NSW GOVERNMENT Health
Hunter New England
Local Health District

Basic Foot Screening

HNELHD Podiatry and Footcare Services
High Risk Foot Clinic – Royal Newcastle Centre
GNS Podiatry and Foot Care Services.

Diabetes

- “Diabetic foot complications are the single most common cause of non-traumatic lower limb amputations in the industrialised world”

Armstrong D, Lavery L & Harkless L (1998) Who is at risk for diabetic foot ulceration? Clinics in Podiatric Medicine and Surgery, 15 pp 11-19

- As many as 75% of amputations due to diabetes could be prevented by appropriate foot care

Larsson J, Apelqvist J, Agardh C & Stenstrom A (1995) Decreasing the incidence of major amputation in diabetic patients: a consequence of multi-disciplinary foot care team approach? Diabetic Medicine 12, 770

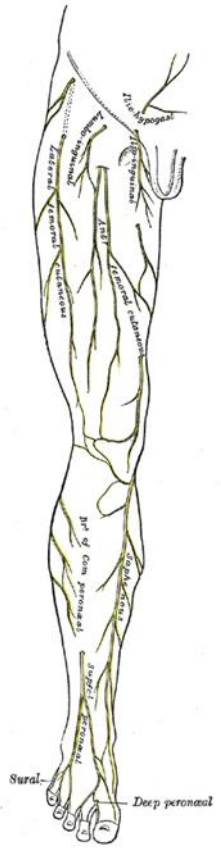
Diabetes

- Every 20 seconds somewhere in the world someone loses a leg due to diabetic complications
  - » IWGDF 2019
- Indigenous Australians are 38 times more likely to have a major amputation compared to non-indigenous Australians
  - » Norman et al. 2010
- 50% of patients who lose their legs will be dead within 5 years
  - » Apelqvist et al. 1993

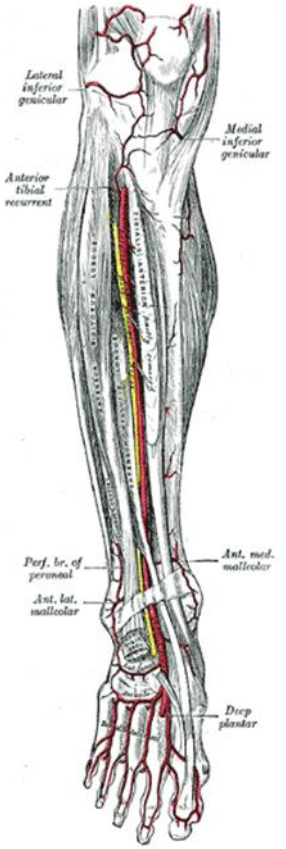
What are the primary effects of diabetes on feet?

There are two Key factors that contribute to diabetic foot complications

- Reduced nerve conduction
  - Loss of sensation
  - Less vasoconstriction
  - “numbness”



- Reduced peripheral perfusion
  - Calcification
  - Tissue damage
  - Gangrene



What are the secondary effects of diabetes on feet?

- Obesity
  - Difficulty reaching feet for routine care
  - Oedema
  - Reduced peripheral perfusion
  - Reduced activity
    - Reduced activity related BGL Control
    - Sedentary risk factors
    - Atherosclerosis

What are the secondary effects of diabetes on feet?

- Lifestyle
  - Smoking
  - Hypertension
  - Hypercholesterolaemia
  - Sub-optimal BGLs
  - Lower income earners
  - Footwear
    - Nil, poor quality or ill fitting

Who can check feet?

What are we looking for?

What else are we looking for?

