Diabetic foot disease masterclass for the primary care physician

Wednesday 15th October 2025

The content in this session is valid at date of presentation

Acknowledgement of Country

We would like to acknowledge the Traditional Custodians of the land on which our work takes place, The Wurundjeri Woi Wurrung People, The Boon Wurrung People and The Wathaurong People.

We pay respects to Elders past, present and emerging as well as pay respects to any Aboriginal and Torres Strait Islander people in the session with us today.

Housekeeping – Zoom Webinar

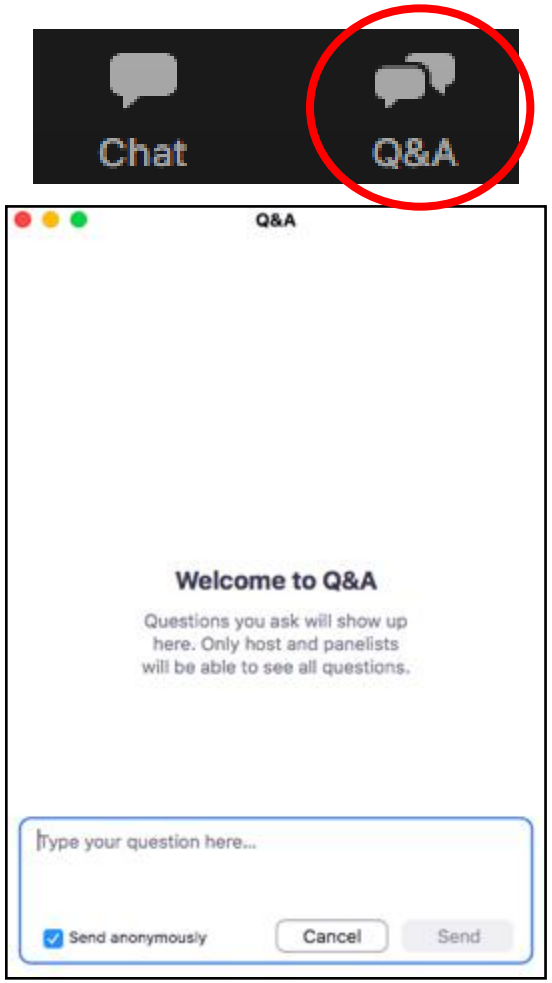
All attendees are muted

Please ask questions via the Q&A box only

Q&A will be at the end of the presentation

This session is being recorded, you will receive a link to this recording and copy of slides in post session correspondence.

Questions will be asked anonymously to protect your privacy



Housekeeping – Zoom Webinar

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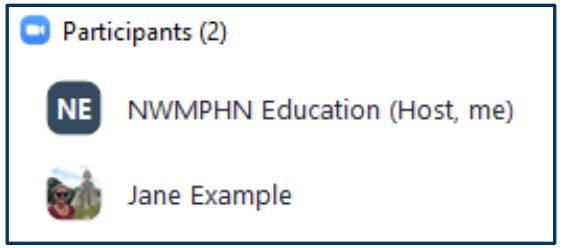


NWMPHN uses Zoom's participant list to mark attendance and certificates and CPD will not be issued if we cannot confirm your attendance.

If you are not sure if your name matches, please send a Chat message to 'NWMPHN Education' to identify yourself.

Speakers – Western Health

- **Ms Charlotte Cooke**, Senior Podiatrist leading Western Health's recently expanded Diabetes Foot Unit
- **A/Prof Fiona Bodey**, Endocrinologist & Clinical Lead, Diabetes Foot Unit
- **Dr Chris Preston**, Endocrinologist
- **Mr Bernard Allard**, Head of Vascular Surgery
- **Dr Asma Sohail,** Infectious Disease Physician
- **Dev Kevat**, Deputy Head of Endocrinology & Diabetes
- **Dr Huy Do**, Endocrinology Advanced Trainee

HealthPathways Melbourne

Diabetic foot disease masterclass for the primary care physician

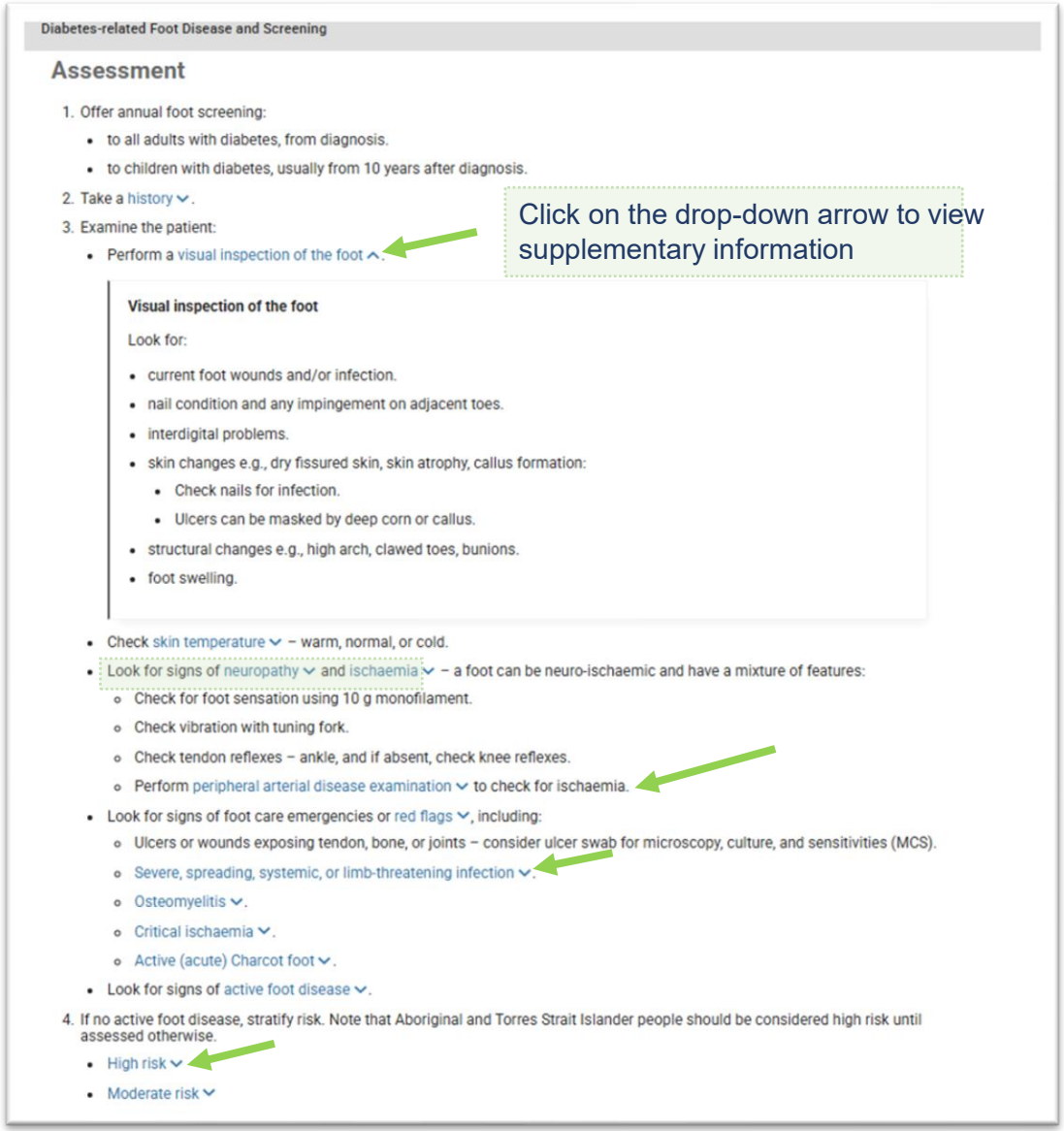
15 October 2025

Pathways are written by GP clinical editors with support from local GPs, hospital-based specialists and other subject matter experts

- clear and concise, evidence-based medical advice
- Reduce variation in care
- how to refer to the most appropriate hospital, community health service or allied health provider.
- what services are available to my patients

HealthPathways – Diabetes-related Foot Disease and Screening

HealthPathways – Diabetes-related Foot Disease and Screening



Diabetes-related Foot Disease and Screening

Assessment

1. Offer annual foot screening:
   - to all adults with diabetes, from diagnosis.
   - to children with diabetes, usually from 10 years after diagnosis.
2. Take a history.
3. Examine the patient:
   - Perform a visual inspection of the foot.

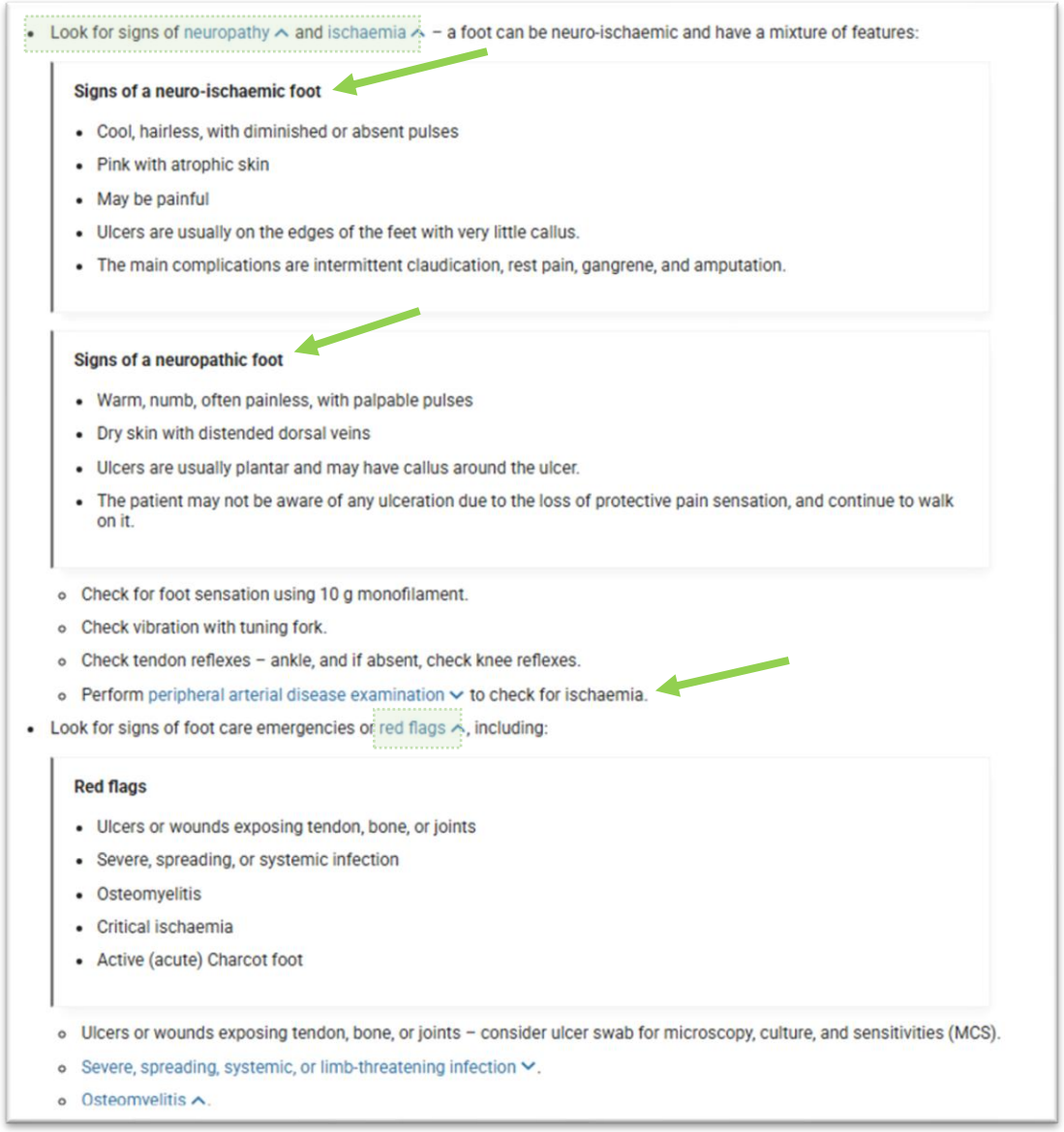
Click on the drop-down arrow to view supplementary information

Visual inspection of the foot

Look for:

- current foot wounds and/or infection.
- nail condition and any impingement on adjacent toes.
- interdigital problems.
- skin changes e.g., dry fissured skin, skin atrophy, callus formation:
  - Check nails for infection.
  - Ulcers can be masked by deep corn or callus.
- structural changes e.g., high arch, clawed toes, bunions.
- foot swelling.

   - Check skin temperature – warm, normal, or cold.
   - Look for signs of neuropathy and ischaemia – a foot can be neuro-ischaemic and have a mixture of features:
     - Check for foot sensation using 10 g monofilament.
     - Check vibration with tuning fork.
     - Check tendon reflexes – ankle, and if absent, check knee reflexes.
     - Perform peripheral arterial disease examination to check for ischaemia.
   - Look for signs of foot care emergencies or red flags, including:
     - Ulcers or wounds exposing tendon, bone, or joints – consider ulcer swab for microscopy, culture, and sensitivities (MCS).
     - Severe, spreading, systemic, or limb-threatening infection.
     - Osteomyelitis.
     - Critical ischaemia.
     - Active (acute) Charcot foot.
   - Look for signs of active foot disease.
4. If no active foot disease, stratify risk. Note that Aboriginal and Torres Strait Islander people should be considered high risk until assessed otherwise.
   - High risk
   - Moderate risk



- Look for signs of neuropathy and ischaemia – a foot can be neuro-ischaemic and have a mixture of features:

Signs of a neuro-ischaemic foot

- Cool, hairless, with diminished or absent pulses
- Pink with atrophic skin
- May be painful
- Ulcers are usually on the edges of the feet with very little callus.
- The main complications are intermittent claudication, rest pain, gangrene, and amputation.

Signs of a neuropathic foot

- Warm, numb, often painless, with palpable pulses
- Dry skin with distended dorsal veins
- Ulcers are usually plantar and may have callus around the ulcer.
- The patient may not be aware of any ulceration due to the loss of protective pain sensation, and continue to walk on it.

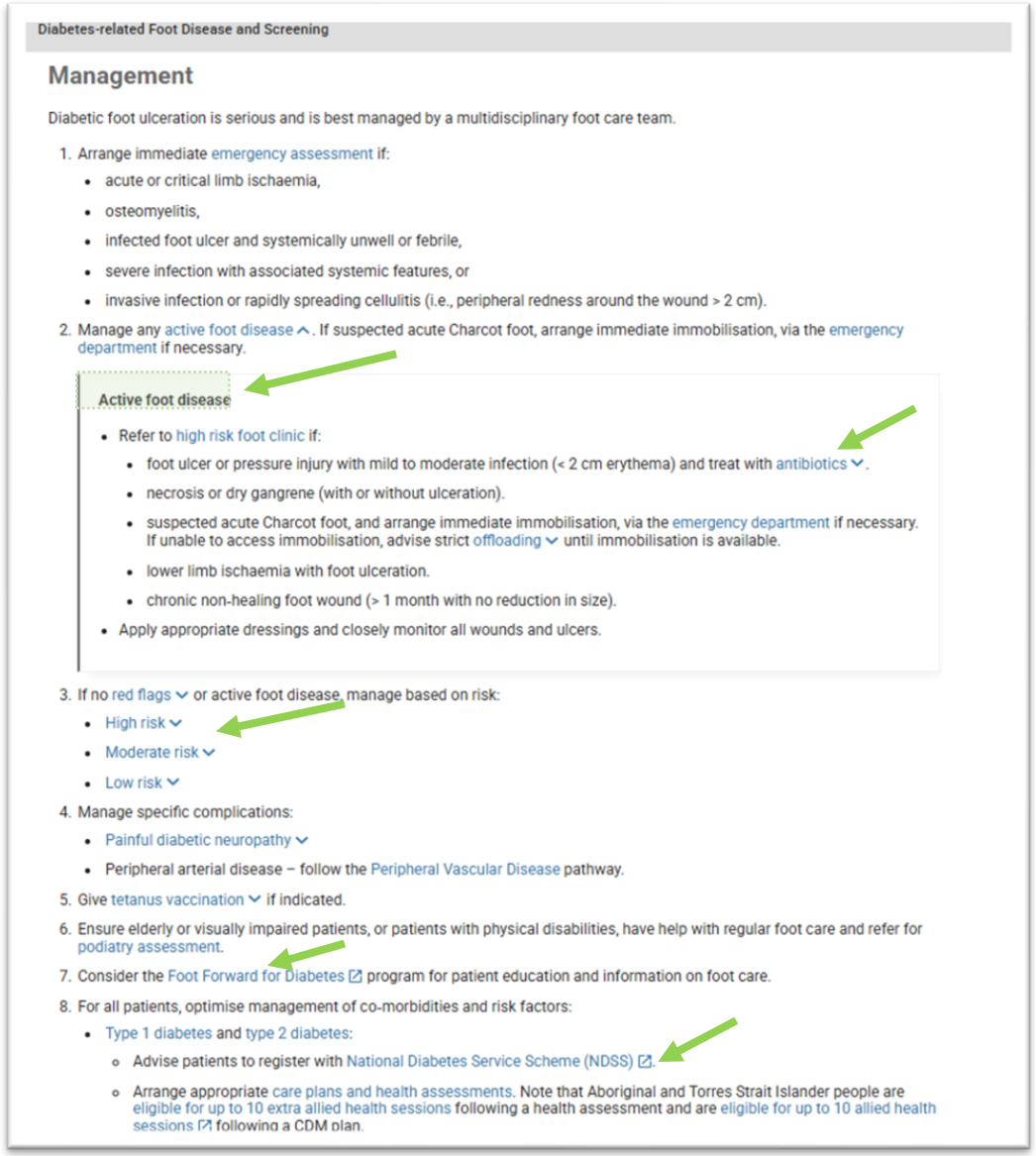
  - Check for foot sensation using 10 g monofilament.
  - Check vibration with tuning fork.
  - Check tendon reflexes – ankle, and if absent, check knee reflexes.
  - Perform peripheral arterial disease examination to check for ischaemia.
- Look for signs of foot care emergencies or red flags, including:

Red flags

- Ulcers or wounds exposing tendon, bone, or joints
- Severe, spreading, or systemic infection
- Osteomyelitis
- Critical ischaemia
- Active (acute) Charcot foot

  - Ulcers or wounds exposing tendon, bone, or joints – consider ulcer swab for microscopy, culture, and sensitivities (MCS).
  - Severe, spreading, systemic, or limb-threatening infection.
  - Osteomyelitis.

HealthPathways – Diabetes-related Foot Disease and Screening



Diabetes-related Foot Disease and Screening

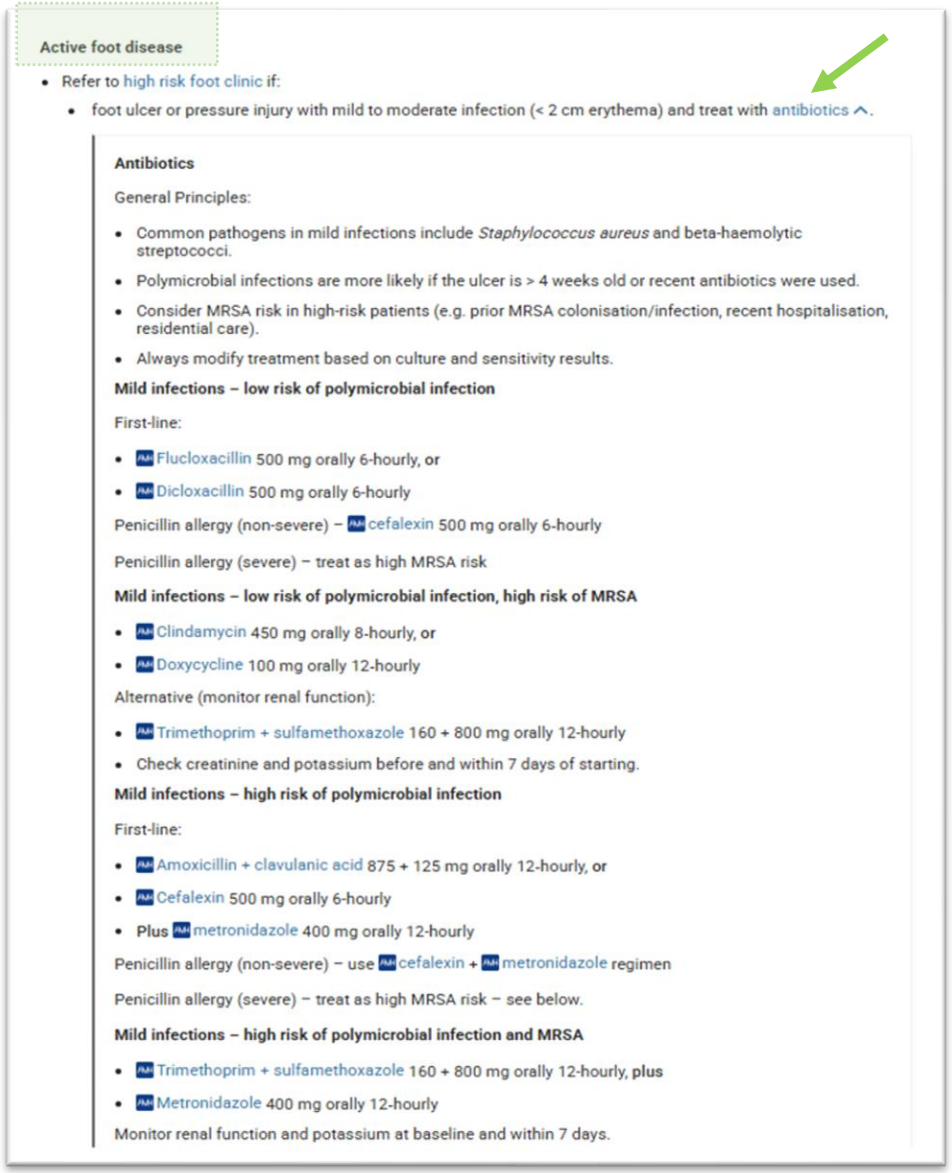
Management

Diabetic foot ulceration is serious and is best managed by a multidisciplinary foot care team.

1. Arrange immediate emergency assessment if:
   - acute or critical limb ischaemia,
   - osteomyelitis,
   - infected foot ulcer and systemically unwell or febrile,
   - severe infection with associated systemic features, or
   - invasive infection or rapidly spreading cellulitis (i.e., peripheral redness around the wound > 2 cm).
2. Manage any active foot disease. If suspected acute Charcot foot, arrange immediate immobilisation, via the emergency department if necessary.

   Active foot disease

   - Refer to high risk foot clinic if:
     - foot ulcer or pressure injury with mild to moderate infection (< 2 cm erythema) and treat with antibiotics.
     - necrosis or dry gangrene (with or without ulceration).
     - suspected acute Charcot foot, and arrange immediate immobilisation, via the emergency department if necessary. If unable to access immobilisation, advise strict offloading until immobilisation is available.
     - lower limb ischaemia with foot ulceration.
     - chronic non-healing foot wound (> 1 month with no reduction in size).
   - Apply appropriate dressings and closely monitor all wounds and ulcers.
3. If no red flags or active foot disease, manage based on risk:
   - High risk
   - Moderate risk
   - Low risk
4. Manage specific complications:
   - Painful diabetic neuropathy
   - Peripheral arterial disease – follow the Peripheral Vascular Disease pathway.
5. Give tetanus vaccination if indicated.
6. Ensure elderly or visually impaired patients, or patients with physical disabilities, have help with regular foot care and refer for podiatry assessment.
7. Consider the Foot Forward for Diabetes program for patient education and information on foot care.
8. For all patients, optimise management of co-morbidities and risk factors:
   - Type 1 diabetes and type 2 diabetes:
     - Advise patients to register with National Diabetes Service Scheme (NDSS).
     - Arrange appropriate care plans and health assessments. Note that Aboriginal and Torres Strait Islander people are eligible for up to 10 extra allied health sessions following a health assessment and are eligible for up to 10 allied health sessions following a CDM plan.



Active foot disease

- Refer to high risk foot clinic if:
  - foot ulcer or pressure injury with mild to moderate infection (< 2 cm erythema) and treat with antibiotics.

Antibiotics

General Principles:

- Common pathogens in mild infections include *Staphylococcus aureus* and beta-haemolytic streptococci.
- Polymicrobial infections are more likely if the ulcer is > 4 weeks old or recent antibiotics were used.
- Consider MRSA risk in high-risk patients (e.g. prior MRSA colonisation/infection, recent hospitalisation, residential care).
- Always modify treatment based on culture and sensitivity results.

Mild infections – low risk of polymicrobial infection

First-line:

- AM Flucloxacillin 500 mg orally 6-hourly, or
- AM Dicloxacillin 500 mg orally 6-hourly

Penicillin allergy (non-severe) – AM cefalexin 500 mg orally 6-hourly

Penicillin allergy (severe) – treat as high MRSA risk

Mild infections – low risk of polymicrobial infection, high risk of MRSA

- AM Clindamycin 450 mg orally 8-hourly, or
- AM Doxycycline 100 mg orally 12-hourly

Alternative (monitor renal function):

- AM Trimethoprim + sulfamethoxazole 160 + 800 mg orally 12-hourly
- Check creatinine and potassium before and within 7 days of starting.

Mild infections – high risk of polymicrobial infection

First-line:

- AM Amoxicillin + clavulanic acid 875 + 125 mg orally 12-hourly, or
- AM Cefalexin 500 mg orally 6-hourly
- **Plus** AM metronidazole 400 mg orally 12-hourly

Penicillin allergy (non-severe) – use AM cefalexin + AM metronidazole regimen

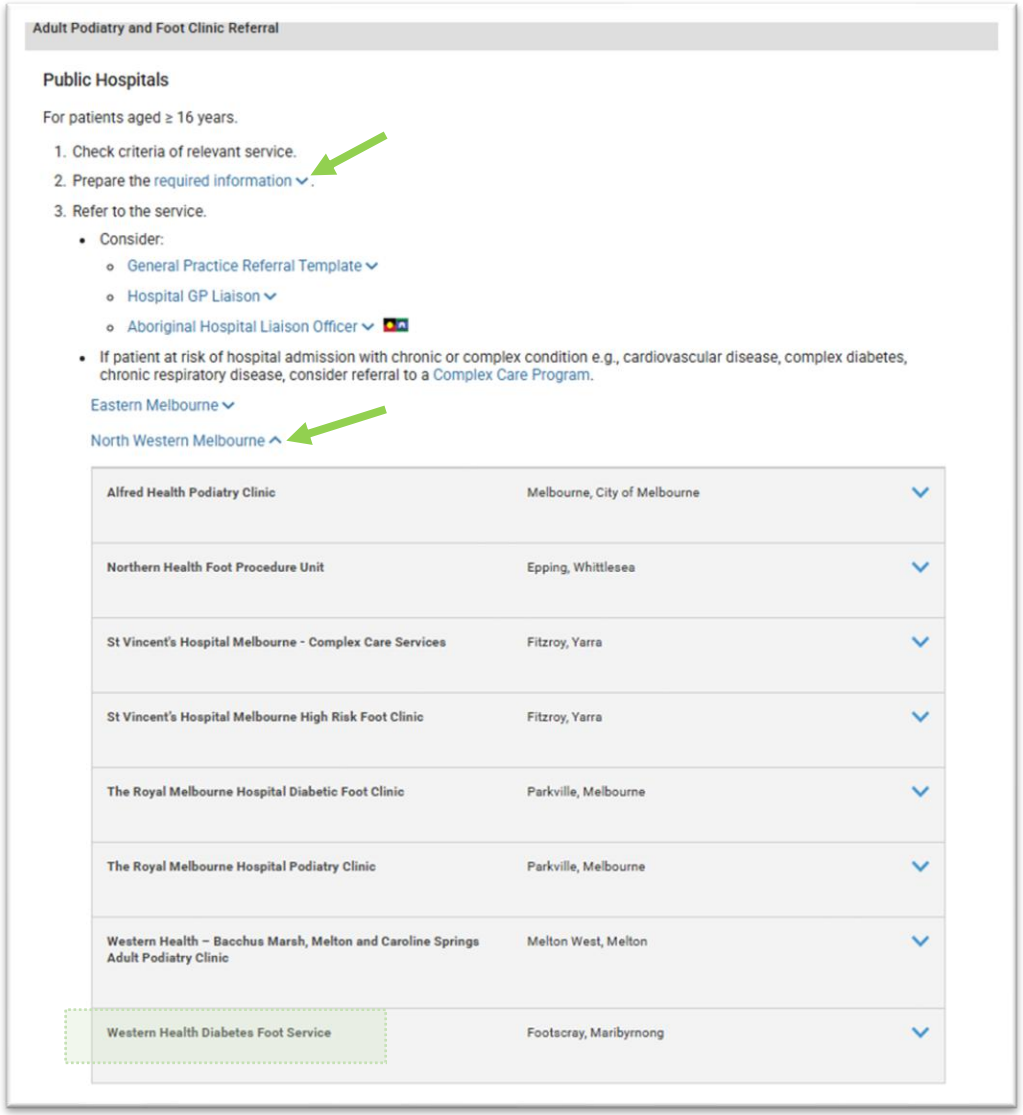
Penicillin allergy (severe) – treat as high MRSA risk – see below.

