A Pictorial Guide to Diabetic Foot Examinations Autor Mike Townson



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Foot Screening Competency

Screening for the risk of foot ulceration and related complications in people with diabetes can be undertaken by any 'competent' person. Below is a list of professional activities that anyone undertaking foot screening can use as a self-assessment for competency and should identify any gaps in knowledge or experience which will help inform a personalised development plan.

Knowledge

- A general knowledge of the nature of diabetes, including its signs and symptoms.
- Recognises the limits of own knowledge about diabetes
- Aware of national guidance for the diagnosis and management of diabetes
- A basic understanding of the psychological impact on the patient and/or carer of having a long-term condition

Skills

- Uses relevant patient record systems and decision support tools.
- Undertakes protocol-led clinical examinations within the scope of their practice.
- Communicates to patients the benefits of good glycaemic control, self care and monitoring to prevent diabetic complications.

Behaviours

- Refers to, and seeks guidance from, appropriately experienced colleagues when necessary.
- Constructively supports changes to improve unhealthy patient lifestyles.
- Utilises available professional networks for support, reflection and learning.
- Takes responsibility for their own continuing professional development.

Screening

- Clearly communicates what is involved in the screening process to the patient.
- Carries out diabetic foot screening in line with national guidance and/or local protocols.
- Assigns an ulcer risk score based on the results of the screening, using relevant decision making tools when available.
- Records the screening results on the relevant patient records system/s.
- Explains the results of the screening to the patient and/ or carer in an appropriate manner.
- Provides up-to-date verbal and written advice relevant to the risk status resulting from foot screening.
- Aware of, and appropriately uses, local referral pathways

Complications

- Understands how the complications of diabetes increase the risk of foot ulceration.
- Understands the necessity of urgent referral and treatment in the event of suspected infection, ulceration or critical limb ischaemia.
- Understands how the complications of diabetes mean that a wound on the foot must be seen by a suitably skilled colleague with access to a multi disciplinary team as a matter of urgency.
- Encourages the patient and/or carer to comply with instructions on the use of pressure-relieving devices for the treatment of active ulceration.
- Carries out dressing changes as instructed and within the scope of their practice.
- Encourages the patient and/or carer to comply with recommended dressing regimens.
- Follows instruction from colleagues to ensure Charcot Neuropathy care plans are carried out, within the scope of their practice.

Who is this guide for?

This guide will support practitioners undertaking a foot examination for someone with either Type 1 or Type 2 Diabetes. The national best practice guidance (NICE NG19) states that anyone performing a foot check or examination for the purpose of identifying risk of ulceration should be competent to do so. This guide will be an aide memoir for any health professional who has received competency training.

Why is this guide important?

There are over 135 amputations each week in England (more than 300 amputations a year in Wales) and it is estimated that 80% are likely to be preventable. A foot ulcer precedes most amputations and is associated with significant increases in cardio vascular mortality, depression and substantial reductions in quality of life measures.

All Primary Care practices are required to undertake the 9 Care Processes for Diabetes; the foot examination is one of these. The QOF indicator DM012 requires a report of "The percentage of patients with diabetes, on the practice register, with a record of a foot examination and risk classification: 1) low risk 2) increased/moderate risk 3) high risk or 4) ulcerated foot within the preceding 12 months"

Identifying the risk of foot ulceration early and informing the patient with appropriate advice are essential prevention actions. Making a timely referral into the foot pathway for those at risk will save limbs and lives of those vulnerable to complications and is a professional regulation responsibility.

What does the national guidance say?

NICE guideline NG19 sets out a list of the checks required to be carried out during a foot examination for someone with diabetes. A good foot examination enables accurate risk identification and gives details of the actions that should follow depending on the findings identified. There will be a local foot pathway for referral into the Podiatry led Foot Protection Service (FPS) or the hospital based Multi Disciplinary Foot Services (MDFS). If there is any difficulty finding out this information the local NHS Podiatry Service will be able to help with contacts and pathway details. A conversation is worthwhile to understand the podiatry service contract, which may have some access limitations for foot care.