corns

tinea

callus

warts

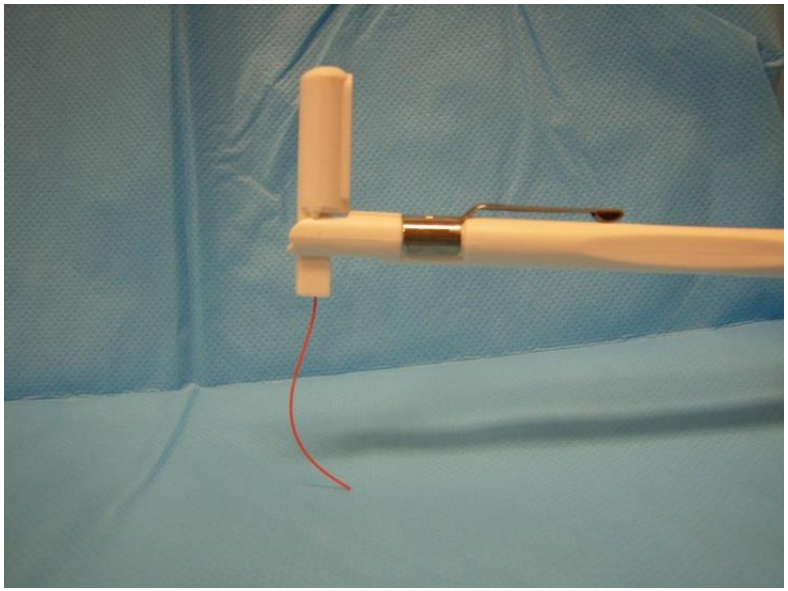
foreign objects

What's wrong with a callous?

- Hyperkeratosis (corns and callus) develop over areas of high pressure
- In cases of peripheral neuropathy, these lesions are not painful and can lead to the ulceration of tissue underneath the hyperkeratosis

Simple checks anyone can do:

- Pulses
- Monofilament/vibration
- Ask patients about their feet
  - Daily foot checks
  - Smell?
  - Skin condition?
  - Sores?
  - Daily washing /drying/moisturising



Why are foot checks so important?

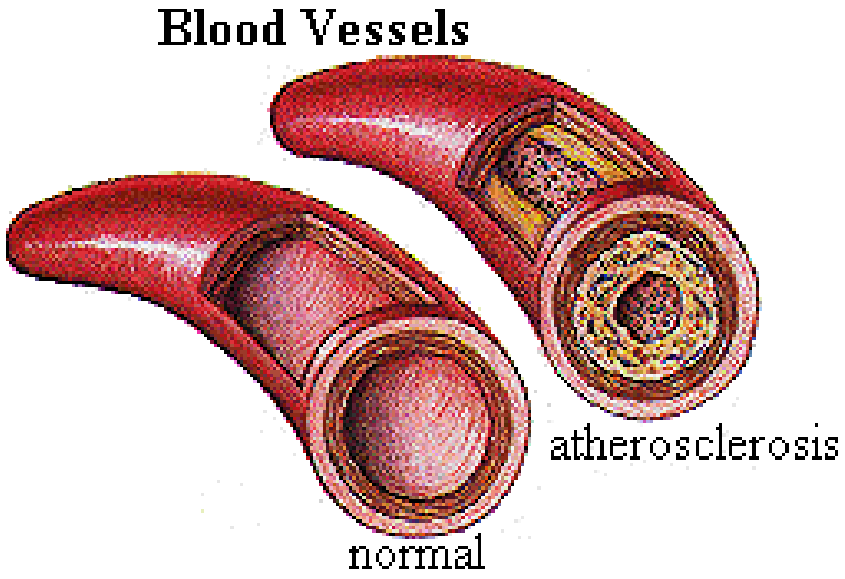
- 60-70% of people with diabetes will develop neuropathy
- 25% of people with diabetes will develop a foot ulcer
- 1 in 5 foot ulcers will require amputation
  - Minor amputation
  - Major amputation

Diabetic foot complications

- Peripheral vascular disease (PVD)
- Neuropathy
  - Sensory
  - Motor
  - Autonomic
- Diabetic foot ulcers (DFU)
- Charcot neuroarthropathy

Peripheral Vascular Disease

- Decrease in perfusion to the feet
- Decrease in oxygenation, nutrients, inflammatory response, chemical mediators for wound healing and repair, immunity and antibiotic therapy
- Decrease in tissue resilience resulting in greater risk of tissue destruction / ulceration from internal or external forces
- Delayed wound healing



Peripheral Vascular Disease

- Reports from the USA, UK and Finland all confirm that PVD is a major contributing factor to the pathogenesis of foot ulceration and subsequent major amputations
    - - Boulton AJM. The Pathway to Ulceration: Aetiopathogenesis. In Boulton AJM, Bonner H & Cavanagh PR (Eds), *The Foot in Diabetes* Third Edition. UK, John Wiley & Sons Ltd, 2000. 19-31

Foot Ulceration - Ischaemic Wounds

- Painful
- Occur around the border of the foot, apex of the toes and the dorsum of the foot
- Surrounded by dry and shiny skin

Neuropathy

- Loss of nerve function & control
  - Sensory: feeling, pain, pressure, temperature
  - Motor: muscular strength and control
  - Autonomic: bladder function & sweat gland regulation

"Oh no, darling. You misunderstood. When I said I had cold feet, I just meant I had some diabetic symptoms."