Mild infections – high risk of polymicrobial infection and MRSA

- AM Trimethoprim + sulfamethoxazole 160 + 800 mg orally 12-hourly, **plus**
- AM Metronidazole 400 mg orally 12-hourly

Monitor renal function and potassium at baseline and within 7 days.

HealthPathways – Adult Podiatry and Foot Clinic Referral



Adult Podiatry and Foot Clinic Referral

Public Hospitals

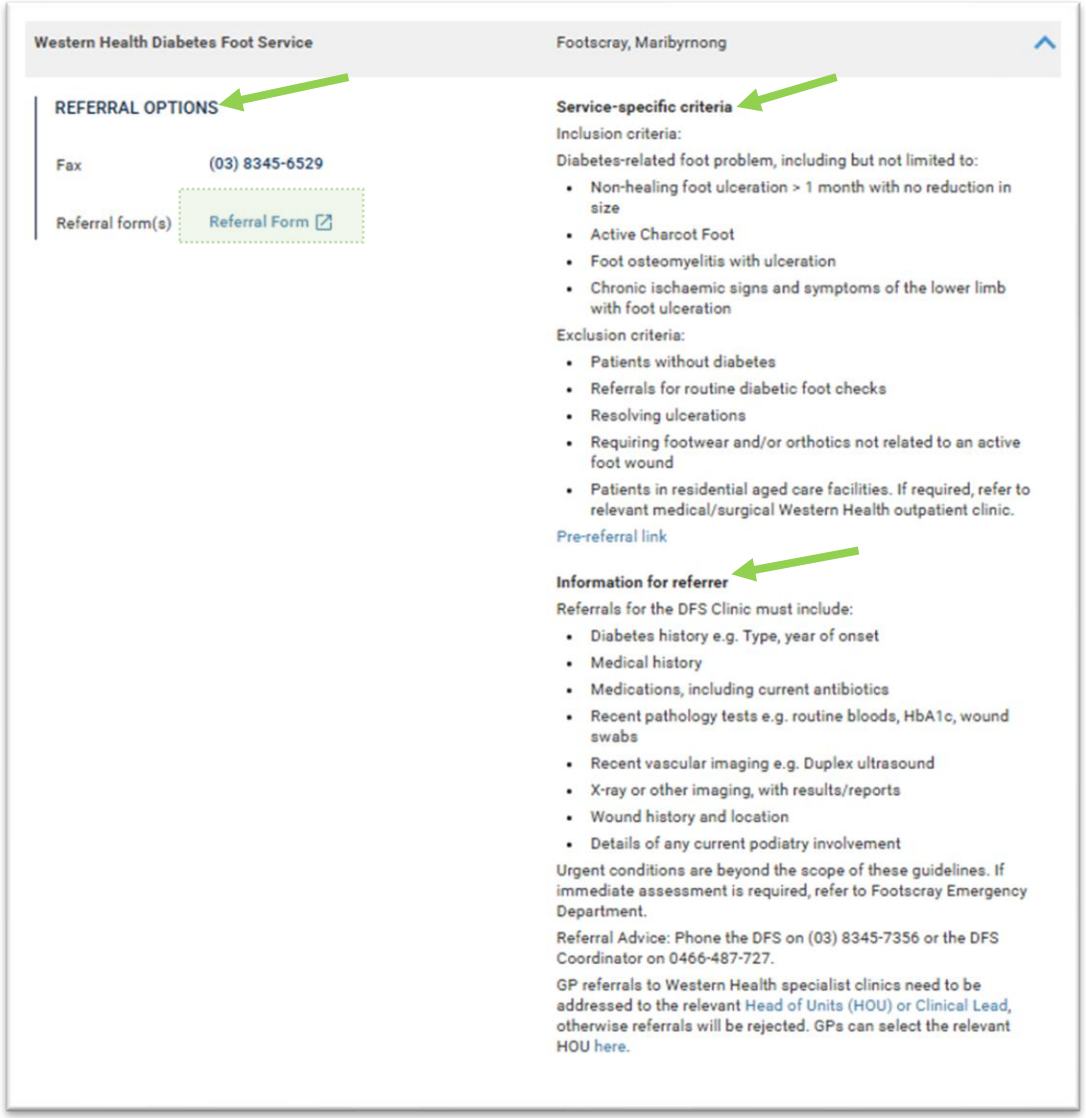
For patients aged ≥ 16 years.

1. Check criteria of relevant service.
2. Prepare the required information.
3. Refer to the service.
   - Consider:
     - General Practice Referral Template
     - Hospital GP Liaison
     - Aboriginal Hospital Liaison Officer
   - If patient at risk of hospital admission with chronic or complex condition e.g., cardiovascular disease, complex diabetes, chronic respiratory disease, consider referral to a Complex Care Program.

Eastern Melbourne

North Western Melbourne

Alfred Health Podiatry Clinic	Melbourne, City of Melbourne
Northern Health Foot Procedure Unit	Epping, Whittlesea
St Vincent's Hospital Melbourne - Complex Care Services	Fitzroy, Yarra
St Vincent's Hospital Melbourne High Risk Foot Clinic	Fitzroy, Yarra
The Royal Melbourne Hospital Diabetic Foot Clinic	Parkville, Melbourne
The Royal Melbourne Hospital Podiatry Clinic	Parkville, Melbourne
Western Health – Bacchus Marsh, Melton and Caroline Springs Adult Podiatry Clinic	Melton West, Melton
Western Health Diabetes Foot Service	Footscray, Maribyrnong



Western Health Diabetes Foot Service — Footscray, Maribyrnong

REFERRAL OPTIONS

Fax (03) 8345-6529

Referral form(s) Referral Form

Service-specific criteria

Inclusion criteria:

Diabetes-related foot problem, including but not limited to:

- Non-healing foot ulceration > 1 month with no reduction in size
- Active Charcot Foot
- Foot osteomyelitis with ulceration
- Chronic ischaemic signs and symptoms of the lower limb with foot ulceration

Exclusion criteria:

- Patients without diabetes
- Referrals for routine diabetic foot checks
- Resolving ulcerations
- Requiring footwear and/or orthotics not related to an active foot wound
- Patients in residential aged care facilities. If required, refer to relevant medical/surgical Western Health outpatient clinic.

Pre-referral link

Information for referrer

Referrals for the DFS Clinic must include:

- Diabetes history e.g. Type, year of onset
- Medical history
- Medications, including current antibiotics
- Recent pathology tests e.g. routine bloods, HbA1c, wound swabs
- Recent vascular imaging e.g. Duplex ultrasound
- X-ray or other imaging, with results/reports
- Wound history and location
- Details of any current podiatry involvement

Urgent conditions are beyond the scope of these guidelines. If immediate assessment is required, refer to Footscray Emergency Department.

Referral Advice: Phone the DFS on (03) 8345-7356 or the DFS Coordinator on 0466-487-727.

GP referrals to Western Health specialist clinics need to be addressed to the relevant Head of Units (HOU) or Clinical Lead, otherwise referrals will be rejected. GPs can select the relevant HOU here.

Relevant and Related Pathways

Relevant and Related Pathways

Diabetes-related Foot Disease and Screening
Managing Type 2 Diabetes
Medications for Type 2 Diabetes (Excluding Insulin)
Diabetes-related Foot Disease and Screening
Glycaemic Control
Hypoglycaemia
Insulin
Newly Diagnosed or Suspected Type 1 Diabetes in Adults
Self-monitoring Blood Glucose (SMBG)
Screening and Detection of Diabetes and Pre-diabetes
Health Assessments

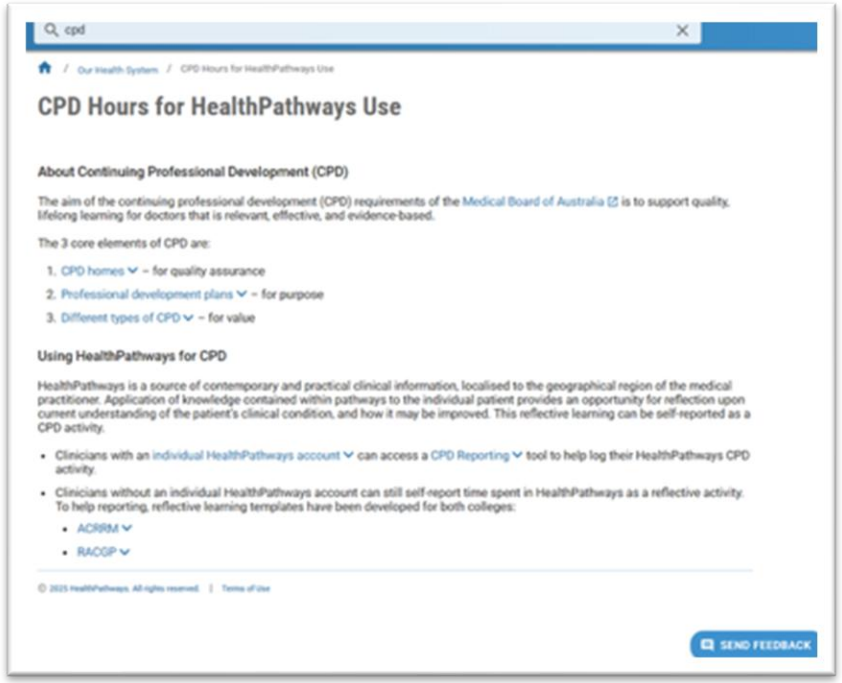
Referral Pathways

Adult Podiatry and Foot Clinic Referral
Acute Diabetes Referral (Same-day)
Non-acute Diabetes Referral (> 24 hours)
Diabetes Education Referrals
Acute Endocrinology Referral (Same-day)
Non-acute Endocrinology Referral (> 24 hours)
Adult Dietetic Referral
Exercise Physiology Referral

CPD Hours for HealthPathways Use

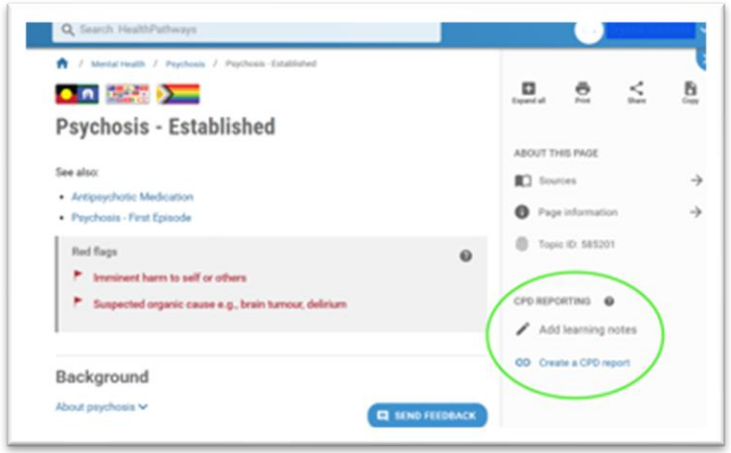
CPD Hours for HealthPathways Use and the CPD Reporting Tool

HealthPathways Melbourne has CPD hours for HealthPathways Use to support clinicians in meeting their **CPD requirements** through everyday use of the platform

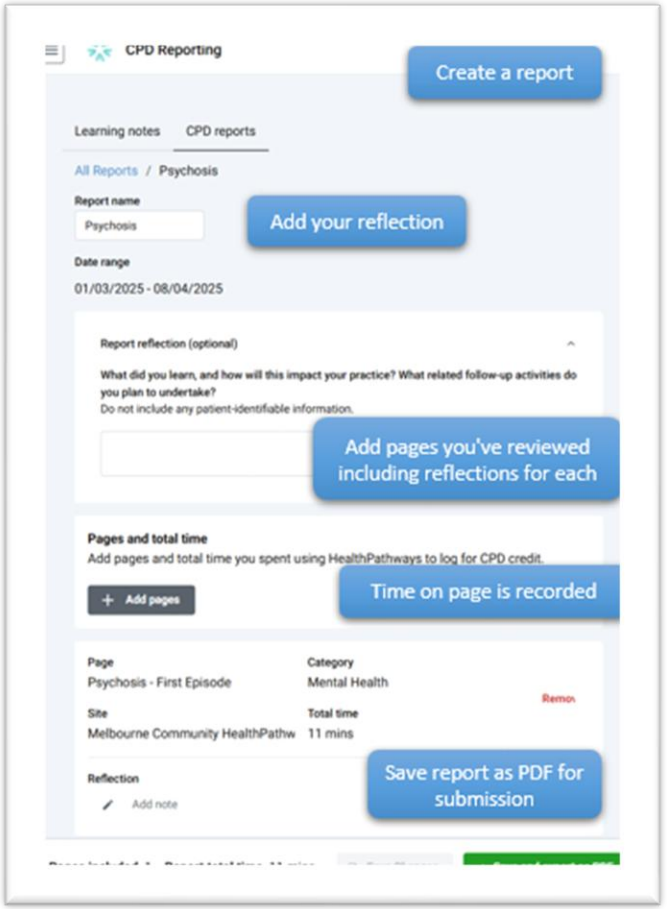


Step 1: Access Pathway page

- Navigate to a clinical pathway (e.g., *Psychosis – Established*).
- Click **"Add learning notes"** or **"Create a CPD report"** to begin tracking your CPD activity.



Step 2: Add Learning Notes



Step 3: Generate Your CPD Report

- Go to the **CPD Reporting** section.
- Add reflections, review pages, and confirm time spent.
- Export your report as a **PDF for submission**.

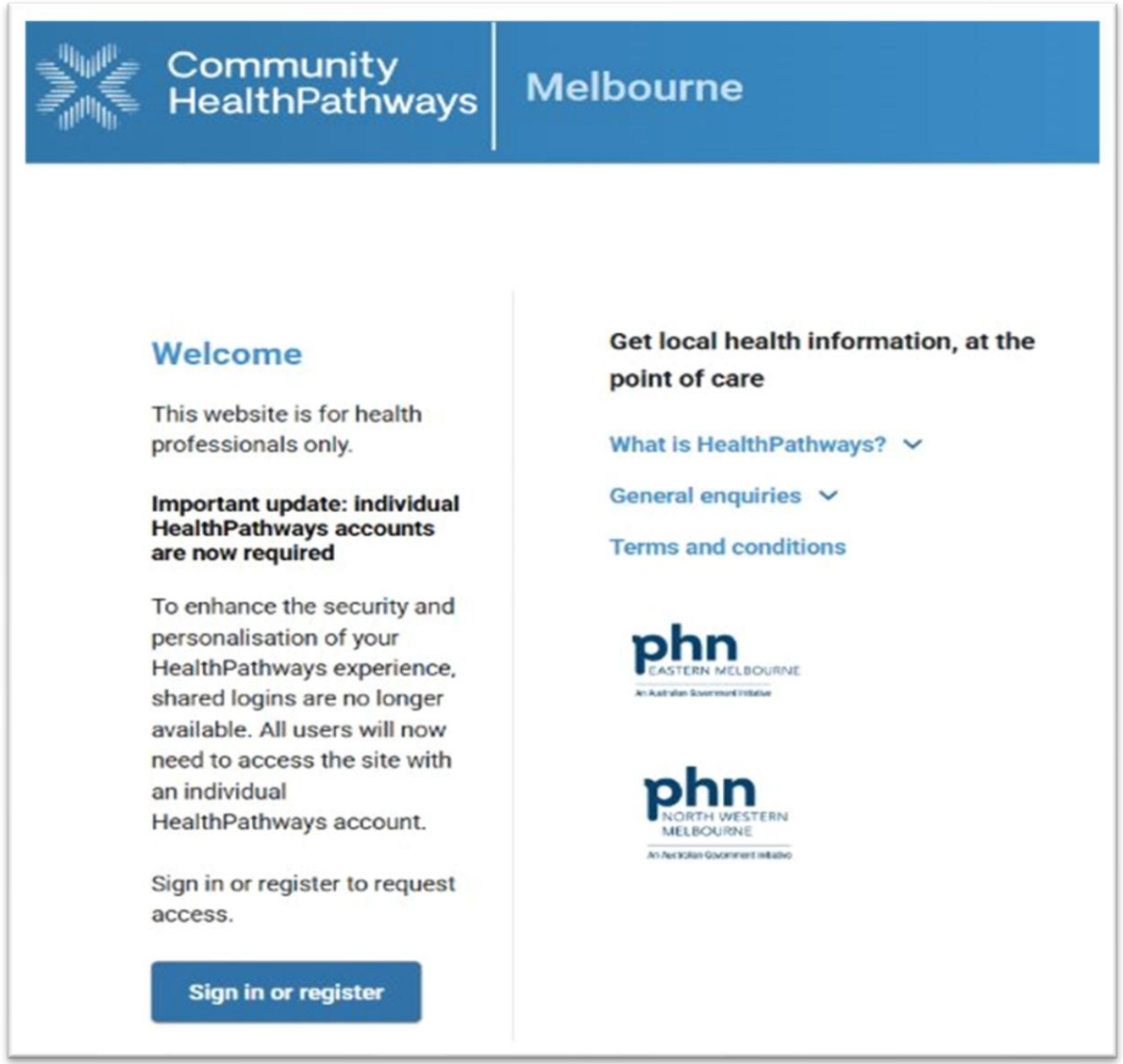
For further information on the CPD reporting tool, please see these videos:

- How to create a CPD report
- How to add learning notes

Accessing HealthPathways

Please click on the **Sign in or register** button to create your individual account or scan the QR code below.

If you have any questions, please email the team info@healthpathwaysmelbourne.org.au



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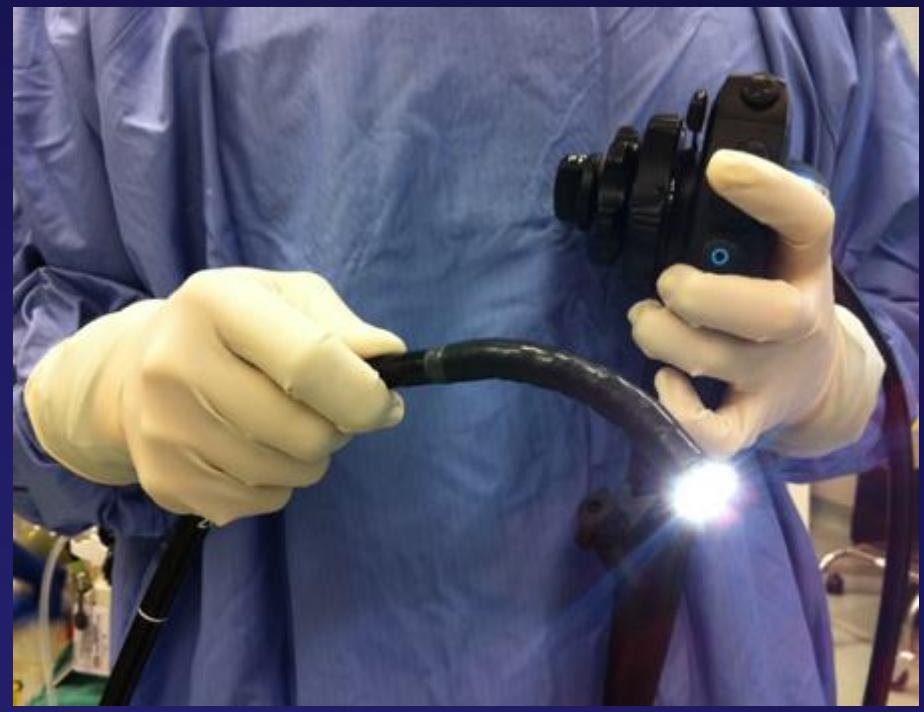
Western Health

Duodenal Mucosal Resurfacing For Type 2 Diabetes Mellitus – An Overview And A New Way Forward.



Dr Dev Kevat –

Deputy Head of Endocrinology and Diabetes

Email: restorestudy@wh.org.au

live BEST CARE

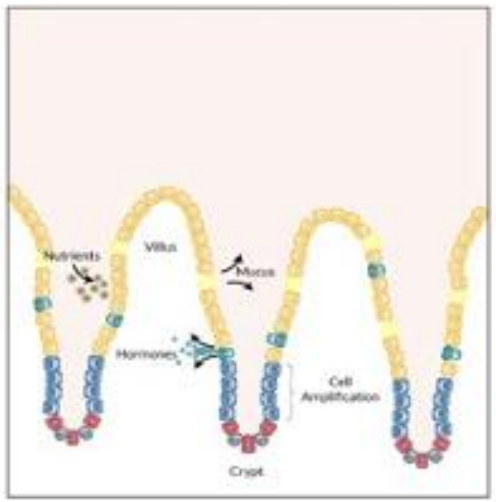
Duodenal Musosal Resurfacing

- Novel treatment for T2DM – first in human study
- Three research groups worldwide

- Endoscopic day procedure – “Gastroscopy +”
- Modified scope to second part of the duodenum
- Energy applied to superficial layer of mucosa – ablation
- Scope removed
- Modified diet afterwards
- Proton pump inhibitor for 7 days

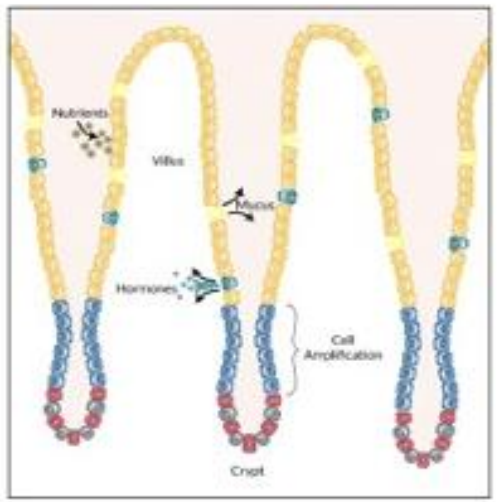
Role of Duodenal Mucosal Hyperplasia in Metabolic Disease

Normal duodenal lining



Epithelial proliferation due to high fat & high sugar diets[1,4]

Duodenal lining overgrowth[2-4]



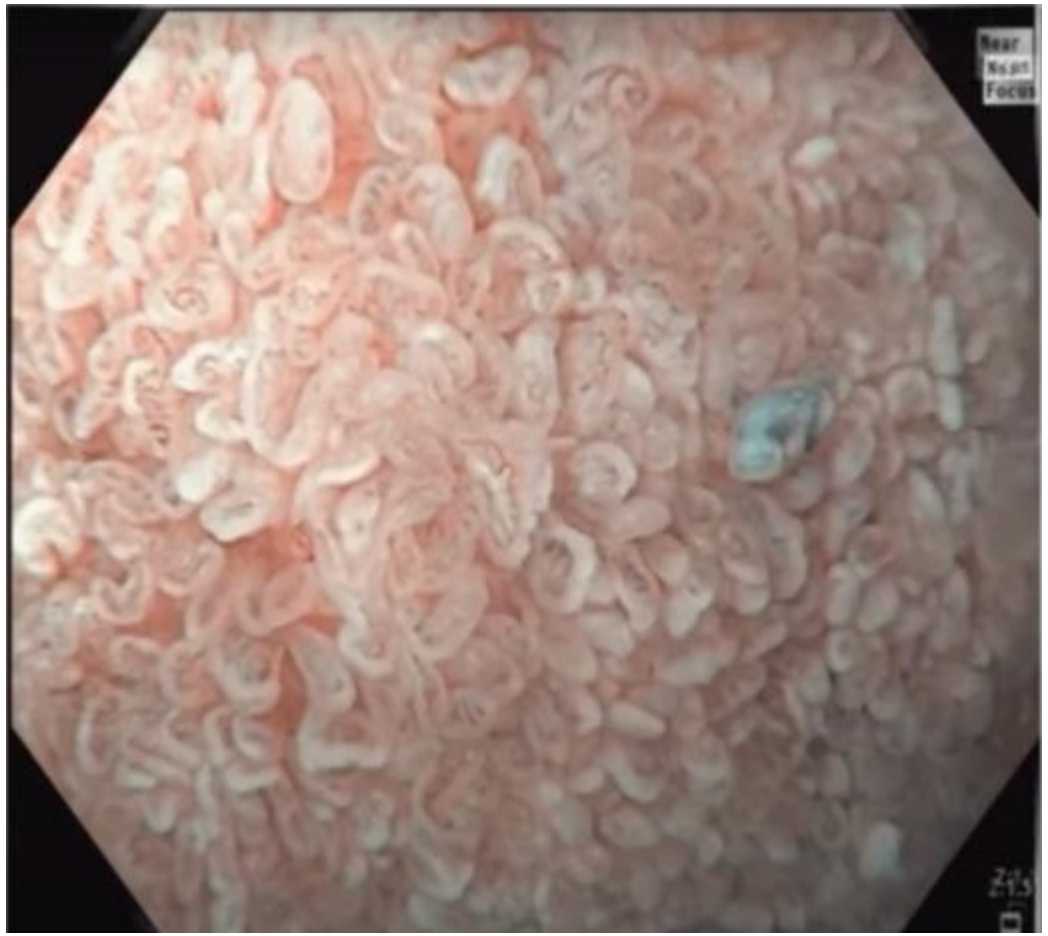
Duodenal hormone hyperactivity[2,5]

