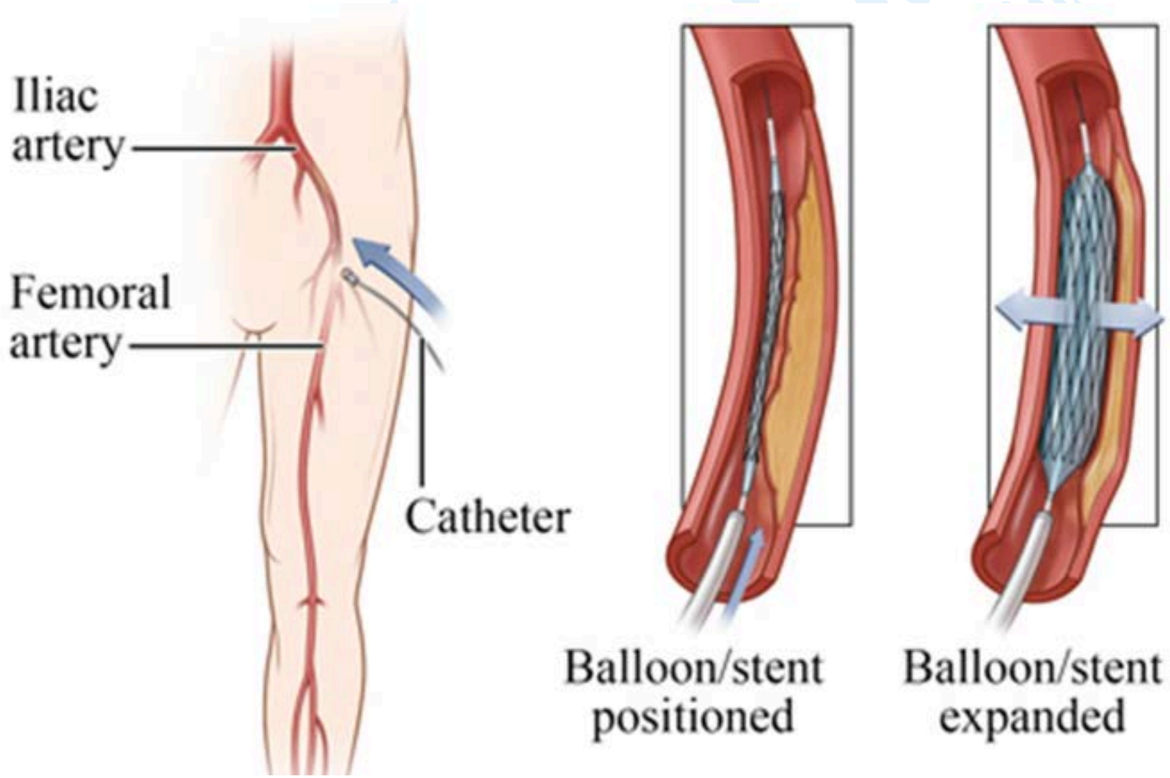
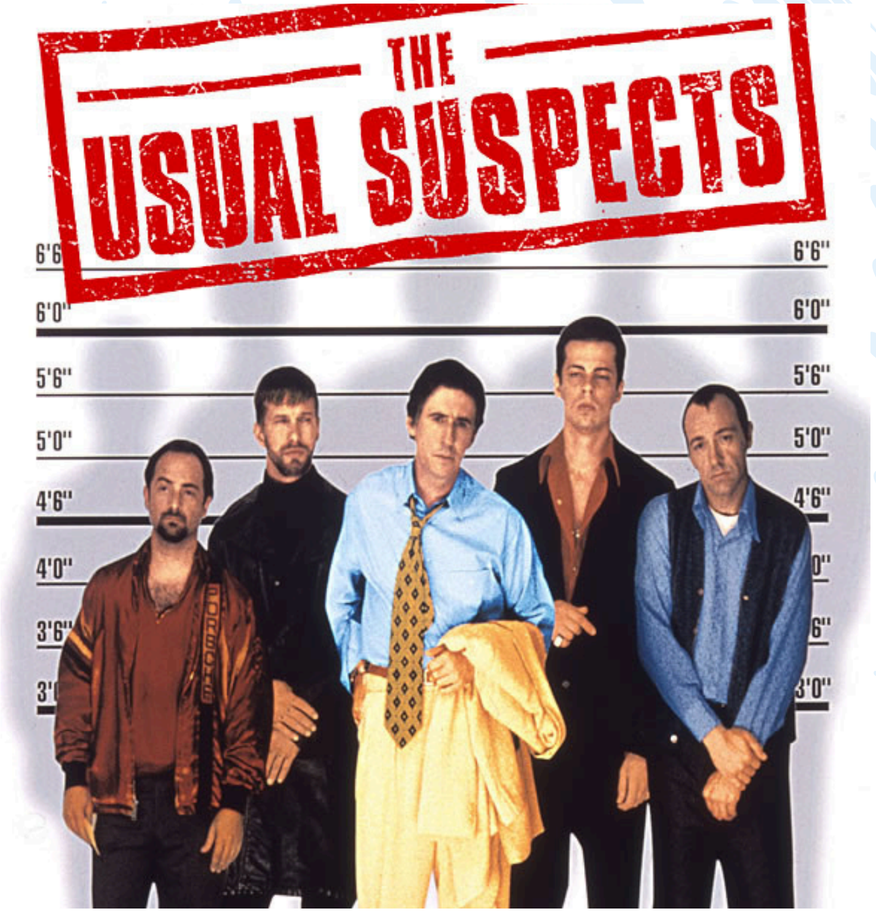
Peripheral Vascular Disease – Saving Limbs, Saving Lives