What risk factors need identification?

If the examination identifies the presence of one of the clinical signs below a moderate risk status should be recorded and appropriate advice given to the patients. If more than one of the clinical signs is identified then high-risk status is recorded. Naturally if a foot ulcer is present then this is classified as an active ulcer.

Risk Factors

- Changes to sensation testing for loss of protective pain sensation associated with neuropathy
- 2. Absence of foot pulses testing for peripheral arterial disease associated with limb ischaemia and cardio vascular risk.
- **3. Deformity** change in foot shape can predict areas of trauma or changes in foot function.
- 4. Callus most ulcers develop under hard skin and indicate an area of trauma, dry skin is often associated with peripheral neuropathy. Callus is only a reportable risk factor in the presence of one or more of these other factors.
- Ulceration must be under the management of a specialist foot care team, but check for history of ulceration.
- 6. Infection or Inflammation the presence of either always requires immediate action.
- 7. Gangrene visible evidence of critical limb ischaemia and must be under acute care management. Indicator of significant cardio vascular disease.
- Charcot arthropathy A complex foot condition often leading to the complete collapse of the foot structure and requires early management by hospital MDFS.
- Renal Replacement Therapy (RRT) Any patient with diabetes undergoing RRT is at high risk of developing foot complications and must be referred to the MDFS.

Carrying out a foot examination

A structured approach to each foot examination will produce a more consistently accurate risk classification and save time.

1. Be prepared.

- a. Ensure you have access to a room which is comfortable for you both so that you can see, feel and examine all areas of their exposed bare feet.
- b. You will need a 10gram monofilament.
- c. Have a range of foot health information available so that you can provide appropriate advice.
- **d**. Ensure that you are familiar with the local foot pathway contact and referral details in case they are needed.
- e. Familiarise yourself with the patients previous foot risk level, previous structured education and advice and their current HbA1c
- f. Is the patient known to be regular smoker?
- **g.** Are there any known language, cultural, physical or mental health issues that may influence communication during the foot examination?

2. Observe

- a. Mobilty
- b. Size and weight
- c. Footwear style
- d. Swelling or oedema within legs and feet
- e. How easily the patient can remove shoes, hosiery and any dressings that may be present.

3. The examination or foot check

- **a.** Explain to the patient what you are going to do and what will happen at the end of the examination
- **b.** With a good view of both legs below the knee make a visual inspection of the front and back of each limb, paying particular attention to the hard to see areas such as heels and between the toes.
- c. The purpose of the foot check is to screen for risk of ulceration so record the presence or absence of any of the visible risk factors such as callus, skin and nail conditions, athletes foot, fungal nails or psoriasis, deformity, pressure points, ulceration, infection or gangrene.
- d. Check both foot pulses on each foot by hand.
- e. Test for changes to sensation using the monofilament.

4. Risk classification

- **a.** On conclusion of the examination the key risk factors will have been identified. Use a checklist so these can be recorded as being absent or present.
- b. Refer to local guidance for referral on to specialist services
- c. Where nail and skin conditions are present but sensation and circulation are adequate the patient should be recorded as low current risk and may need help with footcare.

Please see the attached link for a video demonstration

https://www.youtube.com/watch?v=qM_QdfbX62c

www.diabetesframe.org





Effective Foot Checks

- Promote early detection of foot complications
- Identify a personal foot ulcer risk classification
- Match clinical risk with appropriate actions, advice and referral
- Influence the outcome for the patient based on your competence and communication

Initial Visual Inspection

First, remove all footwear and inspect the feet

- Skin
- Nails
- Deformity
- Callus/corns
- Ulcerations
- Footwear
- Consider: psycho-social, cultural, lifestyle and health factors







Skin and Nails











Maintaining skin integrity is an essential part of good foot care for all people with diabetes. Check carefully for any changes to the skin and nails and manage accordingly. Where toes are bunched or stiff take particular care when looking between them as the skin can tear easily.

These photos show common skin conditions and we offer advice on what to do when you see them.