Sensory Neuropathy

- “Neuropathy” “Numbness”
- Nerves absorb excess glucose which prevents transmission of signal
- Loss of protective sensation
- Can lead to disassociation of limbs

Motor Neuropathy

- Muscular imbalance within the feet
  - Intrinsic muscles – lesser toe deformities
  - joint stiffness at ankle – increases forefoot pressures
  - Balance is altered due to reduced proprioception
  - Pressure areas start to develop

Autonomic Neuropathy

- Dry skin
  - Very common
  - Associated to reduced sweat gland regulation
  - Dry skin is weak skin

Autonomic Neuropathy

- Arteriovenous shunting
  - Leading to a decrease in oxygen and nutrients
- Vasodilation
  - Leading to increased perfusion and Charcot joints

Rocker bottom Charcot Foot

Foot Ulceration - Neuropathic Wounds

- Painless
- Occur over areas where there is high pressure
- Surrounded by hyperkeratosis

What does neuropathy mean for our patients?

- They must check their feet daily
  - Foot feeling is no longer reliable so other senses must be used.
    - LOOK at feet and shoes
    - TOUCH feet with hands dorsum and sole.
    - Looking for….

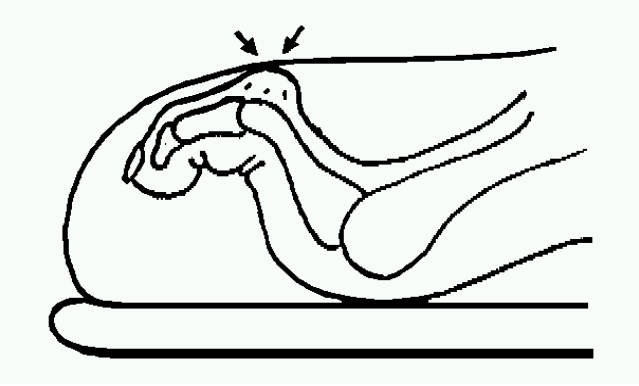
Aetiology of Foot Wounds

Primary Factors

- ✓ Peripheral neuropathy
- ✓ Peripheral vascular disease

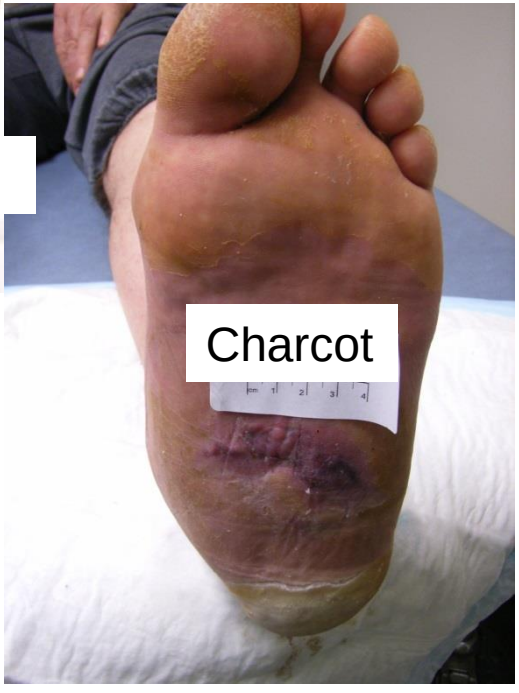
Secondary Factors

- ✓ Limited joint mobility
- ✓ Bony deformity
- ✓ Trauma
- ✓ ↓ Immune response



Australian National Association of Diabetes Centres, The National Diabetes Foot Care Project

Diabetic Foot Ulcers



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Assessment of Foot Wounds

Aetiology

- ✓ Neuropathic ulcer
- ✓ Ischaemic ulcer
- ✓ Neuroischaemic ulcer

Infection

- ✓ Local
- ✓ Cellulitis
- ✓ Osteomyelitis

Investigations

- ✓ X-ray
- ✓ Swab
- ✓ Bone scans
- ✓ MRI

Referral

- ✓ Endocrinologist
- ✓ Vascular Consultant
- ✓ Orthopaedic Consultant
- ✓ Rehabilitation Consultant
- ✓ Infectious disease Consultant
- ✓ Dietician
- ✓ Wound care nurse

Treatment of Foot Wounds

- Debridement
  - ✓ Conservative sharp
  - ✓ Mechanical
  - ✓ Autolytic
  - ✓ Enzymatic
  - ✓ Surgical
- Dressings
- Surgery
- Education

