The COLLEGE of PODIATRY

FDUK

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PRINCIPLES OF DEBRIDEMENT: THE DIABETIC FOOT

DEVELOPING A SCOPE OF PRACTICE FOR PODIATRISTS IN THE UK

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The Principles of Debridement: The Diabetic Foot. Developing a Scope of Practice for Podiatrists in the UK

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FOREWORD

Podiatrists are specialists who assess, diagnose and treat disorders, diseases and deformities affecting the feet and lower limb. Specialist areas in podiatry relate mainly to long-term conditions including diabetes, peripheral arterial disease (PAD) and systemic musculoskeletal disorders (such as rheumatoid arthritis) (Society of Chiropodists and Podiatrists, 2010). A range of treatments, including debridement, pharmacology and therapies in conjunction with footwear advice and the provision of orthoses, where appropriate, are used by podiatry services in the NHS and in private practice to manage foot conditions.

The debridement of hyperkeratosis — including corn and callus — and wounds on the lower limb is a core skill of the graduate podiatrist that develops over time. Post-qualification, all podiatrists must be registered with the Health and Care Professions Council (HCPC) to deliver podiatric care.

The Society of Chiropodists and Podiatrists provides comprehensive professional indemnity insurance to members working within its scope of practice. The requirement for this guideline is acknowledgment that podiatry practice has developed considerably and, complex wound management, including debridement, has become an extended scope of practice. The podiatry profession recognises the following clinical areas are most likely to require advanced debridement skills as a key component for the delivery of holistic foot care:

- The specialist management of diabetic foot wounds (including neuropathic, ischaemic, neuroischaemic and post-surgical ulcers)
- Foot ulceration in rheumatologic and connective tissue foot disorders.

Recent guidance from the North West Clinical Effectiveness Group For Rheumatology (2014) has reviewed debridement as applied to the specific areas of rheumatological conditions. Within diabetic foot management, debridement is a key tenet in both prevention and management of ulceration. However, the professional body does not have access to a similar guideline for debridement in the diabetic foot, which is the rationale for this document.

This document has been written and developed by Foot in Diabetes UK (FDUK), which acts as the lead Special Interest and Advisory Group on diabetes for the Society of Chiropodists and Podiatrists and associated committees within the College of Podiatry and, more specifically, the Directorate of Podiatric Medicine.

The guideline sets out to review what podiatrists can do to operate within relevant legal and regulatory frameworks, and how to practise safely and effectively to meet accepted standards of podiatric practice. It provides a framework outlining the competencies and skills for debridement in the lower limb, as well as other anatomical areas, to provide guidance for all podiatrists to practice with confidence. This framework will facilitate benchmarking of existing skill sets, and guidance for the professional development of podiatrists who are keen to become specialists and clinical leaders within diabetic foot care. Many of the competencies are transferable, and the framework can be adapted and used by healthcare professionals involved in other areas of wound care. This can be used in conjunction with the TRIEPodD-UK competency framework (2012), which provides direction to the skills required in diabetic foot management with a suite of dimensions, including clinical, research and leadership components.

Foot in Diabetes UK (FDUK)
on behalf of the College of Podiatry

FDUK expert working group

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Welcome from 'Chair of Foot in Diabetes UK' and the 'Dean of Podiatric Medicine' in the College of Podiatry

The Principles of Debridement: The Diabetic Foot. Developing a Scope of Practice for Podiatrists in the UK was developed in response to the need, identified within the podiatry profession, to clarify what the recognised standards of debridement are in this specialist area of practice. This document covers the whole spectrum of skills required — from basic debridement through to advanced practice levels. In the current climate, podiatrists are recognised leaders of clinical care in this group of patients and our scope of practice has evolved over the years. Therefore, it is essential that we safeguard existing and future clinicians, while providing guidance and structure to benchmark debridement practice.

We believe that this document provides a clear model that can also help future podiatrists be appropriately skilled to manage the patients within their care. This document has gone through a rigorous and multi-professional review from both the College of Podiatry and FDUK committee members. We are certain that it is applicable to all podiatrists currently working in the UK and that you will find this document transferable to your own clinical practice.

We, the Chair and Dean would like this opportunity to thank the 'expert working group', Joanne McCardle, Mike Townson and Jill Cundell for their hard work in developing the document and the committee members who also provided their expertise in the consultation period. It is now over to you, the clinicians, to bring this document to life and you can be assured that your clinical care embraces the recognised and specialised scope of podiatry practice.

Paul Chadwick — Chair, Foot in Diabetes UK (FDUK)
Matthew Fitzpatrick — Dean, Directorate of Podiatric Medicine and General Practice, The College of Podiatry

DEVELOPING A SCOPE OF PRACTICE

Debridement is a skilled procedure and is complicated by many factors including systemic disease/conditions, foot pathology, and patient lifestyles, attitudes, beliefs and behaviours. For podiatrists to carry out debridement within their scope of practice, they must have the required skills, knowledge and experience to practise lawfully, safely and effectively (HCPC, 2013).

As a new graduate, a podiatrist will have competent scalpel skills for the debridement of corn, callus and superficial wounds. It is essential that such individuals have appropriate exposure and experience before carrying out more advanced levels of debridement (e.g. more complex wounds). Therefore, podiatrists must know the limits of their practice and when to seek advice or refer to another health professional. Podiatrists must also be aware of current professional indemnity requirements applicable to the work of their profession (Box 1).

Box 1: Meeting professional indemnity requirements

All debridement of the lower limb must be carried out within an individual's scope of practice as defined by his/her role, functions and responsibilities and decision-making capacity with the person's professional practice (TRIEPoD-UK, 2012).