If any dermatological conditions are found in association with neuropathy or poor circulation referral into the foot pathway should be made, otherwise the Practice would give advice or prescribe appropriate care.

What to look for

Blisters

A blister is a sign of trauma and understanding why this happened is important - is it functional, work related, or footwear related? Identification of the cause is essential and the Podiatry or Foot Protection Service (FPS) would need to assess in more detail.

Nail Health

Thickened, in grown, or neglected toe nails are all potential causes of skin damage. Poor nail health in a person with diabetes who is at risk of ulceration may indicate poor diabetes care. Again the FPS would assess and advise.

Athletes Foot

This is a fungal condition commonly found between the toes or on skin and nails. The irritation and skin changes can lead to breaks in the skin or can infect an existing wound.

Eczema and Psoriasis

Any patient presenting with Eczema or Psoriasis should be prescribed an appropriate treatment.





Eczema and Psoriasis

Skin and Nails



Corris





What to look for

Corns/Verrucae

Traditional treatment for corns include Corn Plasters which are generally salicylic acid based, these are contra indicated for anyone with a risk classification. Make patients aware of this and ensure they cease using such products.

Verrucae are much more common in children and young adults and much less likely to be found in older adults.

Dry Skin – The skin of people with diabetes appears to age more rapidly with the associated dryness, itching and flaking. This is likely to be caused by slowed function of the sweat and sebaceous glands and a reduction in the skins ability to retain moisture. Causes area associated with changes in the micro and macro blood circulation and auto-immune changes associated with peripheral sensory neuropathy.

What to do

Always look for a cause of corn or hard skin and examine more closely in case there is any inflammation or bleeding below the skin. Is this 'extra' skin caused by a change in foot shape, tight shoes or occupation? Callus and corn are always indications of skin trauma and if allowed to continue is likely to lead to an ulcer or infection.

Dry foot skin is one of the most common complications associated with diabetes and needs long term management with an effective emollient.

Callus

Callus is included as a specific risk factor for ulceration

Many studies have shown the presence of callus to increase the likelihood of ulceration, the authoritative Leese study suggests by as much as 14 times[1].

Dermatonics Once Heel Balm with 25% urea and dimethicone, requires just a single daily application saving your practice money and improving compliance

Comparative costs of skin care prescription options

A standard emollient

Dermatonics Once Heel Balm

A twice a day urea cream



What to look for

To identify callus and treat it appropriately please follow the Young Townson Footskin Hydration Scale for Diabetic Neuropathy (see pages 9 and 10). Callus my occur anywhere on the foot and the grading should be based on the worst piece of skin on the foot.

What to do

By applying cream to their feet daily patients can monitor their feet and report any changes quickly

Neurpoathic patients feet have impaired sweat glands and should continue to use this cream to prevent recurrence

References

[1] Leese GP et al (2006) Stratification of foot ulcer risk in patients with diabetes: a population-based study. Int J Clin Pract. 2006 May;60(5):541-5.[1] a NHS prescribing guidelines suggest between 25 and 50ml per week of a standard non keratolytic emollient is prescribed per week for the hands, grossing this up for the feet which on average are almost 40% larger this would suggest 35ml to 70ml of cream per week, or on average 2.6ltrs per annum costing around £30.00 per annum. Dermatonics Once Heel Balm only requires a single daily application, has keratolytic properties, and is proven to remove callus, the average patient requires just 600ml (source NHS Highland) costing £25.50 per annum

The Diabetic Foot Journal

The Young Townson FootSkin Hydration Scale for Diabetic Neuropathy



Level 1

Well hydrated heels, with little or no signs of drying.