- Infection management
- Oedema management
- Offloading
  - ✓ total contact cast
  - ✓ removable cast walkers
  - ✓ post-op shoes / all purpose boots
  - ✓ orthoses
  - ✓ felt padding
  - ✓ combination of the above

Charcot Neuroarthropathy

- “Charcot foot”
- When neuropathy and good blood flow are combined!
- Frequently misdiagnosed
- Should always be considered for unilateral red hot swollen foot

Charcot Neuroarthropathy

- Suggested aetiology:
  - ✓ Autonomic neuropathy increases blood flow to the extremity, resulting in osteopenia
  - ✓ Motor neuropathy results in muscle imbalance
  - ✓ Sensory neuropathy means that patient in unaware of the osseous destruction that is taking place

Armstrong DG, Todd WF, Lavery LA, Harkless LB, Bushman TR (1997). The Natural Histroy of Acute Charcot's Arthropathy in a Diabetic Foot Specialty Clinic. Diabetic Medicine, 14 pp 357-363.

Charcot Neuroarthropathy

Assessment of Charcot foot

Aetiology

- ✓ Neuropathy
- ✓ Injury vs.
- ✓ Normal activity

Infection

- ✓ Unlikely cellulitis if fails to respond to Abx
- ✓ May be present with wound

Investigations

- ✓ Clinical appearance: red, hot, swollen foot
- ✓ X-ray
- ✓ Temperature
- ✓ Bone scans
- ✓ MRI

Referral

- ✓ High Risk Foot Clinic
- ✓ Endocrinologist
- ✓ Orthopaedic Consultant

Charcot Neuroarthropathy

- AP view on ray
- 2012 compared to 2015

Charcot Neuroarthropathy

- Lateral view on ray

Treatment of Charcot foot

- Prompt Diagnosis is Key
- DDX: infection, tendon rupture, cellulitis, gout, septic arthritis
  - frequently misdiagnosed
  - Early immobilisation/non weight bearing essential to halt progression
- Wound management
  - Conservative sharp
- Immobilisation

  TCC / Vacoped / CAM

  Early immobilisation
- Non weight bearing
  - Wheelchair
  - Crutches
  - Bed bound
- Surgery if deformity is severe once chronic or cold
- Risk vs benefit
  - Post operative risks
  - Reconstruction
  - Amputation risk

Off-Loading Options

- total contact cast
- removable cast walkers
- post-op shoes / all purpose boots
- Orthoses / Footwear
- felt padding
- combination of the above

Footwear

All footwear should have the following features…

1. Fastenings
2. A firm heel counter
3. Heel height of less than 2cm
4. A firm sole
5. A wide and deep toe-box (important for insoles)
6. One thumbs-width from the longest toe to the end of the shoe
7. Preferably a leather upper and lining

Footwear

- Have feet professionally measured
- Find out if your local shoe stores train their staff

Tips for Buying Shoes

- Purchase late in the day
- Always fit larger foot
- Price doesn't indicate better fit!

Diabetes Screening

Screening to identify early foot changes

Looking for risk factors:

- Peripheral neuropathy
- Peripheral vascular disease
- Dermatological conditions and skin integrity
- Abnormal lower limb biomechanics (deformity)
- Inappropriate footwear
- Poor self care

Frequency depends on risk level

6-12 monthly

Diabetes Screening

- Ask your patient…..
  - Neuropathic symptoms?
  - Vascular symptoms?
  - Previous ampuation?

Diabetes Screening

- Look at your patients feet
  - Infection?
  - Ulceration?
  - Corns & Callous?
  - Nail problems?
  - Tinea?
  - Breaks to the skin?
  - Deformity

What about Corns and Callous?