- **Foot treatment**: Members of the Society of Chiropodists and Podiatrists (SCP) are insured to perform debridement of simple and complex wounds, including removal of callus and hyperkeratotic skin, which are located on the lower limb, distal to the femur.
- **Hand treatment:** With informed consent, podiatrists may also undertake treatment of abnormal fingernails, including nail surgery, the removal of callus, and treatment of warts, where a registered medical practitioner has referred the patient and/or the podiatrist can demonstrate a good knowledge of anatomical structures. It is important to note that it is not a requirement of the podiatrist to undertake procedures on hands; this is an individual's decision dependent upon personal clinical judgement, acquired through practice, experience and knowledge. Those working in the NHS, or other employed situations, must ensure that local rules and protocols are followed. In some areas, completion of a comparative anatomy course may be required before undertaking hand treatment. Some podiatrists, working as part of a multidisciplinary team, may also undertake debridement of wounds and areas of tissue necrosis for patients with complex medical needs such as end-stage renal disease.
- **Stumps and lower limb wounds**: SCP members' insurance extends to the prevention and management of wounds on stumps, above or below knee level, for those who can demonstrate sufficient experience in managing lower limb conditions.

Podiatrists performing debridement are expected to have:

- 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 (see Table 2, page 8)
- Capability to identify viable tissue and differentiate non-viable 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 (see Box 4, page 11)
- Good communication skills to inform the patient of the rationale for all levels of debridement (see page 11).

RATIONALE FOR DEBRIDEMENT

Non-wound debridement (callus)

Abnormal stresses caused by pressure and/or friction to areas of the foot with loss of protective sensation can lead to thickening of the stratum corneum. Hyperkeratotic lesions (callus) that develop on the plantar aspect of the foot further increase pressure and may carry a high risk for ulceration and infection (Murray et al, 1996). This type of callus is highly prevalent in the older person and can be extremely painful, which can negatively affect mobility and independence (Landorf et al, 2013); those with neuropathy may not be aware of even discomfort and therefore may continue to walk on areas of callus, increasing the risk of ulceration. Presence of haemorrhage within the callus (Rosen et al, 1985) is an important precursor/indication of ulceration in patients with neuropathic ulcers (Baker, 2002), warranting immediate investigation.

Management of callus is aimed at preventing or at least delaying ulcer development (Young, 1992; Edmonds, 2000; Baker, 2002; Singh et al, 2005). Regular callus debridement is essential and is usually achieved in podiatry by sharp debridement using a scalpel; other methods of debridement may be used alone, as a precursor or as a follow-up to sharp debridement (Stang, 2013). Callus debridement often needs

to be repeated, especially in high-risk individuals (Piti et al, 1999) and should be provided routinely by trained personnel (Baker, 2002). Patients with evidence of increased plantar pressure should also be encouraged to wear footwear that cushions and redistributes forces. This has been shown to prevent or reduce callus formation and that this may be directly proportional to the amount of time spent wearing proper footwear (Soulier et al, 1987). Patient education and topical application of emollients as part of a daily skin care regimen should be included in standard foot care (Baker et al, 2005).

Wound debridement

The presence of callus, which may surround or 'roof over' an existing ulcer and/or necrotic tissue in the wound bed, warrants special consideration in the diabetic foot (Edmonds and Foster, 2006). Wound debridement is a fundamental component of wound bed preparation (Kamolz and Wild, 2013) and is integral to the management of diabetic foot ulcers. Debridement, along with appropriate cleansing, provides for the removal of all necrotic and non-viable tissue and surrounding callus to promote the formation of healthy granular tissue and to stimulate wound healing (Box 2).

Debridement can be achieved with the use of sharp debridement, hydrosurgical or ultrasound lavage devices or some wound care products. Regular, local, sharp debridement using a scalpel or forceps is considered the 'gold standard' (Wounds International BPG, 2013) and provides a rapid and effective method of wound debridement. Debridement may be a one-off procedure or ongoing for maintenance of the wound bed (Wounds UK, 2013). This can involve a combination of methods for optimal outcomes and the need for further debridement should be determined at each dressing change/foot review.

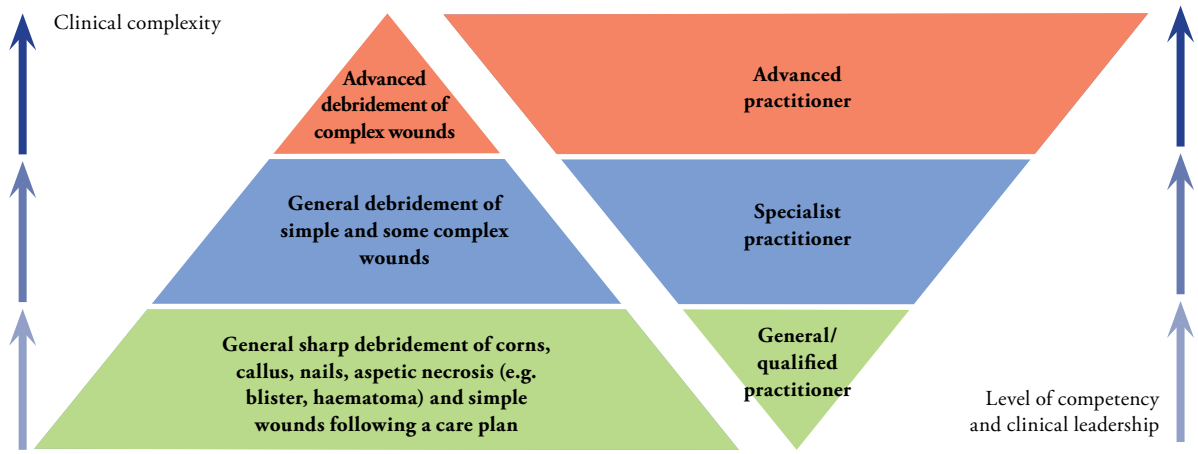
Box 2: The aim of debridement (Baker 2002; Wounds International BPG, 2013)

- Remove necrotic/sloughy tissue and callus
- Reduce pressure
- Allow full inspection of the underlying tissues/bone and extent of the wound
- Help drainage of exudate or pus
- Potentially reduce risk of infection
- Help optimise the effectiveness of topical preparations
- Allow samples to be collected for microbiological examination
- Stimulate wound healing by converting a chronic wound into an acute one.