Note that whilst our photographs are of the heels only, the whole foot and the toes should be checked and that the level applied must be in accordance with grading applicable to the worst skin on the foot

Management

Suggest the patient applies a standard emollient for prevention, to be applied in accordance with manufacturers instructions. Inform the patient that neuropathy poses a risk to the sweat glands in the feet and to monitor any changes in skin condition and report back if these happen



Level 2

Drying skin but no callus. The foot may have some fissuring but no apparent callus

Note that whilst our photographs are of the heels only the whole foot and the toes should be checked and that the level applied must be in accordance with grading applicable to the worst skin on the foot

Management

Advise/prescribe a standard emollient for prevention, if an effective Once-A-Day emollient for footskin is available that would be our recommendation. If the patient has moved from Level 1 to Level 2 make them aware that their footskin condition has deteriorated and that their risk of ulceration may have increased. Instruct the patient that neuropathy poses a risk to the sweat glands in the feet and to monitor any changes in skin condition and report back if these happen.



Level 3

Drying skin combined with Callus. The foot may have some fissuring but no apparent open splits

Note the whole foot and the toes should be checked and that the level applied must be in accordance with level applicable to the worst skin on the foot

Management

SIGN 116 (For Scotland) requires a patient plan which will include an appropriate emollient and NICE NG19 requires prescribing of skin care. We suggest a 25% urea cream with proven Once-A-Day usage profile for all patients, and with excellent efficacy. Currently we strongly recommend Dermatonics Once Heel Balm. Make patient aware that their footskin condition has deteriorated and that their risk of ulceration may have significantly increased. Discuss treatment plan with Community Podiatry Service.



Level 4

Callused skin with open splits. The splits may be wider than those shown

Note the whole foot should be checked and the grading applied must be in accordance with the level applicable to the worst skin on the foot

"By prescribing Dermatonics Once Heel Balm for callused skin [for the high risk diabetic foot] healthcare professionals will comply with what the authors believe is best practice for emollient use"

(Young M, Townson M & Hicks G (2014) Diabetes Foot Journal) **Authors** Matthew Young is Consultant Diabetologist, Diabetes Foot Clinic, Royal Infirmary, Edinburgh. Mike Townson is Dean Faculty of Management and Member of Council, Society of Chiropodists and Podiatrists (UK). Gareth Hicks is Sales Consultant, Dermatonics. **Acknowledgement** This article was supported by Dermatonics.

Management

NICE Guideline NG19 and SIGN 116 (Scotland) require referral to your Community Podiatry Foot Protection Service. Prescribe a 25% urea cream with proven once a day efficacy. Currently we strongly recommend Dermatonics Once Heel Balm. Make patients aware that their footskin condition has deteriorated and that their risk of ulceration has **significantly** increased.



The Diabetic Foot Journal

FootSkin Hydration Scale for Diabetic Neuropathy

Level 1

Hydrated skin

Recommended Footskin Action

Recommend a standard emollient, preferably with a **ONCE-A-DAY** regime, for prevention



Level 3 High Risk

Callused skin - Drying skin combined with Callus. The foot may have some fissuring but no apparent open splits

Recommended Footskin Action

NG19 requires all diabetes patients with callus to be prescribed skin care. **Prescribe Dermatonics Once Heel Balm** due to proven efficacy and **ONCE-A-DAY** regime. In the case of neuropathic patients discuss treatment plan with Community Podiatry Foot Protection Service



Level 2

Drying skin but no callus - The foot may have some fissuring but no apparent callus

Recommended Footskin Action

Prescribe a standard emollient preferably with a **ONCE-A-DAY** regime to prevent deterioration



Level 4 High Risk

Callused and cracked skin - These splits are open to the epidermis rather than being indentations/ fissures in the skin

Recommended Footskin Action

NG19 requires all diabetes patients with callus to be prescribed skin care. **Prescribe Dermatonics Once Heel Balm** due to proven efficacy and **ONCE-A-DAY** regime. Discuss treatment plan with Community Podiatry Foot Protection Service





For further detail and emollient suggestions please see overleaf www.dermatonics.co.uk

Ulceration

Ulceration

Ulceration

Ulceration





Ulceration under Callus

What to look for

Ulcers develop within subcutaneous tissues so are not visible until they 'break through' into an open wound. However a pre ulcerative state should be considered where a foot has hard skin over a pressure area or where there is presence of subcutaneous haemorrhage. Any exudate from a foot where skin tissue appears soft or 'spongy' should be considered clear indications of ulceration.