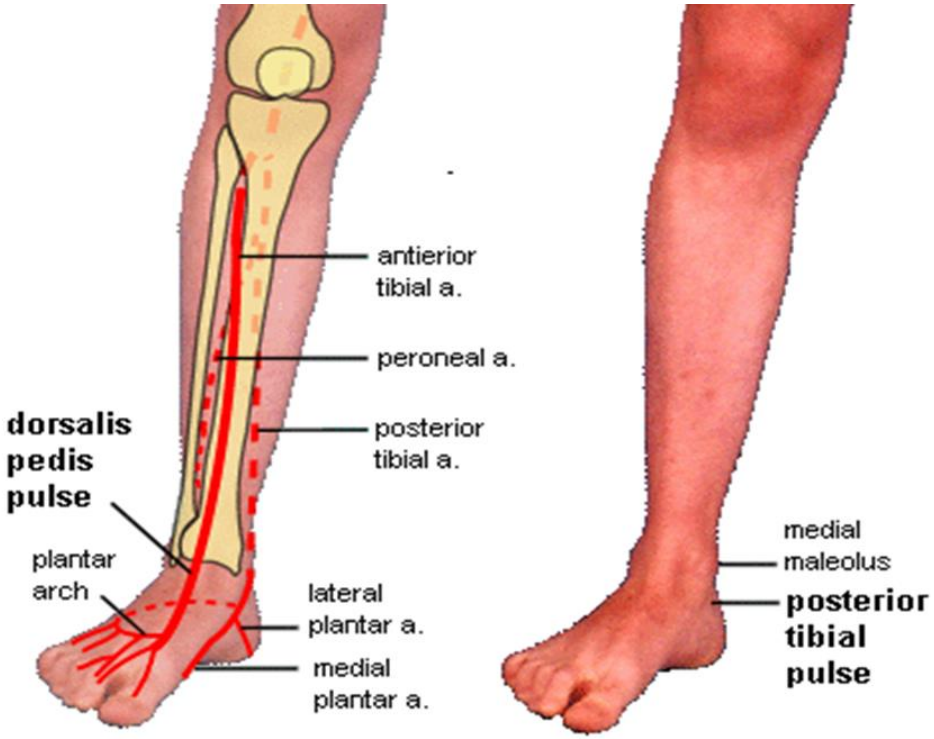
- Must be regarded as pre-ulcerative in the neuropathic foot
- Appear as areas of hard, yellow, thickened skin
- Occur at pressure points
- Early treatment and pressure relief prevents ulceration




Diabetes Screening

Check foot pulses

- Dorsalis pedis is absent in ≈ 10% of all people as an anatomical variation



Diabetes Screening

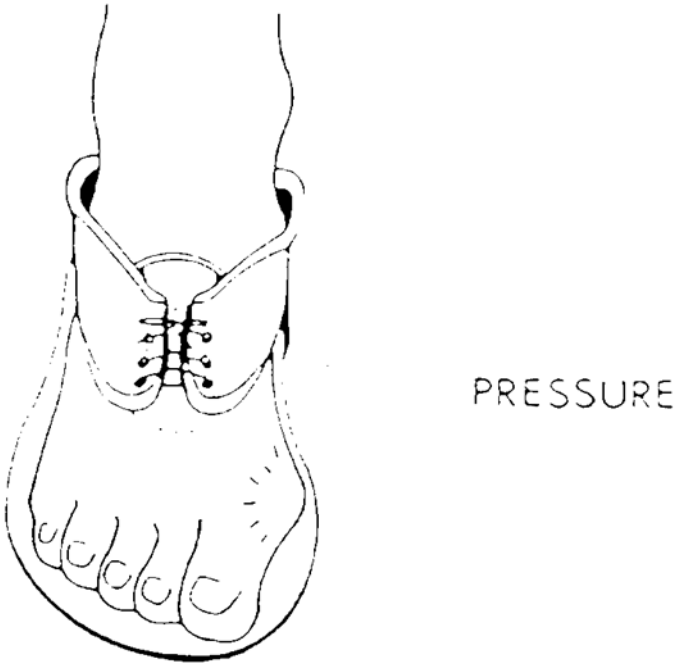
Check for neuropathy

- Indicates sensory nerve function and loss of protective sensation

Diabetes Screening

Check Footwear

- Fit
- Condition
- Style



Diabetes Screening

Patient education

- Does the patient/carer understand the effects of diabetes on foot health?
- Can the patient identify appropriate foot care practices?
- Are the patient's feet adequately cared for?

Diabetes Screening

Ability to self care

- Vision impairment?
- Can the patient reach their feet?
- Cognitive issues?
- Safety issues?

Where to when you have a patient with a diabetic foot complication ?

- Not sure what to do?
  - Give us a call
  - GNS Podiatry and Footcare Services

    Phone 02 4016 4687
- Requires GP to fax a referral
  - Referral and Information Centre

    Fax 4924 2502

    Phone 4924 2590

If there was one piece of foot specific advice to give your patients……

CHECK YOUR FEET DAILY

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Local Health District

If there is one foot specific addition you can make to your patient consult?

Ask your patient to take both their shoes off and have a look at their feet!

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Hunter New England
Local Health District

Let’s keep our patients on their feet


THE END.

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