

Understanding the role of a monofilament fibre debridement pad in the management of diabetic foot ulcers

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A diabetic foot ulcer (DFU) is a pivotal event for a person with diabetes, indicating severe disease progression and comorbidities. Without an optimised early intervention, the wound can rapidly deteriorate, affecting the integrity of the surrounding tissue and can result in amputation of the limb. Debridement is a crucial step in treating DFUs, and is often performed by those with specialist training. This article discusses a debridement method using a monofilament fibre pad that can be used by clinicians without specialist training or by generalists, which may make the process of debridement more universally available for patients with diabetic foot problems.

Appropriate targeted foot care of at-risk individuals can result in a reduction in the incidence of foot ulcers in patients with diabetes. Nevertheless, despite the publication of strategies to prevent and manage diabetic foot problems, there remains a considerable variation within practices and rates of amputation across different NHS settings (NICE, 2015). NICE (2015) reports that the typical costs for an episode of care for a diabetic foot ulcer (DFU) in secondary care is £6,249, compared to £3,221 in primary care. Many of these ulcers do not heal and require minor amputation, costing £8,450 per amputation, or £13,499 per major amputation. With around 135 diabetes-related amputations performed each week (Diabetes UK, 2015), efforts need to focus on improving diabetic foot care.

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The care of people with diabetic foot disease involves a large number of healthcare personnel. Effective working across the interdisciplinary foot team requires conventional obstructions to be removed to promote the use of interventions that facilitate effective care in both primary and secondary care settings. The latest guidelines from NICE highlight the importance of early initiation on detection of diabetic foot problems and states that effective management of DFUs must be underpinned by robust protocols and clear local pathways, which are supported by an interdisciplinary foot team to ensure continuous and integrated care across all settings (NICE, 2015).

Debridement: an essential care component

In podiatric general practice, debridement refers to the removal of callus, corns, verrucae or warts and nails (FDUK, 2014). Within wound management, debridement refers to the removal of necrotic and non-viable or devitalised tissue from the wound to promote the formation of healthy granulation tissue (Strohal et al, 2013). The presence of non-viable tissue in and around the wound bed can provide a medium for bacterial growth. If left

untreated, bacteria can proliferate and further colonise the wound by constructing protected colonies, known as biofilm (Attinger and Wolcott, 2011). Debriding a wound can help to remove these inhibitory factors and stimulate wound healing (Strohal et al, 2013). These benefits means that debridement has long been considered an essential step in the protocol for treating DFUs (Kamolz and Wild, 2013) (Box 1).

There are many methods used for effective wound debridement in the management of DFUs. These include surgical or sharp, larval, mechanical, autolytic, as well as hydrosurgical and ultrasonic methods. Nevertheless, a Cochrane review concluded that no single debridement method is more effective in achieving complete ulcer healing (Edwards and Stapley, 2010). In practice, the gold standard technique for tissue management in DFUs is regular, local, sharp debridement using a scalpel, scissors and/or forceps, which is a skilled procedure, carried out by experienced practitioners with specialist training (FDUK, 2014; Box 2). Whatever method is selected, the risks, benefits and processes of undertaking debridement need to be explained fully in order for the patient to give informed consent (Haycocks and Chadwick, 2008).

Box 1. Benefits of debridement.

- Removes necrotic/sloughy tissue and callus
- Reduces pressure
- Allows full inspection of the underlying tissues
- Helps drainage of secretions or pus
- Helps optimise the effectiveness of topical preparations
- Stimulates healing.

Adapted from: Wounds International, 2013

Box 2. Expertise required by podiatrists to perform sharp debridement.

- Good knowledge of relevant anatomy and vascularity
- Good patient assessment skills (including ability to assess vascular and neurological status)
- Understanding of the range of debridement methods available
- Capability to identify viable tissue and differentiate nonviable tissue
- Ability to manage pain and patient discomfort before, during and after the procedure
- Appropriate skills to deal with complications (e.g. bleeding)
- Awareness of infection control procedures
- Good communication skills to inform the patient of the rationale for all levels of debridement.

Source: FDUK, 2014

Box 3. Benefits of using a monofilament fibre debridement pad.