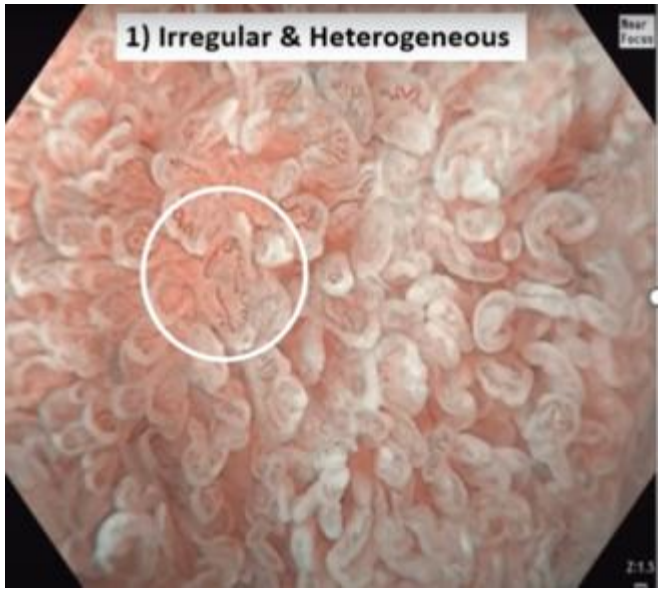
Insulin Resistance Syndrome

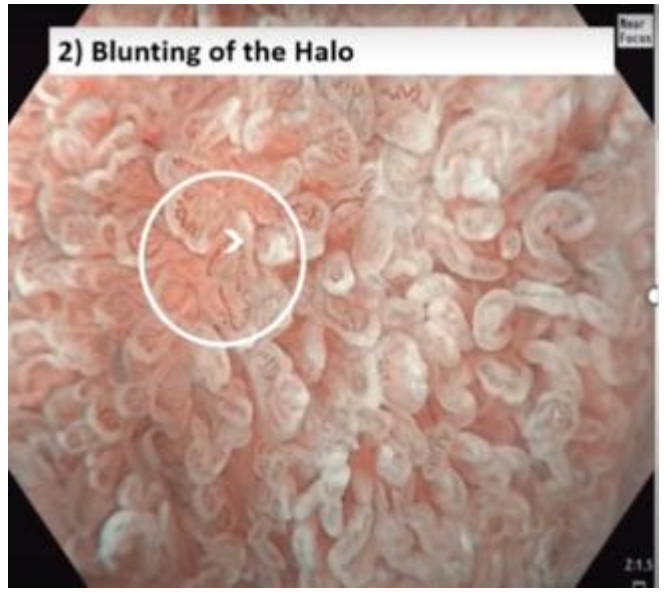
Excessive duodenal hormone signaling leads to insulin resistance

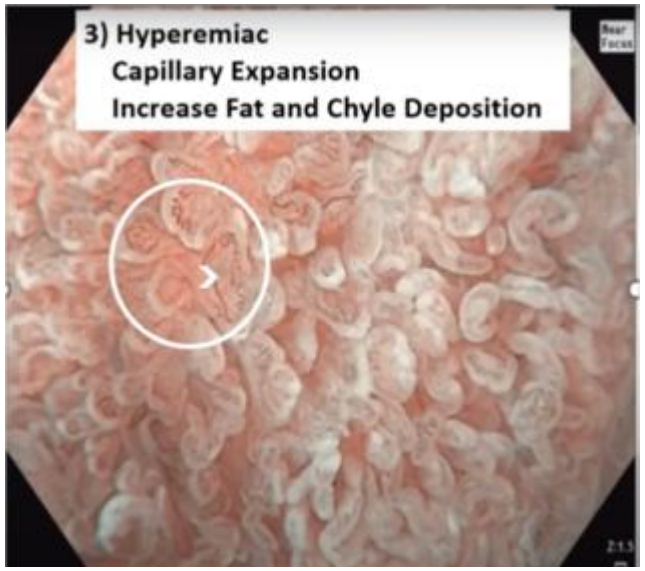
[1] O"Brien et al Cell 2012 [2] Gniuli et al Diabetologia 2010 [3] Theodorakis et al AJPEM 2006 [4] Theodorakis et al D Care 2004 [5] Fractyl – Gubra collaboration (Presented at ADA 2018)

Unhealthy Duodenum







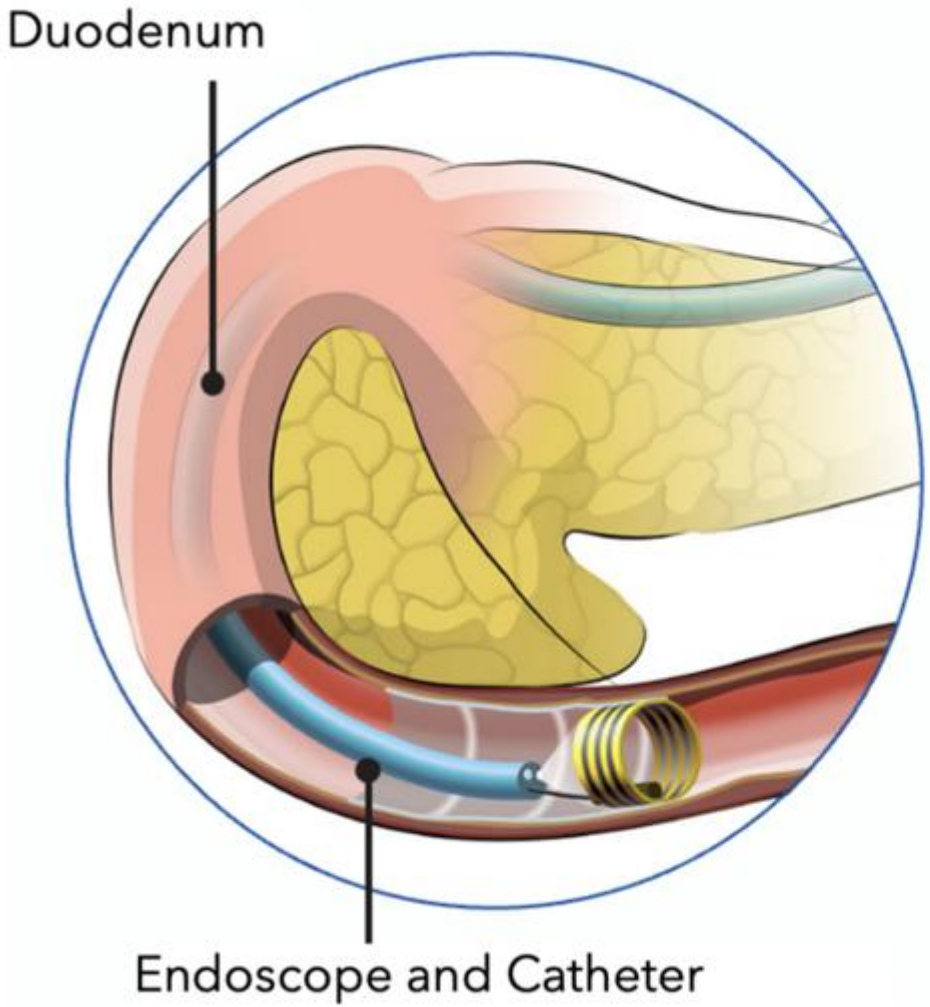


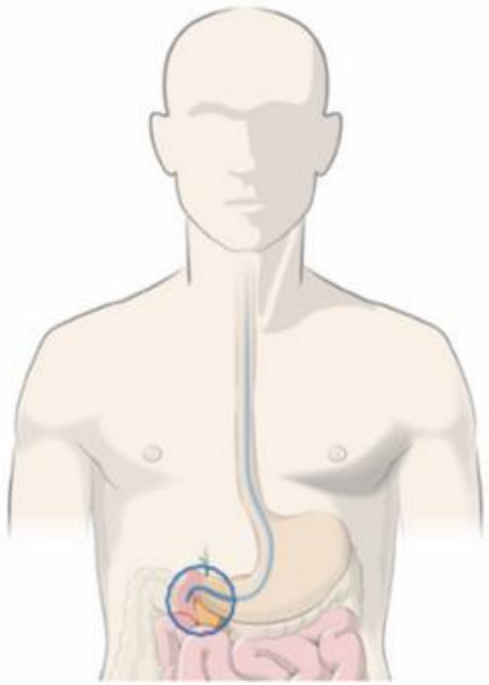
Courtesy of BKA, Cedar Sinai, CA

Duodenal Mucosal Resurfacing Procedure

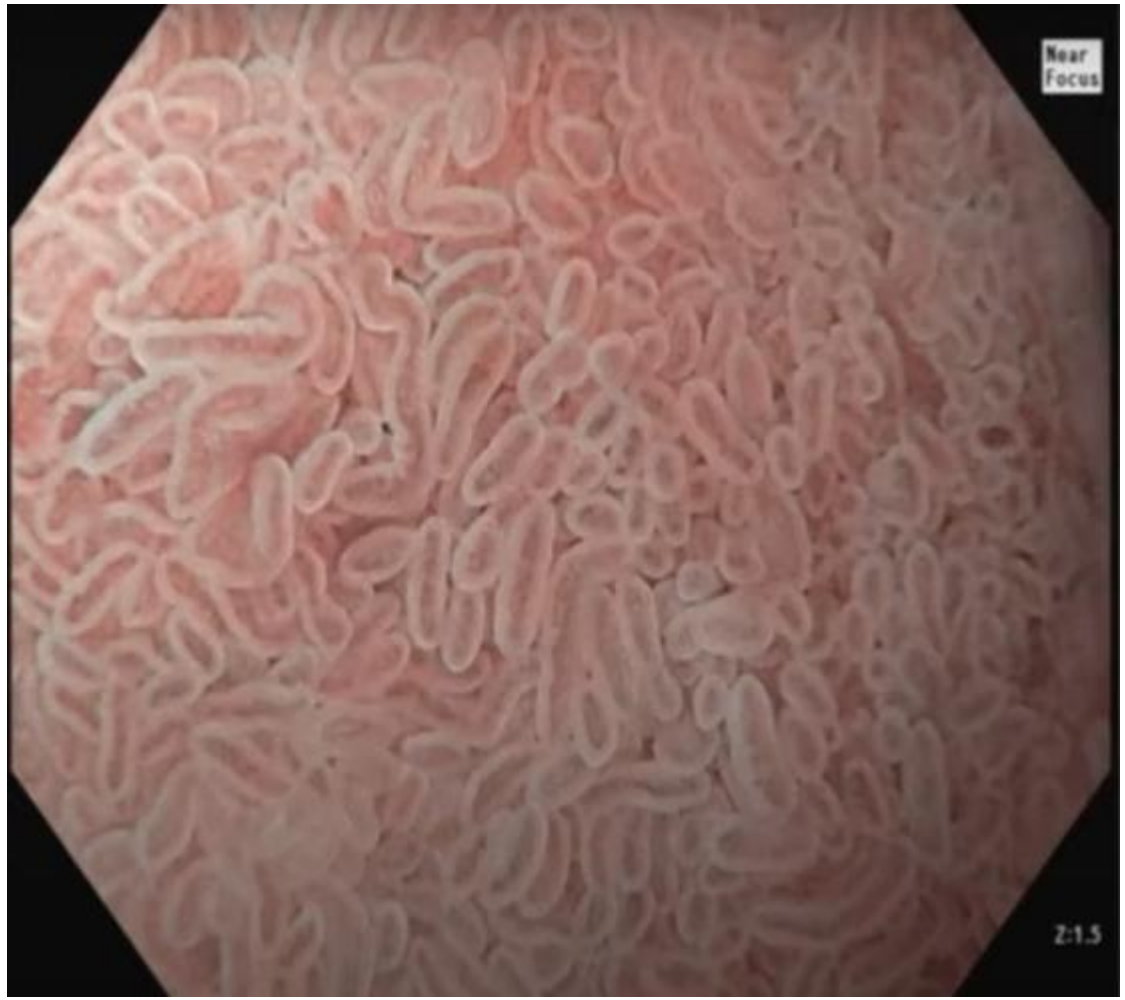
- Duodenal Mucosal Resurfacing – An Endoscopic Approach to Treating Type 2 Diabetes

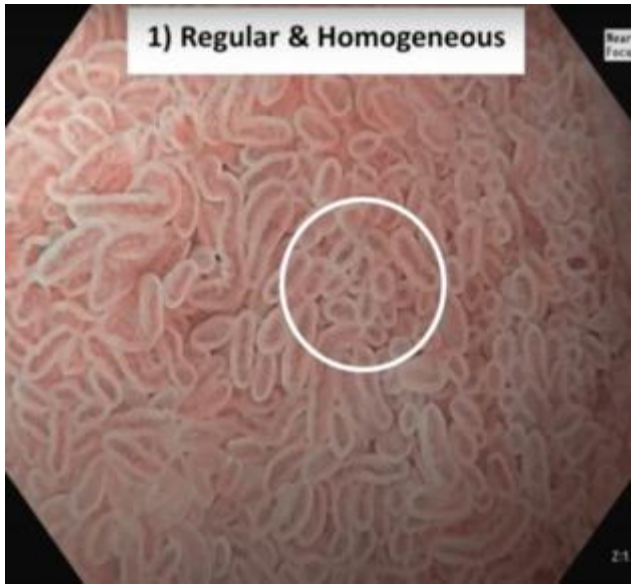
- Screening upper GI endoscopy
- Major papilla identified and marked
- Catheter inserted into scope and extends from tip of endoscope
- Endoscope and catheter passed into D2
- Sequential ablations are completed to ablate the mucosal surface of the duodenum distal to the papilla until the end of D4
- Ablations performed under direct endoscopic vision
- Does NOT require radiation
- Does NOT require guidewire

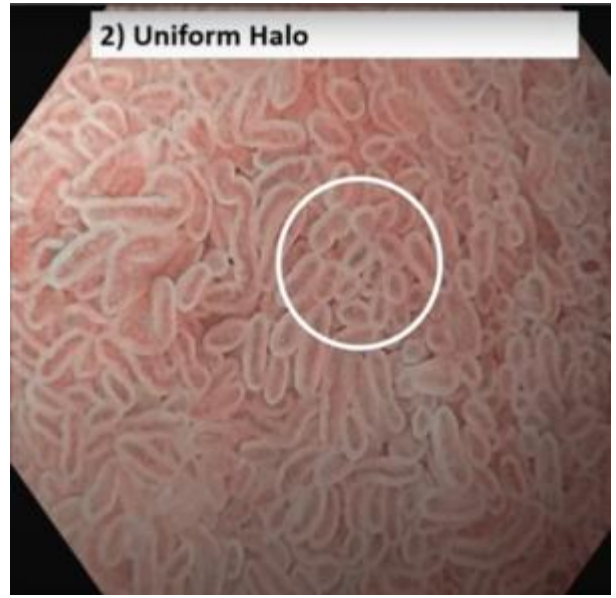




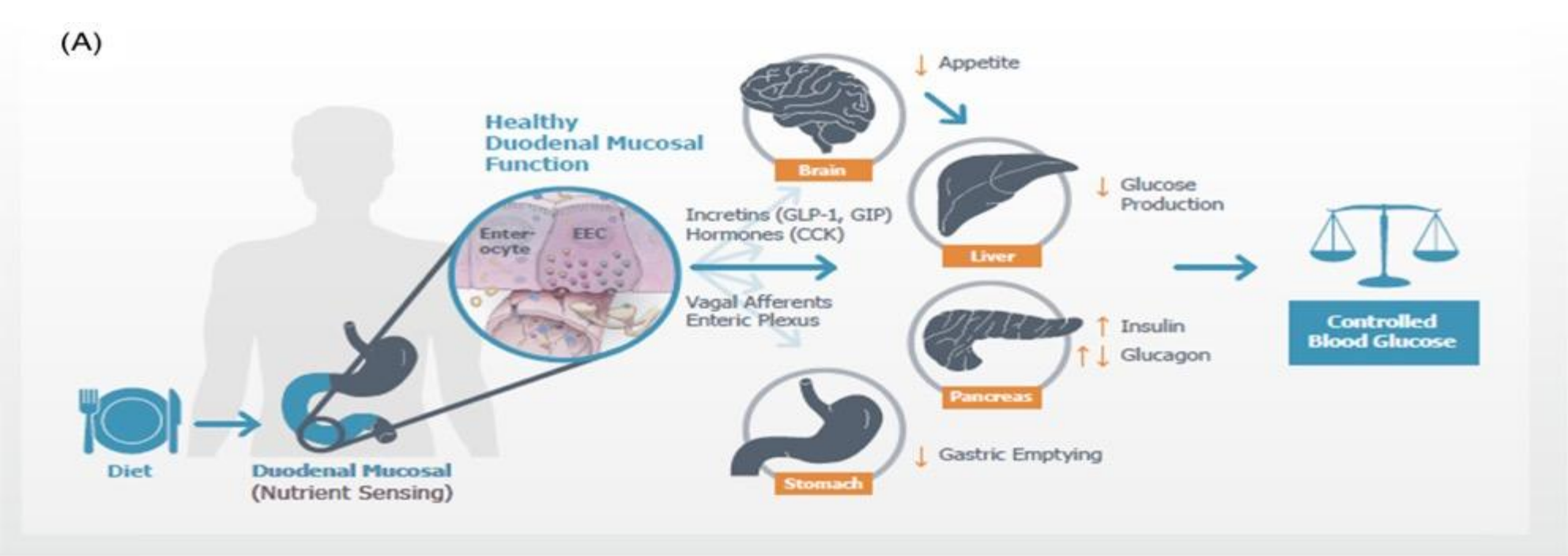
Healthy Duodenum

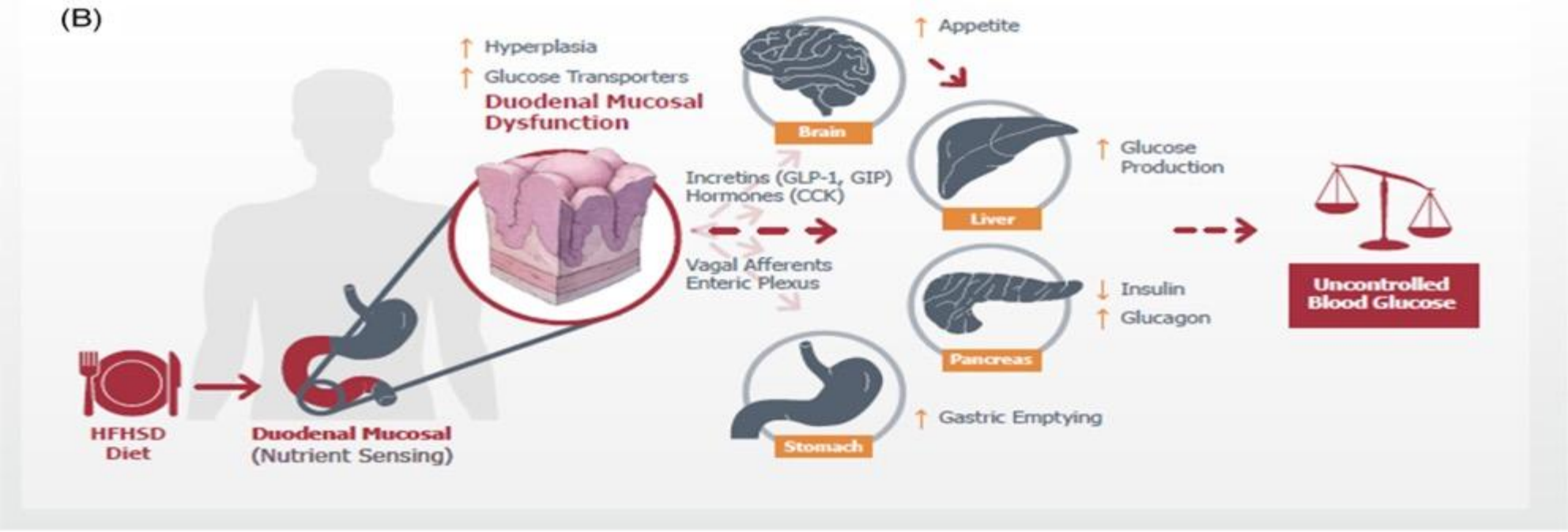






Courtesy of BKA, Cedar Sinai, CA


(A)
Healthy
Duodenal Mucosal
Function
Enter-
ocyte
EEC
Incretins (GLP-1, GIP)
Hormones (CCK)
Vagal Afferents
Enteric Plexus
Brain
Liver
Pancreas
Stomach
↓ Appetite
↓ Glucose
Production
↑ Insulin
↑↓ Glucagon
↓ Gastric Emptying
Controlled
Blood Glucose
Diet
Duodenal Mucosal
(Nutrient Sensing)


(B)
↑ Hyperplasia
↑ Glucose Transporters
Duodenal Mucosal
Dysfunction
Incretins (GLP-1, GIP)
Hormones (CCK)
Vagal Afferents
Enteric Plexus
Brain
Liver
Pancreas
Stomach
↑ Appetite
↑ Glucose
Production
↓ Insulin
↑ Glucagon
↑ Gastric Emptying
Uncontrolled
Blood Glucose
HFHSD
Diet
Duodenal Mucosal
(Nutrient Sensing)

DMR Clinical Outcomes

- DMR with hydrothermal ablation showed significant HbA1c reductions (~1.2% at 6 months) and fasting glucose improvements, but early studies reported duodenal stenosis as a complication. (Rajagopalan et al., 2016)
- Procedure modifications in a multicenter study (Van Baar et al.) improved safety, leading to sustained metabolic benefits (HbA1c, fasting glucose, insulin resistance) at 24 months, with only one mild SAE reported.
- A randomized, sham-controlled trial found HbA1c and liver fat reductions, but overall results were not statistically significant, though subgroups with high fasting plasma glucose showed improvements.
- A systematic review/meta-analysis (Lin et al.) confirmed DMR significantly improves metabolic parameters, independent of weight loss
- The first human study using non-thermal ablation demonstrated promising glycemic improvements, a 100% technical success rate, and no severe complications, with complete mucosal healing in 4 weeks.

Duodenal Musosal Resurfacing – RESTORE

- Age 22-70
- BMI 22-40 (45)
- T2DM <10 years
- HbA1c 7.1-10%
- 2 or more non-insulin medicine (eg OHG, GLP1)
- No history of gastric surgery or coeliac disease

Patients looked after by Western Health diabetes team (Endo, DNE, dietician) for 12 months after procedure. Car parking paid and gift cards $150 after each visit.

Pts undergo: blood tests, DEXA scans, blinded CGM, procedure and two follow up scopes

RESTORE STUDY

Restore Study Team
Departments of Gastroenterology,
Endoscopic Services and Endocrinology

Western Health
Tel: 0481 696 609
Email: restorestudy@wh.org.au

Diabetic Foot Disease Masterclass for the Primary Care Physician

North-West PHN, 15 October 2025

A/Prof Fiona Bodey, Clinical Lead, Diabetes Foot Unit
Ms Charlotte Cooke, Senior Podiatrist
Mr Bernard Allard, Head of Vascular Surgery
Dr Chris Preston, Endocrinologist
Dr Asma Sohail, Infectious Diseases Physician
Dr Huy Do, Endocrinology Advanced Trainee

Acknowledgement of Country

Western Health

Western Health acknowledges the Traditional Custodians of all the lands and waterways on which our staff, volunteers, consumers and caregivers come together.

As we work, learn and grow, we pay our deep respects to the Elders and Traditional Custodians past, present and emerging of the Wurundjeri Woi-Wurrung, Boon Wurrung, Bunurong and Wadawurrung Countries of the greater Kulin Nation.

We are committed to the healing of country, working towards equity in health outcomes, and the ongoing journey of reconciliation.

Western Health is committed to respectfully listening and learning from Aboriginal and Torres Strait Islander people and we are truly guided by the values of relationship, responsibility and respect.

Outline

- **1. Local burden of Diabetes-related Foot Disease (DFD)**
- 2. Stepping forward with Western Health's new Diabetes Foot Unit
- 3. Case presentations highlighting updates in management techniques
- 4. Review of the latest guidelines (diabetes and podiatry cycles of care)
- 5. Practical tips to prevent recurrence (DFD care 101 with a Senior Podiatrist)
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- 8. How and when to refer?
- 9. Q+A session

Diabetes-related Foot Disease

- Diabetic foot disease is an extremely common and costly condition
- Lifetime incidence of foot ulceration in people with diabetes is estimated to be between 19 and 34%
- In patients with diabetes, the risk of death at 5 years is estimated to be 2.5 times higher in a patient with a foot ulcer compared to one without an ulcer
- Approximately 20% of moderate to severe infections will lead to amputation
- Up to 40% of ulcers recur within one year and 65% within 3 years

Edmonds et al, J Clin Orthop Trauma, 2021
Armstrong et al, NEJM, 2017
Bus et al, Diabetes Metab Res Rev, 2020

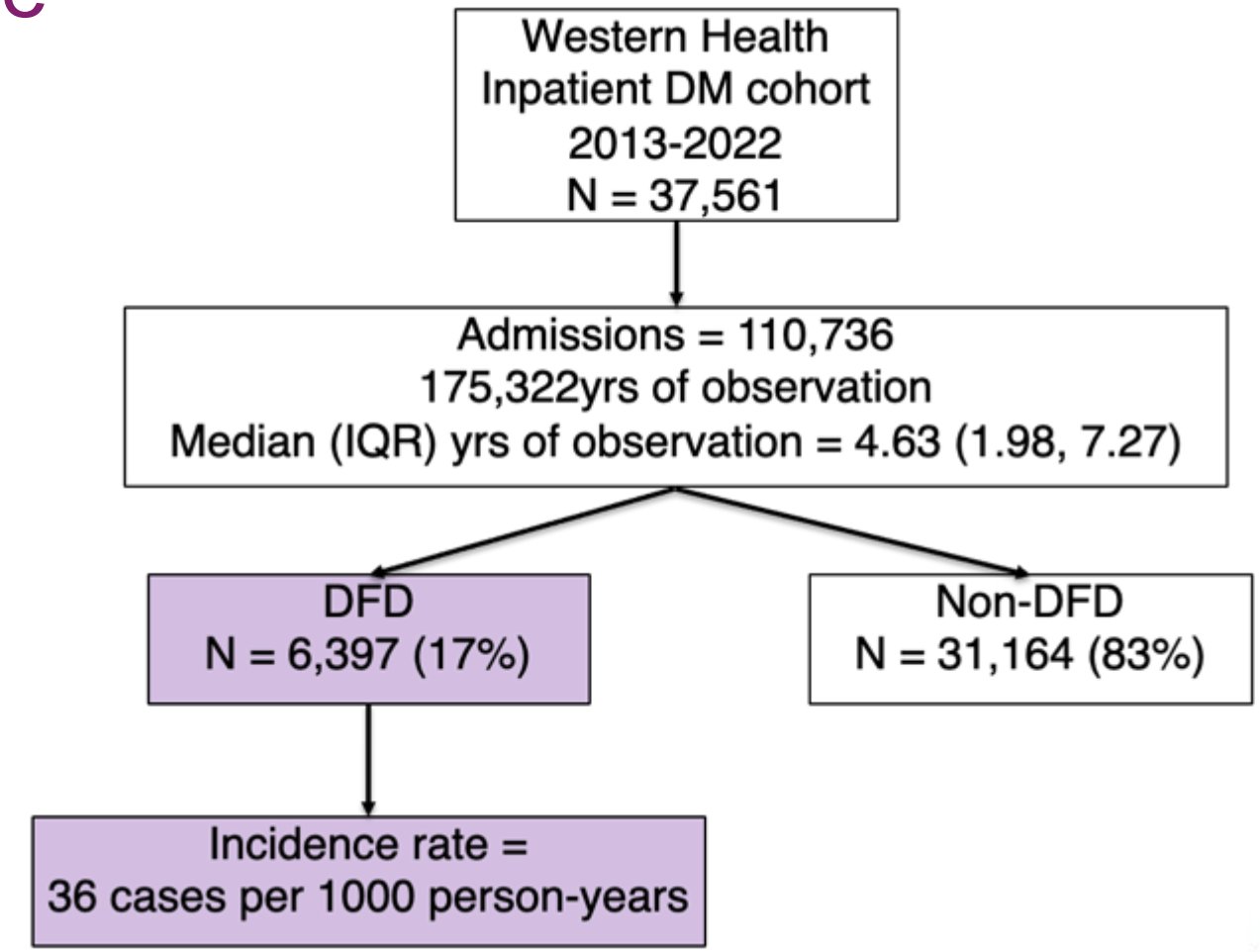
DFD: A growing problem

- Internationally, DFD is a leading cause of:
  - Hospitalisation, amputation, disability and health care costs
- In Australia, 1.3 million people are living with diabetes
  - 34% of individuals with diabetes will develop a foot ulcer in their lifetime
  - 15% of inpatients with diabetes will have a diabetes-related foot ulcer at any one time
- Both diabetes and diabetes-related foot disease are increasing
  - Between 1998 – 2011, a 30% increase in the rate of diabetes-related lower limb amputations was reported
  - High risk foot services advocated to reduce the rate of avoidable amputations due to DFD
  - Limited data on recent trends

