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<thead>
<tr>
<th>Title</th>
<th>Diabetic foot protocol</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Distribution</td>
<td>Clinical staff relating to diabetic foot</td>
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<td>Prepared by</td>
<td>Adam Smith</td>
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<td>Adam Smith</td>
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<td>Equality &amp; Diversity Impact Assessed</td>
<td></td>
</tr>
</tbody>
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DIABETIC FOOT PROTOCOL

The diabetic foot protocol has been developed to inform members of the multidisciplinary team regarding treatment options, protocols, referral pathways and management of the diabetic foot.

Diabetic foot risk assessment is co-ordinated through the SCI DC programme, enabling identification of those most at risk of foot ulceration or amputation. The protocol enables the Podiatrist to be able to assess the patient, and allocate appropriate treatment according to risk stratification.

The diabetic foot protocol and SCI DC programme will be interlinked with the community matrix system, allocating diabetic foot requirements according to risk level.

The protocol is linked throughout to KSF competencies.
Assessment to ascertain risk of ‘FOOT ULCERATION/ AMPUTATION’

Evidence statement

All patients with diabetes should be screened for foot disease (SIGN 55 2002), and as part of an annual review, trained personnel should examine patient’s feet to detect risk factors for ulceration. (NICE 2004)

A full assessment of the patient should be undertaken to determine any risk factors for amputation/ulceration and Charcot arthropathy. (KSF C1, C2, HWB4 and HWB6)

Patient assessment:

- Medical history e.g. renal disease, rheumatoid arthritis
- Surgical e.g. vascular intervention or amputation
- Medication- a complete list of all known medication
- Diabetes control- access to latest HbA1c
- Social factors: housebound, on their own and isolated, intake of alcohol, smoker
- Peripheral vascular disease- are the foot pulses palpable, intermittent claudication, rest pain or night pain, oedema, venous disease. Visual checks include limb colour, skin texture, temperature gradient, presence of ulceration
- Peripheral neuropathy status using 10g monofilament
- Foot pathology- retracted toes, prominent metatarsal heads, HAV etc
- Footwear- suitable? E.g. deep toe box, secure fastening, sufficiently wide forefoot
- Eye sight

VASCULAR assessment

Evidence statement

Methods of screening for vascular disease as less well defined. Absent pedal pulses is a guide to the presence of peripheral vascular disease and can be used for first line screening (SIGN 55 2002) Evidence level 2
Pedal pulses should be recorded (dorsalis pedis and posterial tibial)
If the pedal pulses are not palpable, the patient should be considered as higher risk and a Doppler assessment carried out appropriately

Essential standards:

- Peripheral pulse assessment
- Signs of intermittent claudication, rest pain, night pain, visual checks for colour changes to foot, skin texture, temperature gradient, signs of ulceration

NEUROLOGICAL assessment

Evidence statement

Sensory foot sensation should be tested with a 10g monofilament, or by vibration perception thresholds, and all appropriate methods for neuropathy screening (SIGN 55 guidelines- evidence level 2+) The monofilament should not be used on more than ten patients in a row after which the monofilament is rested for a 24-hour period. See manufacturer guidelines for use (appendix 1).

Essential standards:

- A 10g monofilament should be used
- 5 sites are tested per foot- 1st, 3rd and 5th MTPJ’s, 1st and 3rd toe apices (see appendix)- see SCI DC diabetic foot screening network. If the patient is able to feel <8/10 touches with monofilament, then sensory neuropathy is indicated
- Monofilament testing should be carried out in the following manner (Diabetic Foot Journal 2008 vol 11 issue 3):
  1. Apply to the palm* of the tester first, and then to the palm of the patient two to three times before applying to the foot; this will allow any extra stiffness to be removed. A 10-g monofilament, after rest, usually exerts a 12-13-g force, settling to 10-g by the third or fourth bend.
  2. Ask patient to respond ‘yes’ if they feel the monofilament on the test site
  3. Apply the monofilament perpendicular to the skin surface that is to be tested.
  4. Apply the monofilament until it bends by around 1cm.
5. Remove monofilament pressure and allow a couple of seconds to pass before being applied randomly to the next test site
6. Avoid areas of callous for test sites

*Or another area of the hand or arm with intact sensation.

FOOT DEFORMITY Assessment

Evidence Statement

Any deformity occurring in a diabetic foot with other risk factors, such as prominences of the metatarsal heads, clawing of toes, Charcot prominences or hallux valgus, increases ulcer risk. (Abbot CA, Carrinton AL, Ashe H, et al (2002).

Essential standards
Diabetic ulceration is principally associated with peripheral vascular disease (PVD) and neuropathy, often in combination. Other factors associated with increased risk include (SIGN 55):

- Previous amputation
- Previous ulceration
- Presence of callous
- Joint deformity
- Visual/mobility problems
- Male sex

The data acquired from the foot assessment should be entered onto the diabetic foot risk strategy programme SCI DC. The programme calculates the foot risk category for each patient- low, moderate, high or active. The risk stratification identifies and enables more targeted treatment for those patients at a higher risk of foot ulceration. Foot risk assessment for all diabetic patients will be carried out on a yearly basis.
MANAGEMENT OF THE LOW RISK DIABETIC FOOT