Speaker: Dr. Maher Sabalbal, MD, MSc, RPVI, FRCSC
Vascular and Endovascular Surgeon



Risk Factors – The Usual Suspects

- **AGE**
  - The strongest risk factor for PAD
- **SMOKING**
- **DIABETES**
  - Odds ratio like those for smoking (2-4)
- **HYPERTENSION**
- **DYSLIPIDEMIA**
  - Elevated total cholesterol and reduced HDL levels
  - Relationship between PAD and LDL levels appears less consistent and no target LDL values for therapy have been developed specific for PAD**



Risk Factors – The Not So Usual

OBESITY

- Distribution of body fat is probably more important (e.g. central obesity)

INFLAMMATION

- Elevated plasma CRP and Fibrinogen have shown consistent associations with PAD
- Both of these markers also associated with PAD severity

HOMOCYSTEINE

- Statistical relationship between elevated levels and PAD in some studies
- But … strength of this association is moderate

SOCIOECONOMIC STATUS

- Lower SE status (lower levels of income and education)

Q6: What is the impact of screening asymptomatic patients for PAD on limb loss?

A. No impact

B. Reduces amputation risk by 5% over 5 years

C. Increases risk of amputation due to unnecessary intervention

D. Increases risk of MACE (major adverse cardiac events) due to unnecessary intervention

E. Reduced amputation risk by 10% over 5 years

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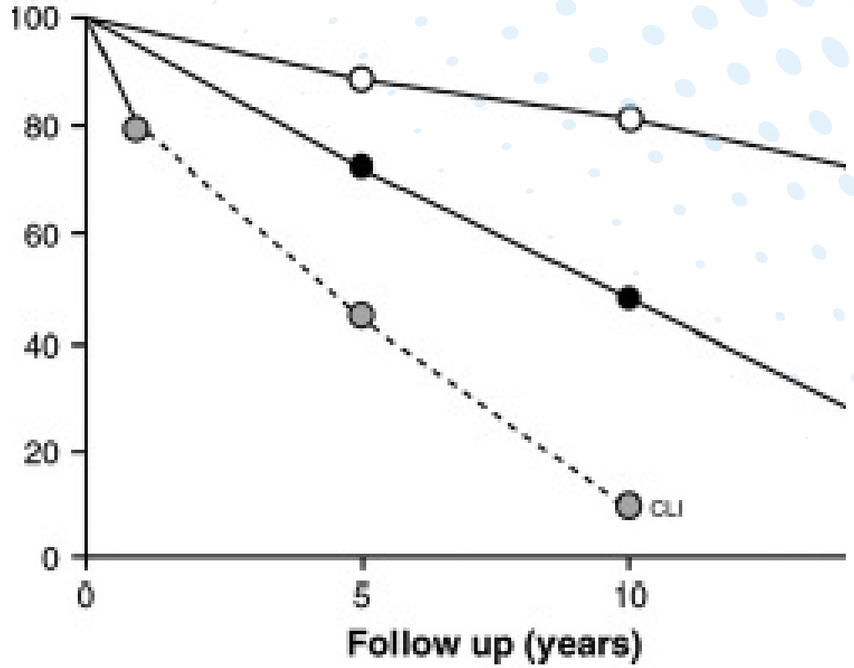
E. Reduced amputation risk by 10% over 5 years

CLI versus intermittent claudication

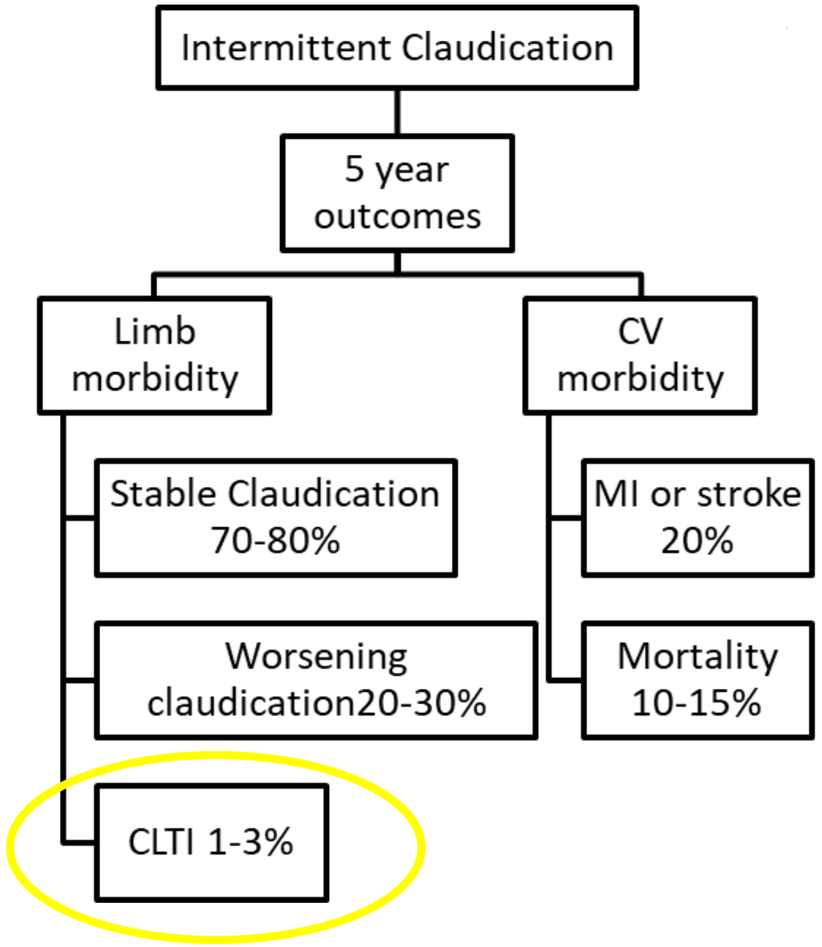
- **Intermittent claudication**
- (limb loss rate of **1%/year**)
  - Reproducible, consistent, gets better with rest (sitting or standing)

- **Critical limb ischemia (CLI) consists of either**
  - Rest pain
  - Tissue loss:
    - Dry gangrene or non-healing ulcers



. **A8.** Survival of patients with peripheral arterial dis
rmittent claudication; CLI – critical limb ischemia.