DEFINING A COMPETENCY FRAMEWORK FOR DEBRIDEMENT

Simple corn and callus reduction carries a lower level of risk and requires registration-level competencies. Complex wound debridement carries a higher level of risk (which increases with complexity of the wound) and podiatrists will need to demonstrate advanced levels of clinical skill (Figure 1). For those who can demonstrate a more advanced

Figure. 1. Roles and defined level of competency and skill in managing the diabetic foot



level of competency — and medical/surgical support is in place — debridement can include extensive removal of soft tissue, digits and other foot structures.

It is important that podiatrists understand their own level of competency and how they can increase these skills to carry out more advanced levels of debridement. Clarity of roles, based on levels of competency (Table 1), ensures interventions are carried out by the most appropriate practitioner in the expected time frames, using a multidisciplinary approach.

This framework is an important tool that may be used by clinicians to benchmark existing competencies and identify areas in which to develop their debridement skills. It can provide assurance that patients will be treated by a clinician with competencies specific to the management of the diabetic foot, relative to their level of need. It can also be used to plan services, ensuring the right mix of competency and provide appropriate professional development activities with the aim of improving outcomes in patients with foot disease (TRIEPoD-UK, 2012).

DEMONSTRATING COMPETENCIES FOR SAFE PRACTICE

Given the changing environment of the NHS and private sector, it is important that individual podiatrists review their current practice requirements and public safety considerations to ensure their knowledge and skills are up to date. Considerations include evidence-based practice, increasing collaborative work between healthcare professionals and interdisciplinary service models. Quality improvements, accountability, legislative and ethical considerations are also important, as is the need to develop and update practice through continuous reflection and career-long learning to provide the highest level of care to patients.

Wound debridement skills should be assessed along with continuing education and training (Wounds UK, 2013). Practical debridement skills may be gained by first observing a competent practitioner performing the procedure, and then performing the techniques under supervision. In addition, critical reflection, peer support/mentoring and other

1. SKILLS AND KNOWLEDGE

Competency framework for debridement outlining the skills and knowledge necessary to care for patients with diabetic foot wounds	
Level F: Consultant level podiatrist or practitioner	• Provides clinical leadership in advanced wound debridement techniques • Leads in the establishment of working relationships with surgical staff responsible for surgical debridement • Provides expert opinion on debridement products, techniques and indications in local and national expert groups • Leads in the evaluation of novel wound care products
Level E: Advanced practitioner	• Able to carry out advanced debridement (with a range of debridement tools) of complex wounds within their scope of practice • Able to carry out advanced wound management techniques (e.g. negative pressure wound therapy) • Able to make complex decisions regarding choice of appropriate debridement method while considering individual patient circumstances • Recognises the need and refers the patient for surgical debridement appropriately • Supports less-experienced colleagues in developing advanced debridement skills
Level D: Specialist practitioner	• Able to carry out general debridement of simple and complex wounds within their scope of practice • A broad knowledge of and experience in using debridement techniques other than sharp debridement (e.g. mechanical, larvae, hydrosurgical) • Appropriately recognises the need and refers the patient for advanced debridement appropriately • Critically analyses wound care interventions to develop evidence-based, individualised care plans • Carries out advanced wound management techniques with appropriate support and supervision
Level C: General/newly qualified practitioner	• Understands the principles of debridement in preventing foot complications (e.g. removal of callus to reduce plantar pressures and reduce likelihood of tissue damage) • Understands the principals of debridement and the association with wound management • Able to carry out sharp debridement in the intact foot • Able to carry out wound management techniques (e.g. general sharp/mechanical debridement, wound irrigation) in simple wounds, not complicated by systemic disease • Recognises the need and refers the patient for advanced wound management and multidisciplinary care (of any non-healing or complex wound) in line with national guidance

[adapted from TRIEPodD-UK, 2012]

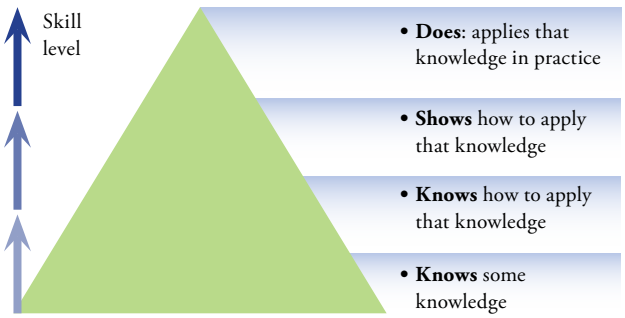
feedback provide effective strategies for continually improving knowledge and manual skills. Transition from basic to advanced debridement skills can be learned only by regular exposure and experiential practice.

There are no current recognised methods of demonstrating competency. All podiatrists graduate with a basic knowledge and ability to practise safely. However, it is recommended that podiatrists demonstrate and record advancing levels of competency in a range of debridement techniques as follows:

- Portfolio — to provide a record of clinical and professional skills, e.g. based on a review and reflection of own practice
- NHS Knowledge and Skills Framework — to identify the knowledge, core skills and development needed for staff to do their job
- Annual performance development review (PDR) — to demonstrate evidence of continuing professional development (e.g. using the KSF as a development tool)
- Continuing professional development events
- Shadowing and peer mentoring.

As there are no formal competency assessment tools, assessment in the clinical situation provides the most reliable evidence of skill level (Miller, 1990) (Figure 2).