**Definition**: The low risk foot displays no signs / symptoms of peripheral vascular disease or neuropathy.

**Aim**: To reduce the likelihood of patients developing risk factors for ulceration / amputation.

**Evidence statement:**

Foot care education is recommended as part of a multidisciplinary approach in all patients with diabetes (SIGN 55 section B). Educational interventions can improve foot care knowledge and behaviour in the short term (RCGP, 2000). (KSF C1, HWB4)

All patients with diabetes should be screened for foot disease - the absence of reliable symptoms and high prevalence of asymptomatic disease make foot screening essential (SIGN 55 section 7.2.2)
**Essential standards:**

- To improve and encourage patient self care, and inform patients of potential foot complications, foot care education by means of verbal communication or leaflets (see SCI DC clinical net work). (KSF C1 and HWB7)
- Yearly foot screening to identify any foot changes which would alter the risk category of the patient.
- Provide community podiatry emergency contacts for patients
- If foot problems occur refer to SCI DC low risk leaflet for indications constituting essential contact with local community podiatrist

**Management of the diabetic foot:**

Involves assessment and treatment of **low risk** diabetic patients

**Routine management and basic risk assessment requirements:**

- Vascular assessment (see vascular assessment criteria)
- Neuropathic assessment (see neuropathic foot assessment criteria appendix 1)
- Structural foot assessment
- Footwear advice (see SCI DC for footwear advice)
- Diabetic foot care advice (see SC DC)
- Patient medical history: identify factors which may put patients feet at risk— including glycaemic control, impaired renal function (kidney), cardiovascular
disease (heart disease), cerebrovascular disease and decreased capacity for self care

- Identify foot problems which may put foot at increased risk such as fungal skin infection, dry skin and structural foot problems
- Discuss with patient their individual level of diabetic foot risk assessment and agree plans for future assessment / care.

Management of a low risk patient with a newly diagnosed diabetic foot ulcer, foot infection or foot which has noticeably changed structurally since previous foot assessment (with regard to neuropathy, vascular status or new foot pain causing concern)

- Diabetic patients should be referred to the community senior podiatrist if the risk category has risen from an initial low risk (KSF HWB7)
- Diabetic patients who present with a newly diagnosed foot infection; foot ulcer or clinical symptoms of ischaemia should be referred immediately to the community senior podiatrist (see clinical pathway for referral/ method of contact appendix 2). For more urgent referral or cases where community podiatry not available, refer to diabetic specialist podiatrist (see referral pathway, criteria and contact details appendix 3 and referral form appendix 4) (HWB7)
MANAGEMENT OF THE MODERATELY AT RISK FOOT

Definition: The moderately at risk foot may display one primary clinical signs- neuropathy or absent foot pulses, without callous or deformity.

Evidence:

**Sensory neuropathy:** 10g monofilaments have been shown to benefit in selecting patients at increased risk of foot ulceration (SIGN 55 evidence 2+)

**Absent foot pulses:** ‘a guide to the presence of PVD and can be used for first line screening’ (SIGN 55 evidence 2+)

**Patients with factors for foot ulceration should be referred to the Community Podiatrist (NICE 2004 grade A)**

**Visual impairment and physical disability:** Factors associated with increased risk of diabetic foot problems include visual and mobility problems (SIGN 55 evidence 1+)

**Education:** 1 year follow up, where patients had agreed ‘personal behavioural contract’, there was a significant reduction in serious lesions (SIGN 55 evidence 1+)
Essential standards:

- Annual assessment and screening of patients by community podiatrist
- Agreed tailored management / treatment plan by community podiatrist according to patient needs
- Provide written and verbal education with emergency contact numbers

Assessment and management of moderate risk patient:

- Vascular assessment (see assessment criteria)
- Neuropathic assessment (see appendix 1)
- Structural foot assessment
- Footwear assessment and advice (see SCI DC)
- Diabetic foot care advice and leaflet (see SCI DC for moderate risk patient leaflets)
- Full patient medical history to identify factors which may increase risk of foot problems- including glycaemic control, impaired renal function, cardiovascular disease, cerebrovascular disease and decreased capacity for self care.
- Identify factors which put foot at increased risk such as skin fungal infection, anhydrous skin, and structural deformities
- Discuss with patient their individual risk status and relevant care programme including review appointments
Management of moderate risk diabetic patients who develop foot ulceration, infection, inflamed lesions and noticeable degeneration of foot including critical ischaemia and suspected Charcot arthropathy

- Accurate assessment of the factors contributing to the presentation of the ulcer/lesion, including peripheral arterial disease, neuropathy, infection and relevant medical, personal and social factors and re-categorise as active (KSF HWB6)
- Digital photo taken on initial presentation (see consent form appendix 5)
- Appropriate management of any infection present using clinical guidelines (see intranet under diabetes and endocrinology) HWB6 AND HWB7)
- Swab suspected infected ulcer
- Management of wound bed according to issued wound management guidelines (see intranet under diabetes and endocrinology) to optimise the process of healing, including appropriate debridement and use of surface applications and dressings HWB6 and HWB7)
- Documentation of treatment, including wound presentation
- Protection of foot or lesion from trauma when indicated including formal offloading (see appendix 6). (KSF HWB7)
- Appropriate referral to Diabetic Specialist Podiatrist where criteria met (see EMERGENCY diabetic foot referral pathway and NON emergency referral form appendix 3 and 7)
MANAGEMENT OF THE HIGH RISK DIABETIC FOOT PATIENT

Definition: Previous ulceration or amputation or more than one risk factor present e.g. loss of sensation or signs of PVD with callous or deformity