Intermittent Claudication



Medical Management – Intermittent Claudication

- **Smoking cessation,** exercise training, pharmacologic therapy
- **Pharmacologic therapy**
  - ASA 81 mg daily (there is NO BENEFIT of Plavix over ASA)
  - Statin *(every PAD patient should be on this regardless of cholesterol levels)*
  - Tight glycemic control: patients with PAD and type 2 diabetes should be offered a SGLT-2 inhibitor compared with usual diabetic control because of the reduction in MACE without any risk of increased amputation
  - Tight BP control – ACE inhibitor or an ARB should be 1st line in patients with PAD
- **CLEVER Trial:**
  - Compared supervised exercise therapy with primary stenting for disabling claudication due to aortoiliac occlusive disease
  - At 6 month follow: change in peak walking time was greatest with supervised exercise, intermediate for stenting and least with pharmacologic therapy

Q7: What is the risk of limb loss per year in patients with claudication?

A. 1%

B. 5%

C. 10%

D. 20%

E. 50%

Q7: What is the risk of limb loss per year in patients with claudication?

A. 1%

B. 5%

C. 10%

D. 20%

E. 50%

Q8: What is the risk of limb loss per year in patients with CLTI?

A. 1%

B. 5%

C. 10%

D. 20%

E. 50%

Q8: What is the risk of limb loss per year in patients with CLTI?

A. 1%

B. 5%

C. 10%

D. 20%

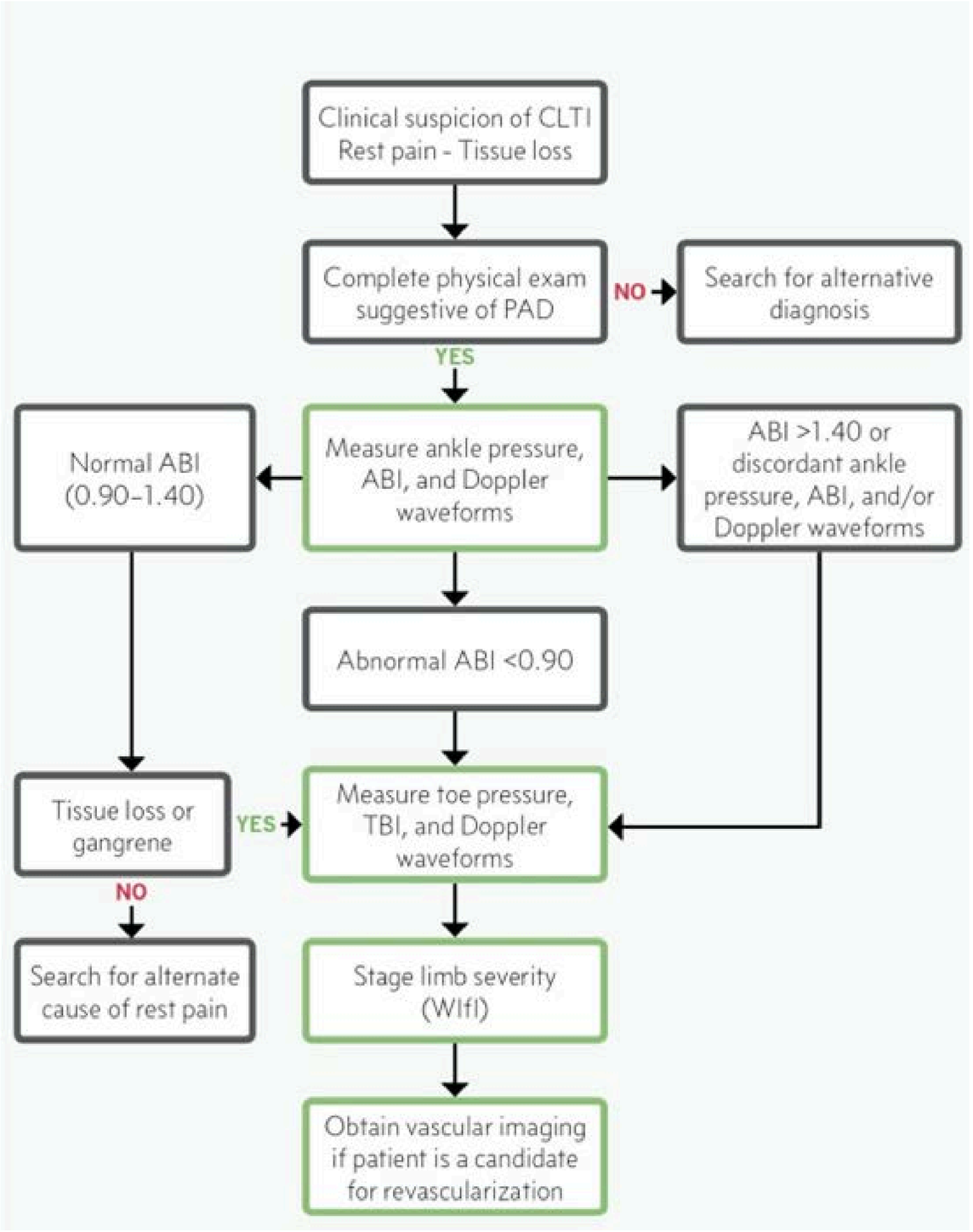
E. 50%

Critical Limb Threatening Ischemia

- Affects a minority of patients with PAD (1-10%)
- Typical values associated with rest pain:
  - Absolute ankle pressure < 40 – 50
  - Absolute toe pressure < 30
- With tissue loss, these defining values are increased:
  - Ankle pressure < 50 – 70
  - Absolute toe pressure < 40 – 50