Armstrong DG et al. N Engl J Med. 2017
Zhang, Y, et al. J Foot Ankle Res 2021

DFD: Local burden of disease

- **Study Design**
  - Retrospective audit using hospital electronic administrative data
- **Population**
  - Inpatient admissions to Western Health with diabetes mellitus in adult population (from ED, elective admissions)
- **Inclusion Criteria**
  - Age >18 years
  - All admissions/separations with ICD code for diabetes mellitus
  - Discharge/separation date: 1st Jan 2013 - 31st Dec 2022
- **Exclusion Criteria**
  - Admissions to subacute care (rehab, GEM)
  - Direct discharges from Emergency Department (including short-stay unit)



*DFD cohorts
Higher rates of readmission: 76% v 48%, P<0.001
Greater no. of admissions: 3 (2-7) vs 1 (1-3), p <0.001

DFD: Local burden of disease

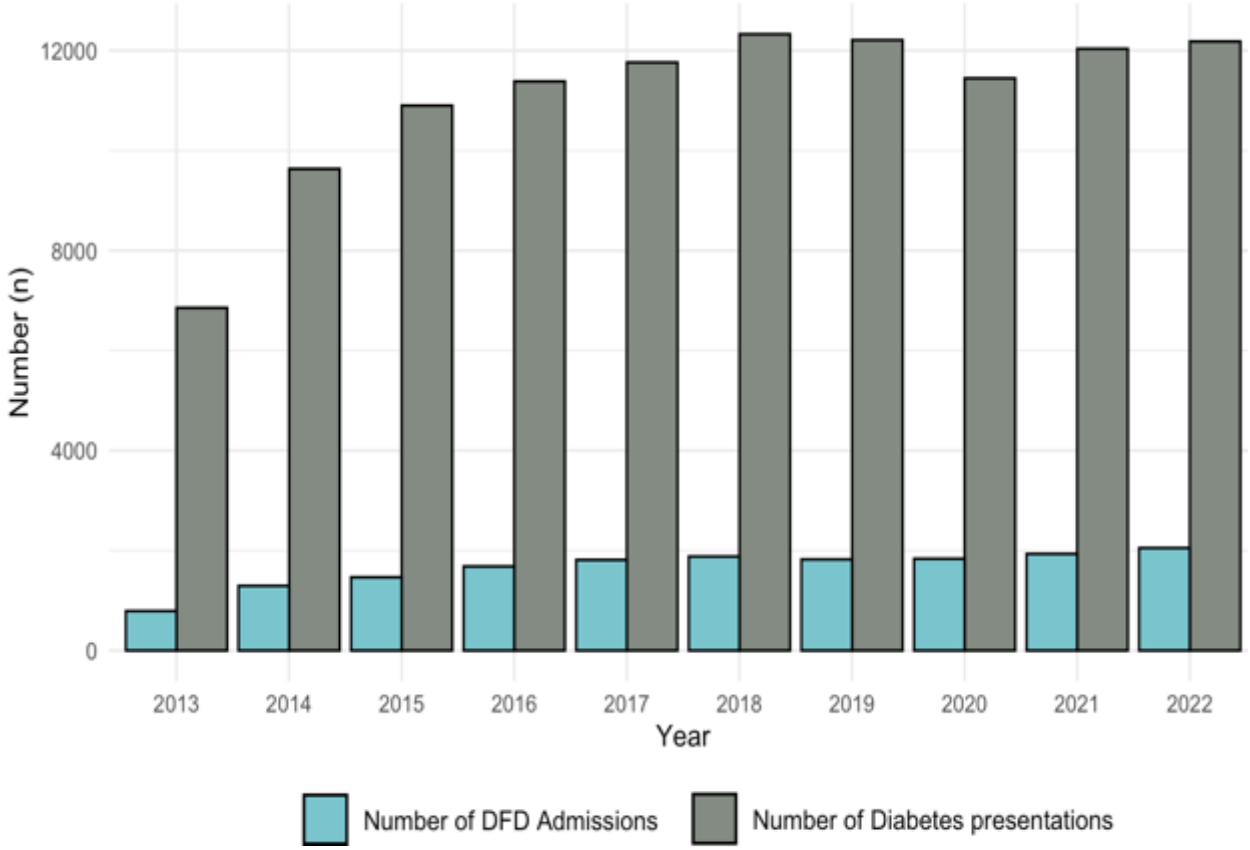
	Total	With DFD	non-DFD	P-value
N (%)	37,561	6,397 (17.0%)	31,164 (82.9%)	
Age, mean (SD)	66.23 (15.09)	68.51 (14.1)	65.76 (15.2)	<0.001
Male sex, n (%)	20397 (54.3%)	4039 (63.1%)	16358 (52.5%)	<0.001
Diabetes type, n(%)				
Type 1	1,559 (4.2%)	182 (2.8%)	1,377 (4.4%)	<0.001
Type 2	35,146 (93.6%)	6033 (94.3%)	29,113 (93.4%)	
Type 1/Type 2 *	463 (1.2%)	163 (2.5%)	300 (1.0%)	
Unknown	393 (1.0%)	19 (0.3%)	374 (1.2%)	
English-speaking, n(%)	28,877 (77.0%)	5,113 (79.9%)	23,764 (76.3%)	<0.001
Country Of Birth, n(%)				
Australia	13719 (36.5%)	2661 (41.6%)	11058 (35.5%)	<0.001
Overseas	23842 (63.5%)	3736 (58.4%)	20106 (64.5%)	
CCI on initial presentation, median (IQR)	3 (1, 5)	3 (1, 5)	3 (1, 5)	0.81
CCI $\geq$ 5 at admission	11,895 (32.4%)	1,999 (32.0%)	9,896 (32.4%)	0.52

DFD = diabetes foot disease; CCI – Charlson Comorbidity Index

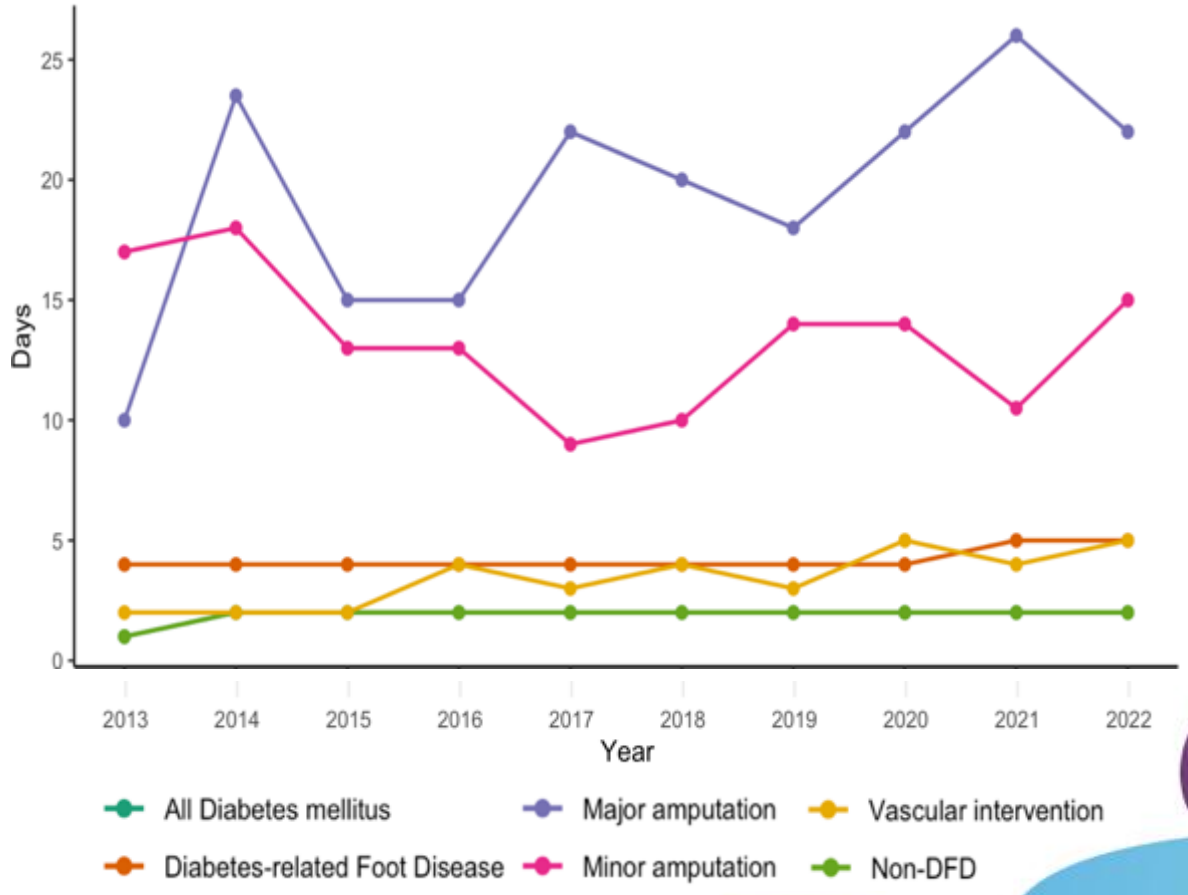
DFD: Local burden of disease

Western Health

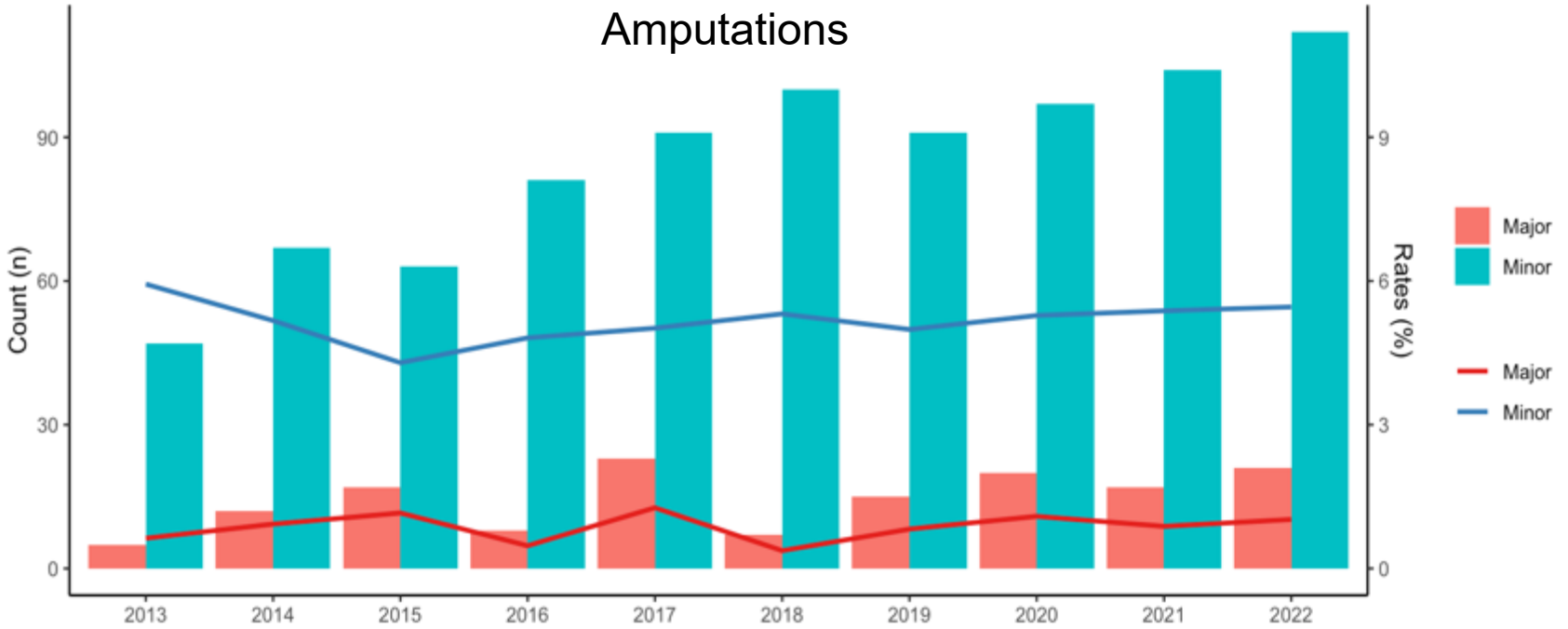
DM and DFD Presentations



Median Length of Stay (excluding HITH)

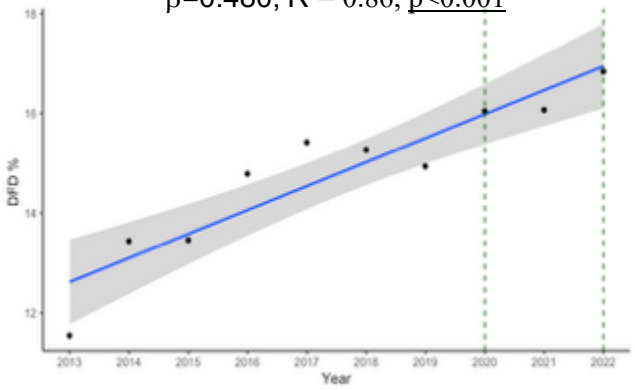


DFD: Local burden of disease



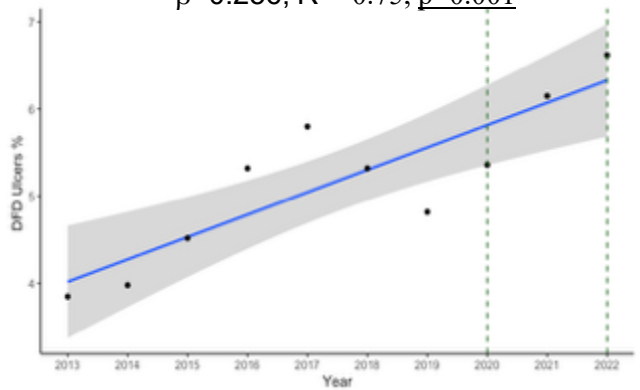
A: Rate of admissions with DFD

β=0.480, R^2= 0.86, p<0.001



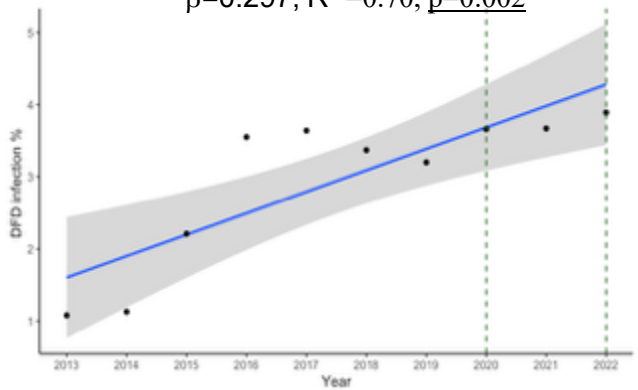
B: Rate of diabetic foot ulcers

β=0.256, R^2 =0.75, p=0.001



C: Rate of diabetic foot infections

β=0.297, R^2 =0.70, p=0.002



DFD: Local burden of disease

	N	5-year mortality	P-value	
			Model A	Model B
Inpatient DM cohort	37,561			
DFD	6,397	1,524 (23.8%)	<0.001	<0.001
Non-DFD	31,164	3,947 (12.7%)		
DFD cohort	6,397			
Amputation	678	125 (18.4%)	<0.001	0.270
No Amputation	5,719	1,399 (24.5%)		
Amputation cohort	678			
Minor amputation	542	89 (16.4%)	0.007	0.002
Major Amputation	136	36 (26.5%)		

DM= Diabetes mellitus; DFD = diabetes-related foot disease
Model A – unadjusted
Model B – adjusted for age, sex, country of birth, primary language spoken, diabetes type

Major Findings

- Increasing burden of inpatient DM and DFD at Western Health from 2013-2022
  - Growing population in the WH catchment area
  - Presence of a high-risk foot service → increased referrals from other health networks
  - Increased life expectancy and duration of diabetes
- Inpatients with DFD experienced longer LOS, greater mortality, and higher hospitalisation rates compared to inpatients with DM without DFD
- Inpatient DFD prevalence at WH (17%) is higher than national averages (7-15%)
  - More than double the global average (7.1%)
- Amputation rates comparable to national average (5.2-7.2%)

Zhang, Y, et al. J Foot Ankle Res 2021

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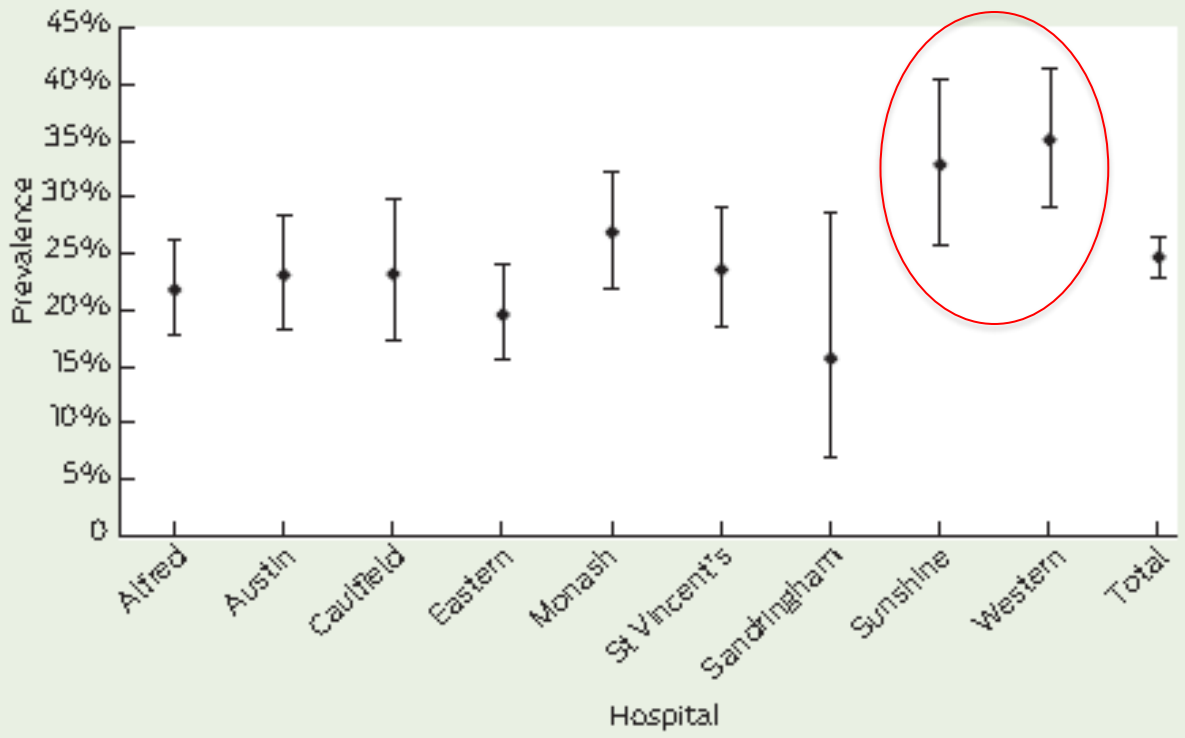
Diabetes at Western Health

Western Health

1 Diabetes prevalence (95% CI) in inpatients at Melbourne metropolitan hospitals



A limb lost every 3 hours: can Australia reduce amputations in people with diabetes?

Increased foot problems due to diabetes means a national focus on coordinated foot care is essential

Data from the Australian Institute of Health and Welfare (AIHW) suggest that one Australian loses a lower limb every 3 hours as a direct result of diabetes-related foot disease (DRFD).[1] Further data suggest there has been a 30% increase in diabetes-related amputations in Australia over the past decade, with 8% of diabetes-related deaths being attributable to foot disease.[1,2] These statistics are especially disappointing given the exponential growth in knowledge, research and published guidelines on managing DRFD.[3,4] In order to reduce this significant burden, several complementary measures are therefore urgently required.

To allow for long-term surveillance of DRFD in Australia, it is paramount that data collection is initiated at a national level. The health system does not currently allow for collection of information from both public and private sectors, and ignores the large group of people managed solely in the community. Effective allocation of resources and care coordination are likely to be hindered by this lack of data, as are identification of at-risk patient groups and development and evaluation of preventive strategies. Solutions for improving data collection would include creation of specific Medicare item numbers for DRFD and development of web-based data collection forms and databases.

The inclusion of chronic disease management items in the Medicare Benefits Schedule (MBS) is acknowledged as a step forward in the fight against DRFD. Reports suggest that 1.3 million consultations were provided by podiatrists under this program in 2004–2008, accounting for 34% of all consultations.[5] It is important to note, however, that this funding arrangement does not allow for more frequent follow-up for individuals with acute DRFD complications or needing intensive secondary prevention due to previous ulceration and/or amputation. Recurrence rates for foot ulceration range from 20%–80% annually, with many of these ulcers leading to amputation.[6] Improved access to publicly funded specialised foot care services, and increasing the number of rebates available under the MBS, are seen as cost-effective necessities for people with current or past foot complications. The cost of this would be recouped by preventing future hospitalisations and amputations.

Improved access to appropriately skilled health care providers and multidisciplinary teams is required, and could be achieved if Australian health care policymakers adopt a standardised national model of care for DRFD. This model must sustain a continuum of care between community-based health care and local hospitals. Research supports the resourcing and implementation of well defined treatment pathways provided under a multidisciplinary model of care.[7,8] A standardised national service model would also support a national network of interdisciplinary DRFD clinics, in turn facilitating the development of a national database to assist with referral pathways, data collection, initiation of quality improvement programs and benchmarking across organisations. Such a model would also allow for accreditation of specialist clinics and staff, which is necessary to ensure adequate and appropriate services.

Recommendations to improve national diabetes-related foot disease (DRFD) care

- National data collection on incidence and outcomes of DRFD.
- Improved access to care, through the Medicare Benefits Schedule, for people with diabetes who have a current or past foot complication.
- Standardised national model for interdisciplinary DRFD care.
- National accreditation of interdisciplinary foot clinics and staff.
- Subsidies for evidence-based treatments for DRFD, including medical-grade footwear and pressure-off-loading devices.
- Holistic diabetes care initiatives to "close the gap" on inequities in health outcomes for Aboriginal and Torres Strait Islander peoples.

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1) Bach LA, Ekinci EI, Engler D, Gilfillan C, Hamblin PS, MacIsaac RJ et al (2014) The high burden of inpatient diabetes mellitus: the Melbourne Public Hospitals Diabetes Inpatient Audit. MJA 201 (6): 334-338.

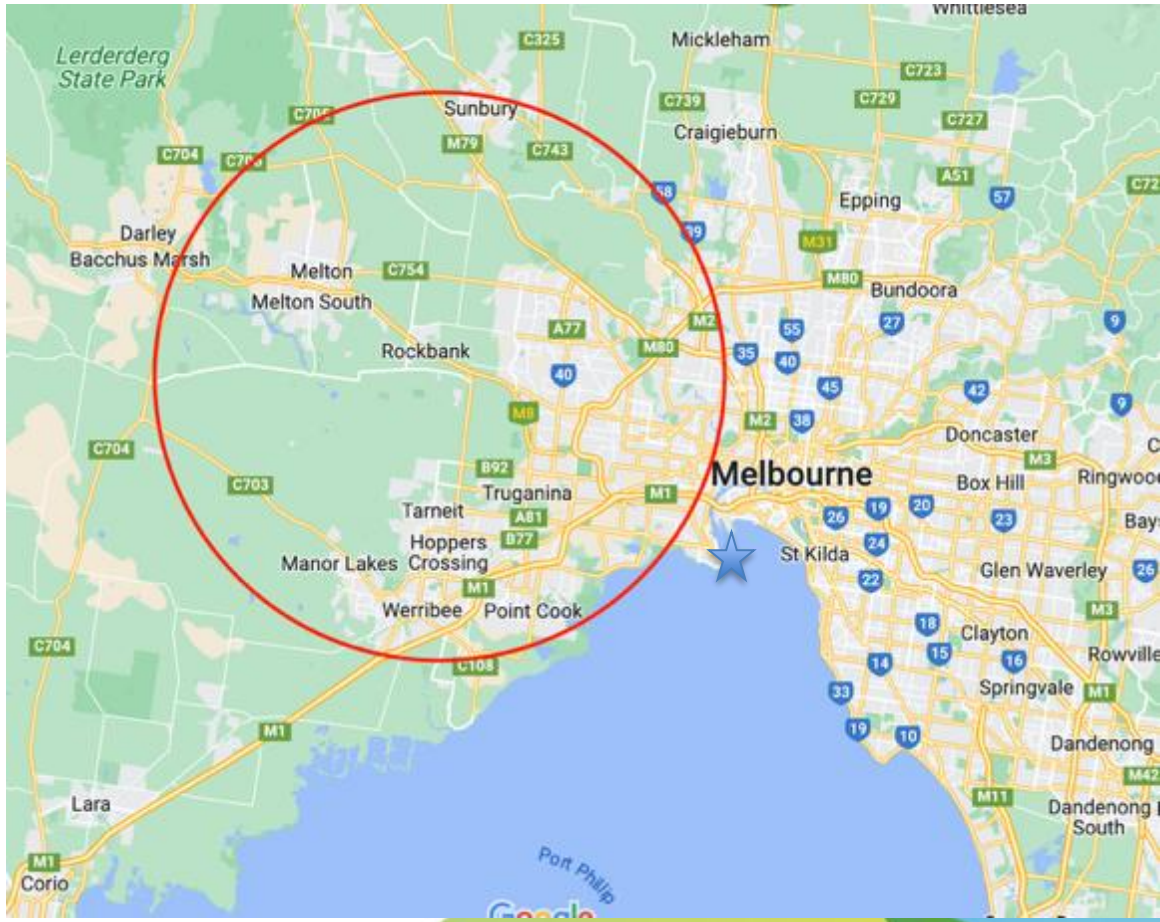
Western Health Diabetes Foot Service (DFS)

Western Health - Victoria

- Large catchment servicing Melbourne's West
- Population >900,000
- Socioeconomically demanding, culturally diverse