- Rapid debridement within minutes
- Ideal for use as an interim measure to support sharp debridement, or in combination with sharp debridement
- Gently removes debris and slough from the wound bed to support healing
- Can be used by clinicians across all competency levels, from general/qualified practitioner to advanced practitioner. It can also be used by patients who are able to self treat
- Cost-effective, reducing reliance on highly trained practitioners and delays in treatment.

Adapted from Wounds UK, 2014

A key finding of an interdisciplinary UK consensus was that access to debridement should be based on clinical need and not the skill of the clinician (Gray et al, 2011). Not debriding a wound, not referring a patient to specialist staff for debridement, or choosing the wrong method of debridement, can cause rapid deterioration with potentially devastating consequences (Wounds UK, 2013).

While sharp debridement is the gold standard technique, a combination of methods may be used for optimal outcomes in certain situations:

- As an interim measure (e.g. by practitioners without the necessary skill sets to carry out sharp debridement: methods include autolytic, mechanical debridement or larval therapy)

- For patients for whom sharp debridement is contraindicated or unacceptably painful

- When the clinical decision is that another debridement technique may be more beneficial for the patient

- For patients who have expressed another preference.

The application of alternative debridement methods can encourage involvement of the wider interdisciplinary team, including non-specialist nurses working in the community, who do not have the specialist training required for sharp debridement.

Role of a monofilament fibre debridement pad

Mechanical debridement is often considered an adjunct to other debridement options or

as an interim measure by practitioners without sharp or surgical debridement training (Stang, 2013). The development of a monofilament fibre debridement pad (Debrisoft®, Activa Healthcare) increases the options for the mechanical removal of non-viable tissue and debris in acute and chronic wounds (Box 3).

The single-use, disposable pad comprises monofilament fibres that are cut at the appropriate length and angle to trap debris and to reach the irregular areas of the wound bed or skin. It is first moistened with water or saline (20–40ml) and then, using a circular motion, can rapidly lift moist necrotic tissue, slough, biofilm and adherent exudate from the wound bed and periwound area, lifting and binding the debris within the fibres (Westgate and Cutting, 2012).

Slough can be a particular problem in neuropathic diabetic foot wounds (Young, 2013). This may be loose or have become firmly attached to surrounding tissue (Black et al, 2010). Slough can act as a physical barrier to wound healing, impede visualisation of the wound bed (preventing accurate recording of depth), provide a reservoir for pathogens and impede healing (Young, 2013).

Loose wound slough may be removed using a monofilament fibre debridement pad and/or by cleansing with 20–40ml tap water or saline. Proprietary antimicrobial cleansing solutions can also be applied to reduce the risk of infection by removing bacteria, debris and disrupting biofilm (Wolcott and Fletcher, 2015). For slough that is adherent and/or hard to remove, sharp or surgical debridement should be considered (Wounds International, 2013).

Problems of recurrent slough (indicative of biofilm) may mean that this procedure needs to be repeated, requiring frequent visits by the patient to the specialist interdisciplinary foot service. For patients with recurrent problems, a monofilament fibre debridement pad can provide an interim method to remove slough and debris from the wound bed, reducing the need for frequent visits to hospital for specialist debridement and minimising waiting times for treatment (NICE Technical Appraisal, 2014).

Adopting debridement strategies across care settings

NICE recommend that all new foot ulcerations should be referred to the interdisciplinary team in a timely manner (NICE, 2015). At this first appointment, the role of debridement should be discussed. The evidence in the literature suggests that more frequent debridement improves the potential for healing in DFUs (Steed, 1996). There is also increased awareness around the role of biofilms in preventing chronic wounds from healing (Metcalf et al, 2013) and the use of regular debridement in disrupting and preventing reformation of biofilm. These factors suggest that debridement should not be a one off intervention, and that it should be considered at every dressing change (Wolcott et al, 2009).

For patients with wounds that need regular removal of dry, flaky or hyperkeratotic skin, slough or biofilm, traditionally this would have meant regular attendance to an already overstretched interdisciplinary team or foot protection service. The use of a monofilament fibre pad can provide a simple method for ongoing debridement. It requires little skill or experience (Figure 1) as there is virtually no possibility of causing any tissue trauma. It can be used in the patient’s home, community wound care clinics, GP surgeries or any acute care setting. This may make the process of debridement for DFUs more universally available for patients and can allow effective use of interventions across numerous care settings, reducing the reliance on specialist methods of debridement and associated costs (Wounds UK, 2015).

