Foot care in Diabetes

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International Diabetes Federation 2015 Diabetes Atlas 7th edition

- 416 million people with diabetes
- Nearly half of those with diabetes are undiagnosed
- Diabetes caused 5.1 million deaths in 2013, one death every 6 seconds
- 12% of global health expenditure is spent on diabetes ($673 billion)
- Estimated 642 million people with diabetes by 2040 (1 in 10 adults)

5-15% of DM patients experienced a foot ulcer in their life time



Up to 50% have neuropathy

20-40% have ischemia

1/12 of all foot ulcers → some form of amputation

23 x more likely to have an amputation than non DM patients

Journal of the American Podiatric Medical Association 2008, Vol 98 (6)

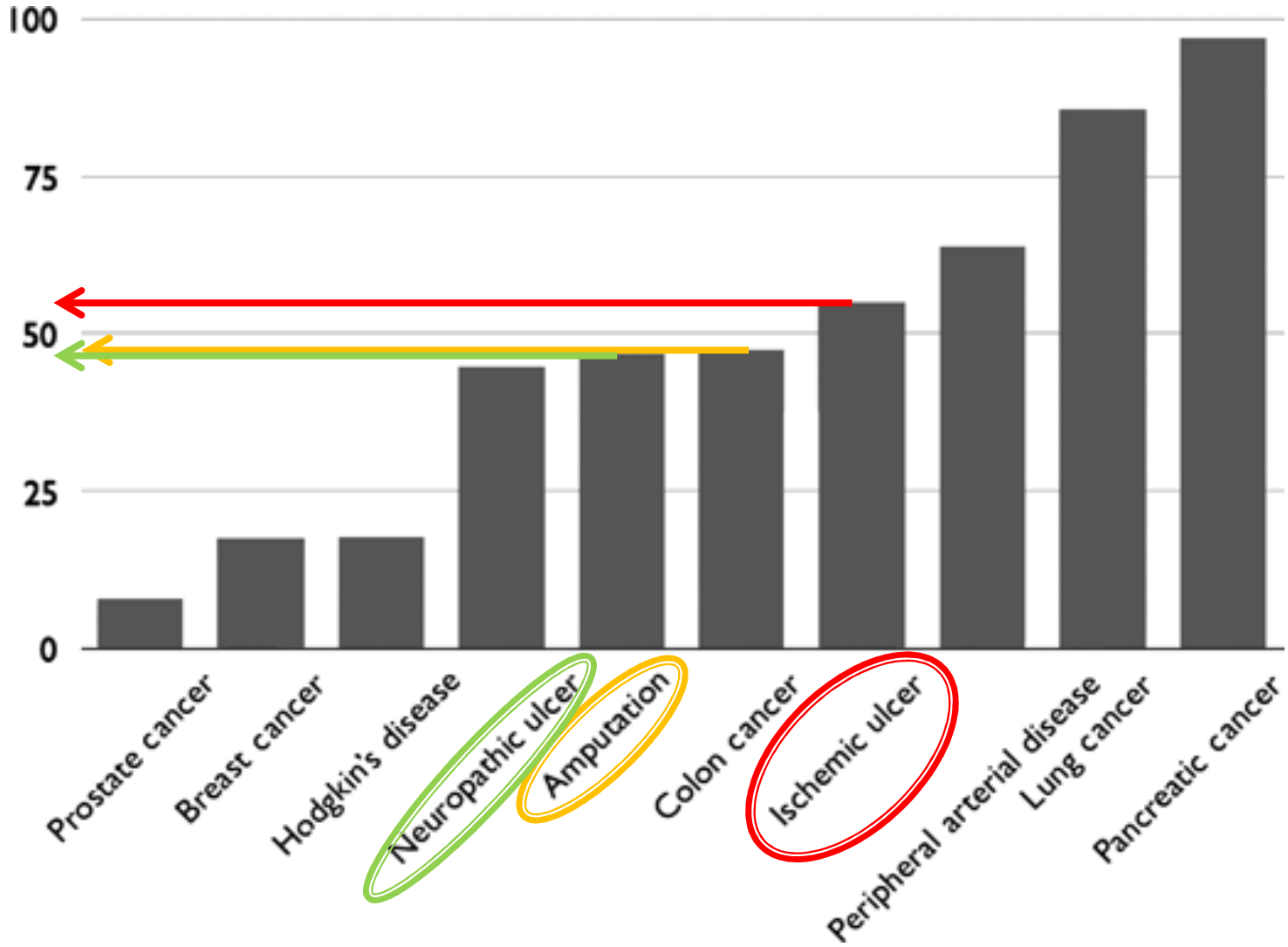
Mortality Rates and Diabetic Foot Ulcers

Is it Time to Communicate Mortality Risk to Patients with Diabetic Foot Ulceration?

Jeffrey M. Robbins, DPM*
Gerald Strauss, PhD*
David Aron, MD*
Jodi Long, DPM*
Jennifer Kuba, DPM*
Yelena Kaplan, DPM*

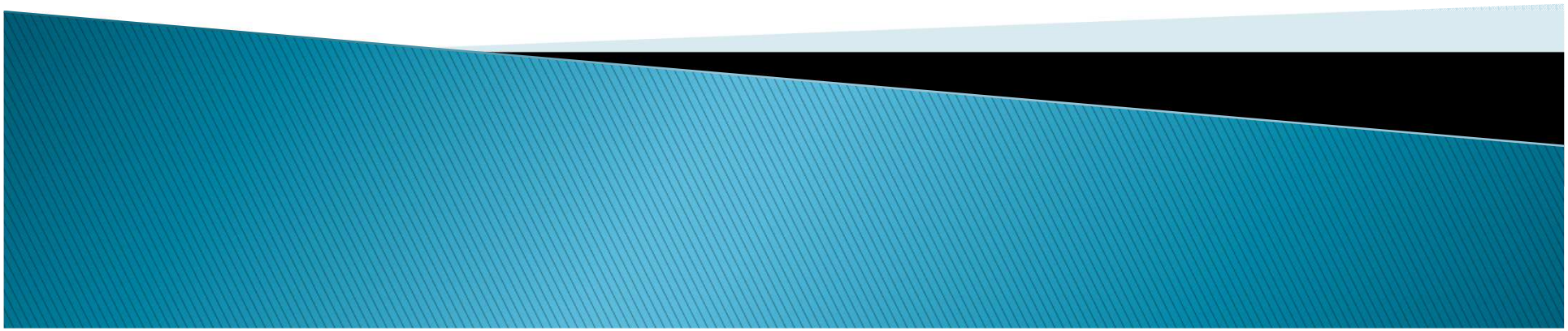
Five-year mortality rates after new-onset diabetic ulceration have been reported between 43% and 55% and up to 74% for patients with lower-extremity amputation. These rates are higher than those for several types of cancer including prostate, breast, colon, and Hodgkin's disease. These alarmingly high 5-year mortality rates should be addressed more aggressively by patients and providers alike. Cardiovascular diseases represent the major causal factor, and early preventive interventions to improve life expectancy in this most vulnerable patient cohort are essential. New-onset diabetic foot ulcers should be considered a marker for significantly increased mortality and should be aggressively managed locally, systemically, and psychologically. (J Am Podiatr Med Assoc 98(6): 489-493, 2008)