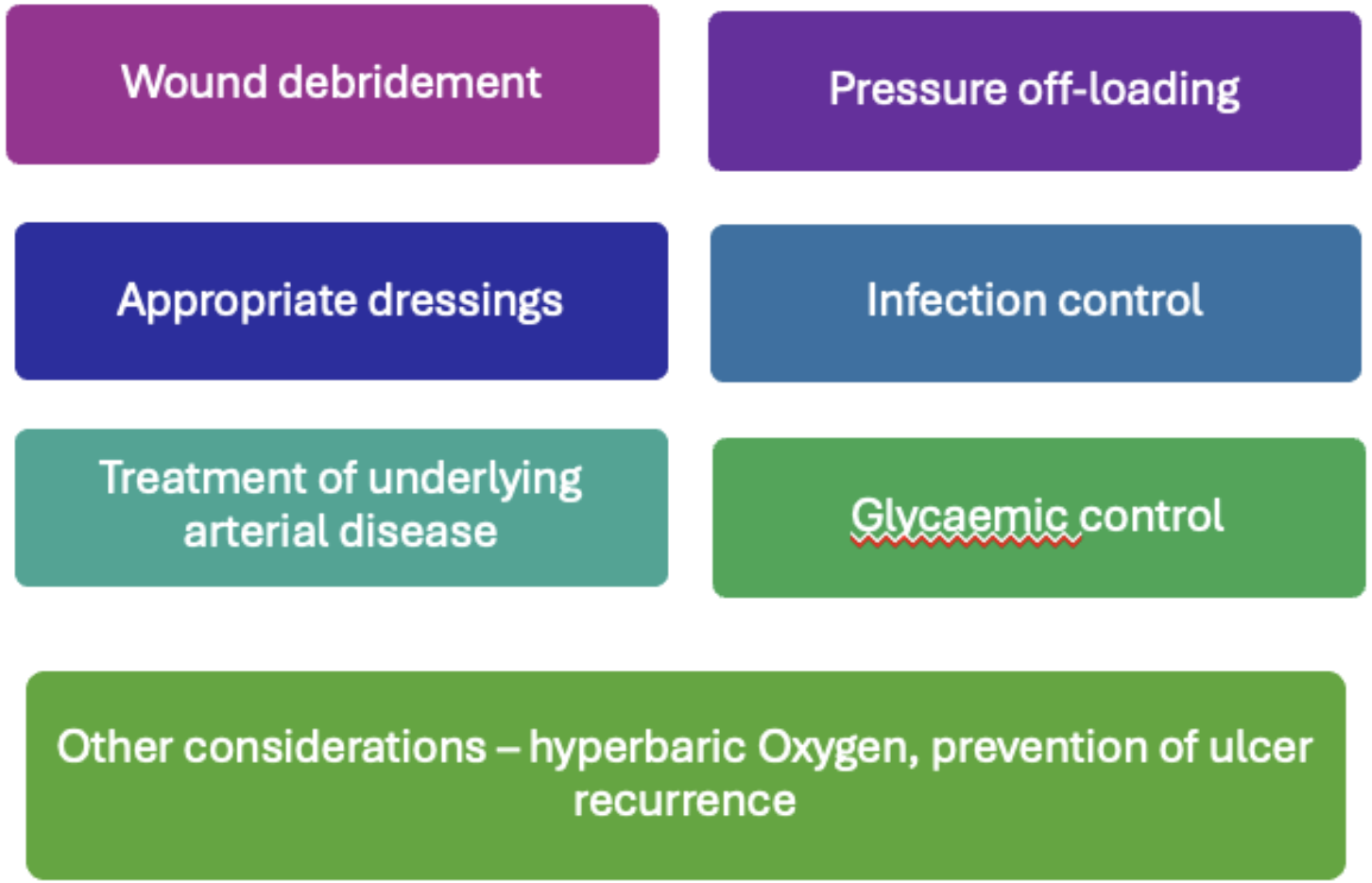
Western Health Diabetes Foot Service

- Established 2011
- Multidisciplinary: Podiatry, Endocrinology, DNE, Vascular, Orthotics, Orthopaedics, Infectious diseases, Psychology/Neuropsychology
- Admitted under Endocrinology unit, and co-managed with Podiatry and Vascular input. IP ward rounds twice weekly

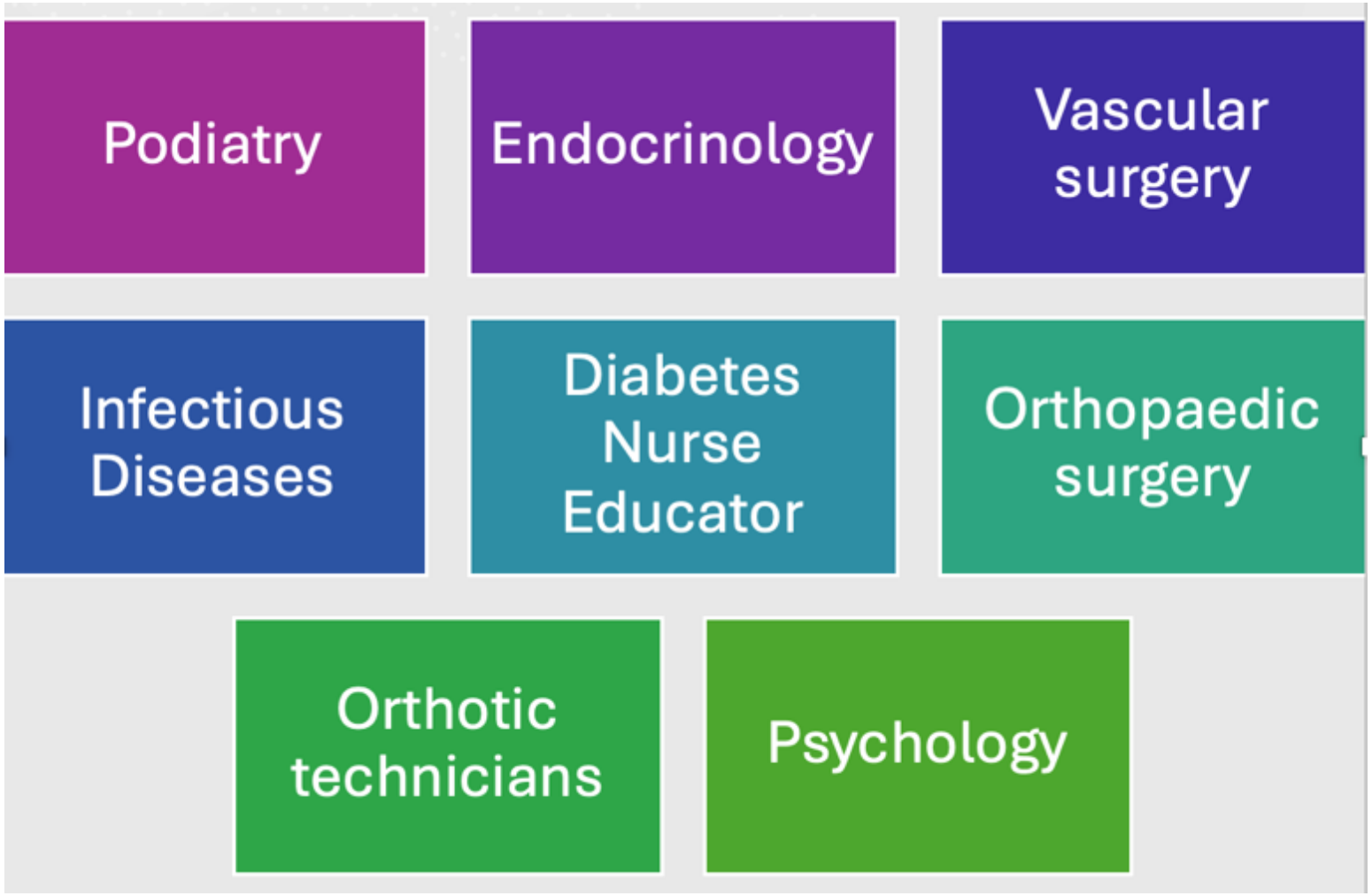


Western Health Diabetes Foot Service (DFS)

- Prompt initiation of management is important to achieve best outcomes



Western Health Diabetes Foot Service (DFS)



Diabetes Foot Service at Western Health

- Multi-disciplinary outpatient service
- Twice weekly multi-disciplinary inpatient ward rounds
- Integration of the acute, subacute and community services in an inter-professional care model; designed to facilitate shared care approach to patients and to increase the health system's capacity to manage this complex patient cohort

Introducing the new Diabetes Foot Unit

- New inpatient unit at Western Health in 2025 dedicated to the management of patients with Diabetes-related Foot Disease

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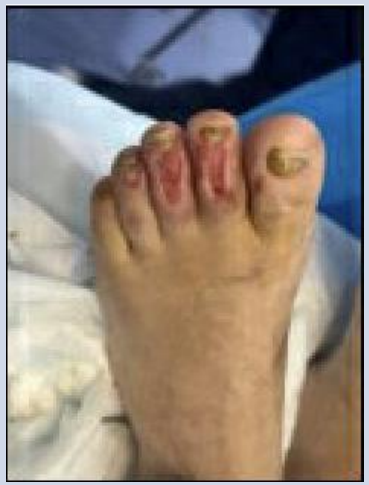
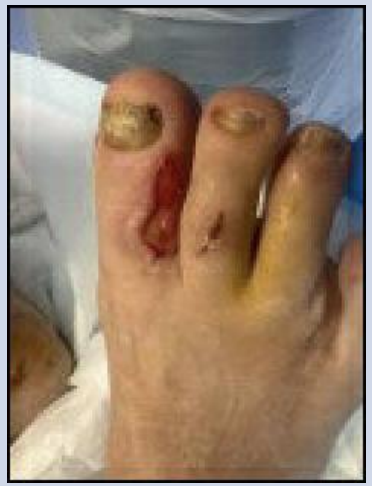
Case 1

- 64M p/w bilateral blistering wounds to dorsum of toes following burn from heater

- Past History
  - T2DM (52): PDR, PN, PVD
  - IHD, HFrEF, CKD IV
  - Obesity, HTN, Hchol
- Medications
  - Empagliflozin + Ryzodeg
  - Aspirin + Statin
  - CCB + Metoprolol + Furosemide
- Social History
  - Lives with wife and son
  - Independent, working a desk job
  - Non-smoker, social EtOH
- Examination
  - Appears well
  - Centrally obese 92kg BMI 32
  - T 36.0 BP 160/80 BSL 7.6

Case 1

- 64M p/w bilateral blistering wounds to dorsum of toes following burn from heater

	Left	Right
DP pulse	palpable	palpable
PT pulse	palpable	palpable
Toe pressure	>140 mmHg	>140 mmHg
Monofilament	1/4	4/4
Appearance		

WIFI Classification

The Wound, Ischemia, and Foot Infection (WIfI) classification system consists of 3 components graded separately from 0 (none) to 3 (severe).

One component may be dominant but the specific combination of scores is used to estimate the risk of limb amputation at 1 year and the need for or benefit of revascularization.[a]

Wound (W)

Grade	Ulcer	Gangrene
0	None	None
1	Small, shallow	None
2	Deep with exposed bone, joint, or tendon	Limited to digits
3	Extensive, deep, and involving forefoot and/or midfoot with or without calcaneal involvement	Extensive and involving forefoot and/or midfoot Full thickness heel necrosis with or without calcaneal involvement

Ischemia (I)

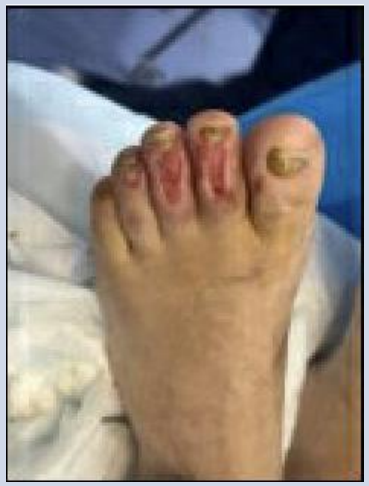
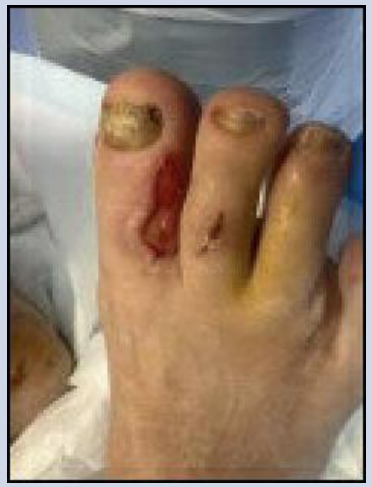
Grade	Ankle-brachial index Ankle systolic pressure	Toe pressure or transcutaneous oximetry
0	≥0.80 >100 mm Hg	≥60 mm Hg
1	0.60-0.79 70-100 mm Hg	40-59 mm Hg
2	0.40-0.59 50-69 mm Hg	30-39 mm Hg
3	≤0.39 <50 mm Hg	<30 mm Hg

Foot infection (fI)

Grade	Clinical manifestation
0	No symptoms or signs of infection
1	Infection indicated by ≥2 of the following: • Local swelling or induration • Erythema 0.5-2.0 cm around ulcer • Local tenderness or pain • Local warmth • Purulent discharge (thick, opaque to white, or sanguineous)
2	Infection as described above with: • Erythema >2 cm around ulcer • Involving structures deeper than skin and subcutaneous tissues (eg, abscess, osteomyelitis, septic arthritis, fasciitis) • No signs of systemic inflammatory response (see below)
3	Infection as described above with ≥2 signs of systemic inflammatory response syndrome: • Temperature >38 °C or <36 °C • Heart rate >90/min • Respiratory rate >20/min or $Paco_2$ <32 mm Hg • White blood cell count >12 000/μL or <4000/μL or 10% immature forms

Case 1

- 64M p/w bilateral blistering wounds to dorsum of toes following burn from heater

	Left	Right
DP pulse	palpable	palpable
PT pulse	palpable	palpable
Toe pressure	>140 mmHg	>140 mmHg
Monofilament	1/4	4/4
Appearance		

WIFI Classification: W:1 I:0 FI:0

- Aetiology: Neuropathic
- Risk of amputation: Very Low
- Benefit of revascularisation: Very Low

Management

- Bedside debridement + dressings
- Wound swabs for MCS
- Pressure offloading: DARCO boots
- Patient education + early clinic review

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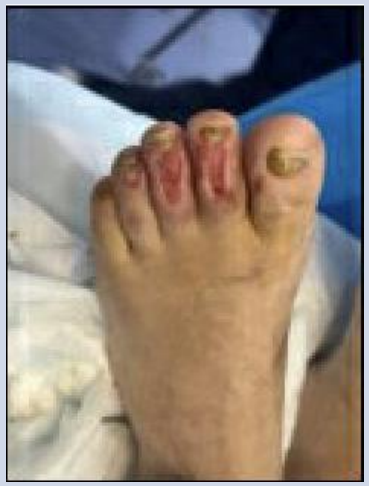
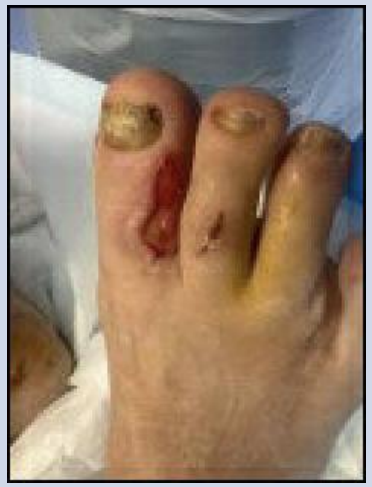
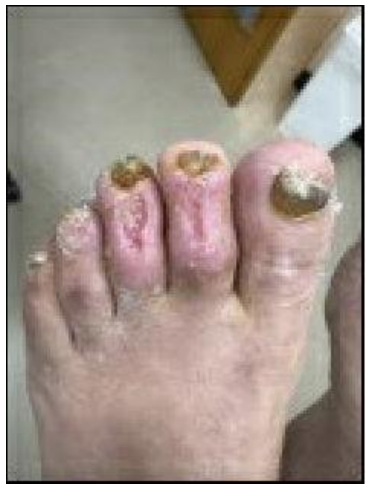
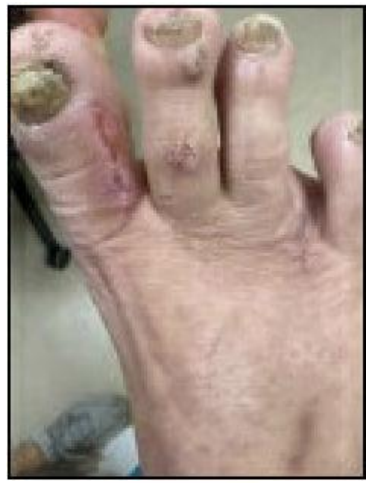
Appearance		

Progress:

- Significant improvement over 3/52
- Returned to own footwear
- Transitioned to community podiatry





Case 2

- 49F p/w worsening L 5th toe ulcer not responding to oral antibiotics

- Past History
  - T1DM (23): PDR, PN, PVD
  - ESKD on HDx
  - 2o HPTH > PTx

- Medications
  - Ryzodeg + Humalog
  - Calcium + Calcitriol
  - PPI + Sevelamer

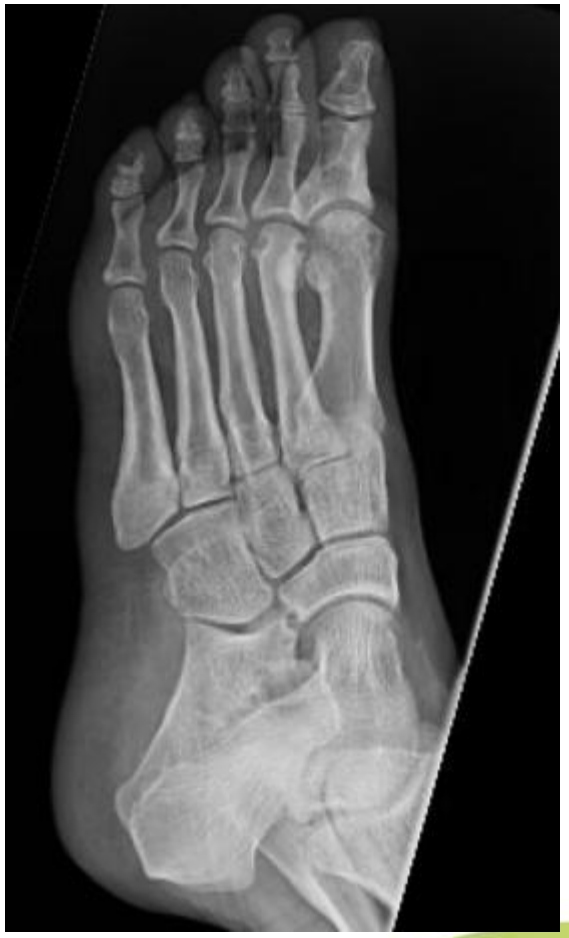
- Social History
  - Lives in a convent
  - Independent
  - Non-smoker, nil EtOH

- Examination
  - Appears well
  - Centrally obese 86kg BMI 35
  - T 36.1 BP 92/60 BSL 16.8

Case 2

- 49F p/w worsening L 5th toe ulcer not responding to oral antibiotics

	Left	Right
DP pulse	palpable	palpable
PT pulse	palpable	palpable
Toe pressure	130 mmHg	84 mmHg
Monofilament	0/4	0/4
Appearance		



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0	≥0.80 >100 mm Hg	≥60 mm Hg
1	0.60-0.79 70-100 mm Hg	40-59 mm Hg
2	0.40-0.59 50-69 mm Hg	30-39 mm Hg
3	≤0.39 <50 mm Hg	<30 mm Hg

Foot infection (fI)

Grade	Clinical manifestation
0	No symptoms or signs of infection
1	Infection indicated by ≥2 of the following: • Local swelling or induration • Erythema 0.5-2.0 cm around ulcer • Local tenderness or pain • Local warmth • Purulent discharge (thick, opaque to white, or sanguineous)
2	Infection as described above with: • Erythema >2 cm around ulcer • Involving structures deeper than skin and subcutaneous tissues (eg, abscess, osteomyelitis, septic arthritis, fasciitis) • No signs of systemic inflammatory response (see below)
3	Infection as described above with ≥2 signs of systemic inflammatory response syndrome: • Temperature >38 °C or <36 °C • Heart rate >90/min • Respiratory rate >20/min or $PaCO_2$ <32 mm Hg • White blood cell count >12 000/μL or <4000/μL or 10% immature forms

Case 2

- 49F p/w worsening L 5th toe ulcer not responding to oral antibiotics

	Left	Right
DP pulse	palpable	palpable
PT pulse	palpable	palpable
Toe pressure	130 mmHg	84 mmHg
Monofilament	0/4	0/4
Appearance		

WIFI Classification: W:2 I:0 FI:2

- Aetiology: Neuropathic
- Risk of amputation: Moderate
- Benefit of revascularisation: Very Low

Management

- Surgery: L 5th toe amputation
- Antibiotics: Targeted to bone chips
- Pressure offloading: DARCO boot
- Patient education to prevent recurrence

Case 2

- 49F p/w worsening L 5th toe ulcer not responding to oral antibiotics

	Left	Right
DP pulse	palpable	palpable
PT pulse	palpable	palpable
Toe pressure	130 mmHg	84 mmHg
Monofilament	0/4	0/4
Appearance		

Progress:

- Primary wound closure
- Bone chips: light growth of skin flora
- Discharged day 6 post-op on PO ABx

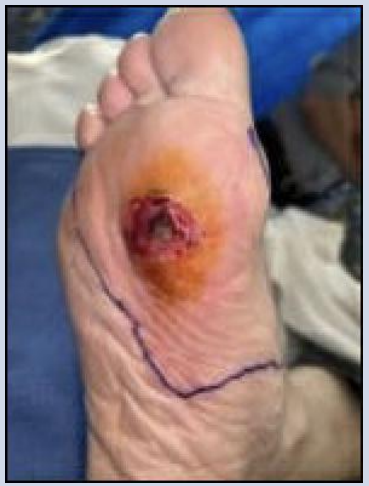
Case 3

- 58M p/w painful atraumatic R 1st metatarsal plantar DFU

- Past History
  - T2DM (40): PN, ?PVD
  - IHD > CABG
  - HTN, Hchol
- Medications
  - MTF + Empagliflozin + Ryzodeg
  - Aspirin + Statin + Fibrate
  - Olmesartan + Metoprolol
- Social History
  - Lives with wife and children
  - Independent, high school teacher
  - Non-smoker, social EtOH
- Examination
  - In pain but not unwell
  - Slim build 72kg BMI 24
  - T 36.4 BP 120/95 BSL 5.0

Case 3

- 58M p/w painful atraumatic R 1st metatarsal plantar DFU

	Left	Right
DP pulse	non-palpable	non-palpable
PT pulse	non-palpable	non-palpable
Toe pressure	60 mmHg	18 mmHg
Monofilament	3/4	3/4
Appearance		

WIFI Classification

The Wound, Ischemia, and Foot Infection (WIfI) classification system consists of 3 components graded separately from 0 (none) to 3 (severe).

One component may be dominant but the specific combination of scores is used to estimate the risk of limb amputation at 1 year and the need for or benefit of revascularization.[a]

Wound (W)

Grade	Ulcer	Gangrene
0	None	None
1	Small, shallow	None
2	Deep with exposed bone, joint, or tendon	Limited to digits
3	Extensive, deep, and involving forefoot and/or midfoot with or without calcaneal involvement	Extensive and involving forefoot and/or midfoot Full thickness heel necrosis with or without calcaneal involvement

Ischemia (I)

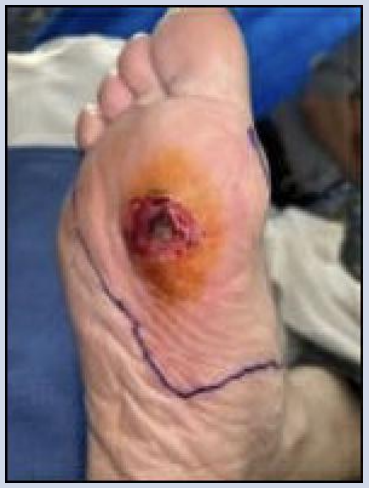
Grade	Ankle-brachial index Ankle systolic pressure	Toe pressure or transcutaneous oximetry
0	≥0.80 >100 mm Hg	≥60 mm Hg
1	0.60-0.79 70-100 mm Hg	40-59 mm Hg
2	0.40-0.59 50-69 mm Hg	30-39 mm Hg
3	≤0.39 <50 mm Hg	<30 mm Hg

Foot infection (fI)

Grade	Clinical manifestation
0	No symptoms or signs of infection
1	Infection indicated by ≥2 of the following: • Local swelling or induration • Erythema 0.5-2.0 cm around ulcer • Local tenderness or pain • Local warmth • Purulent discharge (thick, opaque to white, or sanguineous)
2	Infection as described above with: • Erythema >2 cm around ulcer • Involving structures deeper than skin and subcutaneous tissues (eg, abscess, osteomyelitis, septic arthritis, fasciitis) • No signs of systemic inflammatory response (see below)
3	Infection as described above with ≥2 signs of systemic inflammatory response syndrome: • Temperature >38 °C or <36 °C • Heart rate >90/min • Respiratory rate >20/min or $Paco_2$ <32 mm Hg • White blood cell count >12 000/μL or <4000/μL or 10% immature forms

Case 3

- 58M p/w painful atraumatic R 1st metatarsal plantar DFU

	Left	Right
DP pulse	non-palpable	non-palpable
PT pulse	non-palpable	non-palpable
Toe pressure	60 mmHg	18 mmHg
Monofilament	0/4	0/4
Appearance		

WIFI Classification: W:1 I:3 FI:2

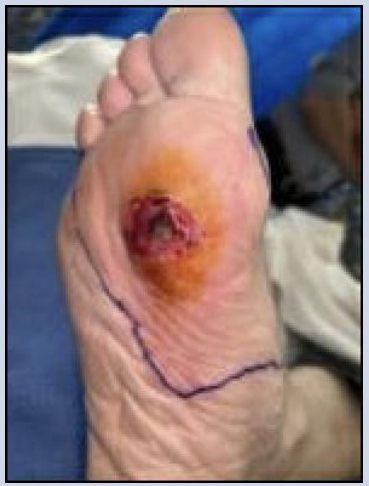
- Aetiology: Neuroischaemic
- Risk of amputation: High
- Benefit of revascularisation: High

Management

- Revascularisation: Angiogram + plasty
- Surgery: debridement of ulcer
- Antibiotics: Targeted to bone chips
- Pressure offloading: CAM boot

Case 3

- 58M p/w painful atraumatic R 1st metatarsal plantar DFU

	Left	Right
DP pulse	non-palpable	non-palpable
PT pulse	non-palpable	non-palpable
Toe pressure	60 mmHg	18 mmHg
Monofilament	0/4	0/4
Appearance		

Progress:

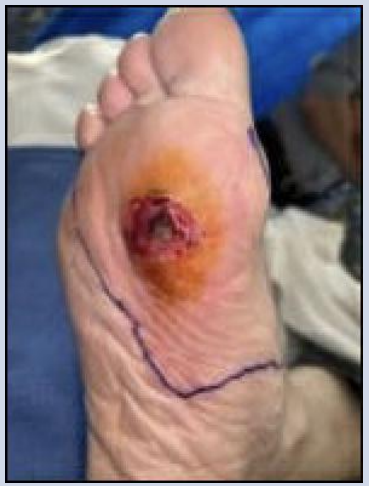
- ATA occlusion > balloon plasty
- R 1st toe pressure 18 > 60 mmHg
- Bone chips: Group B Strep
- VAC applied, discharged via HITH