Using a monofilament fibre pad in practice

Before using a monofilament fibre pad for debridement of DFUs, a holistic assessment of the ulcer and the patient should be undertaken by a qualified practitioner within the interdisciplinary foot clinic according to local policy. The assessment can be used to inform treatment goals and how quickly these should be achieved. This will inform the debridement method that best suits the patient and take

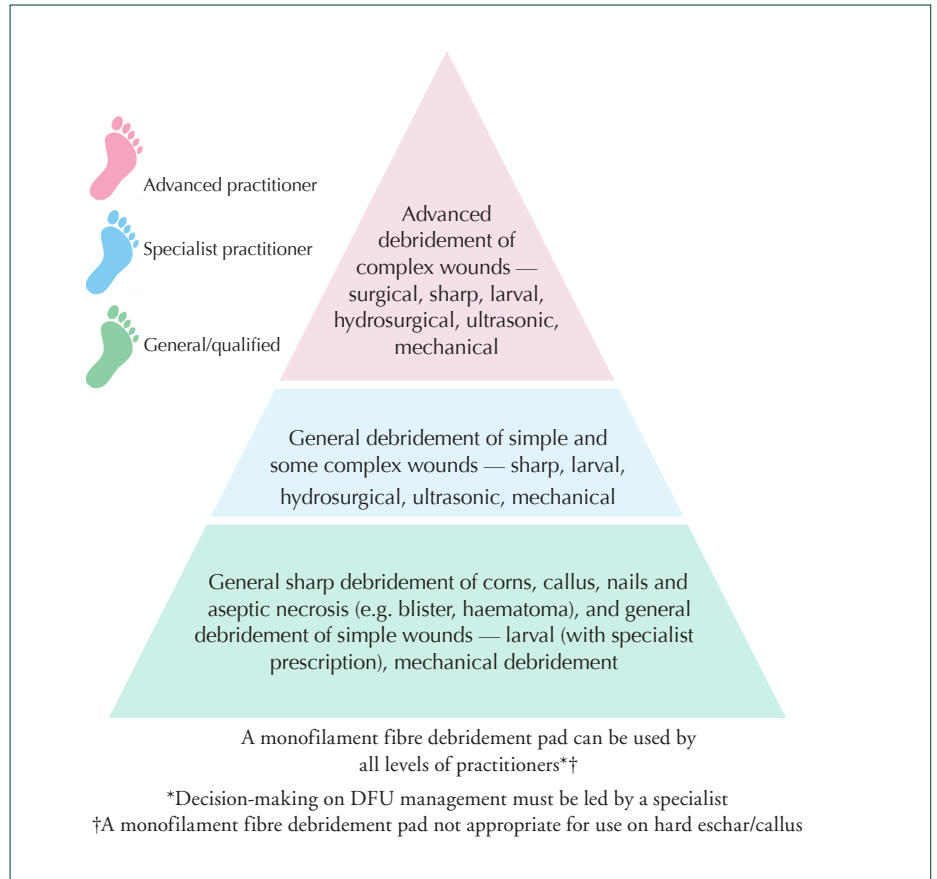


Figure 1: Level of competency and clinical leadership for debridement of the diabetic foot.

into consideration the environment in which it is going to be carried out. At all times, the healthcare professional needs to work within his/her scope of practice and level of competence (Figure 2).

Evidence for using a monofilament debridement pad

Evidence for using a monofilament fibre debridement pad is building. A recent NICE medical technology guidance appraised the clinical evidence for Debrisoft® (Activa Healthcare). This looked at 15 multiple-patient case-series reports (5 peer-reviewed papers and 10 posters), some of which included retrospective comparators (NICE, 2014). NICE concluded that the use of a monofilament fibre pad may lead to faster debridement and healing in a range of wound types. Overall it was found to be convenient and easy to use, and was well tolerated by patients (NICE, 2014).

Chronic ulcers typically require repeated episodes of maintenance debridement, often undertaken in the community. A monofilament fibre debridement pad is considered a useful modality that can be effectively delivered by generalists (Stang, 2013).