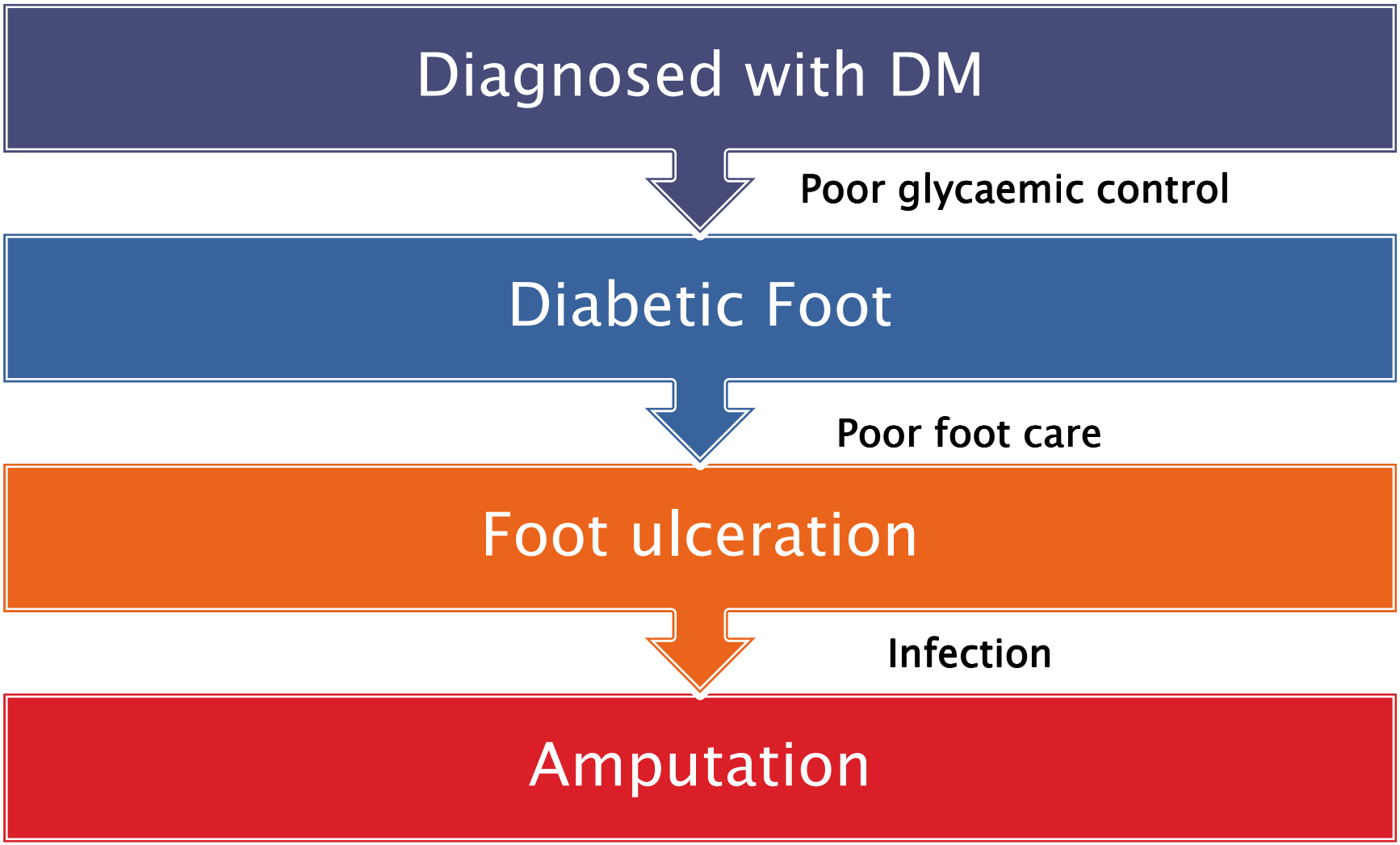
Fig. Five-year mortality (%).

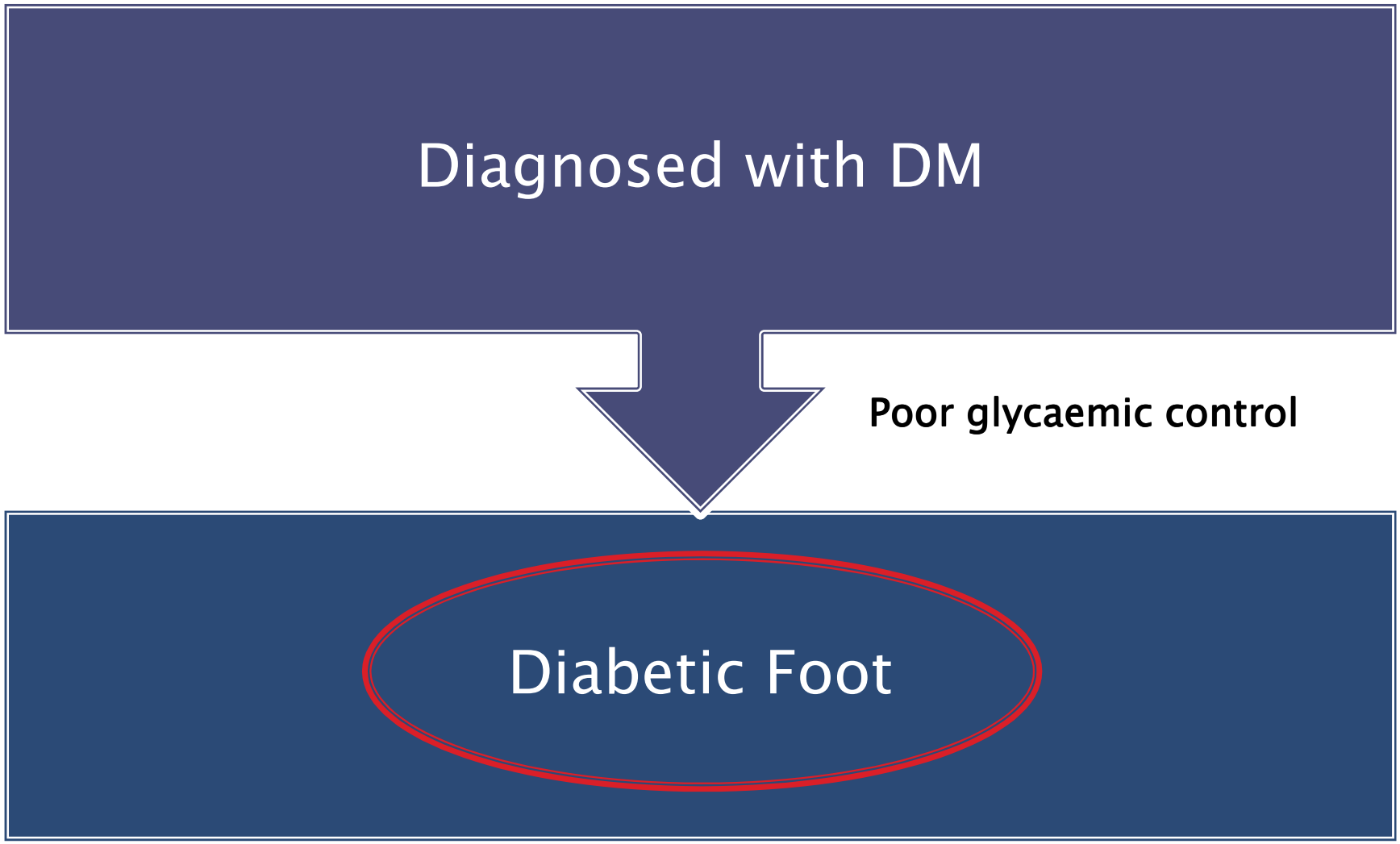


Journal of the American Podiatric Medical Association 2008, Vol 98 (6)

New-onset diabetic foot ulcers should be considered a marker for significantly increased mortality and should be aggressively managed locally, systemically, and psychologically




Diagnosed with DM
Poor glycaemic control
Diabetic Foot
Poor foot care
Foot ulceration
Infection
Amputation