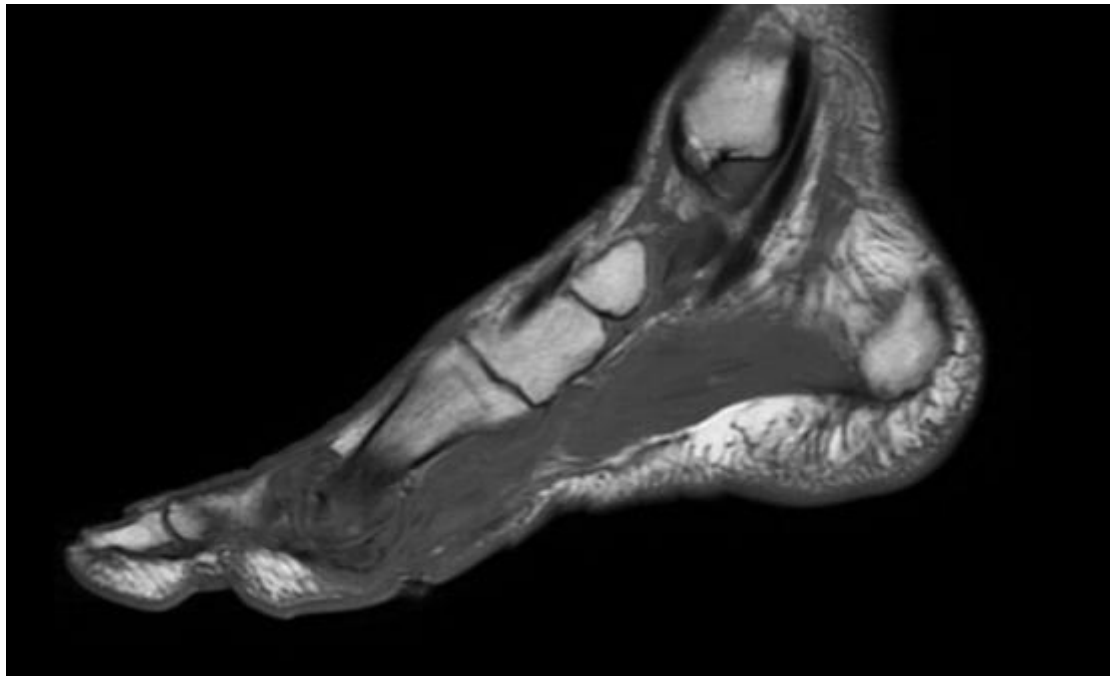
- Initial improvement

- Later deteriorated…

Case 3

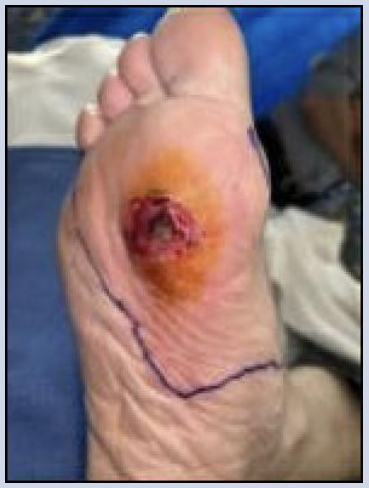
- 58M p/w painful atraumatic R 1st metatarsal plantar DFU

	Left	Right
DP pulse	non-palpable	non-palpable
PT pulse	non-palpable	non-palpable
Toe pressure	60 mmHg	18 mmHg
Monofilament	0/4	0/4
Appearance		



Case 3

- 58M p/w painful atraumatic R 1st metatarsal plantar DFU

	Left	Right
DP pulse	non-palpable	non-palpable
PT pulse	non-palpable	non-palpable
Toe pressure	60 mmHg	18 mmHg
Monofilament	0/4	0/4
Appearance		

Further Progress:

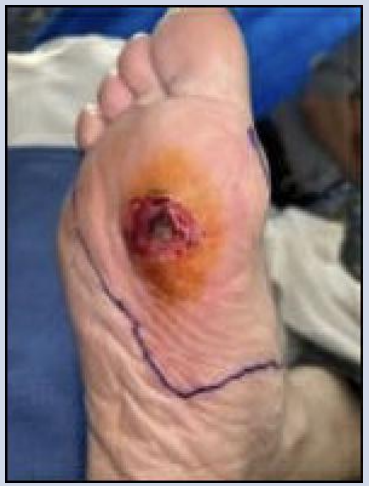
- R 1st MT head + proximal phalynx OM
- Drop in toe pressure: 60 > 35
- Angio: restenosis of ATA + distal DPA

Management

- Revascularisation: 2x balloon plasties
- Surgery: 1st toe ray amputation
- Antibiotics: Targeted to bone chips
- VAC applied, discharged via HITH

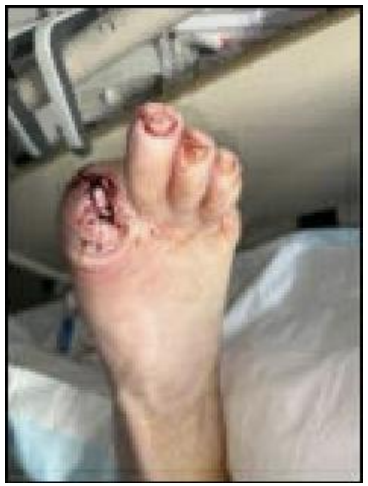
Case 3

- 58M p/w painful atraumatic R 1st metatarsal plantar DFU

	Left	Right
DP pulse	non-palpable	non-palpable
PT pulse	non-palpable	non-palpable
Toe pressure	60 mmHg	18 mmHg
Monofilament	0/4	0/4
Appearance		

Progress:

- Bone chips: Klebsiella
- Improved with VAC dressing
- Discharged after 6/52 PO ABx



Case 4

- 55M p/w atraumatic hot and swollen L foot

- Past History
  - T2DM (45): PDR, PN
  - Obesity, HTN, Hchol
  - Previous R ankle fracture

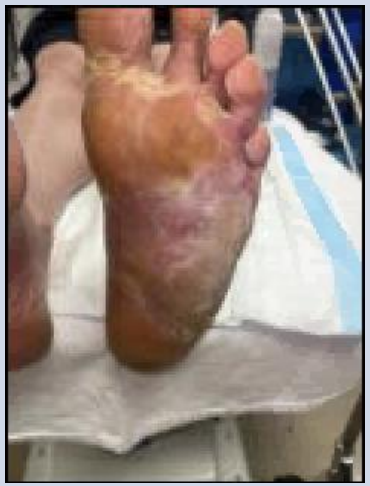
- Medications
  - MTF + Dapagliflozin + Semaglutide
  - Statin + Fibrate
  - Ramipril

- Social History
  - Lives with wife
  - Independent
  - Non-smoker, previous heavy EtOH

- Examination
  - Appears well
  - Obese 102kg BMI 30
  - T 36.2 BP 130/85 BSL 13.8

Case 4

- 55M p/w atraumatic hot and swollen L foot

	Left	Right
DP pulse	palpable	palpable
PT pulse	palpable	palpable
Toe pressure	122 mmHg	134 mmHg
Monofilament	0/4	0/4
Appearance		

Temperature difference

- Left: 34.0
- Right 29.4

WIFI Classification

The Wound, Ischemia, and Foot I
consists of 3 components grade
e) to 3 (severe).
One component may be domi
bination of scores is used t
the risk of limb amputation
enefit of revascularization.

Wound (W)

Grade	Ulcer	Gangrene
0	None	None
1	Small, shallow	None
2	Deep with exposed bone, joint, or tendon	Limited to digits
3	Extensive, deep, and involving forefoot and/or midfoot with or without calcaneal involvement	Extensive and involving forefoot and/or midfoot Full thickness heel necrosis with or without calcaneal involvement

Ischem

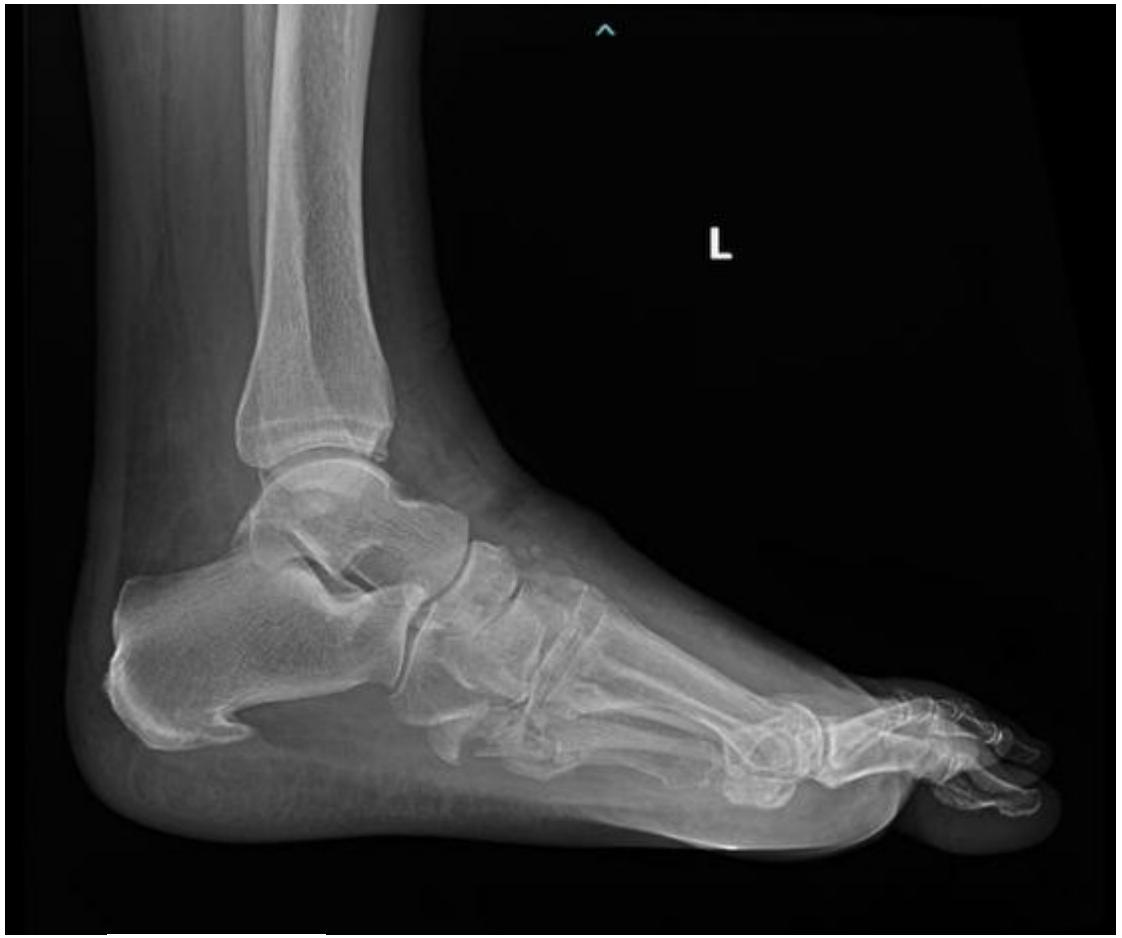
Grade	Ankl Ankle sy	essure or neous oximetry
0	≥0.80 >100 mm Hg	
1	0.60-0.79 70-100 mm Hg	
	0.40-0.59 69 mm Hg	30-39 m

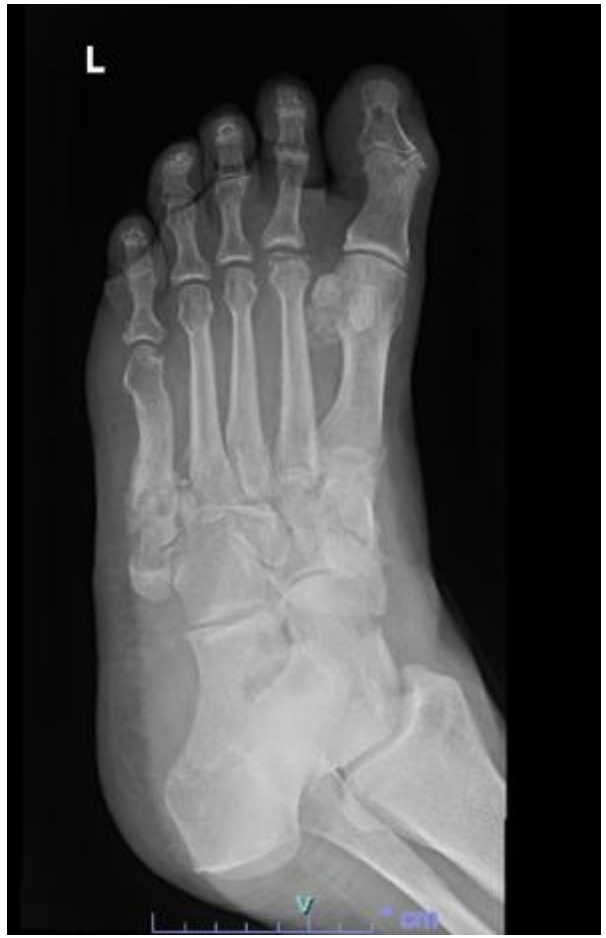
Foot infection (fI)

Grade	Clinical manifestation
0	No symptoms or signs of infection
	Infection indicated by ≥2 of the following: • Local swelling or induration • Erythema 0.5-2.0 cm around ulcer • Local tenderness or pain • Local warmth • Purulent discharge (thick, opaque to white, or sanguineous)
	ection as described above with: • Erythema >2 cm around ulcer • Involving structures deeper than skin and subcutaneous tissues (eg, abscess, osteomyelitis, septic arthritis, fasciitis) • No signs of systemic inflammatory response (see below)
3	Infection as described above with ≥2 signs of systemic inflammatory response syndrome: • Temperature >38 °C or <36 °C • Heart rate >90/min • Respiratory rate >20/min or $Paco_2$ <32 mm Hg • White blood cell count >12 000/μL or <4000/μL or 10% immature forms

Case 4

- 55M p/w atraumatic hot and swollen L foot





Healing fractures

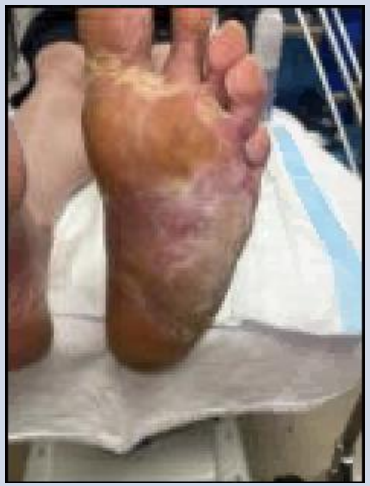
- 2nd MT base
- 3rd MT base
- 5th MT base
- 1st proximal phalanx

Bony debris

= Charcot arthropathy

Case 4

- 55M p/w atraumatic hot and swollen L foot

	Left	Right
DP pulse	palpable	palpable
PT pulse	palpable	palpable
Toe pressure	122 mmHg	134 mmHg
Monofilament	0/4	0/4
Appearance		

Diagnosis

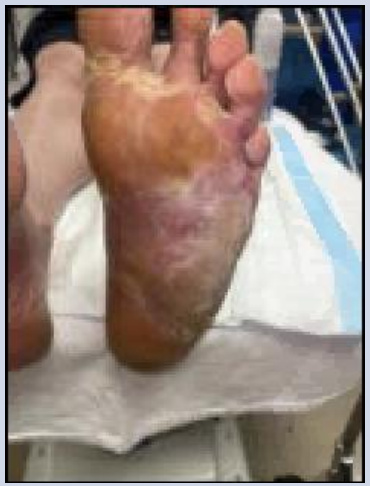
- Charcot arthropathy
- Acutely active
- Multiple subacute healing fractures

Management

- Consented to TCC
- Patient education
- Antibiotics: not indicated
- Surgery: not indicated

Case 4

- 55M p/w atraumatic hot and swollen L foot

	Left	Right
DP pulse	palpable	palpable
PT pulse	palpable	palpable
Toe pressure	122 mmHg	134 mmHg
Monofilament	0/4	0/4
Appearance		

Progress:

- Offloading as mainstay of Rx
- DFS clinic for cast changes
- 1-2 weekly for 6/12 until inactive

Further Progress:

- Subsequent reactivation
- Responded again to TCC
- Close ortho consultation throughout

Outline

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- 8. When to refer?
- 9. Q+A session

Current Guidelines – Annual Cycle of Care

Check	When	Target
HbA1c	At least every 6-12 months	53mmol/mol (7%) or less
Blood pressure	At least every six months	130/80 or less
Foot assessment	Low risk feet: At least every year High risk feet: At least every 3-6 months	Foot health maintained
Eye examination	At least every two years	Eye health maintained
Kidney health	At least every year	Urine albumin levels in target range Kidney function test in target range
Blood fats	At least every year	Total cholesterol less than 4mmol/L LDL less than 2mmol/L HDL 1mmol/L or above Triglycerides less than 2mmol/L
Weight	At least every six months	BMI 18.5-24.9
Waist circumference*	At least every six months	Less than 94cm (men) Less than 80cm (women)
Healthy eating review	At least every year	Following a healthy eating plan
Physical activity review	At least every year	At least 30 minutes of moderate physical activity, five or more days a week and minimise time spent sitting
Medication review	At least every year	Safe use of medications
Smoking	At least every year	No smoking
Diabetes management	At least every year	Self-management of diabetes maintained
Emotional health	As needed	Emotional health and well-being maintained

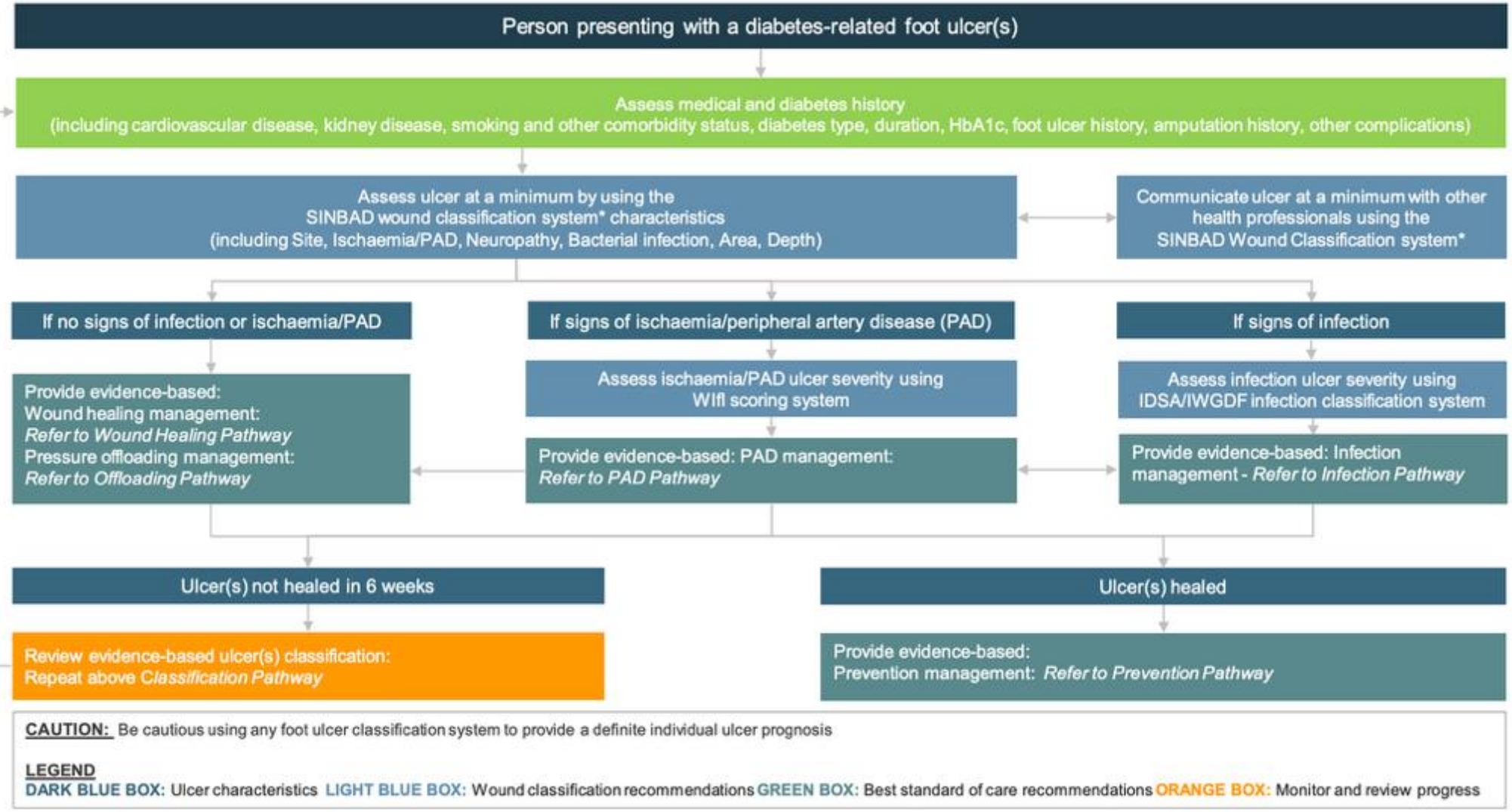
- Treatment Principles
  - Treat to Target

  - HbA1c <7.0%
  - BP <130/80
  - BMI <25
  - Cr and uACR Normal
  - Lipids*
    - TC <4, LDL <2 HLD >1 TG <2

Current Guidelines – Wound Classification

Western Health

Figure 1. Australian evidence-based clinical pathway on wound classification of foot ulcers for people with diabetes



Current Guidelines – Antibiotics

Western Health

Mild infection of diabetes-related foot ulcers in patients at increased risk of polymicrobial infection

Patients at increased risk of polymicrobial infection and low risk of MRSA infection

For mild infection of diabetes-related foot ulcers in patients at increased risk of polymicrobial infection (see Figure 2.82) and low risk of MRSA infection (see Figure 2.94), use:

1 amoxicillin+clavulanate 875+125 mg orally, 12-hourly. For dosage adjustment in adults with kidney impairment, see amoxicillin+clavulanate oral dosage adjustment. See advice on duration of therapy

OR as a 2-drug regimen

1 cefalexin 500 mg orally, 6-hourly. For dosage adjustment in adults with kidney impairment, see cefalexin dosage adjustment. See advice on duration of therapy

PLUS

metronidazole 400 mg orally, 12-hourly. See advice on duration of therapy.

Current Guidelines – Antibiotics

Western Health

Patients at increased risk of polymicrobial and MRSA infection

For mild infection of diabetes-related foot ulcers in patients at increased risk of polymicrobial infection (see Figure 2.82) and increased risk of MRSA infection, a regimen containing trimethoprim+sulfamethoxazole may be an option. However, trimethoprim+sulfamethoxazole is associated with an increased risk of acute kidney injury and hyperkalaemia in patients with diabetes. If trimethoprim+sulfamethoxazole is used, measure serum creatinine and potassium concentrations before starting treatment, and repeat within7 days of starting treatment. A suitable 2-drug regimen is:

trimethoprim+sulfamethoxazole 160+800 mg orally, 12-hourly. For dosage adjustment in adults with kidney impairment, see trimethoprim+sulfamethoxazole dosage adjustment. See advice on duration of therapy

PLUS

metronidazole 400 mg orally, 12-hourly. See advice on duration of therapy.

Current Guidelines – Antibiotics

Western Health

Table 2.90 Suggested duration of antibiotic therapy for infection of diabetes-related foot ulcers that have not had surgical debridement or resection

Severity of infection [NB1]	Total duration of therapy [NB2] [NB3]
mild	10 days
moderate or severe:	
without bone or joint infection	3 weeks [NB4]
with bone or joint infection of forefoot (toes and metatarsals)	6 weeks (up to 12 weeks may be required if the infection does not resolve) [NB4] [NB5]
with bone or joint infection of mid- or hindfoot or extensive unresected necrotic tissue	up to 12 weeks (shorter course if infection has resolved earlier) [NB4] [NB5]

Current Guidelines – Antibiotics

Western Health

Table 2.91 Suggested duration of antibiotic therapy for infection of diabetes-related foot ulcers following surgical debridement or resection

Degree of debridement or resection and severity of residual skin and soft tissue infection [NB1]	Likelihood of residual bone or joint infection	Duration of therapy [NB2] [NB3]
complete and no residual infection [NB4]	none	2 to 5 days
incomplete and mild residual infection	low [NB5]	10 days
incomplete and moderate or severe residual infection	low [NB5]	3 weeks
	high [NB5]	6 weeks (shorter course if infection has resolved earlier)

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NADC Centre of Excellence

Western Health

nadc 30 1994-2024
National Association of Diabetes Centres
Promoting Excellence in Diabetes Care

This certificate acknowledges that the

Western Health

Diabetes Foot Service

has successfully met the NADC Collaborative Interdisciplinary Diabetes High Risk Foot Service **Centre of Excellence** Accreditation Standards and is recognised as a:

NADC Centre of Excellence High Risk Foot Service

Until January 2029

Natalie Wischer OAM
Chief Executive Officer – NADC

Professor Stephen Twigg
Honorary Chair Foot Network - NADC

ads NADC is a division of ADS
ABN 13 053 787 965

e admin@nadc.net.au w www.nadc.net.au

nadc
National Association of Diabetes Centres

Management from DFS: What do we do?

- Early intervention saves limbs

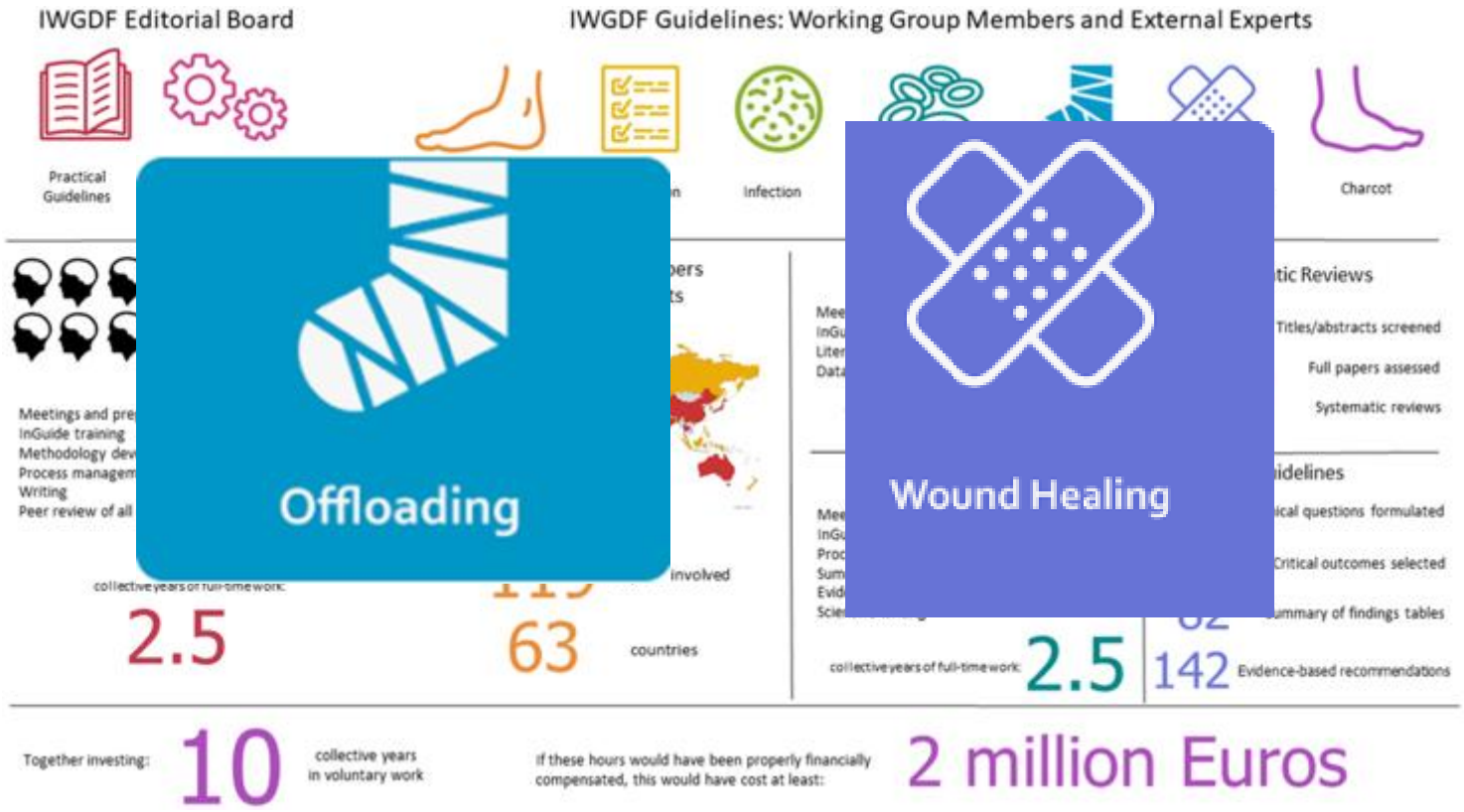
- DFS provides care for
  - Wound debridement
  - Pressure offloading
  - Dressings
  - Infection management and prevention
  - Assessment and treatment of vascular disease
  - Diabetes management
  - Secondary referral to other services

    e.g. hyperbaric oxygen therapy, orthotics, community-based services

Management continued (MOC)

- Patients are seen each 1-4 weeks depending on clinical requirements
- Early referral to DFS outpatient services is essential
- Urgent care for diabetes foot related issues should be directed to ED at Footscray hospital for management under our unit
- On average inpatient LOS <12 days
- Average time spent in outpatient clinic is 3-9 months, but with high re-referral rate over time
- If HITH is required at discharge the inpatient team will continue to see patient with this service (FH only)
- Dressing changes completed in between by patient, family, visiting nursing service or GP. Patients are required to purchase dressings
- Referral occurs to community-based podiatry services early in the episode of care, to facilitate d/c at end and establish contact with other support services e.g. exercise physiology

IWGDF Guidelines



Offloading


New: 2023 Offloading recommendations
2
1
3
IWGDF Guidelines
www.iwgdfguidelines.org

Addressing the patient and healthcare burden for chronic wound care

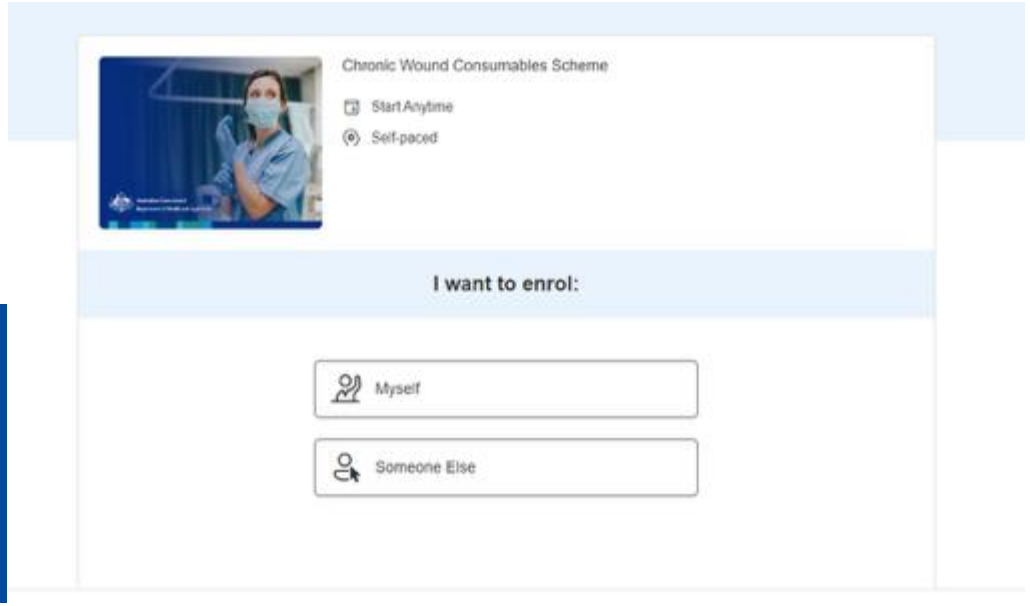
Western Health

Australian Government

Department of Health, Disability and Ageing

Chronic Wound Consumables Scheme

The Chronic Wound Consumables Scheme (CWCS) covers the cost of wound consumable products for people who have diabetes and a chronic wound, and who are 65 and over, or 50 and over for First Nations people.