Figure. 2. Demonstrating advancing levels of competency



DEBRIDEMENT METHODS: INDICATIONS AND SKILL LEVELS

Podiatrists must be aware of debridement methods other than sharp debridement, as well as adjunctive therapies, although they may not have developed these competencies on graduation. Other methods of debridement include autolysis, debridement using a monofilament pad (mechanical), larvae, hydrosurgical and ultrasound therapy, which are starting to challenge traditional methods (Madhok et al, 2013). Each of these debridement techniques has different indications for use and requires a different skill level (Table 2, page 8). Methods of debridement, other than sharp debridement, may be used as an alternative or adjunctive technique in the following situations:

- As an interim measure (e.g. by practitioners without the necessary skill sets to carry out sharp debridement)
- When sharp debridement is contraindicated or unacceptably painful
- When the clinical decision is that another debridement method is more beneficial for the patient
- When the patient has expressed a preference.

The evidence for the effectiveness of different methods of debridement from randomised controlled trials is weak (Smith, 2002; Edwards and Stapley, 2010); most existing studies are often limited in their methodology and lacking in statistical significance (Lebrun et al, 2010). However, wound debridement is seen as an important adjunct in the care of the patient with diabetes (Table 3, page 9).

Recent consensus opinion states that the method of debridement selected must be the most effective for the patient and that this choice should not limited by the skills of the practitioner (Gray et al, 2010). Failure to debride wounds appropriately could be considered failure to provide proper treatment (Wounds UK, 2013). In all cases, the rationale for debriding wounds (or not) should be documented.

Ultimately, podiatrists need to use their experience, expertise and judgement in evaluating the type and level of debridement that is safe and effective. This must include a good understanding of anatomy to avoid damage to viable structures such as tendon, nerves and arteries during debridement. For patients with deeper wounds and/or where there is a higher risk of damage to vitality or functionality of important structures, debridement should be performed by an experienced specialist in consultation with the specialist multidisciplinary team (MDT) to avoid clinical risks (Haycocks and Chadwick, 2012).

The choice of a debridement technique is a risk assessment process that takes into account the following safety factors:

- Amount and type of devitalised tissue to be removed
- Environment in which the debridement will be undertaken
- Availability of debriding equipment
- Time/speed required to remove the devitalised tissue
- Pain caused during the debridement process
- Skill and knowledge of the clinician undertaking the debridement (Benbow, 2011).

2. WOUND DEBRIDEMENT TECHNIQUES

Method	Mode of action	Indications	Contraindications	Skill level/setting	Evidence-base
Autolytic	A highly selective natural process that uses occlusive or semi-occlusive moist wound dressings (e.g. hydrogels, hydrocolloids, honey) to soften and remove devitalised tissue. Wet, sloughy wounds do not require additional moisture and alginate/gelling fibre dressings are best suited to aid autolysis in this situation. This is a relatively slow method of debridement (Strohal et al, 2013)	• Can be used for pre-debridement when there are small amounts of non-viable tissue • For painful wounds when other methods are not indicated • Can be used for maintenance debridement or as an adjunct to other debridement methods	• Application of moisture-retentive dressings is not advised in the presence of ischaemia and/or dry gangrene (Game, 2008) • Infected wounds as the sole method of debridement	• Low levels of skill and knowledge required — advice should be sought for high-risk individuals • Can be used in patient's home, GP surgery or inpatient setting	• Systematic review concluded that hydrogels increased healing rates in diabetic foot ulcers compared to dry gauze (Smith, 2002) • Routine use of honey is not supported by evidence (Jull et al, 2013). Monitoring of blood sugars during use is recommended (BNF, 2014)
Mechanical	Traditional wet-to-dry methods are not recommended in the UK. Monofilament polyester fibre pad (Debrisoft; Activa Healthcare Ltd) can be used to remove devitalised tissue, debris and hyperkeratosis. It also binds and absorbs debris within its fibres, removing devitalised tissue and leaving healthy tissue and structures intact (Fumerola, 2012)	• Superficial wounds • Removal of hyperkeratosis • To facilitate initial assessment (e.g. where slough or necrotic tissue present) • For maintenance debridement and as an adjunct or alternative to other debridement methods	• Wounds with black necrosis/hard eschar or where slough has adhered to the wound bed (NICE Technical Appraisal, 2014)	• Minimal training required — advice should be sought for high-risk individuals • Convenient and easy to use in patient's home, GP surgery or inpatient setting	• A number of smaller prospective pilot, non-comparative studies and case series indicate good debridement results after single use on a variety of tissue types, such as slough and necrosis (Young, 2012) • Debrisoft has been shown to be a rapid and effective method to remove devitalised tissue, debris and hyperkeratotic skin (NICE Technical Appraisal, 2014)
Larval therapy (biosurgical)	Highly selective and rapid method using larvae of green bottle fly (*Lucilia sericata*) to remove moist slough, necrosis and devitalised tissue. Can also ingest pathogenic organisms in wound (possible antimicrobial and wound stimulation effects) (Nigam, 2013). Larvae are available loose or in a 'bagged' dressing (BioMonde)	• As an adjunct to sharp debridement or to accelerate debridement in patients not suitable for sharp or surgical debridement • Infected wounds, including those with methicillin-resistant *Staphylococcus aureus* (MRSA) and beta haemolytic streptococcus (Bexfield et al, 2008)	• Not recommended as the sole method of debridement for neuropathic DFUs, as larvae cannot remove callus (Game, 2008) • Caution is advised in those with highly exuding wounds, patients with clotting issues and wounds requiring occlusion	• Decision must be taken by an appropriate specialist practitioner with appropriate level of skill and competence, but the technique can be carried out by practitioners with minimal training	• May provide a valuable alternative to surgical/sharp debridement (Gottrup and Jorgensen, 2011) • Meta-analysis of four studies (n=356) suggest that larval therapy is significantly superior to standard care in the percentage of DFUs achieving full healing, amputation rate time to healing and antibiotic use (Tian et al, 2013)
Ultrasonic	Selective and immediate method that delivers ultrasound either directly to the wound bed or via an atomised solution. Low-frequency ultrasound provides a gentle maintenance debridement (Waldrup and Serfass, 2008)	• Complex diabetic foot ulcers where it is of paramount importance that wound healing be achieved as quickly as possible to minimise risk of amputation	• Patients with vascular abnormalities, haemorrhagic conditions, malignancies and tissue previously treated with radiation, deep X-ray or irradiation	• High-frequency ultrasound requires specialist training and the device used in a controlled environment • Low-frequency ultrasound does not require specialist training and can be used in the community setting	• High-frequency ultrasound does not appear to improve healing rates (Madhock et al, 2013) • Low-frequency ultrasound has demonstrated faster healing times in patients with chronic wounds (Ennis et al, 2006; Voigt et al, 2011)