Diagnosed with DM
Poor glycaemic control
Diabetic Foot

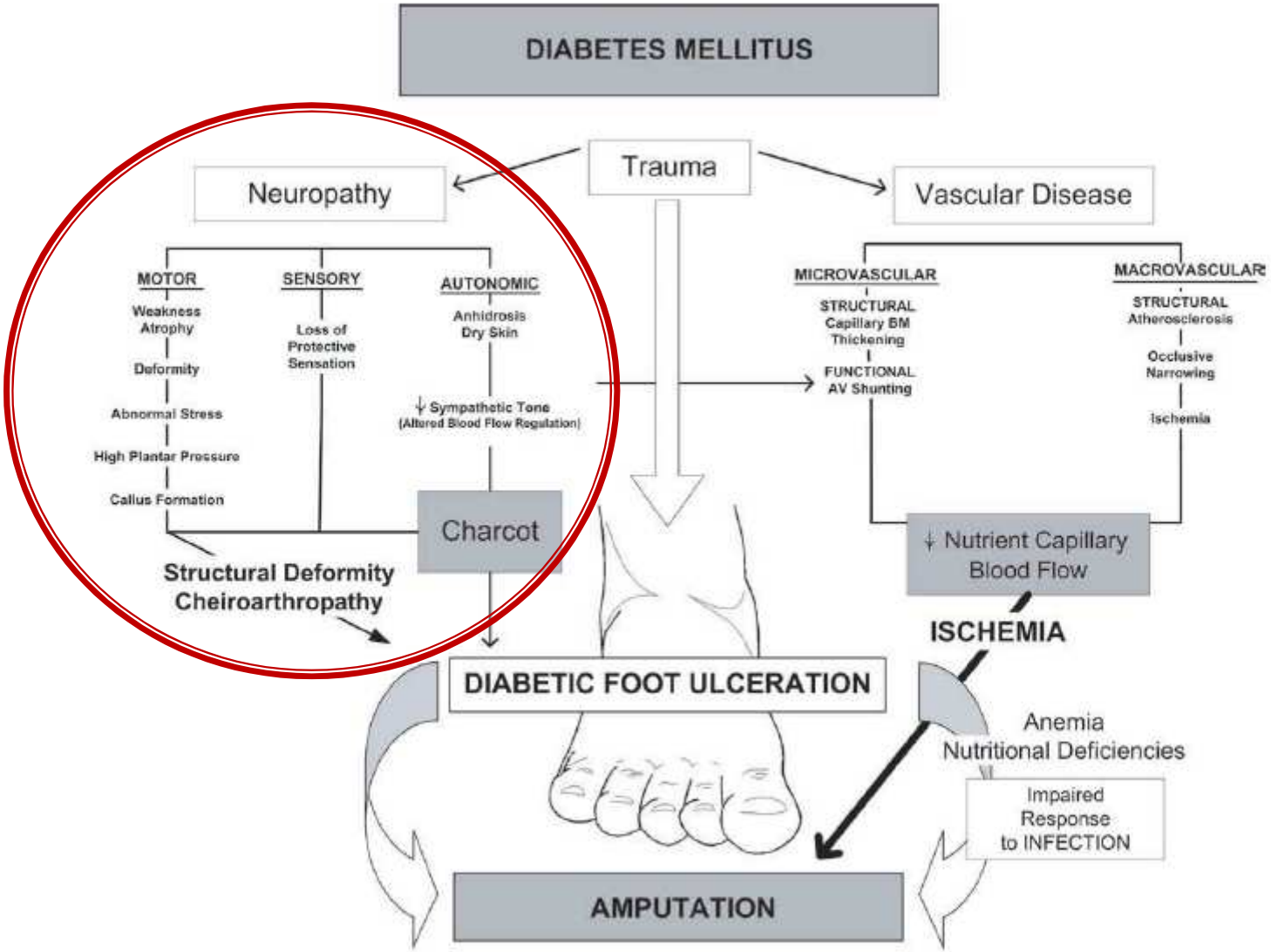


Fig1: Diabetic Foot Disorders: A clinical practice guideline 2006. The journal of foot & ankle surgery.

Peripheral Neuropathy

- Patient may c/o of numbness of foot, gloving sensations, pins and needles etc…

Other signs:

- Failure to c/o of pain when significant foot lesions are present



- Failure to notice trauma on foot

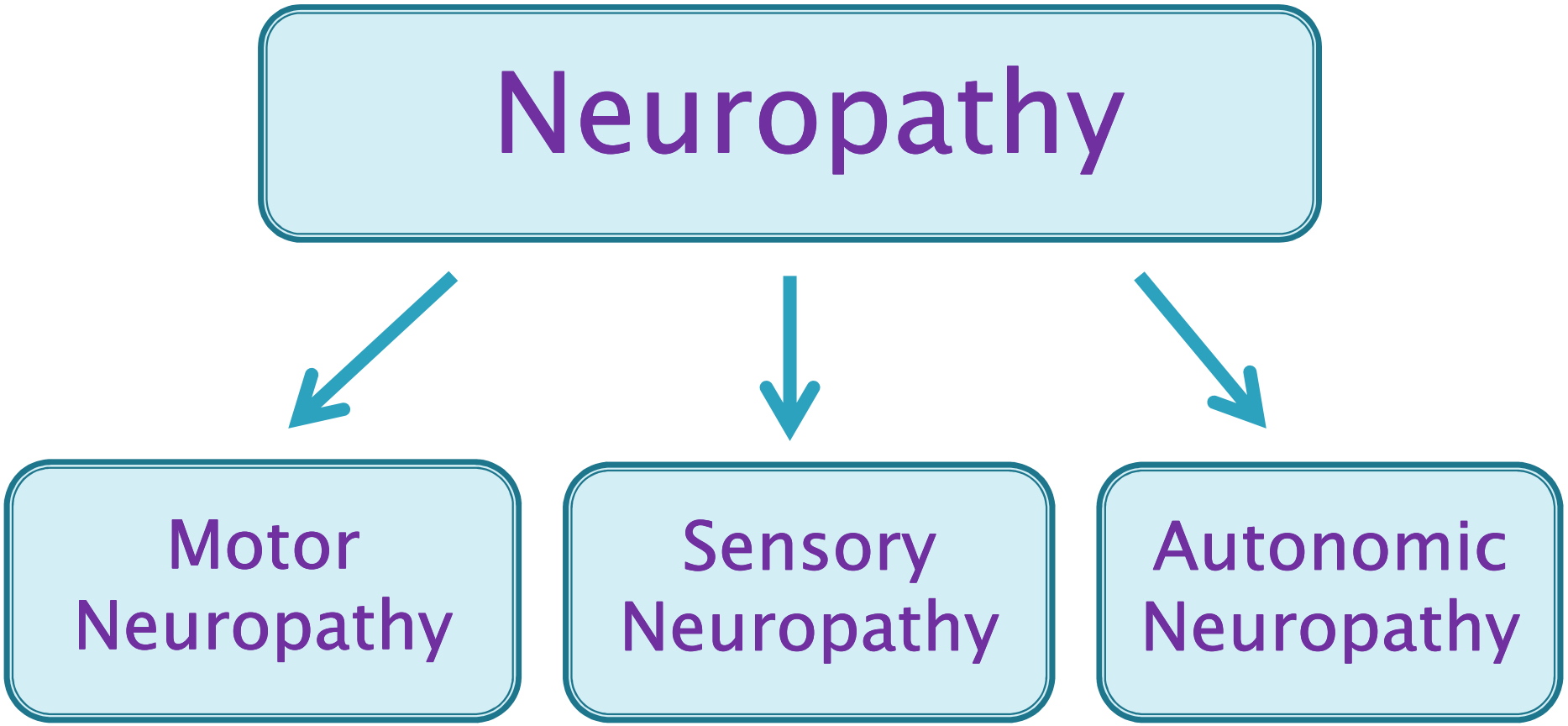
Peripheral Neuropathy cont'