Aim: to prevent patients with identified at risk from developing ulceration/amputation

Evidence:

Patients with risk factors for ulceration should be referred to a foot protection team (NICE 2004 grade A)

Essential standards:

- Annual assessment by community podiatrist
- Agreed and tailored management/treatment plan according to patient needs
- Provide written and verbal education and emergency contact numbers
- Referral to specialist podiatrist if/when required

Assessment and management of HIGH risk patient:

- Vascular assessment (see assessment criteria)
- Neuropathic assessment (see appendix 1)
- Structural foot assessment
• Footwear assessment and advice (see SCI DC)
• Diabetic foot care advice and leaflet (see SCI DC for medium patient leaflets)
• Full patient medical history to identify factors which may increase risk of foot problems- including glycaemic control, impaired renal function, cardiovascular disease, cerebrovascular disease and decreased capacity for self care.
• Identify factors which put foot at increased risk such as skin fungal infection, anhydrous skin, and structural deformities
• Discuss with patient their individual risk status and relevant care programme including review appointments

Management of **HIGH risk diabetic patients who develop foot ulceration, infection, inflamed lesions and noticeable degeneration of foot including critical ischaemia and suspected Charcot arthropathy**

• Accurate assessment of the factors contributing to the presentation of the ulcer/lesion, including peripheral arterial disease, neuropathy, infection and relevant medical, personal and social factors and re-categorise as **active risk**
• Digital photo taken on initial presentation (see consent form appendix 5)
• Appropriate management of any infection present using clinical guidelines (see antibiotic management guidelines- intranet under Diabetes and endocrinology)
• Swab suspected infected ulcer
• Management of wound bed according to issued wound management guidelines (see intranet under Diabetes and endocrinology) to optimise the process of healing, including appropriate debridement and use of surface applications and dressings
• Documentation of treatment, including wound presentation

• Protection of foot or lesion from trauma when indicated including formal offloading (see appendix 6).

• Appropriate referral to Diabetic Specialist Podiatrist where criteria met (see EMERGENCY diabetic foot referral pathway and NON emergency referral form appendix 3 and 7)
MANAGEMENT OF THE ACTIVE FOOT RISK PATIENT

**Definition:** Presence of active ulceration, infection, critical ischaemia, gangrene or unexplained hot, red, swollen foot with or without the presence of pain

**Aim:** To promote wound healing and prevent patients with ulceration from undergoing amputation.

**Evidence:**

For a new foot ulcer, arrange urgent assessment by an appropriately trained health care professional (NICE 2004 grade D). Refer to a multidisciplinary foot care team within 24 hours if any of the following occur:

- New ulceration (wound)
- New swelling
- New discolouration (redder, bluer, paler, blacker, over all or part of the foot) (NICE 2004 grade D)

**MANAGEMENT of the ulcerated foot**

**Essential standards:**

- Podiatrist should identify whether the level of skill required to manage the wound is within their competence and/or whether they have access to the necessary support. If not, they should refer to the diabetic specialist podiatrist (KSF HWB6)
- Pathways for rapid referral of people with deteriorating or static diabetic foot related problems should be established.
Assessment of the ulcerated foot

Essential standards:

- In addition to the other components used to identify a foot at risk of ulceration, appropriate consideration should be given to the following:
  1. **Ulcer type**: neuropathic, neuroischaemic or ischaemic, (see appendix 8 for typical features of ulcer type)
  2. **Ulcer causes**: trauma, footwear, excess activity
  3. **Ulcer status**: depth, area, slough, necrosis, callous, colonisation/ infection, pain….
  4. **Ulcer classification**: Texas wound classification system (appendix 9)

Desirable standards:

- Peripheral arterial disease- full clinical assessment
- Neuropathy- sensory testing with 10g monofilament
- Foot type- gait analysis, footwear assessment and referral as necessary
- Ulcer status- use Texas score, digital photography, bacterial swab

TREATMENT of the ulcerated foot

Evidence statements

In the absence of strong clinical or cost effective evidence, health care professionals should use wound dressings that best match clinical experience, patient preference, and the site of the wound and the cost of the dressings (NICE 2004 Grade D)

Dead tissue should be carefully removed from foot ulcers to facilitate healing, unless revascularisation is required (NICE 2004 Grade B)

All patients with tissue loss and arterial disease should be considered for arterial reconstruction (SIGN 55 2001)
The following need to be considered:

- Debridement / wound preparation
- Wound symptom management (e.g. infection / exudates)
- Offloading the ulcer
- Structured patient centred education

Debridement / wound bed preparation

Essential standards:

- All diabetes related foot ulcers with an undetermined depth should be probed with a blunt sterile probe to the establish the full extent
- In the absence of significant arterial disease the ulcer periphery/ margins should be debrided of all callous / sloughy tissue
- Management of wound bed-using dressings only on NHS Borders Diabetic Wound Formulary (see intranet under diabetes and endocrinology), and used appropriately according to wound type.
- Where excessive tissue depth of digits has occurred (local gangrene), dressings must be used which dry the necrosis to encourage auto-amputation and discourage spread of infection via moist necrosis
- Diabetic patients should be referred to the diabetic specialist podiatrist where the ulcer meets the criteria as per appendix

Infection management

Evidence statement:

No single broad-spectrum antibiotic regimen was shown to be more effective over another in the treatment of diabetic foot ulcers (SIGN 55 evidence level 1+)