Case studies using a monofilament fibre debridement pad

The cases reported here illustrate the complex needs of the person with a DFU. During the course of care, the patients received mechanical debridement with a monofilament fibre debridement pad.

Case 1

A patient with type 2 diabetes, neuropathy, but palpable pedal pulses, presented to the clinic. He underwent ray amputation due to osteomyelitis. Debridement using a monofilament fibre pad 5 weeks post-

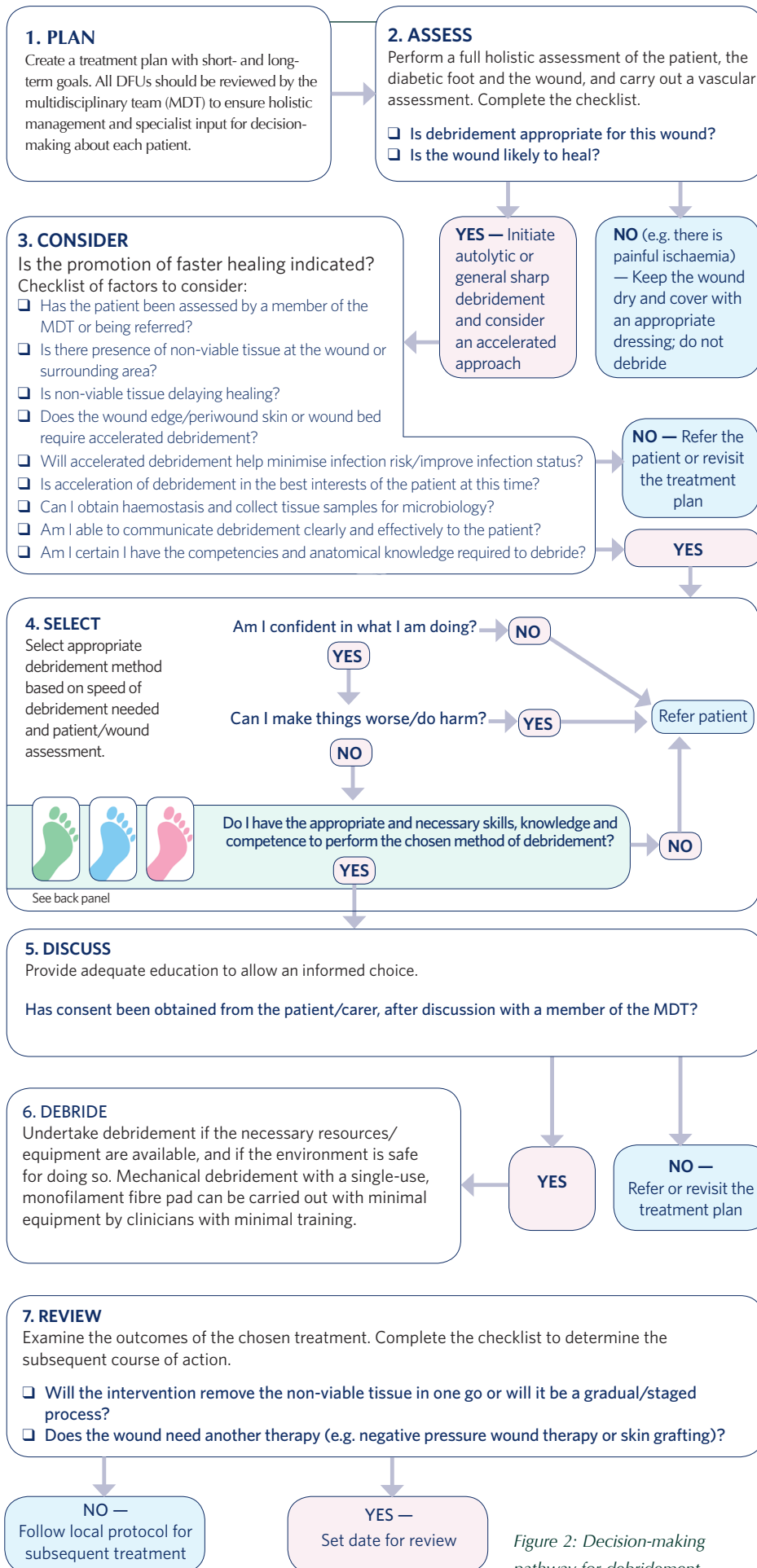


Figure 2: Decision-making pathway for debridement.