- ↑ risk of injury to the foot due to loss of protective sensations

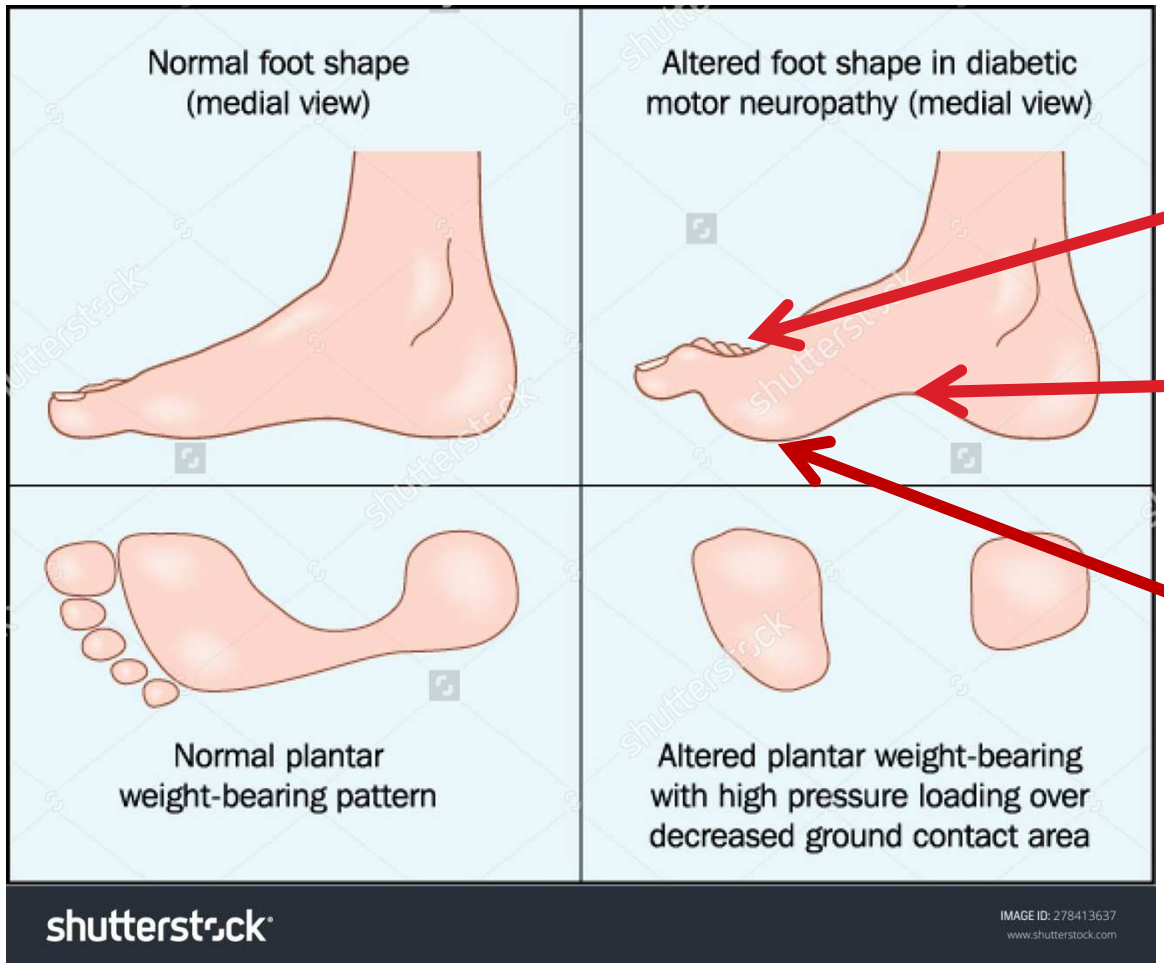


- ↑ risk of fall → due to damage of proprioception




Neuropathy
Motor Neuropathy
Sensory Neuropathy
Autonomic Neuropathy

Motor Neuropathy



Retracted toes

High arch

High pressure point

DM with motor neuropathy



Classical DM neuropathic ulcer

Excessive pressure → callosity with risk of ulceration



Unaware of pain + pressure → callosity untreated → ulceration

Sensory Neuropathy

- Patient may c/o of diminished sensation of the foot
- Some even unaware of ⇩ sensations!