Treatment of an infected diabetic foot ulcer should be commenced with a broad-spectrum antibiotic. Subsequent antibiotic regimens may be modified with reference to bacteriology and clinical response (SIGN 55 2001)
Management of infection

Initial antibiotic therapy:

- Superficial ulceration is unlikely to require antibiotic therapy, and these patients should be reviewed regularly by the Podiatry department
- All other ulceration should be treated with antibiotics in combination with appropriate treatment including debridement, offloading, footwear and wound management

The choice of antibiotic is dependent on the causative agent and epidemiology. However, initial antibiotic therapy is often necessarily commenced before the details of swab taken are available. Therefore, initial antibiotic choice is empirical and based on experience and knowledge of underlying potential pathogens. Antibiotics are used to treat infection and not to heal an ulcer, as this will take longer. In 2009 the Scottish Diabetes Group and Scottish infectious Disease Societies published guidance on the use of antibiotic therapy in diabetic foot ulcers. The full publication is available in The Diabetic Foot Journal, Vol 12 No2 Pgs 64-68. Given below is a summary of this guidance adapted for local use and in keeping with updated local anti microbial guidance where possible. For the purpose of treatment, ulcers are classified into mild, moderate and severe, as defined by the classification systems used by the International Working Group.

MILD INFECTION:

- Pus or two or more signs/symptoms of inflammation: erythematic, warmth, pain, tenderness, induration
- Any cellulites <2cm around wound
- No evidence of systemic infection

(It should be remembered that some of the signs/symptoms could be masked in diabetic patients due a compromised immune system)

TREATMENT

- Antibiotic naïve: Oral FLUCLOXICILLIN 1g QID for 5-7 days
- Allergic to or intolerant of flucloxicillin use Doxycycline 100mg bd or clindamycin 300-450mg qds for 5-7 days
- Not antibiotic naïve- use Doxycycline 100mg bd or clindamycin 300-450mg qds for 5-7 days

MODERATE INFECTION

- Lymphatic streaking, deep tissue infection involving subcutaneous tissue, tendon fascia, bone or abscess
- Cellulites >2cm
- No evidence of systemic infection
TREATMENT

- Antibiotic naïve: Oral/ IV Flucloxicillin qds 5-7 days
- Oral alternatives include Co-Trimazole 960mg BD, Co-amoxiclav 625mg TDS or Clindamycin 450mg QDS. Add metronidazole 400mg if anaerobes suspected.
- Not antibiotic naïve use IV Co-amoxiclav 1.2g TDS (switch to oral Co-amoxiclav 625mg or Co-trimazole 960mg when appropriate)

SEVERE INFECTION

- Any infection associated with systemic signs and symptoms (fever, shock, vomiting, confusion, metabolic instability)

TREATMENT

- Recommended for 10-14 days after which it should be reviewed. IV antibiotics should be switched to oral when appropriate and if evidence of ossteomyelitis treatment should continue for 4-6 weeks
- Antibiotic naïve: IV Co-amoxiclav 1.2 g TDS. Add Gentamycin if required. (ORAL THERAPY INAPPROPRIATE). For those allergic to penicillin, previous antibiotic use, or with MRSA further advice will be taken regarding antibiotics following discussion with microbiology.

Offloading the ulcer

Evidence statement:

Patients with unilateral plantar ulcers should be considered for treatment using total contact casting to optimise the healing rate of the ulcer (SIGN 55 2001)
Essential standards

- Contact casting is still considered to be the ‘gold standard’ for offloading neuropathic diabetic foot ulcers (NICE 2004). The scotch cast boot is the main referenced option for neuropathic and neuro ischaemic ulcers (Jones 1991), although new casting techniques using a lighter synthetic semi-rigid method have been developed (Martini casting) for both neuropathic and ischaemic ulcers. (For available offloading devices please see appendix).

Summary of the management of ACTIVE RISK diabetic foot patients

- Accurate assessment of the factors contributing to the presentation of the ulcer/lesion, including peripheral arterial disease, neuropathy, infection and relevant medical, personal and social factors.
- Digital photo taken on initial presentation (see consent form appendix 5)
- Appropriate management of any infection present using clinical guidelines (see antibiotic management guidelines above)
- Swab suspected infected ulcer
- Management of wound bed according to issued wound management guidelines (see intranet under Diabetes and endocrinology) to optimise the process of healing, including appropriate debridement and use of surface applications and dressings
- Documentation of treatment, including wound presentation
- Protection of foot or lesion from trauma when indicated including formal offloading (see appendix 6).

Appropriate referral to Diabetic Specialist Podiatrist where criteria met (see EMERGENCY diabetic foot referral pathway)
CHARCOT FOOT

Management of CHARCOT NEUROARTHROPATHY

Patient Assessment
Charcot Foot is a neuroarthropathic process with osteoporosis, fracture, acute inflammation and disorganisation of foot architecture. (SIGN 2001) Referral for suspected Charcot’s Foot should be immediate to a multidisciplinary foot care team for immobilisation of the affected joint(s) and for long term management to prevent ulceration”. (NICE 2004)

Patient Assessment
- Diagnosis should be made by clinical examination, patient history including onset supported by the use of thermography. (Frykberg et al 2000; Jeffcoate et al 2000)

Algorithm Guidelines for Charcot Neuroarthropathy

Clinical features
- Diabetes patient presents with red, oedematous, warm and possibly painful foot.
- Evidence of sensory loss.