  Estimated mortality at 1 year: 22% major amputation at 1 year: also 22%

Critical Limb Threatening Ischemia



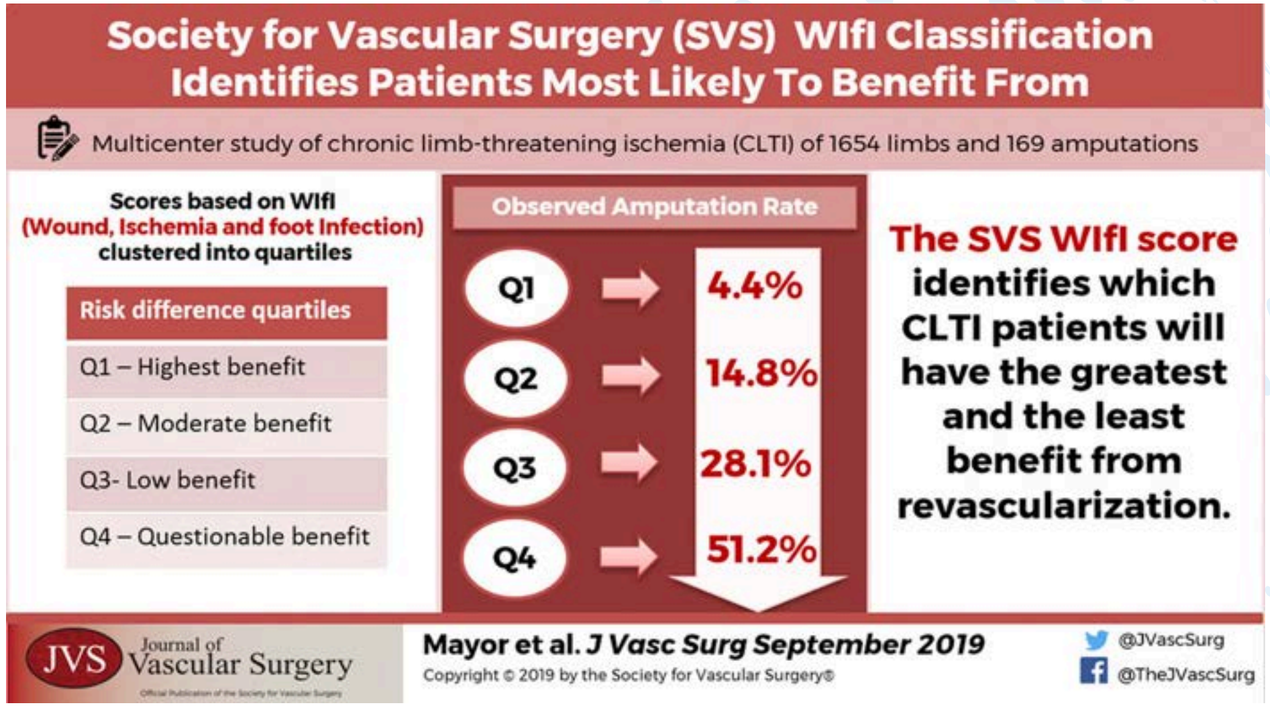
WIfI – SVS Lower Extremity Threatened Limb Classification System

- Stratifies limb risk by grading: Wound, Ischemia, Foot infection (WIfI)
- Staging system applies to all patients with REST PAIN or TISSUE LOSS combined with objective evidence of PAD
- Each of the three key factors is graded on a 4-level scale (0 – 3)

Component	Score	Description		
W (Wound)	0	No ulcer (ischemic rest pain)		
	1	Small, shallow ulcer on distal leg or foot without gangrene		
	2	Deeper ulcer with exposed bone, joint or tendon ± gangrenous changes limited to toes		
	3	Extensive deep ulcer, full thickness heel ulcer ± calcaneal involvement ± extensive gangrene		
I (Ischemia)		ABI	Ankle pressure (mm Hg)	Toe pressure or $TcPO_2$
	0	≥0.80	>100	≥60
	1	0.60-0.79	70-100	40-59
	2	0.40-0.59	50-70	30-39
	3	<0.40	<50	<30
fI (foot Infection)	0	No symptoms/signs of infection		
	1	Local infection involving only skin and subcutaneous tissue		
	2	Local infection involving deeper than skin/subcutaneous tissue		
	3	Systemic inflammatory response		

Critical Limb Threatening Ischemia - WIfI

- WIfI staging is strongly associated with amputation and wound-healing outcomes
- **WIfI stage 1** - 0.75% annual amputation risk (very low)
- **WIfI stage 2** - 5.9% annual amputation risk (low)
- **WIfI stage 3** - 8.2% annual amputation risk (moderate)
- **WIfI stage 4** - 25% annual amputation risk (high)
- **Stage 5** - unsalvageable limb