Loss of protective sensations of the foot
→ unable to notice foot trauma

Autonomic Neuropathy

- Decreased sweating





Autonomic Neuropathy





Neuropathy + ischemia





Neuroischemic ulcer

long wound healing time

Risk of infection

Devastating diabetic foot situation

Neuropathy

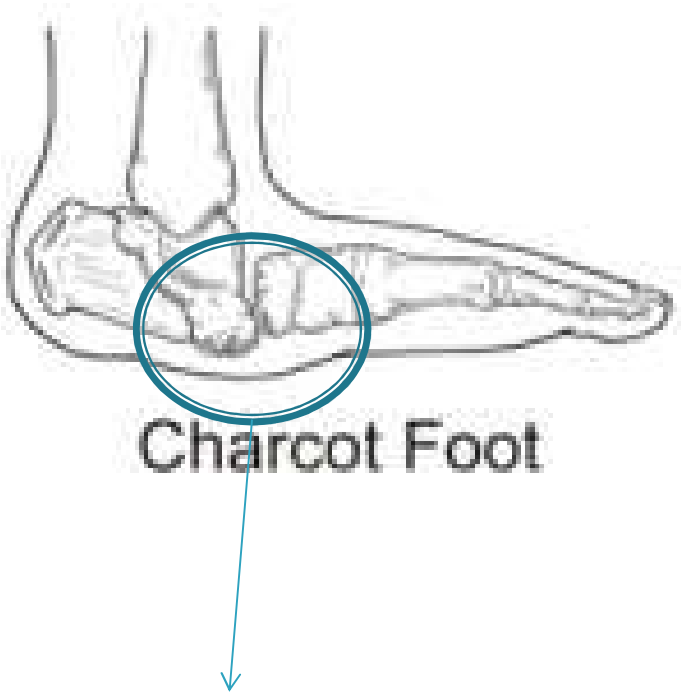


Ischemia

Infection

Charcot arthropathy





Neuropathic foot + mechanical trauma = destruction of the bone and joint

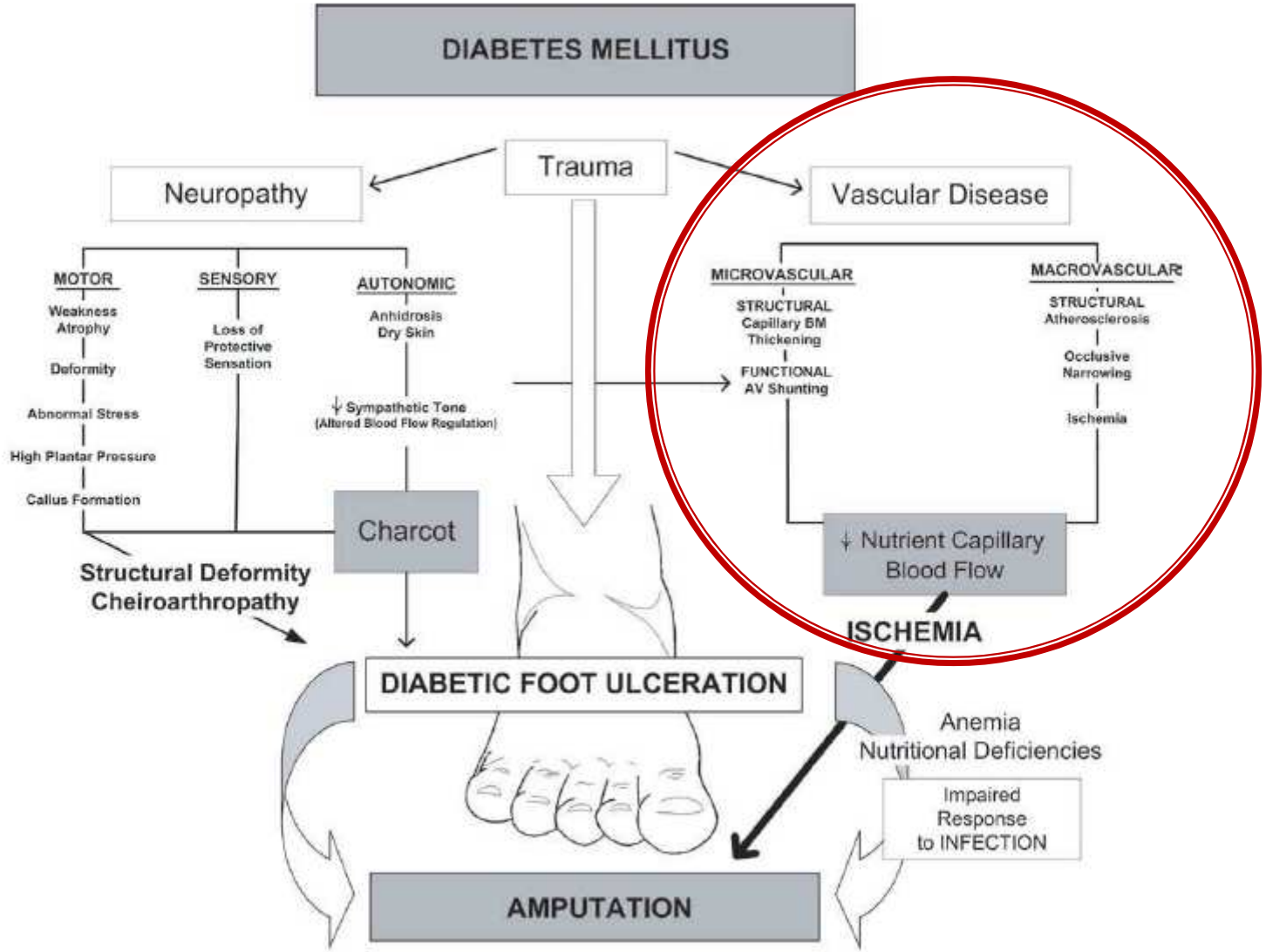


Fig1: Diabetic Foot Disorders: A clinical practice guideline 2006. The journal of foot & ankle surgery.

Peripheral vascular disease





Critical Limb Ischemia

Admitted for necrotic ulcer to right 3rd toe in April 2016

Developed multiple gangrene involving toes, forefoot, shin in May 2016



Risk factors for foot ulceration in DM patients

- History of foot ulcer / amputation
- Peripheral neuropathy
- Peripheral vascular disease
- Foot deformity
- Trauma (Poor footwear, walking bare-foot, objects inside shoes)

Foot Deformity



Bunion / HAV



Toes deformity



Hammer toes



Claw toes



Claw toes → apex ulcer

Underlying osteomyelitis

Resulted in amputation of right 2nd toe

Charcot foot





Midfoot collapse → abnormal foot pressure → risk of ulceration

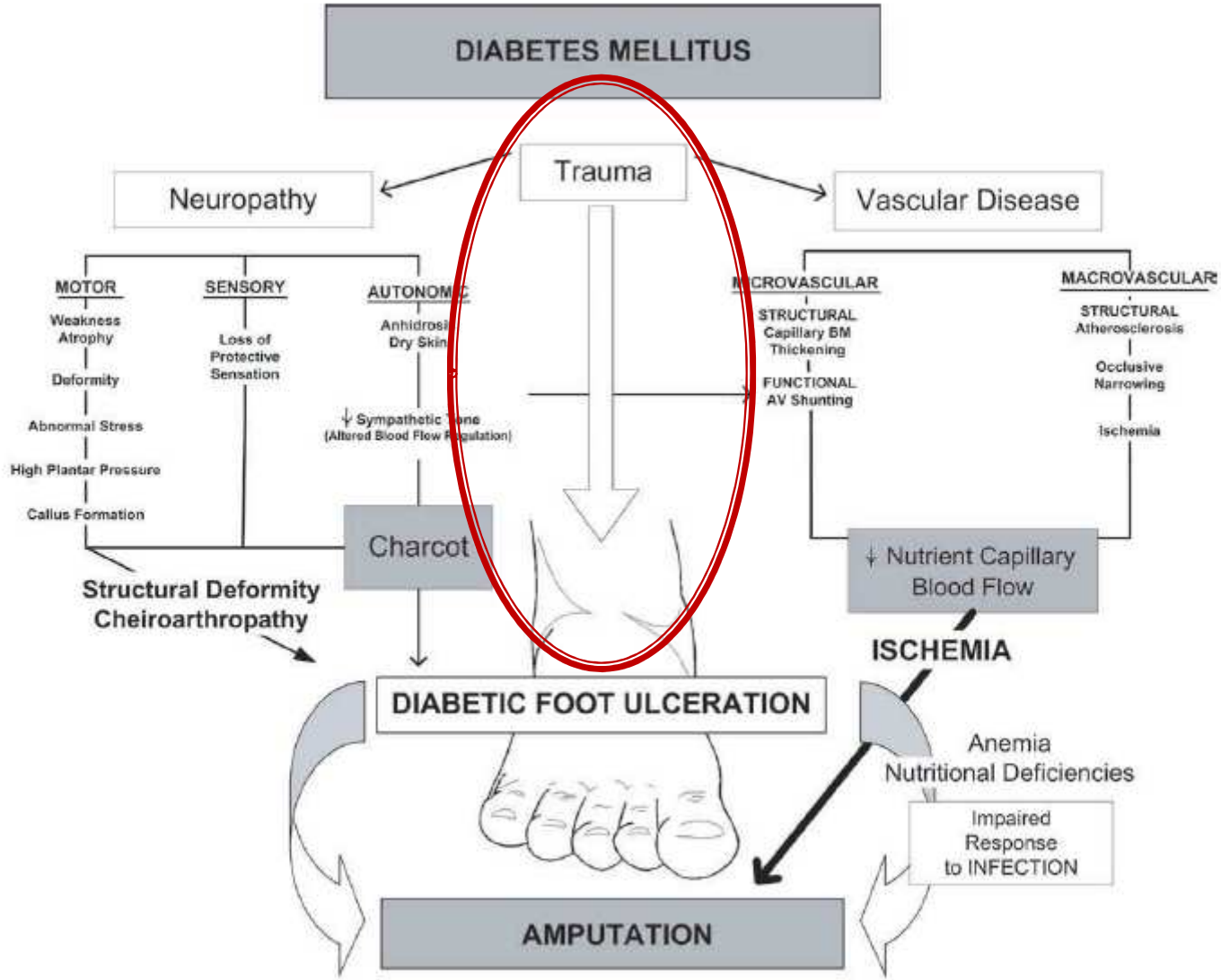


Fig1: Diabetic Foot Disorders: A clinical practice guideline 2006. The journal of foot & ankle surgery.