Differential diagnosis between Charcot Neuroarthropathy and Infection

诊断 / Investigations
- Good blood supply to lower limb with evidence of neuropathy.
- Assess foot for obvious signs of tissue trauma, cellulitis or systemic toxicity to rule out infection.
- History of trauma to limb may be present.
- Heat differentiation between limbs – affected limb often 2-8 degrees higher than contralateral foot when tested with thermography.
- Biochemical profile as indicated e.g. HbA1c, ESR and C-reactive protein.
- X-Ray for baseline and to exclude diabetic neuropathic fracture
- If Charcot foot suspected consider MRI / Bone Scan

Management
1. Immobilisation urgently required until heat differentiation disappears and bone activity reduces. (SIGN 2001)
2. Patients require education on the causes and management of Charcot foot and advice on prevention of complications.
3. There is insufficient evidence to support the routine use of bisphosphonates in the acute Charcot foot (SIGN 2001) However there are a number of studies which indicate that Bisphosphonates may be useful in halting the acute phase of Charcot neuroarthropathy in some patients. (Anderson et al 2004, Jude et al 2001). All suspected Charcot foot cases to be reviewed by Consultant Physician to consider options.
4. Consider referral to an Orthopaedic surgeon for assessment and discussion of appropriate surgical procedures.
5.
**Long Term Management**

1. Long term pressure relief with footwear and orthotic therapy as appropriate. Refer to Orthotist or specialist podiatrist
2. Classify patient as high current risk and review regularly for signs of long term complications. (NICE 2004)
## APPENDIX

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory neuropathic foot assessment</td>
<td>23</td>
</tr>
<tr>
<td>Referral pathway to community Podiatry and hospital Diabetic foot clinic</td>
<td>25</td>
</tr>
<tr>
<td>Urgent diabetic foot referral pathway</td>
<td>26</td>
</tr>
<tr>
<td>Urgent diabetic foot referral form</td>
<td>27</td>
</tr>
<tr>
<td>Digital photo consent form</td>
<td>28</td>
</tr>
<tr>
<td>Diabetic foot ulcer and Charcot offloading devices</td>
<td>32</td>
</tr>
<tr>
<td>Non urgent diabetic foot referral form</td>
<td>40</td>
</tr>
<tr>
<td>Diabetic ulcer and Charcot clinical features</td>
<td>41</td>
</tr>
<tr>
<td>Texas wound classification</td>
<td>42</td>
</tr>
</tbody>
</table>
GUIDELINES ON THE USE OF MONOFILAMENTS AND ASSESSING FOOT RISK STATUS

Are they accurate and effective?

Clinical examination and a 10g Semmes Weinstein Monofilament test are the two most sensitive tests in identifying patients at risk for foot ulceration, especially when the tests are used in conjunction with each other.¹

Health care providers can lower the incidence of lower extremity amputation by using a Semmes-Weinstein monofilament to identify protective sensation loss and quickly taking measures to prevent ulceration.²

Monofilaments are an effective, convenient, easy to use, relatively inexpensive way of testing for loss of protective sensation in the feet in daily clinical practice³ ⁴

Who’s Monofilaments are Best?

The accuracy of monofilaments varies among manufacturers; Bailey and Owen Mumford monofilaments are the most accurate.

Do Monofilaments Wear Out?

Longevity and recovery testing suggest that each monofilament will survive usage on ~10 patients before needing a recovery time of 24 hours before further use.⁵

Several studies suggest that repetitive use of the monofilament may lead to a reduced ability to accurately detect peripheral neuropathy, however these studies

Acknowledgement is given to J McCall/M Doyle, Podiatry Services NHS Ayrshire and Arran
relate to repetitive compression without recovery time and do not draw conclusions relating to the 'lifetime' of a monofilament which is allowed to rest for 24 hours between testing on 10 patients. So the answer is “they do but we don’t really know how long it takes”.

How many sites on each foot?

Research varies from 2 to 10 sites per foot. Most centres now test at least 5 per foot. The method of testing, including the Podiatrists explanation and the patient’s understanding of the test, is more important to the accuracy of the test than the exact number of sites tested.

References


2 Identifying diabetic patients at high risk for amputation. Umeh A, Wallhagen M, Nicoloff N Nurse Pract 1999 Aug; 24(8): 56, 60, 63-6, 70


5 Differences in the performance of Commercially Available 10g Monofilaments. Booth J, Young MJ, Diabetes Care, 23:983-988, 2000
APPENDIX 2

ULCER

Neuropathic
Or
Ischemic
Or
Neuroischemic
(See pie chart to classify)

ADDITIONAL SYMPTOMS/SIGNS

YES

NO

CELLULITIS

DEEP ULCER
CRITICAL ISCHAEMIA
SUSPECT OSTEOMYELITIS
SYSTEMICALLY UNWELL
SUSPECTED CHARCOT ARTHROPATHY (WITH OR WITHOUT FOOT ULCER)

Refer to Primary Care Podiatrist

ADDITIONAL SIGNS/SYMPTOMS

Refer to Secondary Care
Emergency Podiatry Clinic
Contact: Adam Smith
Diabetic Podiatry foot clinic
Bleep 26510
Tel 01898 826510
### Foot Ulcer Care pathway criteria