2. WOUND DEBRIDEMENT TECHNIQUES *CONTINUED*

Method	Mode of action	Indications	Contraindications	Skill level/setting	Evidence-base
Hydrosurgical (jet lavage)	Selective and highly-controlled removal of dead tissue using a high-speed stream of saline beam to create a localised vacuum that cuts and removes tissue (e.g. Versajet, Smith and Nephew). Allows for precise visualisation of the wound bed (Haycock and Chadwick, 2012)	• Complex diabetic foot ulcers where it is of paramount importance that wound healing be achieved as quickly as possible to minimise risk of amputation	• Patients receiving anticoagulant therapy	• For use in specialist centres where the expertise is available to use the equipment • Should be performed in a controlled environment due to potential for aerosol spread (Bowling et al, 2011)	• RCT found hydrosurgery to be quicker (by nearly 7 minutes per procedure) than surgical debridement, although median time to wound closure was similar in both groups (Caputo et al, 2008)
Sharp	Selective and quick method to remove callus and dead or devitalised tissue in the wound bed using a scalpel and/or forceps to just above the viable tissue level. Can be repeated several times over a course of treatment	• Complex diabetic foot ulcers where it is of paramount importance that wound healing be achieved as quickly as possible to minimise risk of amputation	• Patients receiving anticoagulant therapy • Those with poor vascular status	• Decision should be made by MDT and vascular status known • Should be performed by practitioners with appropriate training and competency and in a suitable environment	• Generally considered the 'gold standard' method in diabetic foot ulcers (Edwards and Stapley, 2010; Wu et al, 2007)
Surgical	The most direct form of debridement involving excision or wider resection of non-viable tissue, including removal of healthy tissue from the wound margins until a healthy bleeding wound bed is achieved	• Complex diabetic foot ulcers where it is of paramount importance that wound healing be achieved as quickly as possible to minimise risk of amputation	• Patients who are not able to receive anaesthesia	• Decision made by MDT for surgeons and podiatrists with appropriate training	• No significant benefit over standard treatment (Edwards and Stapley, 2010). Although rationale for surgical debridement seems logical, evidence for its role in enhancing healing is deficient (Lebrun et al, 2010)

3. EVIDENCE FOR DEBRIDEMENT IN DIABETIC FOOT ULCERS

Authors	Title of paper	Method	Outcomes
Wilcox et al (2013) *JAMA Dermatol* 149(9):1050–8	Frequency of debridements and time to heal: a retrospective cohort study of 312,744 wounds	To investigate healing outcomes and debridement frequency in a large wound data set (19% diabetic foot ulcers)	Frequent debridement healed more wounds in a shorter time (P<0.001)
Edwards and Stapley (2010) Cochrane Database Sys Rev 1: CD003556	Debridement of diabetic foot ulcers	Review of six RCTs assessing effectiveness of a hydrogel, surgical debridement and larval therapy	Hydrogels were found to be significantly more effective than gauze or standard care in healing diabetic foot ulcers. Larval therapy resulted in a more than 50% reduction in wound area compared to hydrogel. Surgical debridement showed no significant benefit over standard treatment
Smith J (2002) Cochrane Database Syst Rev 4: CD003556	Debridement of diabetic foot ulcers	Systematic review (5 RCTs) of debridement in diabetic foot ulcers	Hydrogels are significantly more effective than gauze or standard care. Surgical debridement and larval therapy showed no significant benefit in these small trials
Steed et al (1996) *J Am Coll Surg* 183(1): 61–4	Effect of extensive debridement and treatment on the healing of diabetic foot ulcers. Diabetic Ulcer Study Group	Randomised prospective, double-blind, multicentre trial (n=118) comparing recombinant human platelet-derived growth factor or placebo. All patients had aggressive sharp debridement before randomisation and repeat debridement of callus and necrotic tissue as needed	There was a lower rate of healing observed in those centres that performed less frequent debridement. This was independent of the treatment group. Wound debridement was seen as a vital adjunct in the care of patients with diabetic foot ulcers

CREATING A SAFE ENVIRONMENT FOR DEBRIDEMENT

Wound debridement should be performed in a safe environment under aseptic conditions, according to local protocols, to prevent the spread of infection and maintain asepsis (Kamolz and Wild, 2013). The Aseptic Non-Touch Technique (ANTT) is the most commonly used model for reducing healthcare-associated infections (Rowley and Clare, 2011). This includes a non-touch technique whereby single-use sterile components (or reusable sterile instruments/devices) are opened onto a sterile area, and direct contact with key parts and key sites is avoided (Rowley and Clare, 2011). All attempts should be made to maintain cleanliness and avoid infection, referring to local policies where appropriate (Leek, 2012). Box 3 provides a guide to the steps that should be followed to create a safe environment.