Trauma



Nail cutting



Thermal Injury

Trauma



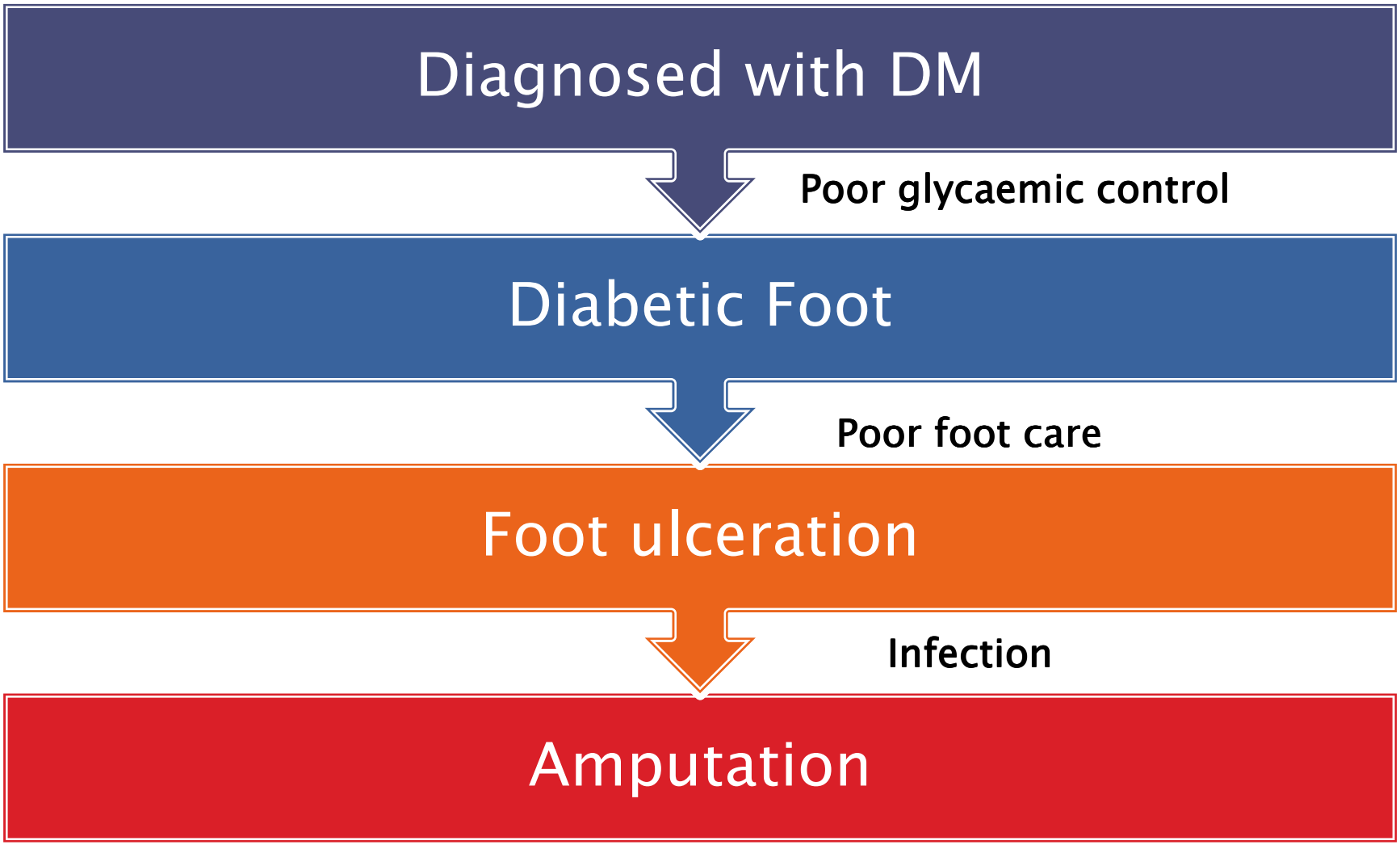
- Rubbing of shoes
- Deformed toes difficult to purchase shoes

Trauma







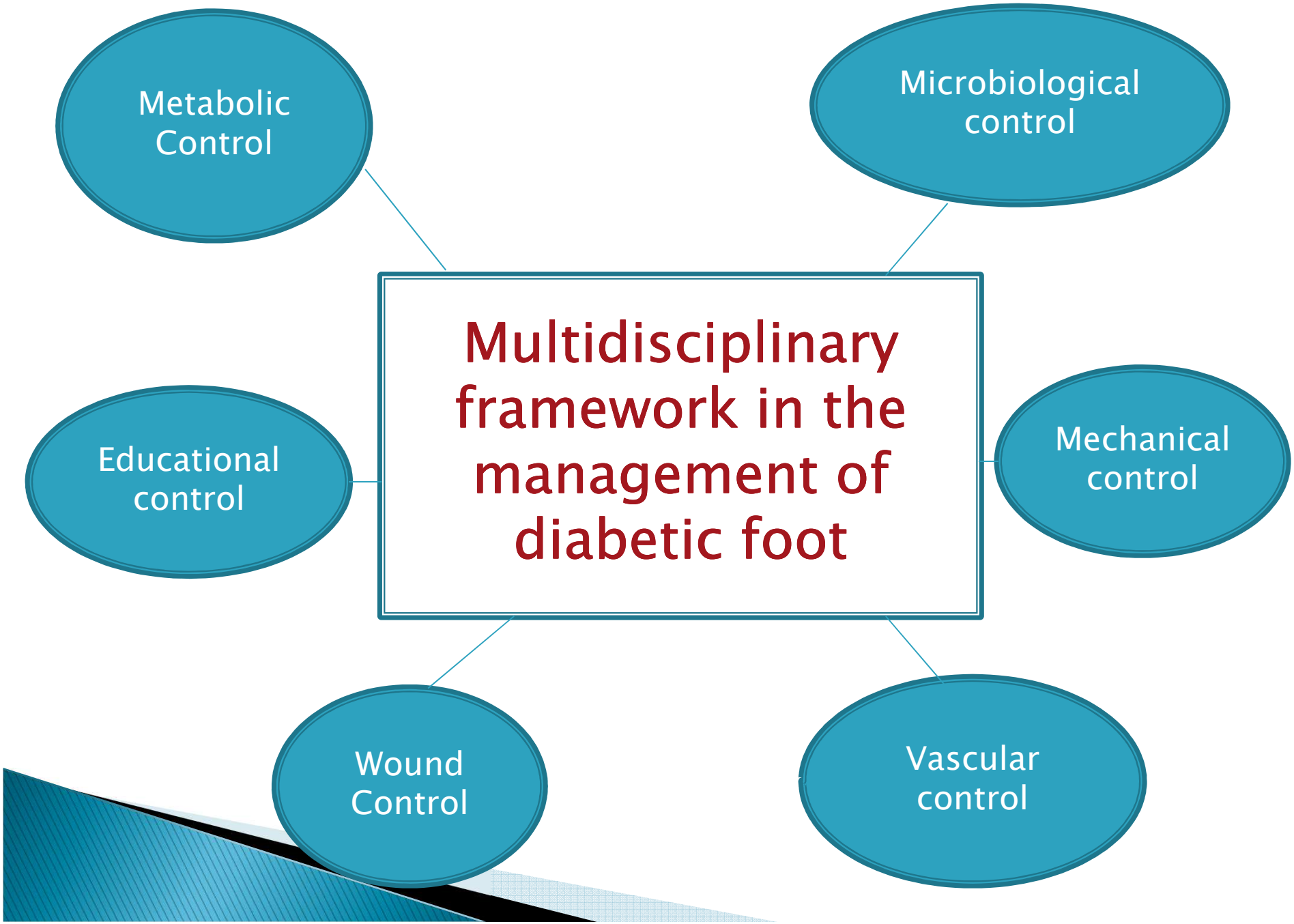

Diagnosed with DM
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Poor foot care
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Infection
Amputation

Multidisciplinary approach in Diabetic Foot Management

- Endocrinologist
- Diabetes Nurses
- Podiatrist
- Dietician
- Vascular surgeon
- Orthopaedics
- Microbiologists
- Optometrist

And so on…




Metabolic Control
Microbiological control
Multidisciplinary framework in the management of diabetic foot
Educational control
Mechanical control
Wound Control
Vascular control

Podiatry DM foot management

Assessment of:

- Vascular
- Neurological
- Musculoskeletal
- Skin / Nail
- Footwear
- Self care ability



Vascular assessment

- Pedal pulses
- Foot perfusion
- Foot colour
- Capillary refill
- ABI

And so on…



Assess status, predict wound healing potential, signs of critical / acute limb ischemia

Neurological assessment



10g monofilament test



Testing of vibration perception threshold (VPT) using a biothesiometer

Neurological assessment

- 10g monofilament
- Vibration perception threshold
- Pinprick
- Light touch sensation
- Proprioception
- Reflexes