ChronicWounds@health.gov.au

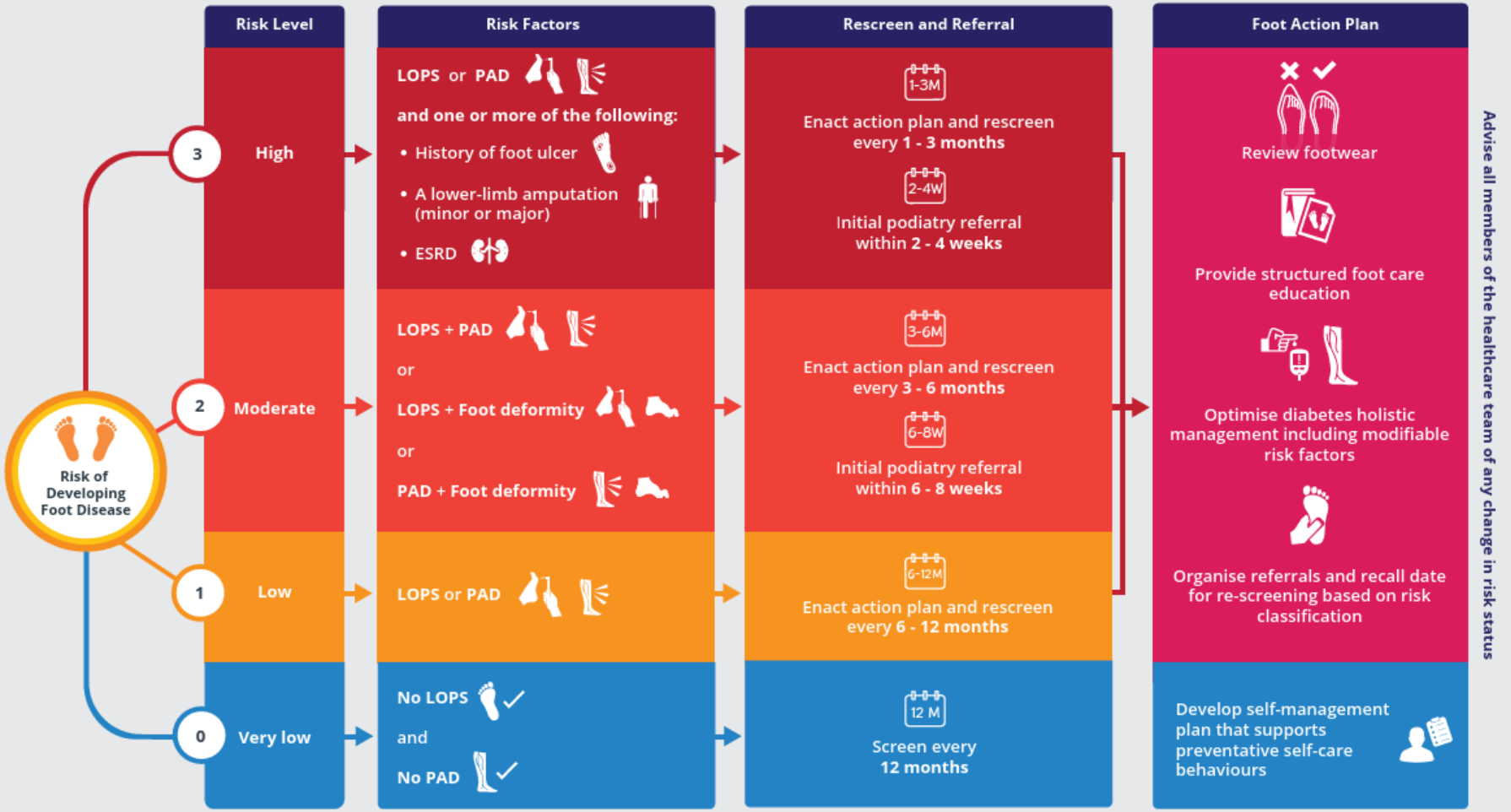
Intergrated Diabetes Foot Care Pathway

Western Health

NDSS Helpline **1800 637 700**
ndss.com.au

Integrated Diabetes Foot Care Pathway

Diabetes Foot Risk Stratification and Triage



Aboriginal and Torres Strait Islander people should be considered "High Risk" until assessed otherwise – consider cultural safety when conducting a foot assessment and providing foot care advice.

Outline

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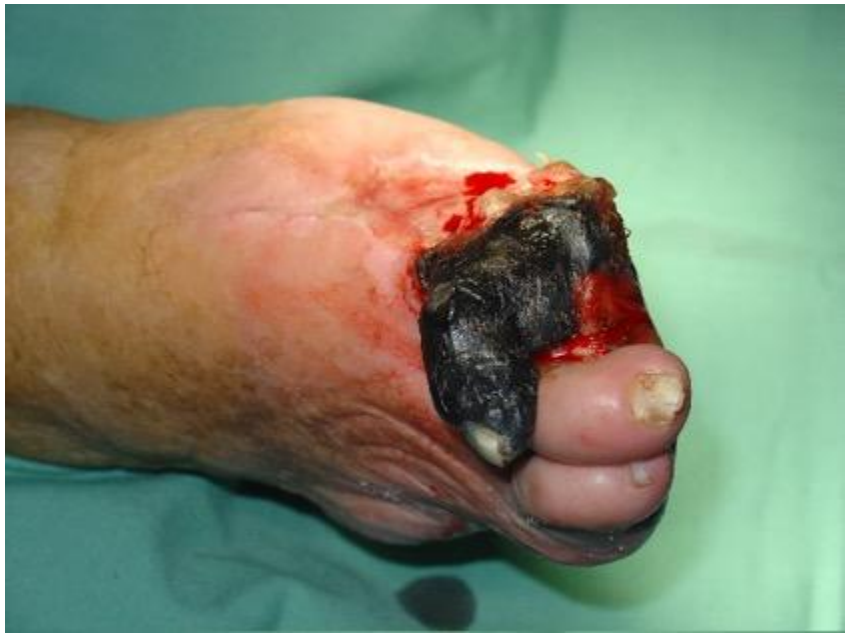
Diabetes Foot Vascular Considerations

Ischaemia major contributing factor in many DFU's

The underlying etiology of DFU is classified into three types:

- Purely neuropathic (35%)
- Purely ischaemic (15%)
- Mixed neurosichaemic (50%)



What referral information do we require?

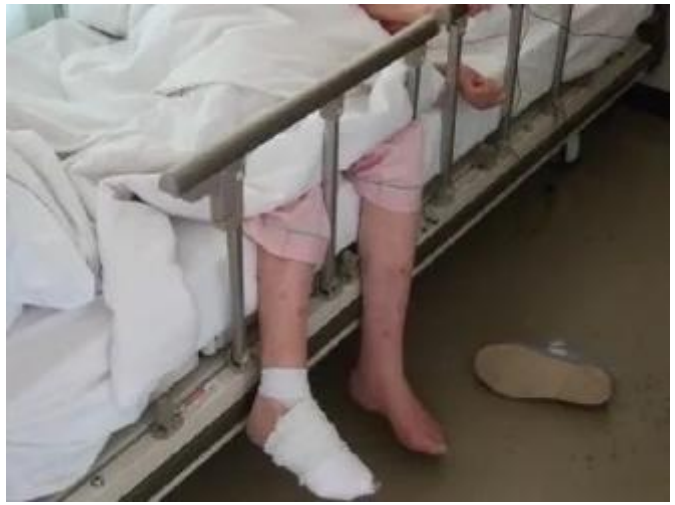
Investigations?

Rutherford's Vascular Surgery and Endovascular Therapy. 9th ed.

Diabetes Foot Vascular Considerations

Western Health

Report Past Vascular History

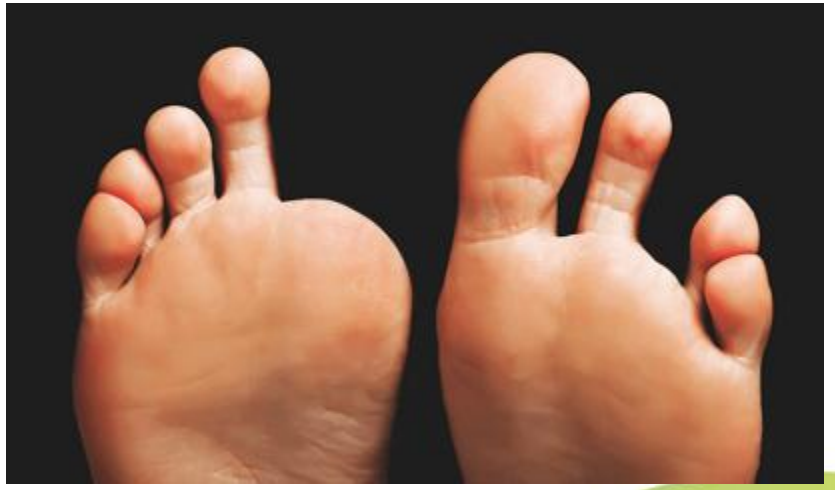


Symptoms

- Claudication, rest pain

Investigations

- Duplex, angiograms, CT angiograms



Interventions

- Operative, endovascular, amputations

Diabetes Foot Vascular Considerations

Western Health

Features on Examination

Pulses

Temperature

Capillary return

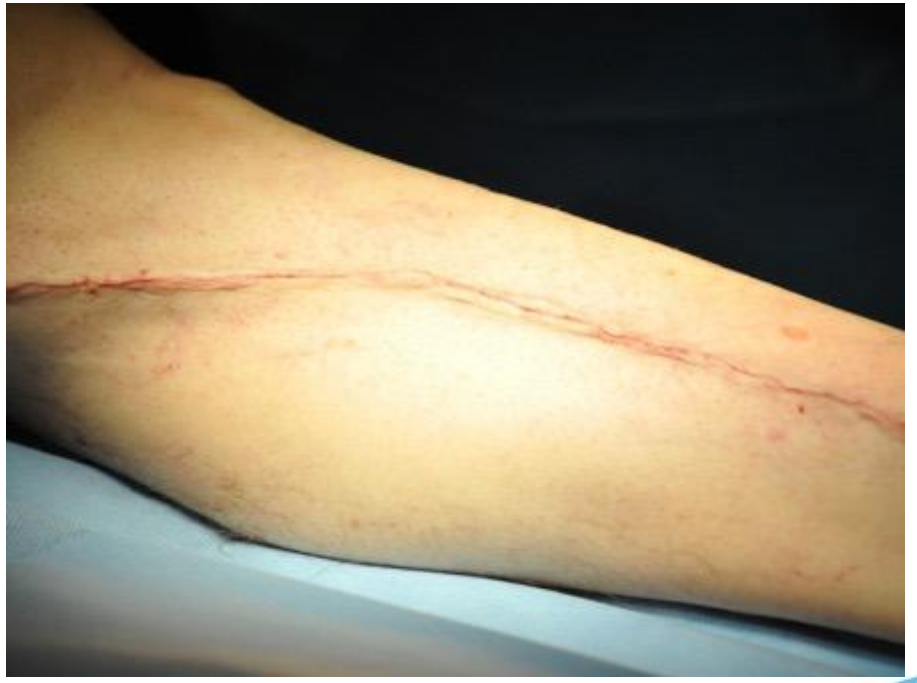
Trophic changes

- Hair loss, thin shiny skin, nail changes

Surgical scars

- Vein harvest, bypass scars, endarterectomy

Pallor on elevation



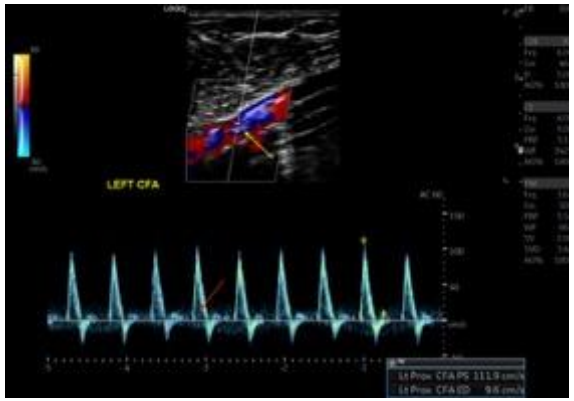
Diabetes Foot Vascular Considerations

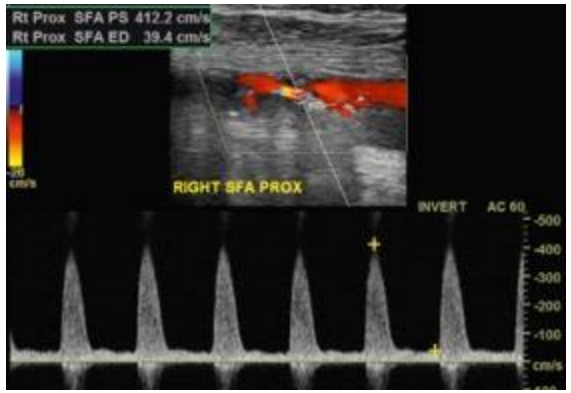
Western Health

Investigations

Duplex

- Non-invasive, readily available, low cost
- Operator dependent, vascular calcification, poor predictor of healing





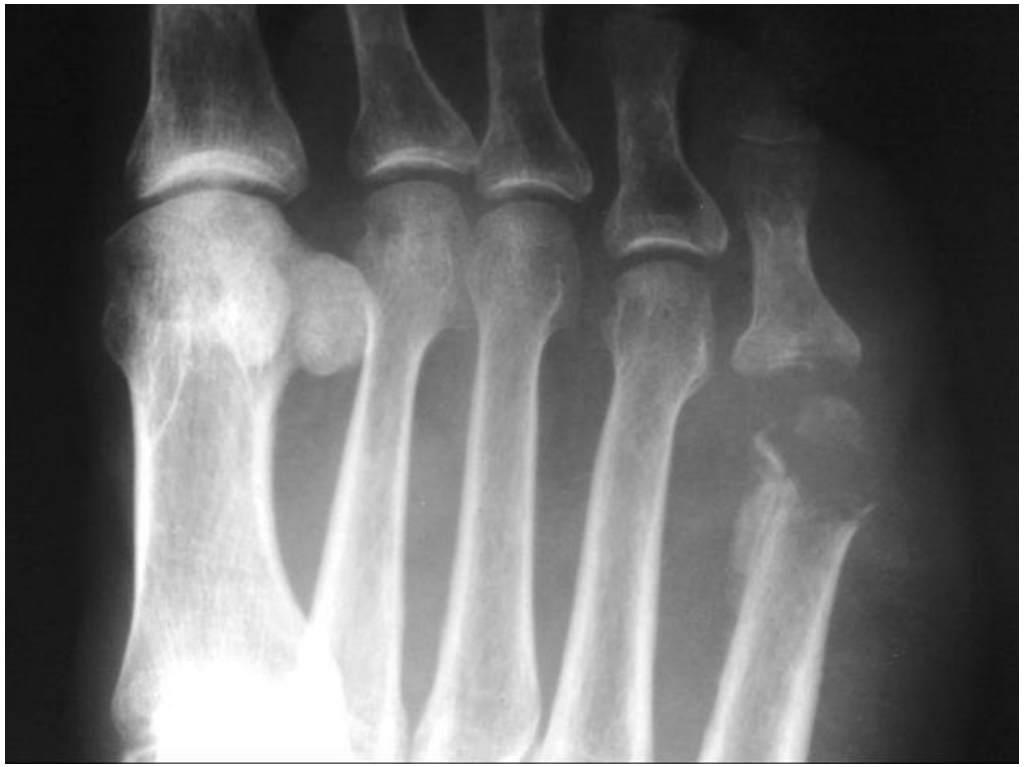
Diabetes Foot Vascular Considerations

Western Health

Investigations

X-Ray plain films

- Various planes
- Changes can be delayed
- Degenerative changes vs osteomyelitis



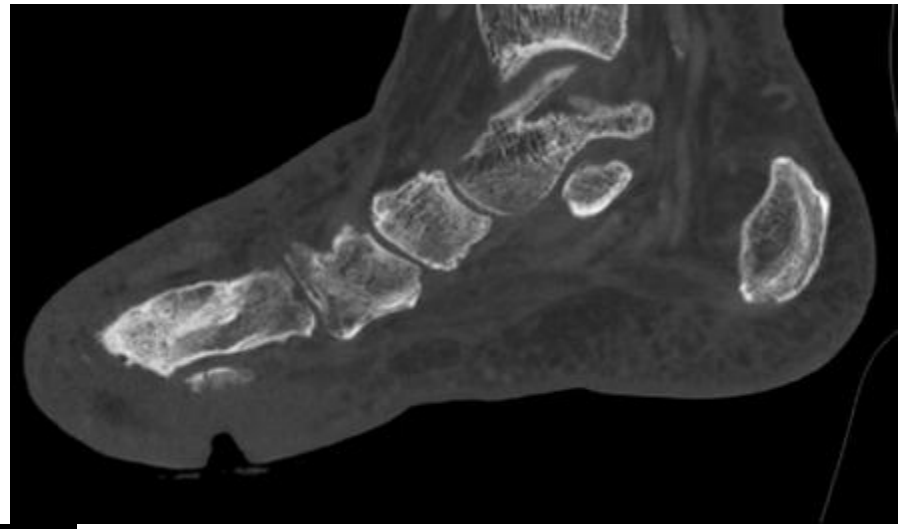
Diabetes Foot Vascular Considerations

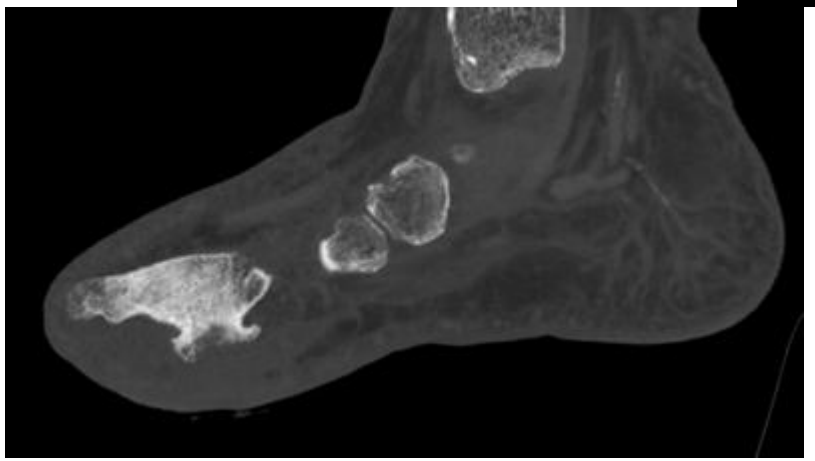
Western Health

Investigations

CT Bone

- Determination of osteomyelitis





Diabetes Foot Vascular Considerations

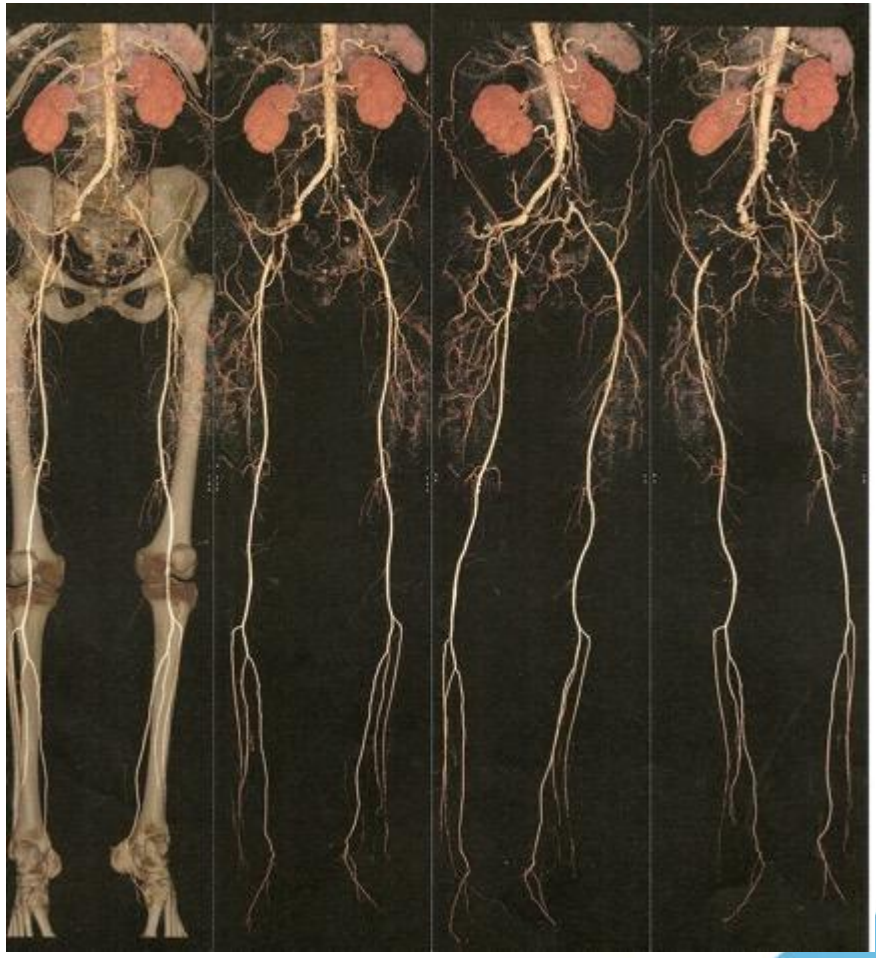
Western Health

Investigations

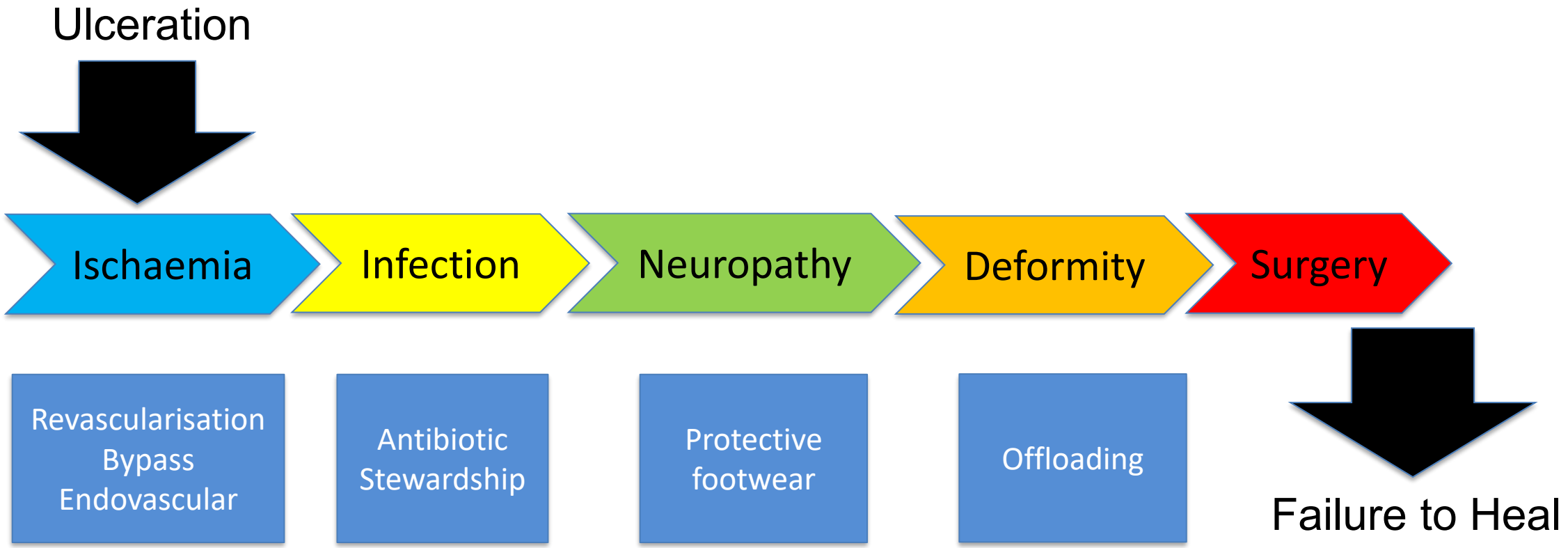
CT Angiogram

- Fast acquisition, subtract calcification
- Multiplanar reconstructions, no arterial puncture