ANNT should be applied to any clinical setting. However, when working in the community and domiciliary setting, specific equipment may not be available (e.g. dressing trolleys) so an alternative clean surface should be used to create a sterile field. In a health centre or GP surgery where care is shared, aseptic procedures should be carried out in a designated 'clean' treatment room.

Infection control policies are established to safeguard patients. Any adverse events should be documented according to local policies and incidents reported using standard protocols.

In addition, practitioners should be aware of policies for preventing and managing needlestick and sharps injuries to minimise risks of contamination of blood-borne viruses.

DEBRIDEMENT AS PART OF AN OVERALL MANAGEMENT PLAN

Debridement is often the first component of care and must be viewed as part of an overall management plan, involving a comprehensive patient assessment and diagnosis, development and application of a treatment plan, evaluation and reassessment.

Where appropriate, decisions about debridement of active ulceration should be made with the patient and in the context of a multidisciplinary approach, with individual clinicians delivering specific elements of care based on their skills, knowledge and competency (Diabetes UK, 2009; SIGN, 2010; NICE, 2011). Where there is access to a specialist MDT, there is evidence to show reductions in amputation rates and costs of diabetic foot care (Krishnan et al, 2008).

Box 3: Guide to creating a safe environment for wound debridement

- Choose a suitable room for the procedure, with adequate lighting, disposal facilities and availability of equipment.
- Close all windows and doors to prevent cross-contamination and turn off fans/air conditioning before the procedure to allow the air to settle.
- Decontaminate all surfaces including examination couches, dressing trolleys and examination lamps before individual procedures.
- Ensure basic infection control precautions such as effective hand cleansing and decontamination are performed in accordance with local hand hygiene policies and guidelines (www.who.int/gpsc/5may/Your_5_Moments_For_Hand_Hygiene_Poster.pdf).
- Assess what sterile instruments, equipment (e.g. scalpel handle, forceps, probe) and other items (e.g. wound swab, scalpel blade, sample tubes) will be required for the procedure. These should be assembled onto the sterile field including any solutions, devices or dressings required. More than one scalpel may be required if debriding different wounds in the same procedure to avoid cross-contamination.
- Wear appropriate personal protective equipment (e.g. single-use, disposable gloves, goggles, mask and apron) to protect from exposure to blood or body fluids. If it is not necessary to touch key parts of the equipment (i.e. the parts that come into direct contact with the wound) non-sterile gloves may be worn. Consider two sets of gloves — one for debridement and one for applying dressings.
- Good lighting and optimisation of practitioner position to prevent musculoskeletal injuries.
- Place any used instruments on the secondary (non-sterile field) and dispose of any sharps and waste according to the waste disposal policy.
- Consider the use of dressing packs where available.
- All procedures should be documented in the patient's health records and photographs taken where appropriate and in line with local policies and procedures.

Integrated assessment

All patients should undergo a comprehensive assessment comprising a neurological assessment to identify loss of protective sensation, vascular assessment to define the overall lower extremity status, a full patient history, general inspection of the feet, and a dermatological and musculoskeletal assessment, e.g. to determine the presence of any callus and/or foot deformity.

For those with an existing ulcer, first assess the predominant aetiology of the wound — neuropathic,

Box 4: Checklist for wound debridement decisions

Aim/treatment goals

Is debridement appropriate for this wound? Is the wound likely to heal?
If **NO** (e.g. the patient has ischaemia/the wound is going to auto-amputate) ➔ **KEEP DRY AND DO NOT DEBRIDE**
If **YES** and a conservative approach is indicated (e.g. to stablise the wound) ➔ **INITIATE MOIST WOUND HEALING (AUTOLYTIC DEBRIDEMENT)**

If **YES** and an accelerated approach is indicated (i.e. to promote faster healing) ➔ **CONSIDER MORE RAPID METHODS**:

- ☐ Is non-viable tissue delaying healing?
- ☐ Does the wound edge/periwound skin or wound bed require accelerated debridement?
- ☐ Is acceleration of debridement going to help management of infection in this wound?
- ☐ Is acceleration of debridement in the best interests of the patient at this time?
- ☐ Do I have means of obtaining haemostasis and collecting tissue samples for microbiology?
- ☐ Am I certain what to do?

NO ➔ CONSULT MDT BEFORE PROCEEDING
YES ➔ ACCELERATE DEBRIDEMENT

Debridement options

Having assessed speed of debridement necessary, select appropriate debridement method based on assessment of patient/wound:

- ☐ Have I discussed the debridement options with the patient/family members?
- ☐ Have I provided appropriate patient education to make an informed choice?
- ☐ Has the patient given consent?
- ☐ Do I have the necessary skills to perform the chosen method of debridement?
- ☐ Am I confident in what I am doing? **NO ➔ REFER**
- ☐ Can I make things worse/do harm? **YES ➔ REFER**
- ☐ Is the current environment safe to undertake debridement?

YES ➔ DEBRIDE

- ☐ Have I got access to the necessary resources/equipment?
  YES ➔ DEBRIDE
  NO ➔ REFER or PLAN RESOURCES/EQUIPMENT

Expected outcomes

Create a treatment plan with short- and long-term goals and assess:

- ☐ Will the intervention remove the non-viable tissue in one go or will it be a gradual/staged process? **SET DATE FOR REVIEW**
- ☐ Does the debrided wound need another therapy (e.g. negative pressure wound therapy or skin grafting? **YES ➔ SET DATE FOR REVIEW**

Options at every stage

Check clinical guidelines/local policies
Seek advice from the specialist MDT
Refer to another practitioner for debridement as appropriate

ischaemic or neuroischaemic — as determined by current vascular and neurological assessments (Wounds International, 2013) and presenting factors that inhibit normal wound healing, including the amount of tissue to be removed. Document the wound size, shape, depth and position, signs of infection and MRSA status.