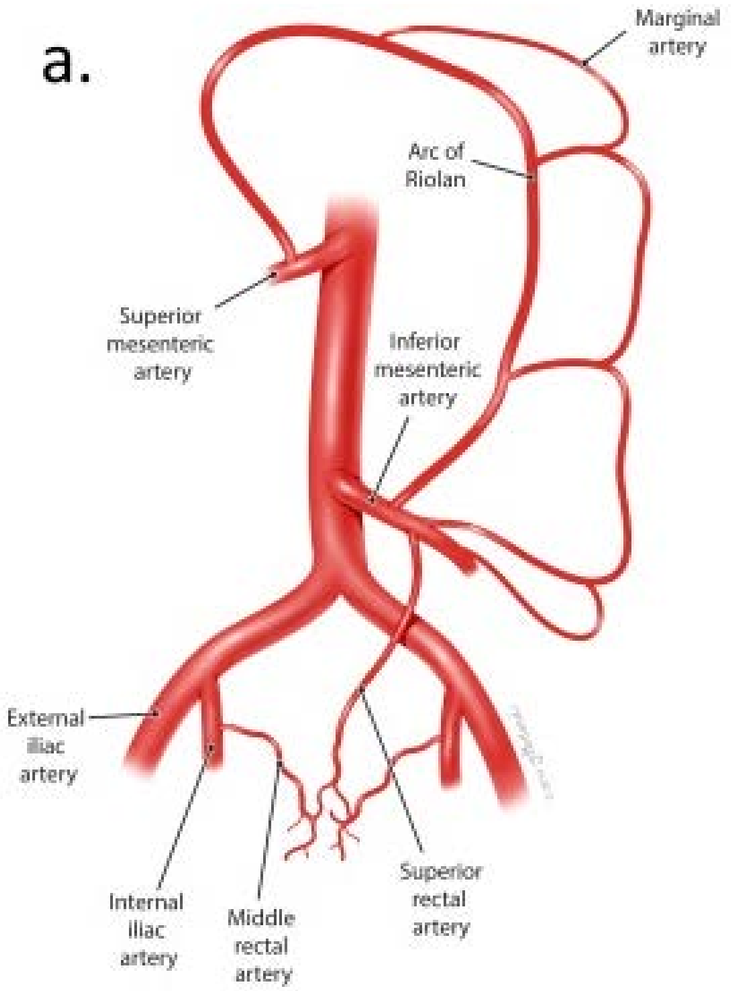


Surgical Intervention

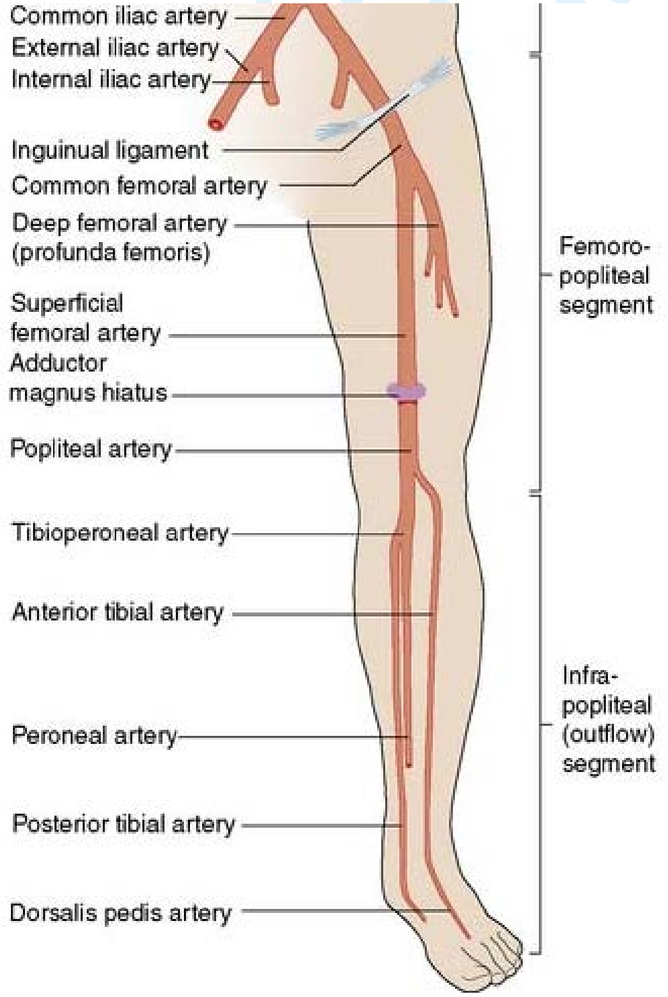
- Indicated in the presence of CLTI
- NOT indicated as primary modality in patients with intermittent claudication
- Can be considered in good surgical risk patients with disabling claudication
    - Affecting vocational, recreational, or daily living activities who have an acceptable risk profile, reasonable expectation for function and life expectancy
    - A trial of nonoperative therapy with an exercise program and optimal medical therapy has failed

Surgical Options – All About The Anatomy

Aortoiliac (inflow)



Infrainguinal



Case Study

- 67 yo male with right lower extremity pain, right D1 ulcer
- Past medical history: Dyslipidemia, T2DM, hypertension, obesity, COPD, Anxiety/depression
- Lifelong smoker, sleep apnea, previous C spine fracture, previous prostatectomy
- Medications: Lipitor 10 mg daily, Amitryptyline 10 mg qhs, Duloxetine, Diltiazem, Zopiclone, fenofibrate, Toujeo, Trelegy, Wellbutrin XL

Case – History & Physical

- Presented to ED with severe pain in the right forefoot, and “discoloration” in the great toe.
- Tells me problem started summer of 2021, noticed after walking 100 feet severe cramping in both cramps, walking distance continued to deteriorate and in Aug. 2022 symptoms acute worsened cellulitis of right forefoot.
- Infection involved the right great toe, waxed and waned for 6 months.
- Now, severe pain at rest. Cannot sleep, even at the bedside, unable to keep leg elevated during our conversation.
- On exam, he was restless, fidgety, cannot seem to get comfortable.
- Right forefoot hyperemic, dependent rubor, dry scab over first PIP joint, eschar over right heel.
- Right forefoot very tender to touch, very warm, cap refill delayed.
- No palpable pulses on exam….