Musculoskeletal assessment

Types of deformites

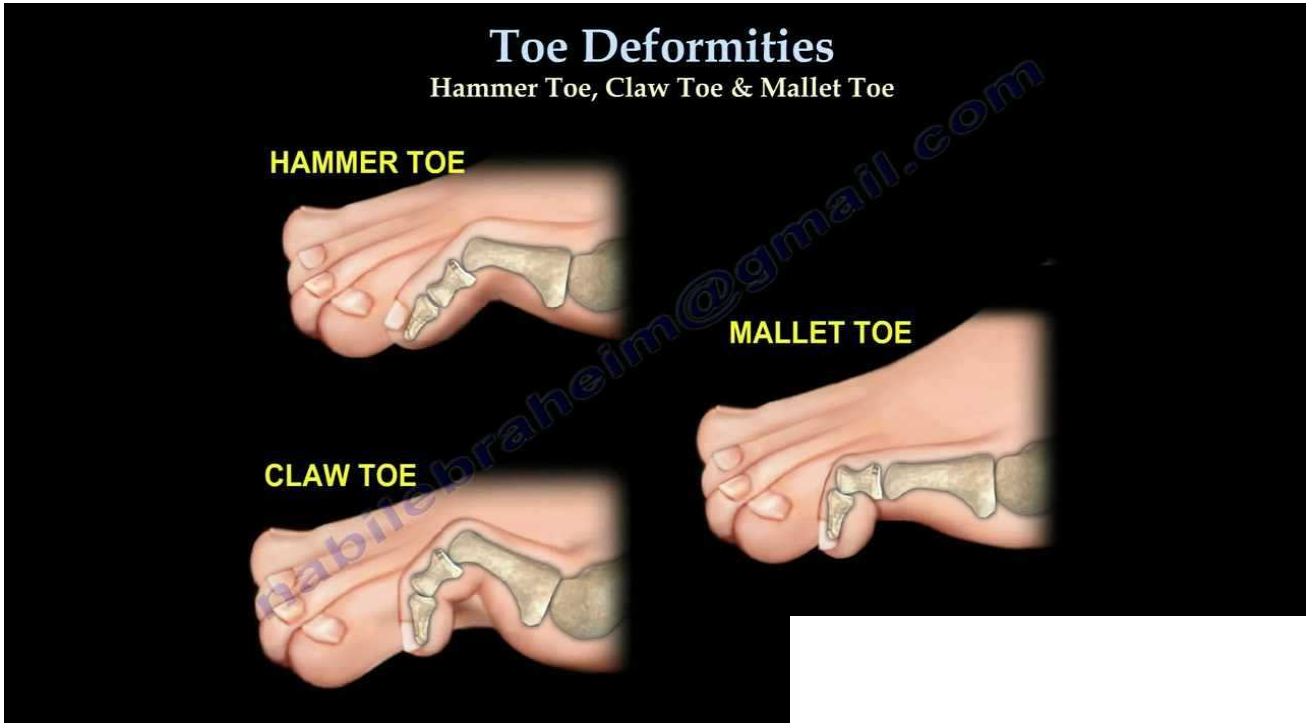
- Hallux Valgus
- Claw toes
- Mallet toes
- Hammer toes
- Pes Cavus
- Pes Planus
- Tailors bunion



Foot and Ankle jt ROM

Muscle Power




Toe Deformities
Hammer Toe, Claw Toe & Mallet Toe
HAMMER TOE
MALLET TOE
CLAW TOE


Tailor's bunion

Dermatological (Skin / Nail)

- Callosity
- Subcallous break down → DM foot ulcer
- Pathological nails e.g. onychomycosis
- Diabetic Dermopathy





Diabetic Dermopathy (Melin's shin spots)

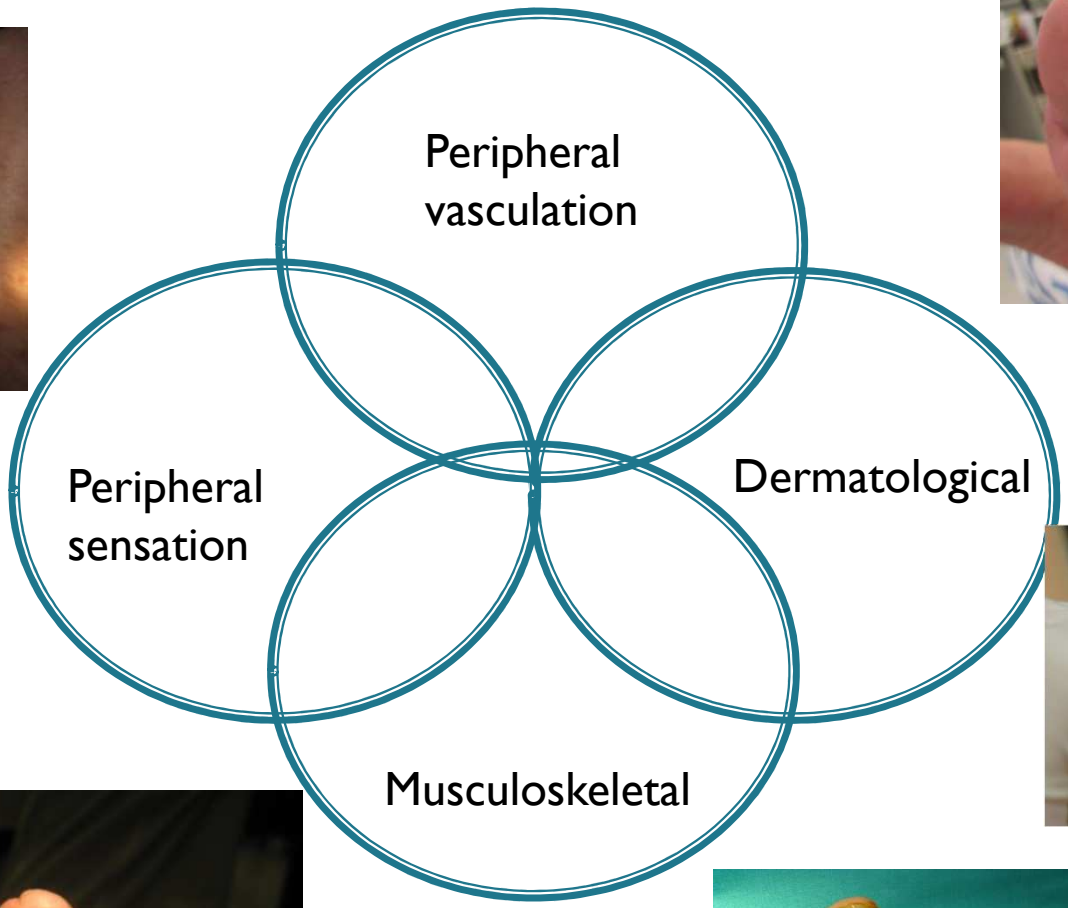
- Etiology **Unknown**, associated with post-traumatic atrophy and post inflammatory hyperpigmentation in poorly vascularized skin
- Prevalence Increase with the age and duration of diabetes
- Men > women
- Usually asymptomatic



- Circumscribed brown circular patches
- 10-12mm diameter
- Seen on the shin of diabetic patients






Peripheral vasculation
Peripheral sensation
Dermatological
Musculoskeletal





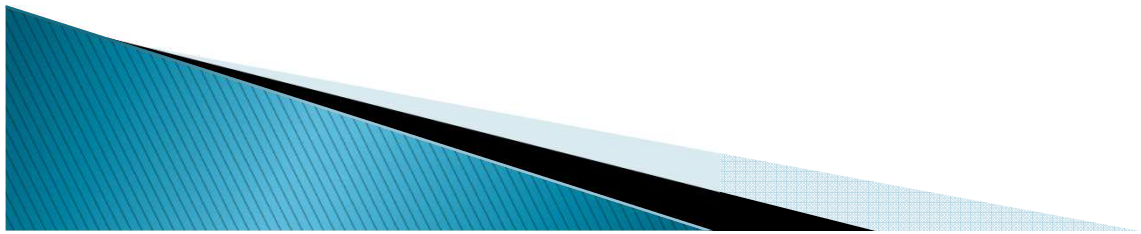


The Goal of foot assessment in diabetes

To Identify the risk level

→ Determine treatment approach

1. Low risk feet ?
2. At risk feet ?
3. High risk feet?



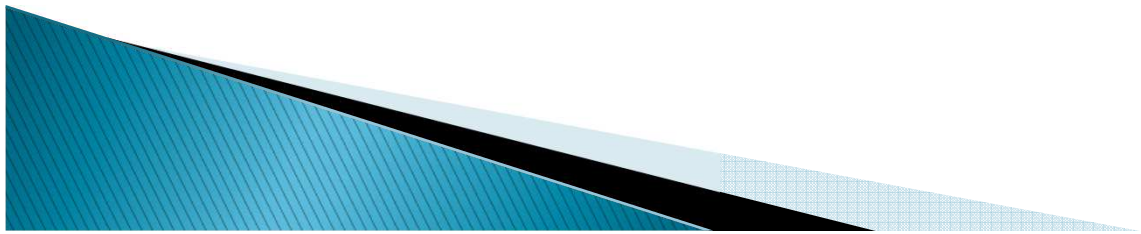
Diabetes with Low Risk Foot (ADA Risk Category 0)

