Management of the High Risk Foot

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Agenda

- Assessment and Management of diabetes-related foot disease
- Metro South Health and Queensland Health new foot ulcer / Acute Charcot referral funding and KPI
- How to refer to Metro South High Risk Foot Services
Today's learning outcomes

• Understand the importance of timely specialist interventions of patients with active foot disease
• Assessment and management of the High risk foot.
• Understand the MSH Podiatry referral Criteria
• Understand the Queensland Health 2 working day KPI – foot ulcer and acute Charcot foot
• Understand how to refer to MSH High Risk foot services
• Understand the concept of "CPR for feet".
Diabetes-related foot disease

- Diabetes-related foot disease (DFD) is defined as ulceration, infection, ischemia or neuro-arthropathy (Charcot foot) of the foot in people with diabetes.
- People at-risk of DFD are defined as those with diabetes who have developed peripheral neuropathy, peripheral arterial disease or have a history of previous foot disease.
- DFD is globally-recognised as the leading cause of diabetes-related hospitalisations and amputation, with mortality rates comparable to many cancers.
- It poses a major burden on an individual’s quality of life, significant risks to their morbidity and mortality, and increases their healthcare costs.
The National Problem

There is a rising prevalence of diabetes

- 280 Australians develop diabetes everyday, that’s one person every 5 minutes

- Around 1.7 million Australians have diabetes and a similar number with pre-diabetes

- Of these 1.7 million, it has been estimated that 25% will develop ulceration at some point during their lifetime
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). 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. These statistics are especially disappointing given the exponential growth in knowledge, research and published guidelines on managing DRFD. 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 these ulcers leading to amputation. 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. A standardised national service model would also support a national network of interdisciplinary DRFD clinics, in turn facilitating the

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DIABETIC AMPUTATIONS IN AUSTRALIA

- Diabetes affects 1,000,000+
- Indigenous Australians are 38 times more likely to require a lower-limb amputation
- Foot complications are the second leading cause of death relating to diabetes
  
- Patients with foot complications need 12 Medicare-subsidised podiatric consultations every year
  
- 18 amputations per 100,000 people
- Double the rate of the UK and second-worst in the developed world

- Each amputation costs the health system $26,000

- 5-year mortality rates for people with diabetes amputations are 50%, higher than many cancers

- Preventing amputations increases life expectancy

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By Nicole Siddi, at popdot media. The Australian Diabetes Council for supplying facts and information for this infographic. For more on diabetes and podiatry refer to the ADFC website at www.adfc.com.au

Metro South Health
The issue!

Every year patients are admitted who, had they been referred for care earlier, would not have needed to be admitted or undergo an amputation.

85% of diabetic foot amputations are preventable.

Foot disease is the leading diabetes-related diagnosis for potentially preventable hospitalisations in Queensland.

Foot ulcers can be healed!
What causes foot ulceration?

- Neuropathy
- Deformity
- Trauma

Leading causes of ulceration

- Ischaemia
- Infection

Often dictate the outcome
Vascular Supply

- Blood is the most important component of the entire wound healing process
- Blood transports oxygen and nutrients required for the phases of wound healing
- Platelets for clotting
- Macrophages to digest pathological organisms
- Fibroblast and epithelial cells for regeneration
- No blood = necrosis
Ischaemia

- Impaired vascular supply increases risk of ischaemic limbs and digits.
Infection

- Wounds do not heal until infection is eradicated
- Untreated infection will lead to degeneration
- Local soft tissue infection →
- Cellulitis →
- Osteomyelitis →
- Systemic infection

- What to look for?

- Refer to the ‘Therapeutic Guidelines for Diabetic Foot Infections’ for appropriate Abx management
- Diagnostic investigations – X-ray, MRI
Infection >> amputation
Diabetic Foot Assessment

- Peripheral Vascular Disease
- Peripheral Neuropathy
Management of the High Risk foot
Learning Objectives

• Review peripheral arterial system
• Review clinical arterial assessments
• Review Peripheral nervous system
• Review Neurological assessment
Arterial Assessment:
Circulatory System = Plumbing
Peripheral Arterial Anatomy

Abdominal Aorta

Right Common Iliac  Left Common Iliac

Right External Iliac  Right Internal Iliac

Femoral

Popliteal

Profunda Femoris

Anterior Tibial

Tiboperoneal Trunk

Peroneal

Posterior Tibial

Dorsalis Pedis

Lateral Plantar Artery  Medial Plantar

Artery
Assessing for Peripheral Arterial Disease (PAD)

- Pedal pulses
- ABPI
- Toe pressures
- Duplex Ultrasounds or Angiograms
What are the aims of Vascular Assessment?