**Patient presents to Podiatrist with a new foot ulcer / suspected Charcot Foot**

**Actions**

1. Instigate initial assessments, dressings, antibiotics and advice as appropriate, including follow up appointments
2. For chronic ulcer patients, refer onto Diabetic foot clinic if no improvement at 1-2 weeks, or deterioration as in acute state (see below)
3. For limb threatening foot ulcers (e.g. extending cellulites / wet necrosis) or suspected Charcot Foot (diabetes + neuropathy + warm, swollen foot) contact BGH diabetic Foot Clinic or Hospital Diabetes Team immediately

If unavailable (e.g. weekend / bank holiday), refer for possible hospital admission via GP or direct to A&E and notify diabetic foot clinic in BGH

---

**To be seen by Primary podiatry or Diabetic foot clinic**

**If ulcer presents with any of the following in acute stage:**
- Cellulites extending < 2cm from edge
- Query PVD
- Patient systemically well
- Early stages of ulceration

**If ulcer presents with any of the following:**
- Cellulites extending > 2cm from edge
- Wet necrosis / gangrene present
- Patient becoming systemically unwell / in severe pain with ulcer / foot
- Ulcer static at 1-2 weeks (diabetes)
- Ischaemia identified
- Symptoms of Charcot

Refer within 24 hours (during working hours) to BGH Diabetic Foot Clinic, to provide / facilitate interventions (NICE, 2004). Referral form required from referrer.

---

**Contact Details**

**Rapid Access to BGH Diabetes Foot Clinic**

Where a patient with diabetes meets the criteria for referral to the BGH diabetic foot clinic (As detailed above) please complete the following performa. Incomplete or unsigned forms will not be accepted and will be returned.

Please note that BGH Diabetic Foot Clinic can be contacted Monday / Tuesday 8.00am to 5.30 pm and Wednesday- Friday 9-00– 4.00. Tel 01896 826510/ 01896 826696 or bleep 26510

Out of hours Diabetic Foot Protocol should be referred to as above

APPENDIX 4
URGENT DIABETIC FOOT REFERAL FORM
Rapid Access to BGH Diabetes Foot Clinic

Where a patient with diabetes meets the criteria for referral to the BGH diabetic foot clinic (As detailed in the foot ulcer referral criteria section) please complete the following form AND contact by telephone or bleep as below:
Bleep 26510 or
Telephone 01896 826510/ 01896 826696
Please note that BGH Diabetic Foot Clinic can be contacted Monday / Tuesday 8.00am to 5.30 pm and Wednesday- Friday 9-00– 4.00.

PATIENT LABEL

Patient contact number:
Transport required: yes no

Referred by: GP
Podiatrist
Treatment nurse
District nurse
Other…..

Name of refer:
Date of referral: __/_ __/_

Reason for referral:
☐ New ulcer
☐ Non-healing ulcer
☐ Unresolved infection
☐ Charcot foot
☐ Other …………………

Previous foot clinic pt: yes no

Details of ulcer if present:
Site of ulcer-

Duration-

☐ Neuropathic ☐ Ischaemic ☐ Neuroischaemic

Other etiological factors

Current dressing regime:
PHOTO CONSENT FORM

1. You have been asked to give agreement for yourself, or a child in your care.
   Or

2. You have been asked to give agreement for a person for whom you are a ‘Proxy’ under the Adults with Incapacity Act 2000 to be □ photographed □ recorded on tape □ recorded on video

You may also have been asked to agree to any photographs or recordings being used for training and teaching in a healthcare setting.

[All recordings will be kept confidential, like any other part of your medical record.]

This form records that the reasons for this have been explained to you and:

- you have understood why we want to use photographs or recordings
- you agree to these being used during the period of treatment
- you agree to these being used for teaching/training, if you have been asked this

Or that

- you do not agree to have photographs taken or recordings made

Therapist’s name .................................. Job title.............................................

Department ............................................. Base .............................................
Patient’s name
........................................................................................................................................

Consultant or
GP........................................................................................................................................

CHI number.............................................. or Date of birth / /

Home address
........................................................................................................................................
........................................................................................................................................

........

Post code ....................... Telephone number .................................................

Please tick the boxes below that apply to you.

1. I agree to have

☐ photographs of the patient named on page 1 taken for treatment use

☐ a tape recording of the patient made for treatment use

☐ a video recording of the patient made for treatment use
☐ the above photographs or recordings used for training/teaching,

if this was requested

2. I do not agree to have

☐ photographs or recordings taken for any purpose

3. Relationship to the patient

☐ I am the patient

☐ the patient is a child in my care¹

☐ I am a ‘Proxy’ for the patient

Name (print)

...........................................................................................................................

Signature

...........................................................................................................................

Date ..................................................

¹ Children have the legal right, on their own behalf, to consent to or refuse treatment where they have a sufficient understanding of what is proposed.

² ‘Proxy’ is used within the Adults with Incapacity Act 2000 (and NHS Borders Informed Consent Policy) to mean a welfare guardian with powers relating to the medical treatment in question.

“All Trust staff involved in providing examinations, treatments, operations or investigations should be aware of the issues of informed consent, with particular attention to the implications of the Adults with Incapacity Act (Scotland) 2000¹
and, where relevant, the Mental Health (Scotland) Act 1984”. (NHS Borders Informed Consent Policy)
Guidelines – Pressure Relief in the treatment of Diabetic Foot Ulceration

5-7% of people with diabetes suffer from foot ulceration at any one time and up to 15% will suffer from ulceration at some point in their life (NICE, 2003).