- Foot sensations normal
- Foot circulation normal
- No deformity
- No lesions

Treatment aim:

Education, advocate self care

May conduct foot assessment in longer interval



At risk feet (Risk Category 1)

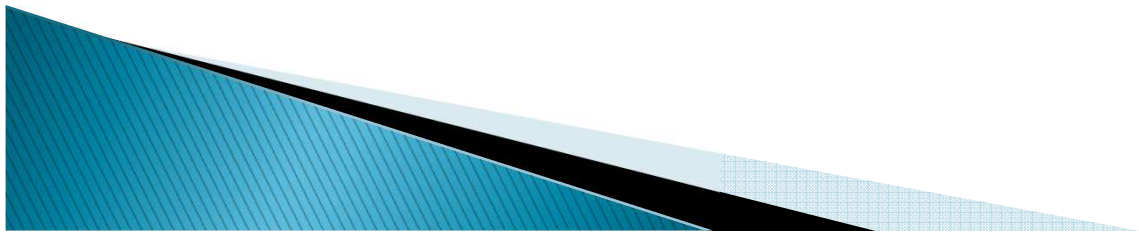
- Loss of Protective Sensations
- +/- Foot deformity

Treatment Plan:

At risk diabetic foot education

Refer for Pod assessment or treatment

Treatment Aim to prevent foot ulceration



High risk feet
(Risk Category 2)

Peripheral Arterial Disease (or PVD)

+/- Loss of Protective Sensations

This patient group can lead to devastating diabetic foot condition with only a small foot ulcer!!

e.g. Gangrene, amputation



Consider Vascular input

High risk Foot (Risk Category 3)

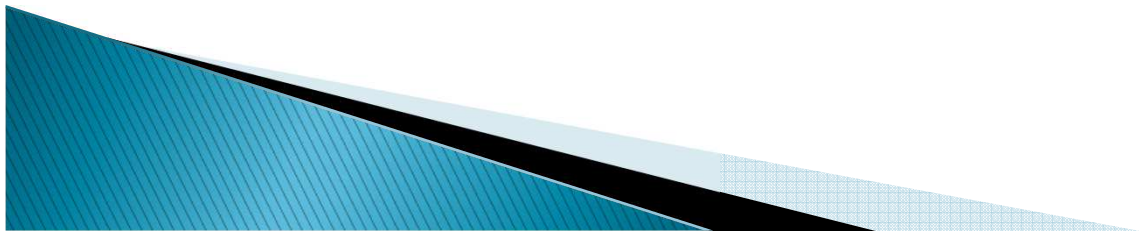
- Hx of ulcer or ampuation





Management approach for High risk DM foot * Risk Category 2 &3

1. Close podiatric review
2. Prevent and Minimize risk of foot infection
3. Effectively manage established wounds, infection or necrosis
4. Multidisciplinary care



Treatment of Diabetic ulcer

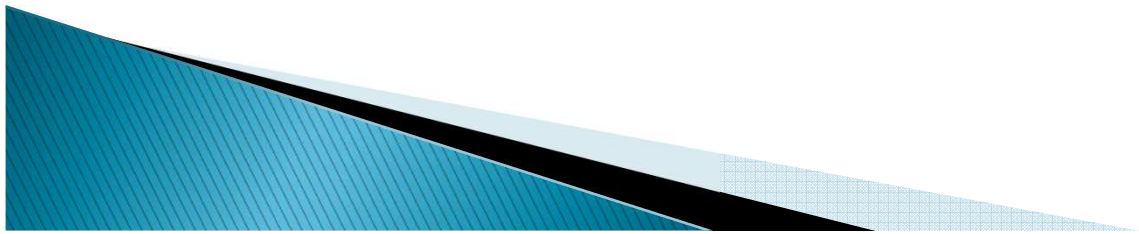
- Wound management
- Prevent further foot deformity / callous formation
- Off loading device? E.g. insole / orthotic
- Foot care education to patient and carer





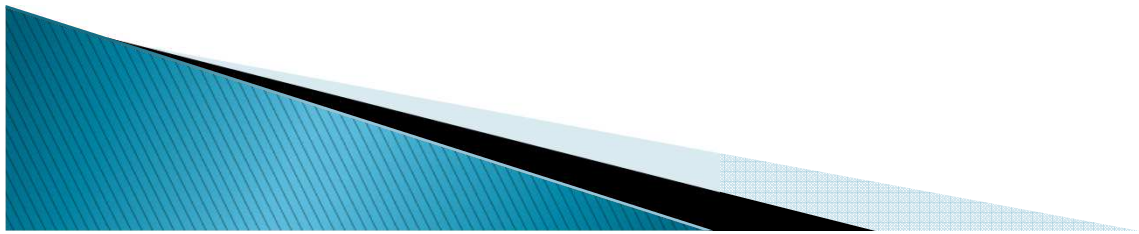
"Of all the approaches to saving the diabetic foot, the most important is patient education"

Dr Marvin Levin (1925-2016)
Washington University Diabetes Expert



Diabetic foot care education

1. Good glycaemic control
2. How to prevent foot complications
3. What to do when foot problem arise
4. To seek help in timely manners



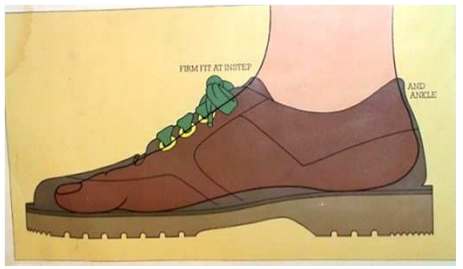
Diabetic foot care education

- Callosity care
- Nail care





Footwear advice



Light & Comfortable

Suitable shoe size & shape

Firm & adequate heel counter



Velcro straps or Lace-up

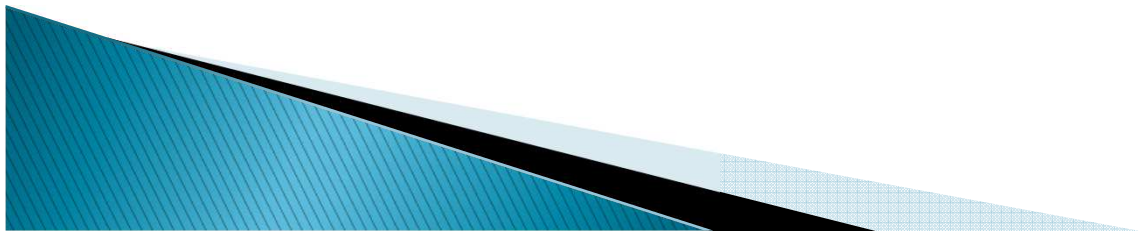
Soft cover materials: net / leather



Reflections

Prevention is better than Treatment

- Glycemic control !
- Patient and carer education
- Strong and closely coordinated multidisciplinary relationship
- Early referral



Together, How can we enhance the care of our diabetic patients ?