• Determine vascular status relative to tissue viability
• Screen and monitor change in status
• Confirm if blood flow adequate for normal tissue function
• Prevent complications e.g. ulceration, necrosis & gangrene
• Decide if vascular status affects treatment proposed
• Identify patients who need further referral
Relevant Patient History

- History of presenting symptoms
- Social history
  - Cigarette smoking, exercise regime, BMI
- Medical history
  - Angina, MI, CVA, hypertension, diabetes mellitus, hyperlipeadmia
- Current pharmacology
- Surgical history
  - Previous CV surgery
- Family history
  - Type 2 diabetes, CVD
History of Presenting Symptoms

- Arterial pain
  - Description
  - Location
  - Duration
  - Excitory Factors
  - Management

“Listen to your patient, for they are telling you the diagnosis” (Sir William Osler 1849-1919)

- Acute change in status
Assessing for Peripheral Arterial Disease (PAD)

Symptoms:
- Poor healing capacity
- Cool feet
- Exercise induced leg pain
- Skin dry thin shiny scaly
- Hair loss on lower legs and feet
- Severe cases, necrosis
Intermittent Claudication

• Claudication is a word derived from the Latin word *claudicato*, meaning to limp

• What is it?
  – Symptom of atherosclerotic disease affecting the peripheral arteries
  – Supply and demand discrepancy in blood delivery to active muscle
  – Presents as cramping
    • Triceps surae
  – Symptoms are relieved by rest

• Need to experience it to truly appreciate what it is…
Appearance of Well Perfused

• Appraise tissue quality:
  • Texture
  • Subcutaneous tissue
  • Integrity

• Appraise nail quality
  • Texture
  • Eponychium
  • Attachments
  • Striations
Appearance of Poorly Perfused Tissues

- Pallor
- Thinning of skin - shiny papery appearance
- Poor quality and depth of skin
- Reduction / Absence of subcutaneous tissue
- Dry inelastic dorsal skin
- Dry plantar skin with creases evident
- Nail dystrophy
Physical Examination

• Temperature gradient
• Capillary refill
• Pedal pulse palpation
  – **Objective:** presence / absence
  – **Subjective:** rate, rhythm, strength
  – **Location:** pedal, popliteal
• Doppler ultrasound
  – **Objective:** values, phasic tone, tracing inflow
Neurological system = Electrics
Lower limb nerve anatomy
Lower Limb Anatomy
3 main types of Neuropathy

- **Sensory** - receive sensation, such as temperature, pain, vibration or touch, from the skin
- **Motor** - muscle weakness, paralysis
- **Autonomic** - Heat intolerance and altered sweating, Bowel, bladder or digestive problems,
Neurological assessment

- 10g monofilament
- Vibration tuning fork
- Test for light touch, sharp touch, temperature, proprioception, 2 point discrimination, muscle tone, muscle power, tendon reflexes
Sensory testing
Vibration testing
Debridement

- Removal of necrotic material, scar tissue, dead tissue parts, crusts, infected tissue, hyperkeratosis, coatings, pus, haematomas, foreign bodies, bone fragments and all other substances that delay wound healing

- Includes not only preparation of the wound bed but also the wound edges and surrounding skin
Why debride??

- Biofilm
- Wound bed prep
- Devitalised Tissue removal
- Allows primary dressing application
- Promote wound healing: prevent spread of infection
- Dead tissue: odour and exudate increase risk of spread of bacteria

Not ALL wounds can be debrided or require debridement
Types of Debridement

- Surgical debridement
- Sharp debridement
- Larval therapy: maggots or their larvae are placed on wound site and eat away at dead tissue, leaving healthy tissue behind
Pre-debridement
Post debridement

5 days later
Offloading

‘It’s Not What You Put On, but What You Take Off’

David Armstrong, 2010

– Debridement
– Offloading

The role of Podiatry in acute diabetic foot care…
Pressure & Biomechanics

• Plantar pressure can influence risk of foot ulceration, healing & recurrence
Pressure Relieving Devices

- Total Contact Cast
- Air Cast Walkers
- CROW
- ITCC
Pressure Relieving Devices

• Wound Healing Shoe System

• Post Op shoes
Pressure Relieving Devices

- Felt padding
- Orthotics
- Medical Grade Footwear
After debridement- Offloading
Diabetes Control

• An elevated blood sugar levels will:

  – decrease blood flow and oxygen to a wound
  – decreases the function of red blood cells that carry nutrients to the tissue
  – lowers the efficiency of the white blood cells that fight infection
Wound Dressings

• What is the primary goal?
  – Protect from infection
  – Absorb/control exudate
  – Optimise wound environment

Dry dressing, Foam:
Advanced Wound Dressings

- Antiseptic
  - Betadine, chlorhexidine

- Antimicrobial
  - Acticoat, Inadine

- Autolytic debridement
  - Iodosorb, Aquacel, Algisite

- Hydrogel
  - Solosite, instrasite

- Combination
  - Aquacel Ag, Mepilex Ag
Stagnant / Deteriorating Wound

- What have you missed…?
- Vascular supply
- Infection
- Offloading
- Diabetes control
Multi-Disciplinary Team