Wounds that have a good vascular supply can support more-aggressive debridement, while wounds with a reduced vascular supply need to be carefully assessed for the level of debridement they can support to prevent further damage;. The latter requires joint working with the vascular team. Box 4 provides a checklist for debridement decisions to support the debridement process.

Patient choice and consent

Podiatrists must explain fully to patients the risks and benefits of debridement before performing the procedure and ensure that there is a care plan in place with planned follow-up appointments. This conversation should include a discussion of various debridement options and potential outcomes for debridement techniques, e.g. reduction in risk of wound infection and the possibility of the wound becoming larger in size (Haycocks and Chadwick, 2012). This should be tailored to the individual patient's need with consideration given to alternative or adjunct treatments and pain control required for the chosen method (Leek, 2012).

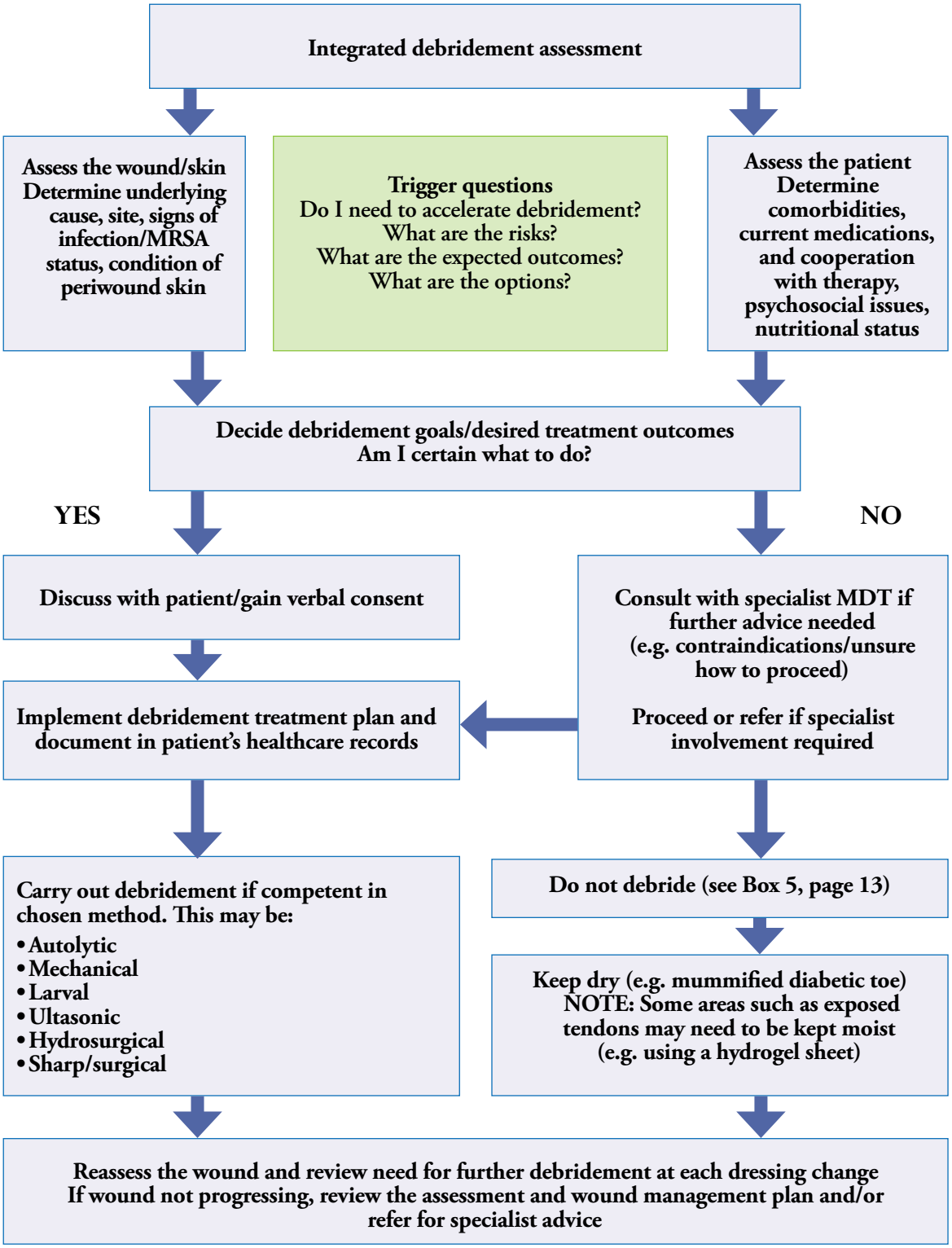
Good interpersonal communication skills appropriate for diverse patient/client groups are important to ensure the patient has a good understanding of what to expect. Simple, written information that clearly explains the nature, indications, benefits and risks of treatment may also help the patient to decide how they want their care or treatment to proceed (Haycocks and Chadwick, 2008; Young, 2012).

Informed consent of the patient should be obtained. If this is not possible, e.g. due to lack of capacity, practitioners should follow local guidance. Verbal consent is usually sufficient for a single procedure or course of treatment (SCP, 2010). However, if there is a risk to the wellbeing of patients, or treatment may cause pain or suffering, signed consent should be sought (SCP, 2010). This may include radical sharp debridement or procedures such as hydrosurgery/jet lavage, or where deeper structures (e.g. tendon and bone) are involved.

Where consent is given, this should be documented appropriately in the patient's health records with a clear rationale provided in accordance with applicable legislation, trust protocols and guidelines. When a patient refuses a certain type of debridement, an alternative method should be chosen if appropriate.

Where the patient is considered to be a vulnerable adult, follow the local mental health guidance and safeguarding policy and document outcomes in the patient's records.