  What’s the next step?

Q9: What is(are) the next step(s) in managing Mr. S?

A. Recommend smoking cessation, start ASA, start statin

B. Obtain a vascular Duplex ultrasound with ABI’s

C. Refer to vascular surgery

D. Start an ACE-I or ARB, ensure tight glycemic control

E. All of the above

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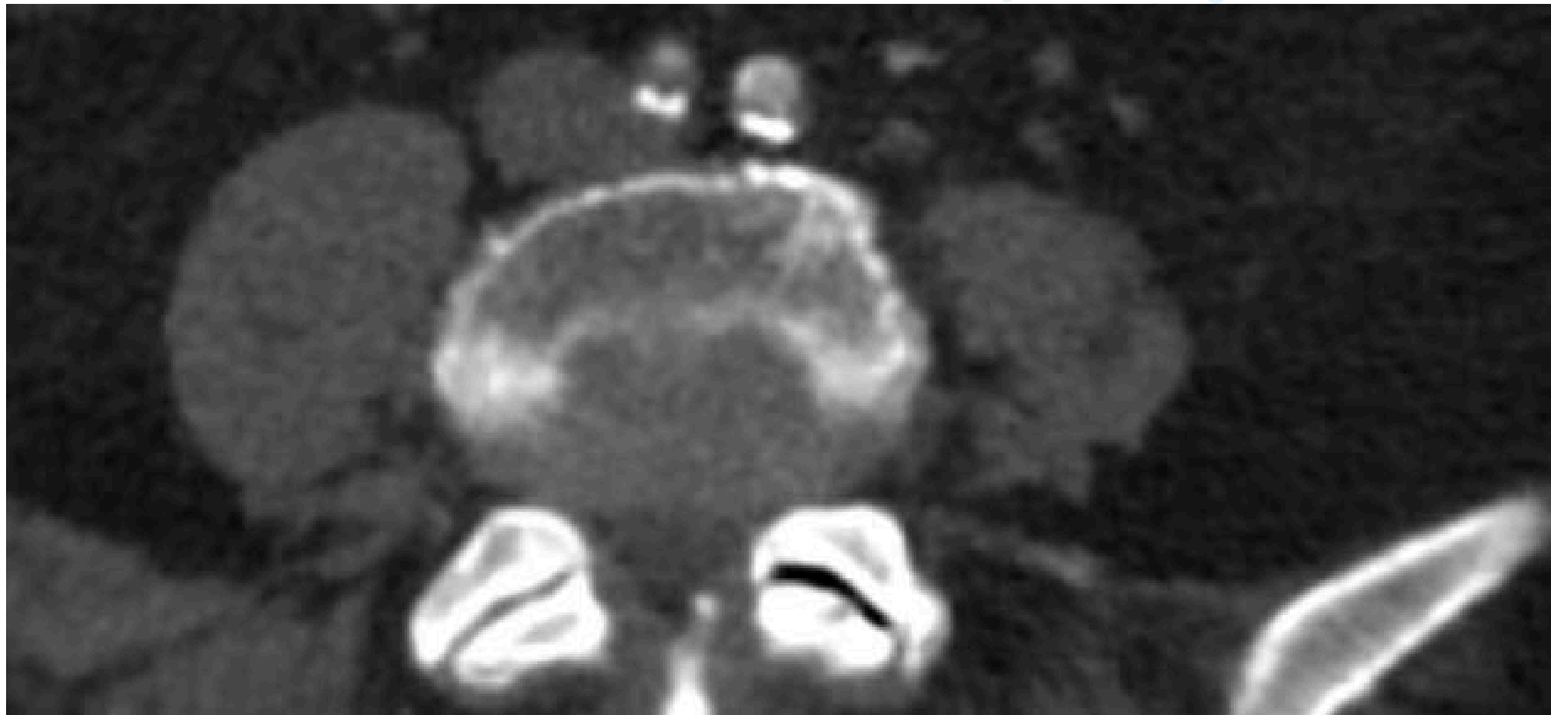
Case – Investigations

- Arterial Dopplers done in the ED showed “severe stenosis” bilaterally, with dampened PSV in his infrainguinal vascular bed.
- ABI’s were not done…
- CTA abdomen with runoff showed a nearly occluded infrarenal aorta, calcified nearly occlusive plaque in the right >> left common iliac arteries