- Podiatry
- Orthopaedics
- Endocrinologist + DNE
- Vascular
- Infectious Disease
- Prosthetist and Orthotist
- Dietician
- Nursing care
- Plaster techs
- GP
Charcot Neuro-Arthropathy

- Condition affecting the bones, joints, and soft tissues of the foot and ankle
- Characterized by chronic inflammation
- As a consequence of various peripheral neuropathies

- 21st century - diabetic neuropathy has become the most common etiology
- Still presents secondary distal neuropathies from chemotherapy, ethanol abuse, spinal cord injuries etc.
Causes

- Hx minor trauma
- Surgery
- Renal transplant
- Pancreas-renal transplant
Examination

- Clinical features: pain, discomfort, deformity
- Examination: neuropathy, bounding pulses, swelling odema, erythema
- Increase in foot temperature (2.2 degrees)
- Deformity (later stage)
Diagnosis

- Primarily based on history and clinical findings but should be confirmed by imaging
- Inflammation is the earliest clinical finding
- The occurrence of acute foot/ankle fractures or dislocations in neuropathic individuals is considered active CN because of the inflammatory process of bone healing, even in the absence of deformity
- Blood test – rule out infection – CRP likely elevated
Investigations

- **X-rays** - subtle fractures or subluxations if no obvious pathology is visible
- **MRI** – can assist differentiating between charcot and osteomyelitis
- **White Cell Bone Scan** – May be useful diagnosis but may need to compare Tc 99 with In111 to differentiate OM from charcot and currently has high false outcome
- **Bone biopsy**
Xray – weight bearing
Radiology in acute phase

- Initially may be no changes
- Bone resorption, thinning of bones
- Soft tissue welling, joint effusion
- Joint destruction, fractures, dislocation, articular erosions
- Fracture lacks the surrounding osteopenia seen with infection
Clinical Course

• People risk for Charcot foot $\rightarrow$ **stage 0**

• **Acute** Charcot foot $\rightarrow$ **stage I $\rightarrow$ Dev-fragmentation**
  - Swollen, hyperemia, bone fragmentation, joint dislocation and destruction
  - Radiological still looks normal, bone debris, joint subluxation and dislocation subsequently develop

• **Chronic** Charcot foot $\rightarrow$ **stage II $\rightarrow$ coalescence**
  - Decreasing erythrem, hot, swelling
  - X-Ray : absorption of fine debris, formation of new bone, coalescence of larger fragments and sclerosis of bone ends
  - Decrease joint mobility
Progress if not treated

- Collapse of feet
- Breaking up of bones
- Fast progressive destruction
- Commonly in mid-foot or ankle region – lead ulcers/infection, deformity
- Can occur in the hand
Treatment

- Offloading till consolidation
- TCC/Air Cast Walker
- Temperature monitoring
- Can reoccur anytime in life
- Surgery (low number of cases)
48 hour access for Podiatry
Acute Foot Complication Funding Proposal

- Up to 70% of diabetes-related hospitalisations and amputations are preventable if detected early and managed appropriately by a multi-disciplinary team that includes a podiatrist

- Beginning of this financial year, recurrent funding to deliver additional specialist high risk foot ambulatory clinic services

- In 2018-2019 recurrent funding of $219,928
  - In 2019-2020 this will increase again by $109,964

- Total payment of $329,892 per annum recurrent funding
Funding Conditions – ‘48hr KPI’

• 2018-2019: >60% of patients with a new foot ulcer referral are to be assessed and a care plan initiated with the best practice timeframe of 2 working days from the receipt of referral.

• 2019-2020: this target will increase >80%
Metro South Statistics

- Est. population: 1,119,862
- People dx with diabetes: 55,993
- People living with DFD: 11,199
- People living with DFU: 1,680

- Sept 2018 Metro South HRFS: 226
- 13% currently captured
Who do I refer?

Any patient with a lower limb complication such as
- Ulceration
- Infections not responding to antibiotics
- Ascending cellulitis
- Absent foot pulses
- Osteomyelitis
- Unexplained foot deformity