Any patient with an active foot ulcer must be assessed for a managed program of pressure relief by a podiatrist specialising in diabetes.

Podiatrists should use some form of (research based where possible) pressure relieving device to offload pressure from the ulcer site.

**Prevention of ulcers**

**Education**

The diabetes team has a responsibility to provide the appropriate education to enable patients to acquire the necessary knowledge and skill to take responsibility for managing their own foot health care. Enabling the patient to alter their lifestyle in such a way as to maximise their foot health and reduce the risk of complications.

Patients at risk of ulceration need to know how foot ulcers are caused, how footwear can precipitate them and what the patient’s role is in preventing and healing them. Education should be given written and verbally and should be reinforced at regular intervals.

Education does make a difference (Boulton et al, 2000)

**Footwear**

**Low to moderate risk**

Patients assessed as being of low to moderate risk (SIGN 55, 2001) should:

1. Receive verbal and written advice on suitable footwear and fitting, appropriate to their activity. eg Cushioned soles, foot shaped shoe and insole, leather uppers, adequate depth, adjustable fastening, correct size.
2. A daily foot care routine including checking footwear daily for anything that could cause injury to the foot.

**Moderate to High Risk**

Patients who are higher risk of foot ulceration, due to abnormal foot shape, loss of protective sensation, limited joint mobility and who cannot be fitted with appropriate over-the-counter shoes in the shoe shops should be assessed for stock/bespoke footwear depending on their level of risk/deformity.

**Footwear**

Shoe trauma if frequently the pivotal event that precedes ulceration or amputation.

Therapeutic shoes and customised insoles have been shown to reduce ulcer occurrence and the severity of callus.

Patients who are provided with stock/bespoke footwear should be provided with insoles appropriate to their risk/deformity. (Australian National Guidelines, 2001)

**Review of footwear and insoles**

All supplied footwear and insoles must be reviewed on a regular basis ensuring that the effectiveness of the footwear/insoles is being maintained

**Callus**

Good Podiatric care is essential because the removal of callus can reduce high foot pressures by up to 26% (Young et al, 1992, SIGN 12, 1997)

**Current Ulceration**

All patients with a foot ulcer should be referred urgently for assessment at a specialist multidisciplinary diabetic foot ulcer clinic.

**Total Contact Casts**

Total contact methods of pressure relief are aimed at increasing the area of contact between the foot and the supporting surface thus redistributing the same force over a larger area, which results in a decrease in pressure.

\[
\text{Pressure} = \frac{\text{Force}}{\text{Area}} \quad \text{(Force} = \text{Mass} \times \text{Acceleration})
\]
A total contact cast is a non-removable cast which is very efficient at redistributing plantar pressure. However this is not without complications. It consists of a close fitting plaster of Paris cast reinforced with fiberglass. This is placed over a protective area of felt padding. A rocker is applied to the cast in the mid foot area.

Skilled, trained practitioners should only apply a total contact cast. The total contact cast controls oedema, sheering stress and alters cadence, velocity and will reduce activity.

The cast is removed first in 3-4 days then weekly for dressing change and inspection of the ulcer.

The foot and leg can also be checked at this stage for any sign of trauma. Patients must be given written and verbal instructions on how to care for their feet and cast. An emergency contact number is essential.

Total contact cast can achieve mean healing time of 6 weeks and up to 85% reduction in plantar pressures (Armstrong et al 2005)

**Air casts**

The Aircast walker is a removable prefabricated walking cast, which is close fitting with 4 inflatable cells. These cells are easily inflated and deflated using a hand pump and gauge. Oedema can be controlled if the cells are inflated correctly. A rocker sole distributes pressure evenly and sheering stress is limited. The Aircast can be used with the plastazote insoles supplied or a total contact insole can be inserted. The walker alters cadence and velocity, reduces activity and can achieve 65% reduction in plantar pressures (Armstrong et al, 2001)

**Advantages**

- Patients may remove Aircast when not weight bearing i.e. in bed
- It can be easily removed to allow inspection of the foot and leg
- It is easily applied

**Disadvantages**

- Rigid shell may not accommodate certain deformities e.g. Charcot joint.
- Visual impairment (the wearer may have difficulty in reading the gauge)
- Contra lateral limb may require a shoe raise
- The patient may remove the device and weight bear against advice
- The patient cannot not drive when wearing the Aircast

**Scotch cast boots**

The Scotch Cast Boot Is a lightweight, well padded fiberglass cast that extends from just beyond the toes to the ankle and is worn with a cast sandal. This device has an expected healing times of 8-12 weeks (Armstrong et al, 2005)

**Advantages**
- It can be easily removed to allow inspection of the foot
- Especially useful in patients with multiple ulceration i.e. forefoot and rear foot
- Useful in the treatment of midfoot ulceration

**Disadvantages.**
- Contra lateral limb may require a shoe raise
- May cause other areas of trauma

**Hope Walking Cast**

The Hope Walking Cast (Williams 1994) is constructed of Hexalite (a heat moldable material) which is built around a total contact insole with a rubber sole. It is fastened with Velcro straps and is quite durable. The skills of a podiatrist or orthotist are needed to make the casted orthosis. It has been successfully used to heal plantar- neuropathic ulcers.