Figure. 3. Wound debridement pathway for podiatrists



Involvement of the specialist MDT

Effective management of foot disease in diabetes requires collaboration between primary (community), secondary, tertiary (e.g. vascular, diabetes, orthopaedics and renal services) and social care as well as private practice. Established clinical guidelines state that specialist podiatric intervention and podiatrists are key members of the multidisciplinary foot care team (NICE, 2004; Diabetes UK, 2009).

All new foot emergencies, including active ulceration, should be referred within 24 hours (NICE, 2011) or one working day (SIGN, 2010). NICE also recommends that debridement be performed only by health professionals from a multidisciplinary foot care team, using the technique that best matches their specialist expertise and clinical experience, patient preference and the site of the ulcer. In the event of ulceration, a named consultant should be accountable for the overall care of the patient and for ensuring that health professionals provide timely care (NICE, 2011).

Formal care pathways for debridement containing referral triggers can facilitate MDT decision-making and referral to appropriate specialists (Figure 3, page 12). Where patients are referred, all professional advice and guidance should be documented in the patient's records. Not referring a patient to specialist staff for skilled debridemen — or choosing the wrong method of debridement, including not knowing when not to debride (Box 5) — can cause harm to the patient, reduce patient satisfaction with treatment and increase costs to the NHS. It is therefore important that the MDT informs all local providers of referral triggers to promote rapid access to specialist services.

Box 5: When not to debride

Not all necrotic tissue should be debrided. In ischaemic diabetic foot ulcers with dry necrosis or gangrene, without infection, the necrotic tissue should remain in place over a wound when it may play a role in auto-amputation (mummification). However, if moist, wet or evidence of periwound autolysis or underlying bogginess, careful debridement is indicated.

Debridement is generally not recommended for arterial ulcers (Miller, 1996) and for patients with ischaemic disease without prior vascular intervention (Ramundo and Wells, 2000). However, minimal debridement may be beneficial in certain cases and should be considered within the context of the multidisciplinary team.

In a patient with a terminal disease, debridement may not be indicated to avoid further discomfort to the patient.

SUMMARY

Modern podiatry services have developed in collaboration with private practice and community services with a focus on maintaining high quality foot care. As the scope of practice for podiatrists has expanded, there has been a need to further clarify roles to ensure interventions such as debridement are carried out safely and effectively.

This document provides guidance to those working in this field with the aim of supporting best practice and providing a framework for continuing professional development in the principles of debridement. ■

Definitions and classifications

For the purposes of this document, the following definitions apply:

Debridement refers to the removal of dead, non-viable/devitalised tissue, including necrotic material, eschar, serocrusts, infected tissue, hyperkeratosis, slough, pus, debris, bone fragments or any other type of foreign material/bioburden from the wound with the objective to promote wound healing (Wounds UK, 2013; Strohal et al, 2013). In podiatric practice, debridement also refers to the removal of callus, corns, verrucae/warts and nails.

In addition, debridement should be clearly differentiated from cleansing, which is defined as the removal of dirt (e.g. by loosening or washing away of cellular debris). Debridement does not include revision of a wound, resection of functional tissue or amputation (Kamolz and Wild, 2013).

Assessment of the skin and/or tissue types in the wound bed informs management, including decisions about when to decide and which method of debridement to choose. Wounds may be classified as follows:

- Superficial wound: involves loss of the epidermis only. Where there is also involvement of the upper dermis, this may be described as a partial-thickness wound
- Deep wound: involves skin and subcutaneous tissue loss with possible penetration to bone or tendon.

In addition to tissue depth, wounds may be simple or complex:

- A simple wound is one where there is damage to the epidermal layer of the skin, including discolouration due to pressure damage.
- A complex wound is where one or more complicating factors, e.g. exudate, infection, comorbidity and polypharmacy (Vowden, 2005) which determine to a great extent its ability to heal. Most diabetic foot wounds are complex and in most patients peripheral neuropathy and peripheral arterial disease play a central role and diabetic foot ulcers are therefore commonly classified as neuropathic, ischaemic or neuroischaemic (mixed aetiology).

The presence and extent of various physical characteristics (such as size, depth, appearance and location) can be used to classify or grade ulcers. This can assist in the planning and monitoring of treatment and in predicting outcome (Frykberg, 2002; Oyibo et al, 2001), as well as for research and audit. The key features of common wound classification systems for diabetic foot ulcers are shown in Table 4.

Classification systems should be used consistently across the healthcare team and recorded appropriately in the patient's records. However, it is the assessment of the wound and/or skin that informs management.

4. WOUND CLASSIFICATION SYSTEMS FOR DIABETIC FOOT ULCERS

Classification system	Key points	Pros/cons	References
Wagner	Assesses ulcer depth along with the presence of gangrene and loss of perfusion using six grades (0–5)	• Well established (Oyibo, 2001) • Does not fully address infection and ischaemia	Wagner, 1981
University of Texas	Assesses ulcer depth, presence of infection and presence of signs of lower-extremity ischaemia using a matrix of four grades combined with four stages	Well established (Oyibo 2001) Describes the presence of infection and ischaemia better than Wagner and may help in predicting the outcome of the DFU. Does not address neuropathy	Lavery et al, 1996
PEDIS	Assesses Perfusion, Extent (size), Depth (tissue loss), Infection, Sensation (neuropathy) using four grades (1–4)	Developed by the International Working Group on Diabetic Foot (IWGDF) User-friendly (clear definitions, few categories) for practitioners with less experience with diabetic foot managment	Lipsky et al, 2012
SINBAD	Assesses Site, Ischaemia, Neuropathy, Bacterial infection and Depth Uses a scoring system (0–6) to help predict outcomes and enable comparisons between different settings and countries	Simplified version of the S(AD)SAD classification system (Treece et al, 2004) Includes ulcer site, as data suggest this might be an important determinant of outcome (Ince et al, 2007)	Ince et al, 2008

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