Do not delay, refer immediately!
## Metro South High Risk Foot Services

<table>
<thead>
<tr>
<th>FACILITY</th>
<th>CLINIC/SERVICES</th>
</tr>
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<tbody>
<tr>
<td>Princess Alexandra Hospital</td>
<td>High Risk Foot Service</td>
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<tr>
<td></td>
<td>Multi-Disciplinary High Risk Foot Clinic</td>
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<tr>
<td></td>
<td>Amputee Clinic</td>
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<tr>
<td></td>
<td>Chronic Foot Care Clinic</td>
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<tr>
<td>Logan Hospital</td>
<td>High Risk Foot Service</td>
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<tr>
<td></td>
<td>Multi-Disciplinary High Risk Foot Clinic</td>
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<tr>
<td>QEII Jubilee Hospital</td>
<td>High Risk Foot Service</td>
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<tr>
<td>Redlands Hospital</td>
<td>High Risk Foot Service</td>
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<tr>
<td>Burke Street Clinic (Wooloongabba)</td>
<td>High Risk Foot Service</td>
</tr>
<tr>
<td>Eight Mile Plains Community Health Centre</td>
<td>High Risk Foot Service</td>
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<tr>
<td>Browns Plains Community Health Centre</td>
<td>High Risk Foot Service</td>
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<tr>
<td>Inala Community Health Centre</td>
<td>High Risk Foot Service</td>
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<tr>
<td>Wynnum Community Health Centre</td>
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Refer your Patient
Diabetic foot modules - CSDS
https://csds.qld.edu.au/
Discharge Planning

A patient's ongoing management may be transferred from a specialist high-risk foot services to primary care providers, when:

1. The acute episode of care of foot disease has been completely resolved
2. The foot health status is determined to be stable:
   • The patient has been ulcer free for > 12 months
   • The Charcot foot is stable
3. Appropriate offloading interventions have been implemented
4. The patient has been made aware how they can immediately self-refer to the service if required, i.e. recurrence of foot ulcer or acute Charcot foot
## Redland Hospital Podiatry Service

### Referral Criteria

<table>
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<tr>
<th>Category</th>
<th>Indications</th>
<th>Waiting Period</th>
<th>Review</th>
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</table>
| **Urgent / Emergency Department presentation** | - Foot ulcer with infection and systemically unwell or febrile  
- Invasive infection or rapidly spreading cellulitis (defined by peripheral edema around the wound > 2cm)  
- Acute *Candida* – directly to Princess Alexandra Hospital  
- Wound gangrene | < 2 Week | Weekly |
| **1 Acute Complication** | - Current foot ulcer with / without infection  
- Current pressure injury with / without infection  
- Suspected Acute Charcot  
- Necrotic / Dry gangrene (with or without ulceration) | 1 – 3 Months | Weekly |
| **2 High Risk Foot** | - Previous Foot Ulceration or  
- Previous Lower limb Amputation  
and Two or more of these risk factors  
- Peripheral Arterial Disease  
- Peripheral Neuropathy  
- Significant Foot Deformity | 3 months | |
| **3 At Risk Foot** | - No previous history of foot ulcer / amputation  
And any of these risk factors  
- Peripheral Neuropathy or  
- Peripheral Arterial Disease or  
- Significant Foot Deformity | Not eligible for Metro South services  
Refer to alternative services | |
| **4 Low Risk Foot** | Clients with:  
- No Risk Factors and / or  
- History of foot ulcer / amputation  
Aboriginal & Torres Strait islander people with diabetes  
$205.005/06/09$ to be at high risk of developing foot complications until adequately assessed otherwise | Not eligible for Metro South services  
Refer to alternative services | |
The performing of routine nail care will not be undertaken by any Metro South Podiatrist unless there is a clear medical reason for doing so. A diagnosis of diabetes without any secondary complication does not constitute a clinical reason for routine nail care.

**Referrals**

Referrals will be accepted by the following Health Care Providers:

- General Practitioner
- Medical Officer
- Medical Specialist
- Registered Nurse or Clinical Nurse
- Allied Health Professional
- Indigenous Health Worker


**Central Referral Hub**

Phone: 1300 364 155  
Fax: 3155 4382  
Email: metrosouth_communityreferral@health.qld.gov.au

**PAH Referrals**

Phone: 1300 304 155  
Fax: 1200 304 219

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**Clinic Location**

<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
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</thead>
<tbody>
<tr>
<td>Redlands Health Service Centre</td>
<td>3 Verdon Road, CLEVELAND 4163</td>
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</table>

**Resources**

- Diabetic Foot Online Modules [https://cods.qld.edu.au/](https://cods.qld.edu.au/)
- Health Care Pathways [https://gpisforhealthproject.healthpathwayscommunity.org/](https://gpisforhealthproject.healthpathwayscommunity.org/)
Check both feet:
- Are there any breaks in the skin/areas of discolouration?
- Are there any ulcers present?
- Is neuropathy present?
- Is action required?

Protect feet if:
- Pressure damage/ulcer present
- at risk due to:
  - Neuropathy
  - Previous ulcer/pressure damage or amputation
  - Bed bound or fragile skin

Refer all patients with a foot ulcer/pressure damage or other major concern to the podiatry department or Tissue Viability Services for treatment and reassessment of pressure relief requirements.
Tel: ____________________
Thank you!