Very often it is only following debridement that the real extent of the foot ulcer is observed. Trauma is often the trigger and so a good history and inspection must be undertaken as a patient with neuropathy may not be aware of an incident or injury. It is not uncommon for ulcers to develop under thickened toe nails, around the heel or between toes so check thoroughly as the patient may not feel any discomfort.

Ulcers may be associated with neuropathy, ischaemia or a combination. Testing foot skin temperature with the back of your hand may help identify a warm neuropathic foot and a cold ischaemic one.

What to do

This is a clinical emergency. NG19 guidelines dictate immediate referral to either the MDFS(Multi-Disciplinary Foot Service) or the Foot Protection Service for medical and wound assessment.

Best practice for wound classification is either **SINBAD** for a more complete description in your referral:

SINBAD

Site Ischaemia Neuropathy Bacterial infection Area Depth

Gangrene



What to look for

A good foot inspection will identify any changes in colour and temperature. Gangrene is evidence of critical limb ischaemia and tissue death and is most likely to affect toes or heel if bed bound. Characterised by loss of colour, eventually turning dry and dark, going through red to black color in dry gangrene, or being swollen and foulsmelling in wet gangrene where it is associated with infection.

The foot will have a shiny appearance, shedding of skin tissue with a distinct line forming between affected and healthy skin. The affected area of the foot will be cold due to lack of blood flow.

Initial pain is later followed by loss of sensation and an inability to move the part.

What to do

Gangrene is a limb and life threatening condition and requires immediate referral for acute vascular assessment and inform the multidisciplinary foot care service (according to local protocols and pathways) so they can be assessed and an individualised treatment plan put in place.

Deformity





Deformity is defined as a change in foot shape that results in difficulty in fitting standard shoes and is subjectively assessed by the practitioner. Clearly this is a flexible definition and a good visible inspection will identify any changes in alignment between the foot and ankle joints. In the forefoot the presence of common conditions such bunions, hammer or clawed (retracted) toes are all deformities, which will create trauma to foot skin tissue, which must be avoided particularly in association with loss of protective sensation and poor foot pulses.

What to look for

Check the suitability of the patient's footwear, especially if they are showing signs of shoe pressure. Check inside the shoe. Is the lining worn or cracked? Are there any rough seams? Are there any foreign objects that have gone unnoticed? Is the style and the shape of the shoe suitable for daily wear?

What to do

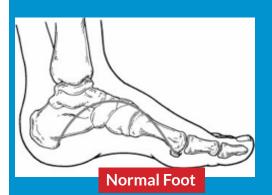
Patients should be advised to wear a shoe that fastens to increase stability and prevent friction. Their shoes should also be wide and deep enough to accommodate any deformities of the patient's feet. Heel height should be kept to a minimum.

Always advise on suitable footwear and use information from Diabetes UK.

Bespoke footwear is an important part of ulcer prevention and may be prescribed once the patient has been referred into the foot pathway

Charcot Foot







Charcot foot (arthropathy) is a condition causing weakening of the bones in the foot that can occur in people who have significant nerve damage (neuropathy). The bones are weakened enough to fracture, and with continued walking the foot eventually changes shape. As the disorder progresses, the joints collapse and the foot takes on an abnormal shape, such as a rocker-bottom appearance.

If the patient has reduced sensation, they may be unaware of the trauma and not reduce their activity levels, leading to further destruction and damage to the foot.

What to look for

Suspect acute Charcot arthropathy if there is redness, warmth, swelling or deformity (in particular, when the skin is intact), especially in the presence of peripheral neuropathy or renal failure. Think about acute Charcot arthropathy even when deformity is not present or pain is not reported.

What to do

To confirm the diagnosis of acute Charcot arthropathy, refer the person within 1 working day to the multidisciplinary foot care service for triage within 1 further working day. Advise non-weight-bearing until definitive diagnosis and treatment can be started.

This complication is not common but failure to recognise and/ or refer can have devastating implications on mobility and well being.

Neuropathy



Monofilament Test



What to look for

Lack of sensation in the feet.