- Contrast effects, poor imaging of tibial vessels
- Limited access, expensive

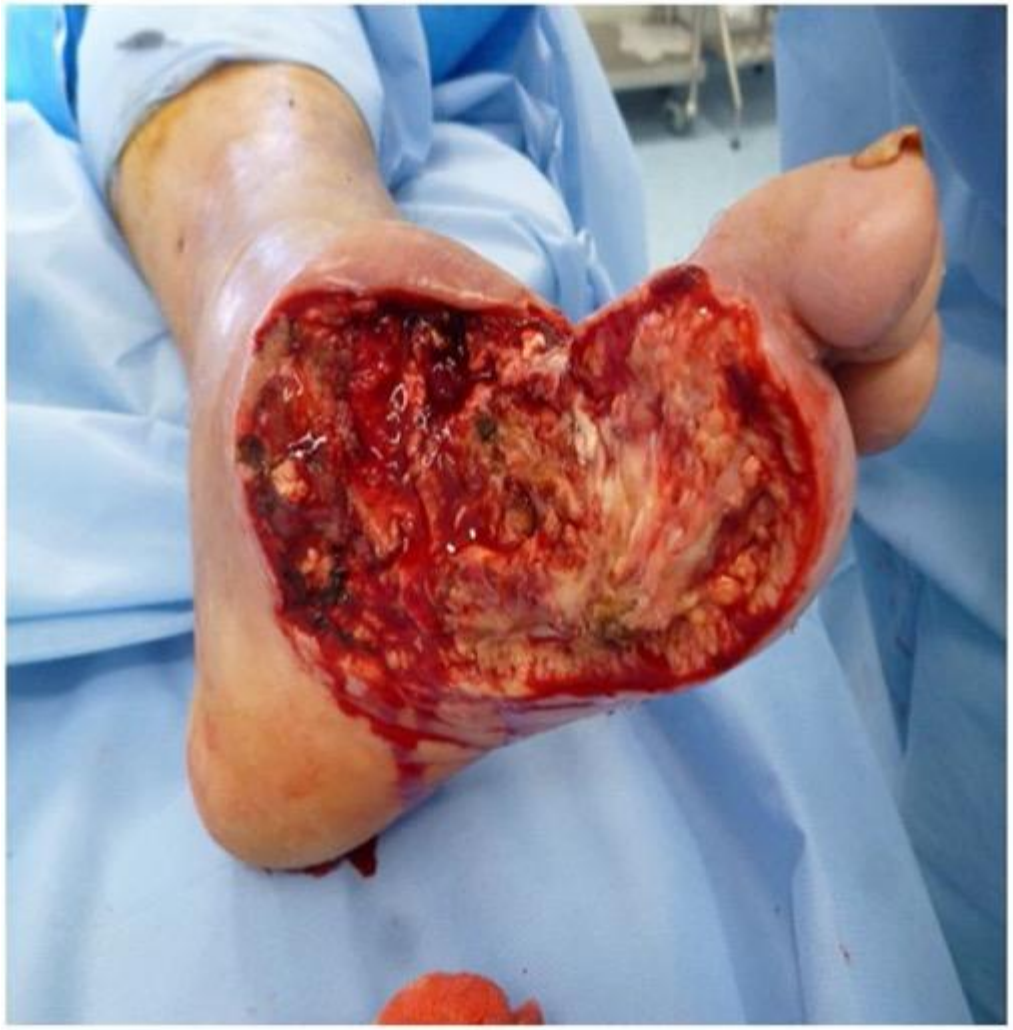


Diabetes Foot Ulceration



Failure to Heal

- Salvage vs BKA
  - Function?
  - Closure?
- Wound
  - Bone
  - Tendon
  - Open to infection



Biodegradable Temporising Matrix (BTM)

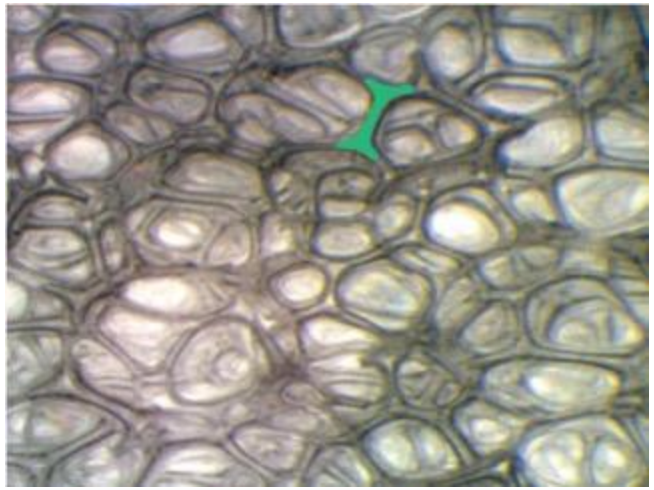
- NovoSorb® BTM is a synthetic, biodegradable and biocompatible device designed to facilitate the dermis to grow within a patented polyurethane matrix
- When ready, the sealing membrane is removed, leaving a fully vascularised dermis, ready for definitive closure

Biodegradable Temporising Matrix (BTM)

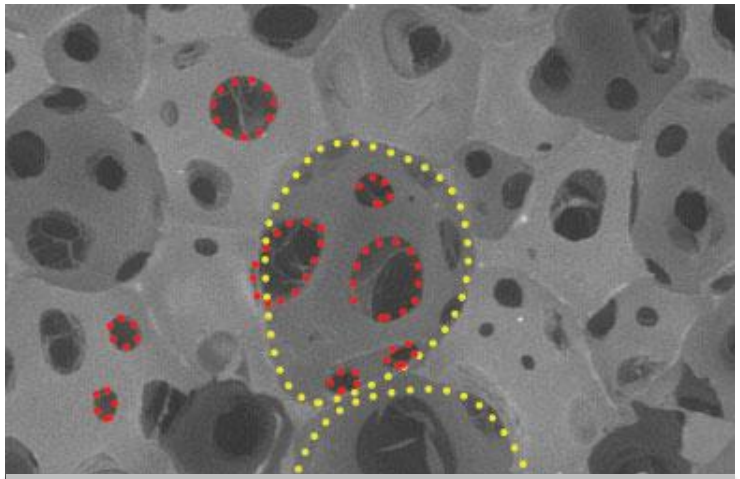
- Matrix
  - Synthetic biodegradable biocompatible
  - Open cell
  - 2mm thickness
  - Infiltration of cellular materials
  - Scaffolding for ingrowth of cells

- Sealing membrane
  - Non biodegradable
  - Seal to limit moisture loss
  - Barrier to bacteria

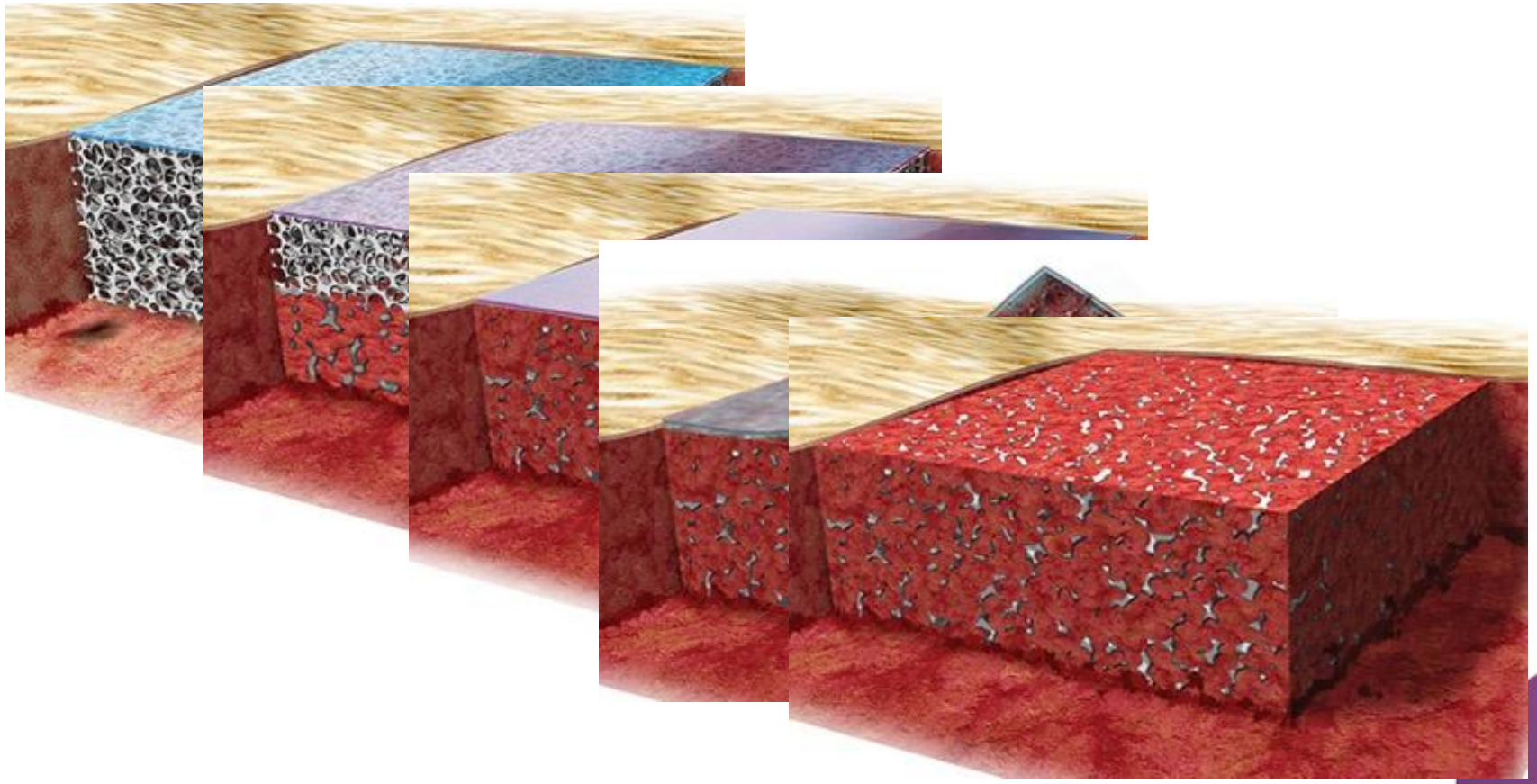
Biodegradable Temporising Matrix (BTM)



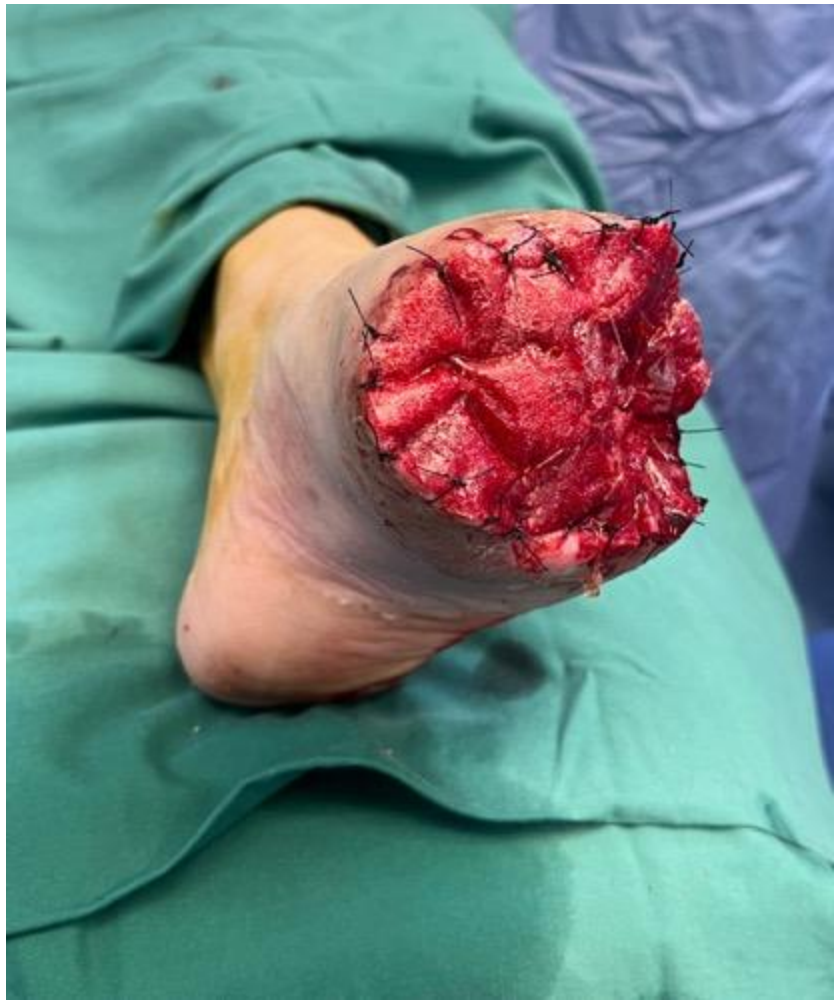
Struts



Chambers Pores



Biodegradable Temporising Matrix (BTM)



Biodegradable Temporising Matrix (BTM)

Western Health

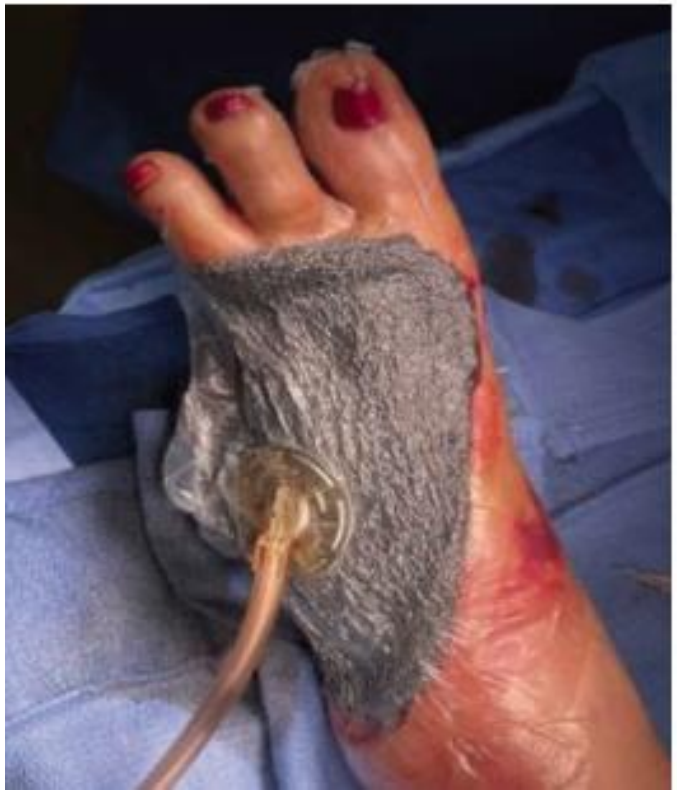
Post attachment dressing plan

VAC dressing

Changes at day 2, day 7 and day 14

Simple dressings from then

Delamination expected after day 28



Biodegradable Temporising Matrix (BTM)

- Benefits
  - Cover bone and tendon
  - Artificial dermis - skin graft ready
  - Faster time to grafting
  - Fill defects
  - Infection protection
  - Moisture control
  - Mobility

- Cautions
  - Ongoing infection
  - Requires compliant patient
  - Offloading / immobilisation
  - Dressings review
  - Drainage of collections
  - Delamination of matrix

BTM Evidence

Wound healing and dermal regeneration in severe burn patients treated with NovoSorb® Biodegradable Temporising Matrix: A prospective clinical study

Cheng Hean Lo [a,b,*], *Jason N. Brown* [c], *Eric J.G. Dantzer* [d], *Peter K.M. Maitz* [e], *John G. Vandervord* [f], *Marcus J.D. Wagstaff* [g], *Timothy M. Barker* [h], *Heather Cleland* [a,b]

[a] Victorian Adult Burns Service, The Alfred, 55 Commercial Rd, Melbourne, VIC 3004, Australia
[b] Department of Surgery, Central Clinical School, Monash University, 99 Commercial Rd, Melbourne, VIC 3004, Australia
[c] Professor Stuart Pegg Adult Burns Centre, Royal Brisbane and Women's Hospital, Butterfield St, Herston, QLD 4029, Australia
[d] Centre des Brûlès, Hô;pital d'Instruction des Armées Sainte-Anne, 2 Boulevard Sainte-Anne, 83000, Toulon, France
[e] Burns Unit, Concord Repatriation General Hospital, Hospital Road, Concord, NSW 2139, Australia
[f] Department of Burns, Reconstructive and Plastic Surgery, Royal North Shore Hospital, Reserve Road, St. Leonards, NSW 2065, Australia
[g] Adult Burns Service and Department of Plastic and Reconstructive Surgery, Royal Adelaide Hospital, Port Rd, Adelaide, SA 5000, Australia
[h] PolyNovo Biomaterials Pty Ltd., 2/320 Lorimer Street, Port Melbourne, VIC 3207, Australia

Results

Thirty patients were treated with BTM and delayed split skin grafting. The % graft take had a mean of 81.9% and % BTM take had a mean of 88.6%, demonstrating effective integration of BTM. When managed appropriately, it was possible for BTM to integrate successfully despite findings suggestive of infection. Scar quality improved over time.

Burns Open 9 (2025) 100378

Contents lists available at ScienceDirect

Burns Open

journal homepage: www.sciencedirect.com/journal/burns-open

A systematic review of the Novosorb® Biodegradable Temporizing Matrix in the treatment of complex wounds

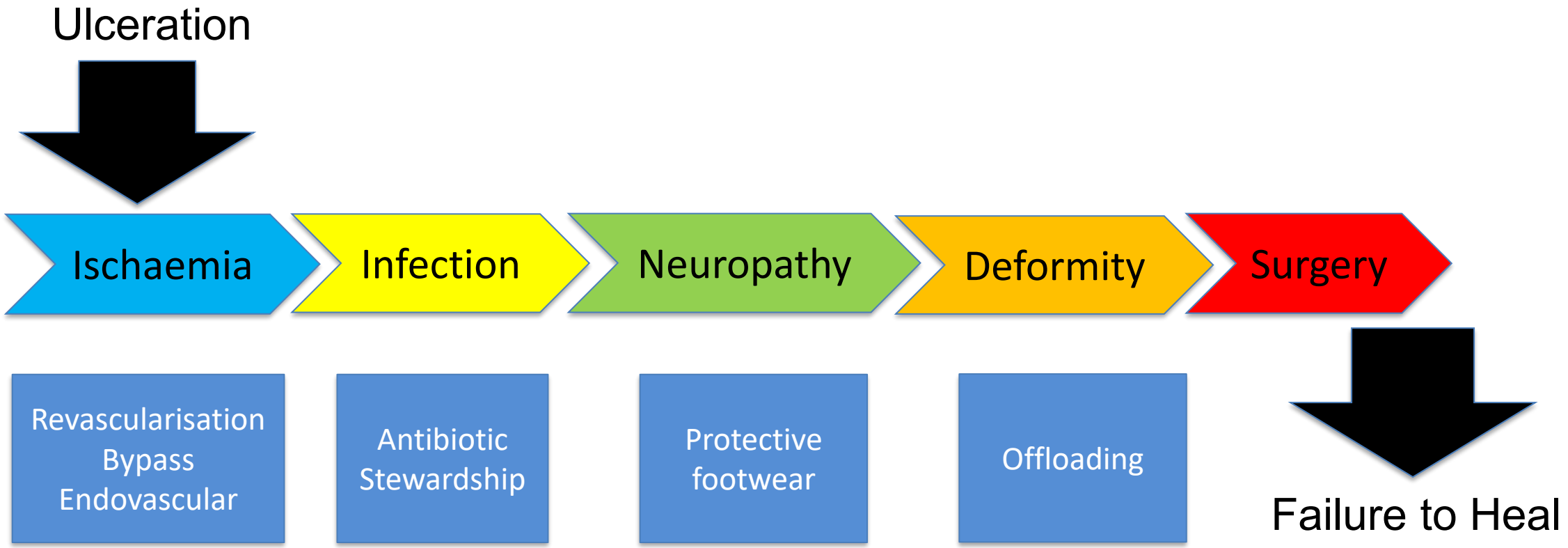
Olivia Fruergaard, Mathias Ørholt, Christian Lyngsaa Lang, Jennifer Berg Drejøe, Mikkel Herly, Peter Vester-Glowinski, David Hebbelstrup Jensen *

Department of Plastic Surgery and Burns Treatment, Copenhagen University Hospital, Rigshospitalet, Copenhagen, Denmark

Results

We identified 725 studies, and 69 were included after screening. The included studies involved 880 participants and were mostly concerned with the management of burns, but other difficult wounds were also addressed. The infection rate was 10%, yet only few reported losing their BTM as a result of this consequence. The incidence of adverse events was low, with the majority of trials reporting no adverse events related to BTM.

Diabetes Foot Ulceration



Hyperbaric Oxygen Therapy

Western Health

- Benefits
  - High degree of evidence
    - Decompression illness
    - Carbon monoxide poisoning
  - Moderate evidence
    - Diabetes foot wounds
    - Radiation injury
    - Necrotising fasciitis
    - Burns
- Drawbacks
  - Some medical contraindications
    - eg ICD device
  - Middle ear injuries
  - Cataract formation
  - Claustrophobia
  - Travel daily to chamber
  - Limited chamber availability
  - Fire

Hyperbaric Oxygen Therapy Evidence

Western Health

ELSEVIER

Journal of Vascular Surgery
Volume 71, Issue 2, February 2020, Pages 682-692.e1

Review article

A systematic review and meta-analysis of hyperbaric oxygen therapy for diabetic foot ulcers with arterial insufficiency

Robin J. Brouwer MD [a], Rutger C. Lalieu MD [b], Rigo Hoencamp MD, PhD [a c d], Rob A. van Hulst MD [e], Dirk T. Ubbink MD [f]

Results: Eleven studies, totaling 729 patients, were included for analysis, including 7 randomized clinical trials, 2 controlled clinical trials, and 2 retrospective cohorts. Four were used for quantitative synthesis. Meta-analysis showed a significantly fewer major amputations in the HBOT group (10.7% vs 26.0%; risk difference, −15%; 95% confidence interval [CI], −25 to −6; $P = .002$; number needed to treat, 7; 95% CI, 4-20). No difference was found for minor amputations (risk difference, 8%; 95% CI, −13 to 30; $P = .46$). Three studies reporting on complete wound healing showed contrasting results. No significant difference was found for mortality or amputation-free survival.

Conclusions: Current evidence shows that adjuvant HBOT improves major amputation rate, but not wound healing, in patients with DFUs and PAOD. Given the wide range of patients included in the trials, better patient selection may help define which patients with DFUs and PAOD benefit most from HBOT as standard adjunctive treatment. (J Vasc Surg 2020;71:682-92.)

Coming Soon to Sunshine

Diabetes Foot wound indications

- Failure to heal despite revascularisation
- Low tissue oxygen
- Surgically optimised wound

Outline

- 1. Local burden of Diabetes-related Foot Disease (DFD)
- 2. Stepping forward with Western Health's new Diabetes Foot Unit
- 3. Case presentations highlighting updates in management techniques
- 4. Review of the latest guidelines (diabetes and podiatry cycles of care)
- 5. Practical tips to prevent recurrence (DFD care 101 with a Senior Podiatrist)
- 6. Novel surgical approaches to DFD
- **7. Identifying risk factors and early disease**
- 8. How and when to refer?
- 9. Q+A session

Identifying risk factors and early disease

- Regular foot assessments in all patients living with Diabetes
    - Minimum 3-6 monthly in patients at high risk
- Aim to prevent the first ulcer
    - Smoking cessation
    - Promoting good pedal hygiene and footwear
    - Treating fungal infections
- Prompt recognition and treatment of infected ulcers
    - Empiric antibiotics as per guidelines
    - Then directed by appropriate (deep) wound MCS

Outline

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When to refer to DFU and DFS outpatient services

Western Health

Criteria for referral to public hospital specialist clinic services

- Non-healing foot ulceration present for more than 1 month with no reduction in size despite medical management
- Red hot swollen foot (active Charcot foot)
- Foot osteomyelitis with ulceration
- Chronic ischaemic signs and symptoms of the lower limb with foot ulceration
- Neuropathic symptoms associated with deranged function and structure.

Direct to an emergency department for:

- Sepsis or acutely unwell due to foot infection
- Tissue loss with absent pulses
- Suspected acute limb ischaemia
- Rapidly deteriorating ulceration or necrosis
- Suspected infection from a foreign body in the foot
- Rapidly deteriorating ulceration or necrosis
- Suspected Charcot's neuroarthropathy (e.g. unilateral, red, hot, swollen, possibly aching foot).

Diabetes Foot Service (DFS) at Western Health

The Western Hospital (Footscray) Diabetes Foot Service (DFS) provides high risk assessment and management to patients with diabetes related foot complications in the Western Region.

The DFS clinic includes the following disciplines:

- Podiatry
- Endocrinology
- Vascular Surgery
- Orthopaedic Surgery
- Infectious Diseases
- Diabetes Education
- Orthotics

Please review the following guidelines before referring a patient to the DFS

Eligibility for DFS services at Western Health

Diabetes related foot problem including but not limited to:

- Non healing foot ulceration
- Active Charcot Foot
- Foot osteomyelitis with ulceration
- Chronic ischaemic signs and symptoms of the lower limb WITH foot ulceration

Conditions/Patients not seen at Western Health DFS

The following conditions are not seen by the DFS specialists at Western Health:

- Referrals for routine foot checks for people with diabetes
- Patients requiring footwear and/or orthotics in the absence of an active foot wound
  Patients in residential aged care facilities (if required refer to relevant medical/surgical Western Health outpatient clinic)

Alarm Symptoms

Urgent conditions are beyond the scope of these guidelines. If immediate assessment is required, please refer patients directly to Footscray Emergency Department. Please note there is no DFS at Sunshine or Williamstown Hospitals

Refer immediately to Emergency Department:

- Septic patient or acutely unwell patient due to foot infection
- Critical lower limb ischemia with necrosis, pain or ulceration
- Suspected acute limb ischaemia
- Rapidly deteriorating ulceration/necrosis

Minimum clinical information for referral

- Diabetes history e.g. Type, year of onset etc.
- Medical history

Western Health

Western Health HARP
Access & Referral Guidelines

- Medications, including current antibiotics (if any)
- Recent pathology tests e.g. routine bloods, HbA1c, wound swabs etc.
- Recent vascular imaging e.g. Duplex ultrasound
- X-ray or other imaging, with results/reports
- Wound history and location
- Details of any current podiatry involvement

Please note referrals that do not provide adequate information for triaging may be returned with a request for further information.

Referral requirements

- Clearly address referral to the Diabetes Foot Service, fax referrals to 8345 7315
- List your provider number and the patient's Medicare number
- Provide any health advocacy requirements for the client

Please contact the DFS on 8345 6922 or the DFS Coordinator on 0466 48 77 27 if you would like to discuss a referral

How to refer to DFU and DFS outpatient services

DFS outpatient services

- Phone: 03 8345 6922
- Email: diabetesfootservice@wh.org.au

- Early referrals encouraged!

The DFU team (inpatient service) can be contacted via switch at Western Health if you wish to provide handover regarding a patients care

Outline

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- **9. Q+A session**

Western Health

Questions?

Session Conclusion

We value your feedback, let us know your thoughts.

Scan this QR code

You will receive a post session email within a week which will include slides and resources discussed during this session.

Attendance certificate will be received within 4-6 weeks.

RACGP CPD hours will be uploaded within 30 days.

To attend further education sessions, visit,

https://nwmphn.org.au/resources-events/events/

This session was recorded, and you will be able to view the recording at this link within the next week.

https://nwmphn.org.au/resources-events/resources/