**Orthowedge/Orthoheel Shoes**

An orthowedge/heel is an orthoses which provides either forefoot or rear foot pressure relief. Plantar pressure reduction of up to 66% can be achieved. The device can help to reduce mean healing times of neuropathic ulcers to 10 weeks (Chantelau 1993).
The upper section is a foam lined nylon mesh, which incorporates a padded dorsal flap with Velcro fastenings. This is designed to accommodate bulky dressings. The sole section provides either fore foot or rear foot pressure relief in the form of a wedge.

- **Orthowedged healing shoe;** The 10 degree wedged sole redistributes weight behind the metatarsal heads giving greater pressure to the hind foot whilst relieving pressure from the fore foot.

- **Orthoheel healing shoe;** These orthoses relieve pressure from the hind foot by avoiding any ground contact to the posterior aspect of the foot

- These devices will alter cadence, velocity and activity therefore careful assessment of the patient’s ability is needed.

**Advantages**

- Stock can be held within clinic
- Easily applied
- Easily removed for inspection of foot and dressing change

**Disadvantage**

- Patient’s balance may be compromised.
- The patient may remove the device and weight bear against advice
- The patient cannot not drive while wearing the device

**PRAFO (Pressure Relief Ankle Foot Orthoses)**

This is a custom made ankle foot orthoses which will control dorsi-flexion and plantar-flexion. In addition the device provides complete pressure relief around the heel and ankle. The sole is non-slip. The PRAFO can and should be worn in bed. The toe extension prevents pressure and risk of injury to the toes. The liner encloses the foot and calf areas but leaves the calcaneal area free. The liner is washable. The PRAFO alters cadence, velocity and activity.

**Advantages**

- Stock can be held within clinic
- Easily applied
- Easily removed for inspection of foot and dressing change
- Lining can be easily changed when soiled
Disadvantage

- Patient’s balance may be compromised.
- The patient may remove the device and weight bear against advice
- The patient cannot not drive while wearing the device

Suitable deflective/cushioning pads

It is not generally advisable to use adhesive padding because of the risk of trauma on removing dressings and the risk of infection however in some circumstances where other effective methods are not available its use is acceptable for short periods with close monitoring.

The above measures should be employed until foot ulcer is healed, prevention of reoccurrence is essential and pressure relief must be continued.

Prevention of Recurrence

Prevention hinges around Education and regular review of feet, footwear and insoles (Boulton, 2000)

Every patient should be assessed for stock/bespoke footwear with total contact insoles if required. To prevent recurrence of pressure areas patients must receive specific advice on their usage.

Patients should be recalled for footwear and orthotic review:

1. 1st Review approx 4-6 weeks after original fitting
2. Orthotic review 6 Months after 1st review
3. Podiatry review as appropriate to risk level
4. Patient must have contact telephone number incase of any problems

Conclusion

Pressure relief is one of the most essential elements in the prevention and treatment of diabetic foot ulcers.

Patient knowledge, motivation and participation is an essential element of the overall treatment plan.

Summary


Acknowledgement is given to Podiatry Services, NHS Ayrshire and Arran for their contribution to this piece of work.
APPENDIX 7

NON-URGENT DIABETIC FOOT REFERRAL FORM

PATIENT LABEL

Patient contact number:  
Transport required: yes no

Referred by: GP
Podiatrist
Treatment nurse
District nurse
Other.....

Name of refer:
Date of referral: _ _ _ _ _ _

Reason for referral:
☐ Footwear
☐ Insoles
☐ Other ..................

Previous foot clinic pt:
• For shoes?
• For insoles?

Foot pathology:

Peripheral vascular status

Sensory neuropathy status

Foot deformity:

1. Site of prominent met heads /callous
2. Site of Retracted toes and callous
3. HAV or DQV
4. Site of any other foot deformity or amputation site
5. Charcot prominences
APPENDIX 8 – DIABETIC ULCER AND CHARCOT CLINICAL FEATURES

1) Neuropathic ulcer
- Signs/symptoms:
  - Callus
  - Painless
  - Deep
  - Often on plantar aspect of foot
  - Undetermined edges

2) Neuro-ischaemic
- Signs/symptoms:
  - Callus + or -
  - Painless
  - Slab:
    - Often non-weight bearing
    - Yellow adherent slough
    - Punched-out appearance

3) Ischaemic
- Signs/symptoms:
  - Slab:
  - Undermined edges
  - Often non-weight bearing
  - Yellow adherent slough

4) Charcot foot
- Signs/symptoms:
  - Radii changes in foot structure
  - Foot swollen, foot compared to other limb
  - Can be painful or painless
  - Bounding foot pulses
## Ulcer Grade (depth)

<table>
<thead>
<tr>
<th>Ulcer Stage</th>
<th>0</th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pre / post ulcerative lesion completely epithelialised</td>
<td>Superficial lesion, not involving tendon, capsule or bone</td>
<td>Wound penetrating to tendon or capsule</td>
<td>Wound penetrating to bone or joint</td>
</tr>
<tr>
<td>B</td>
<td>Infection</td>
<td>Infection</td>
<td>Infection</td>
<td>Infection</td>
</tr>
<tr>
<td>C</td>
<td>Ischaemia</td>
<td>Ischaemia</td>
<td>Ischaemia</td>
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</tr>
<tr>
<td>D</td>
<td>Infection and ischaemia</td>
<td>Infection and ischaemia</td>
<td>Infection and ischaemia</td>
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</tr>
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### Appendix 9 – TEXAS FOOT ULCER CLASSIFICATION SYSTEM