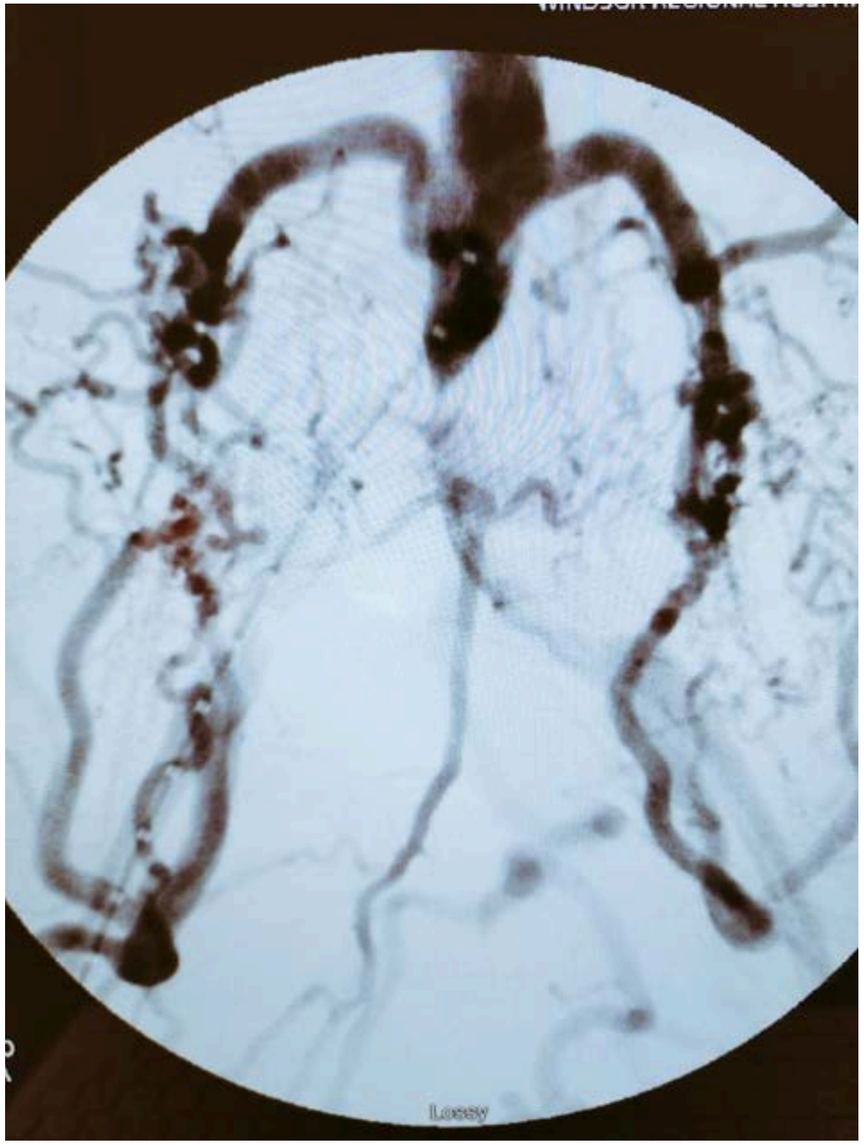


Case – Plan

- Surgical options include:
  - **Open surgery:** aortobifemoral bypass
  - **Endovascular:** CERAB (covered endovascular reconstruction aortic bifurcation)
  - **Hybrid:** stent left common iliac, then a left femoral-femoral bypass

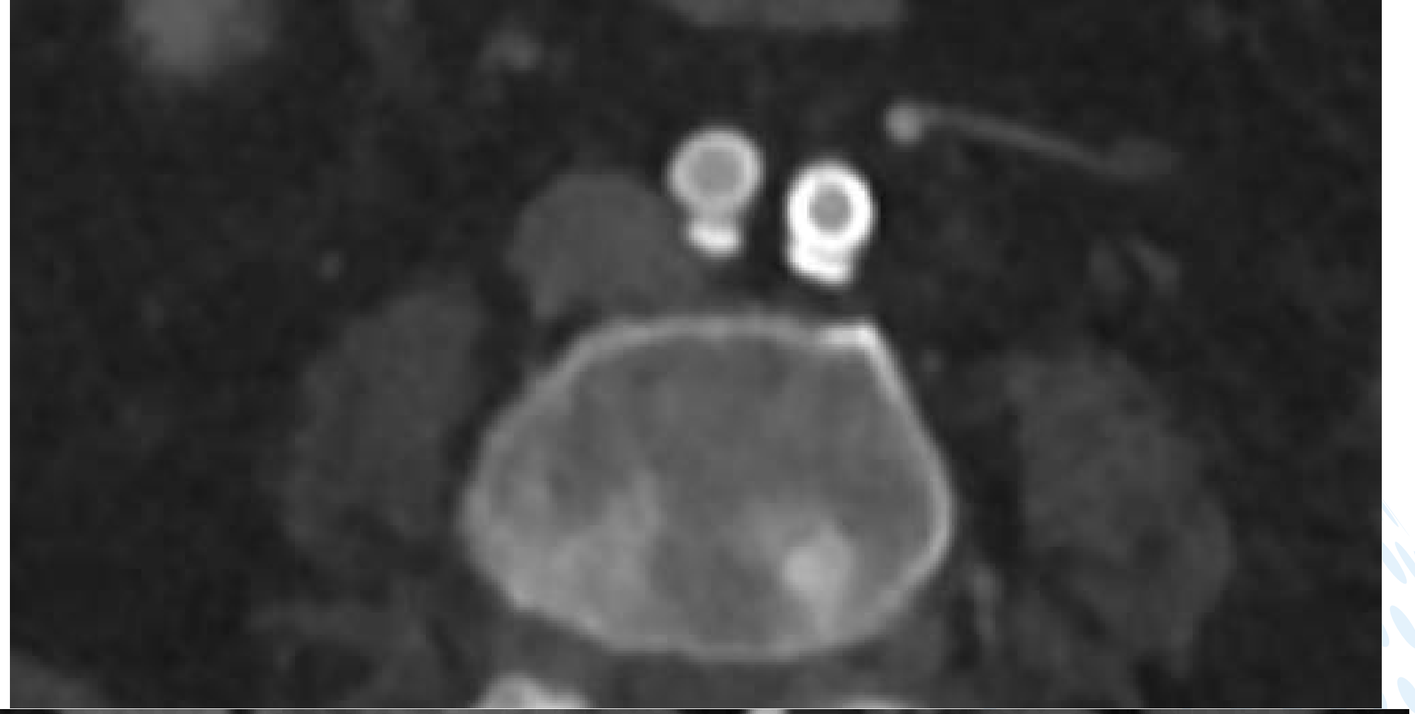
- Given his overall risk profile, opted for most minimally invasive option:
  - CERAB with a large balloon expandable stent in the abdominal aorta,
  - Followed by two small “kissing” stents into the aortic stent