Figure 3: Before debridement (a) top; after debridement using a monofilament fibre debridement pad (b) bottom (Stang, 2013).

surgery, successfully removed dry eschar, slough and debris, leaving a clean wound in a healing trajectory (Figure 3a and b).

Case 2

This 62-year-old patient had a history of type 2 diabetes since 2004 and cauda equine syndrome. She presented with chronic leg oedema, palpable pedal pulses (despite a loss of protective sensation) and a pressure ulcer on the posterior calcaneus since early 2015. This was complicated by osteomyelitis, requiring a prolonged course of antibiotics. She was offloaded with a soft cast heel and had compression to control her chronic oedema.

The wound progressed initially, but became static in July 2015. More frequent debridement was needed between podiatry visits as a biofilm was suspected. The patient was prescribed a monofilament fibre debridement pad for use by the community nurse. The wound went on to heal completely in 8 weeks (Figure 4 a–d).

Case 3

This 55-year-old female has well-controlled type 2 diabetes (HbA1c of 44), peripheral



Figure 4: Wound debridement performed by a podiatry assistant using a monofilament fibre debridement pad, before (a) and after (b). Debridement was also performed to the dorsum of the foot to remove dry eschar, before (c) and after (d).

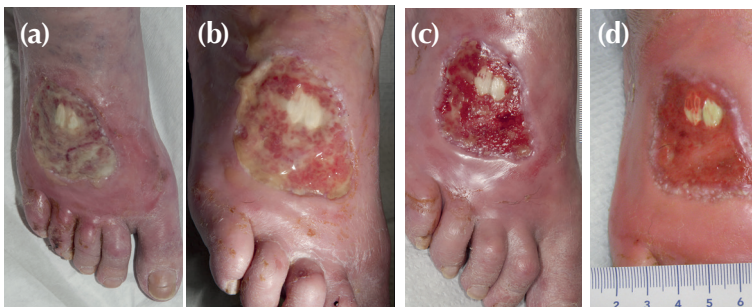


Figure 5: At the start of treatment (a); 9 days later (b); after 4 weeks' treatment (c); and after further 2 weeks' treatment.

arterial disease and no evidence of neuropathy.

She initially presented on September 10 with a 5-week history of an ulcer on the dorsal lateral aspect of her right foot. She had been referred to the vascular team and was waiting for an angiogram. The wound was very painful and measured 55 mm x 61 mm, with slough on the base with extensor tendons visible. There were no signs of osteomyelitis on initial X-ray.

The patient was started on clarithromycin (she was allergic to penicillin). A wound swab showed MRSA+ and was treated with doxycycline. Because the wound was too painful for sharp debridement, it was decided to use a monofilament fibre debridement pad to clean the wound (Figure 5a–c).

Case 4:

This 71-year-old gentleman presented with type 2 diabetes, chronic obstructive airways disease and chronic venous hypertension. He had a loss of protective sensation, but good arterial circulation demonstrated by palpable foot pulses and biphasic waveforms. The patient lived out of the area and struggled to attend clinic. He required regular debridement of his ulcer to remove slough, dry eschar and serocrusts. A monofilament fibre debridement pad was prescribed and the patient's wife, who was the main carer, was instructed on how

to use the product. The wound was debrided every 3 days. After 5 weeks of self-treatment, the wound was healed (Figure 6a and b).



Figure 6: At the start of treatment with a monofilament fibre debridement pad (a) left; after treatment (b) right.

Conclusion

Debridement is an essential part of DFU management. There are many methods available and it is important that healthcare practitioners select the method that is most appropriate and to be aware that more than one method can be used at any one time. The use of a monofilament fibre debridement pad can play an important role in managing DFUs that require regular, ongoing debridement. While this method does not replace all other debridement techniques, it can facilitate patient access to immediate and rapid debridement across a range of healthcare settings where care is shared. This has the potential to reduce costs, without any loss in care quality or safety, and improve outcomes for patients with diabetes. ■

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