How to check

Begin by asking if there is any history of restless legs, tightness, tingling or irritation in legs and feet.

Prior to assessing the foot sensation, demonstrate to the patient that the monofilament is not sharp by applying it to your own forearm. In addition, allow the patient to feel the pressure on their arm or hand so they understand what they should be feeling



Guidelines from the International Working Group for the Diabetic Foot (2015) recommend sensory assessment at three key sites on each foot.

Optional extra sites that can be tested if the minimum sites are inappropriate or impossible to test (for example, the big toe may be amputated). It is never a mistake to test additional sites.

The absence of protective sensation at even a single site indicates the presence of peripheral neuropathy; that's why it's an important part of the test.

For further information and a demonstration of how to use a monofilament visit https://www.youtube.com/watch?v=qM_QdfbX62c



What to do

Loss of protective pain sensation is an indicator of neuropathy and places a person with diabetes at significant risk of active foot disease. The reduction or loss of pain can reduce the stimulation to check feet daily so reinforcing and supporting education is critical at this stage. As well as changes is sensation neuropathy will lead to changes in foot shape leading to pressure areas and skin dryness resulting in cracks in the skin. These changes add up to a foot at HIGH risk of ulceration so refer to a specialist team immediately.

Pulses





Dorsalis Pedis

The foot contains two pulses in arteries bringing blood into the area.

Tibialis Posterior: To palpate pulse, place fingers behind and slightly below the medial malleolus of the ankle. In an obese or oedematous ankle, the pulse may be more difficult to feel.

Dorsalis Pedis: To palpate pulse, place index and middle fingers just lateral to the extensor tendon of the great toe, usually between the 1st and 2nd metatarsal. If you cannot feel a pulse, move fingers more laterally.

To enhance technique: Assume a comfortable position for you and the patient. Place hand in position and linger on the site. Varying pressure may assist in picking up a weak pulsation. Always keep your thumb away from the process, as it is likely to transmit your own pulse pressure and cause confusion.

What to do

Regularly practice feeling foot pulses so they become familiar, its always a good health check and may help identify people with circulatory conditions or undiagnosed diabetes. There is no need to use a Doppler for this 'screening' process. If you cannot feel a pulse the patient is likely to need further assessment and this could help early detection of Peripheral Arterial Disease, which is a key cardio vascular risk indicator. Always take absent pulses seriously and refer particularly if associated with other symptoms such as intermittent claudication, rest pain, neuropathy and hard skin. Poor circulation in association with a foot wound is a Foot Attack clinical emergency and needs immediate vascular assessment. Absence of even one of the foot pulses should result in referral to local FPS.