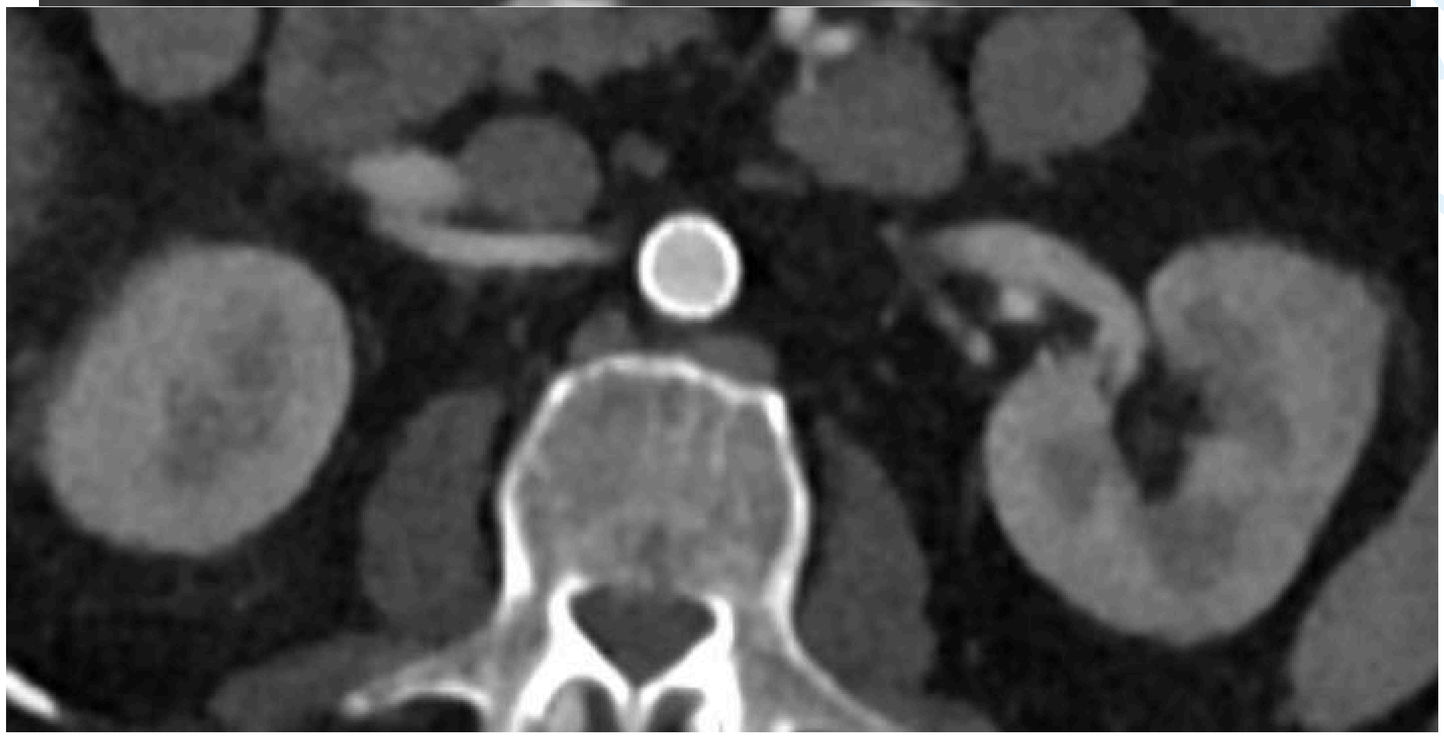
Case – Intraop Angio



Case – Clinical Response

- Resolution of rest pain.
- Restoration of normal ABI’s: 0.92 on the right, 0.96 on the left (Oct. 2024 scan).
- Great toe was partially amputated, heel debrided - both went on to fully granulate.
- Maintained on ASA 81 mg daily and Xarelto 2.5 mg BID (indefinitely)





Ontario Resources and Guides

- **CorHealth Ontario – Lower-Limb Preservation Strategy**
  - Offers clinical pathways, implementation tools, and patient education resources aligned with Ontario's Lower-Limb Preservation Strategy.

- **Wounds Canada – Best Practice Recommendations (BPRs)**
  - Nationally recognized clinical guidelines for diabetic foot ulcers, pressure injuries, and vascular wounds.

- **Diabetes Canada – Foot Care for People with Diabetes**
  - Includes education tools for patients and providers on diabetic foot complication prevention and care.

- **Wounds Canada – Online Education & CME**
  - Offers self-paced, accredited modules for ongoing professional development in wound prevention and care.

How do I receive my CME/CPD credits?

For any questions or concerns please contact:
Christen Abraham - cabrham@windsorfht.ca

QUESTIONS?

Please put your questions in the chat!

Post-Session Evaluation

LIMB LOSS AND LIMB DIFFERENCE

AWARENESS MONTH APRIL 1-30

Satisfaction Survey

Post Conference

SCAN ME

Thank You!

Resources

CorHealth Ontario – Ontario Framework for Lower-Limb Preservation

Canadian Cardiovascular Society 2022 Guidelines for Peripheral Arterial Disease

Diabetes Canada

Hamilton LLPS Socks Off Diabetic Patient Foot Care Education booklet

Inlow's 60-second Diabetic Foot Screen: Update 2022 (Wounds Canada Limb Preservation Journal – Vol 4, Number 1 – 2023)

International Working Group on the Diabetic Foot – Update 2023 Wounds Canada

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