Infection or Inflammation



What to look for

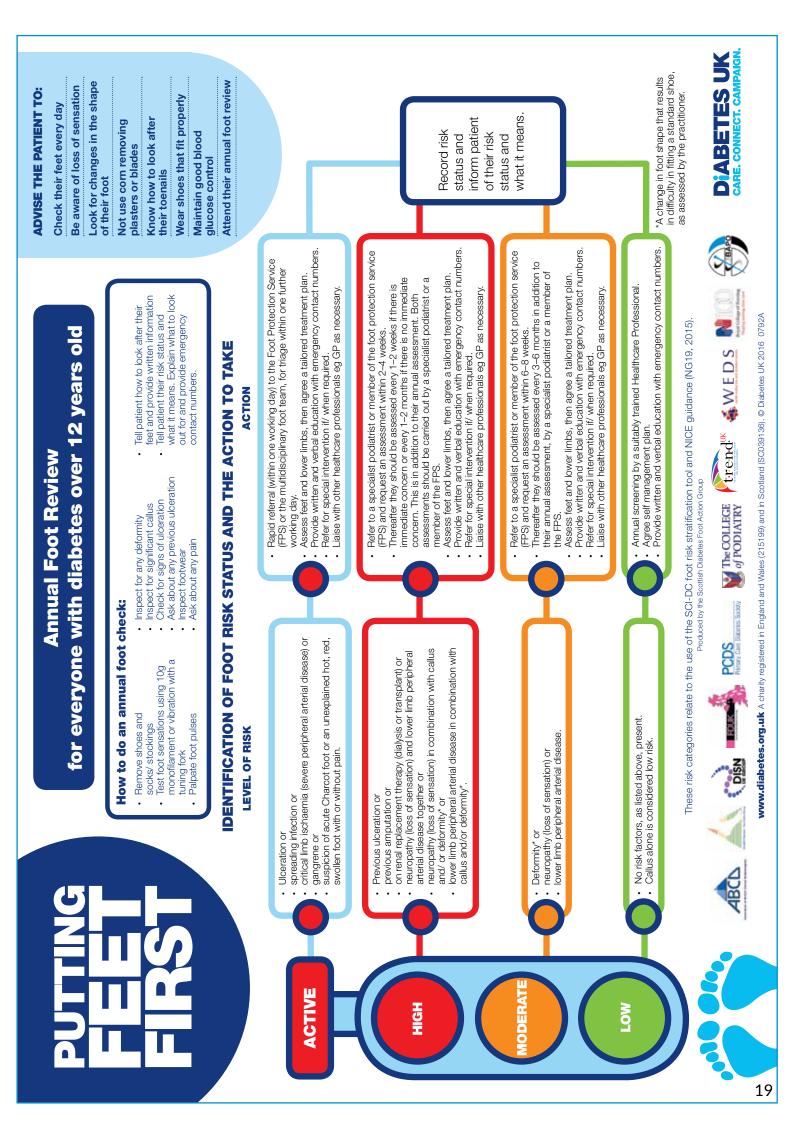
Early identification, action and referral for all foot infection with diabetes is essential to protect limb and life. Bacterial infection can rapidly devastate soft tissues and deeper infections may affect bone leading to osteomyelitis. Sepsis and cellulitis are associated complications that may lead from a small foot wound.

Inflammation is an early sign of infection and should always be taken seriously. The nature of ageing, peripheral neuropathy and limb ischaemia is to suppress the inflammatory response and so an infected foot may not present with the classic signs of redness, swelling and heat. So be suspicious and check for puncture wounds, compare foot temperature and take a good history. Any exudate of typical bacterial odour must prompt very close inspection.

Other infections such as fungal, typically on nails or between toes can delay wound healing and need to be managed as part of preventative care.

What to do

Whenever there is a concern of deep-seated soft tissue or bone infection (with or without ulceration) refer immediately to acute services and inform the multidisciplinary foot care service (according to local protocols and pathways. Be aware of your local anti biotic guidelines for diabetic foot infection.



References & Acknowledgements

References

NICE National Guideline 19 published August 2015 https://www.nice.org.uk/guidance/ng19

International Working Group Guidelines on the Diabetic Foot. July 2015 http://iwgdf.org/guidelines/

Diabetes UK Putting Feet First https://www.diabetes.org.uk/putting-feet-first

The Foot Risk Awareness and Management Education (FRAME) module was developed by NHD Scotland and is available to benefits all people with diabetes in the UK. http://www.diabetesframe.org

TRIEPodD-UK

at www.diabetesonthenet.com/media/fduk/TRIEPodUK-UL_compframe.pdf, TRIEPodD-UK June 2012 www.diabetesonthenet.com/media/fduk/TRIEPodUK-UL_compframe.pdf

Podiatry Competency Framework for Integrated Diabetic Foot Care - A Users Guide

Mike Townson



Mike has lead and developed podiatry and other clinical services over many years as a former NHS podiatry and general manager. Mike was Dean of Faculty of Management for the Society of Chiropodists and Podiatrists from 2008 -2013 and an elected Member of Council until 2015. Mike has represented/represents the profession on a range of local, regional and national groups including the Wessex Diabetes Strategic Clinical Network, Health Education England AHP Advisory Group, All Party Parliamentary Limb Loss Group, the Parliamentary Diabetes Think Tank and the Diabetes UK Putting Feet First Steering Group. Mike is also a Fitness to Practice and Membership Registrations Partner at the HCPC.

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