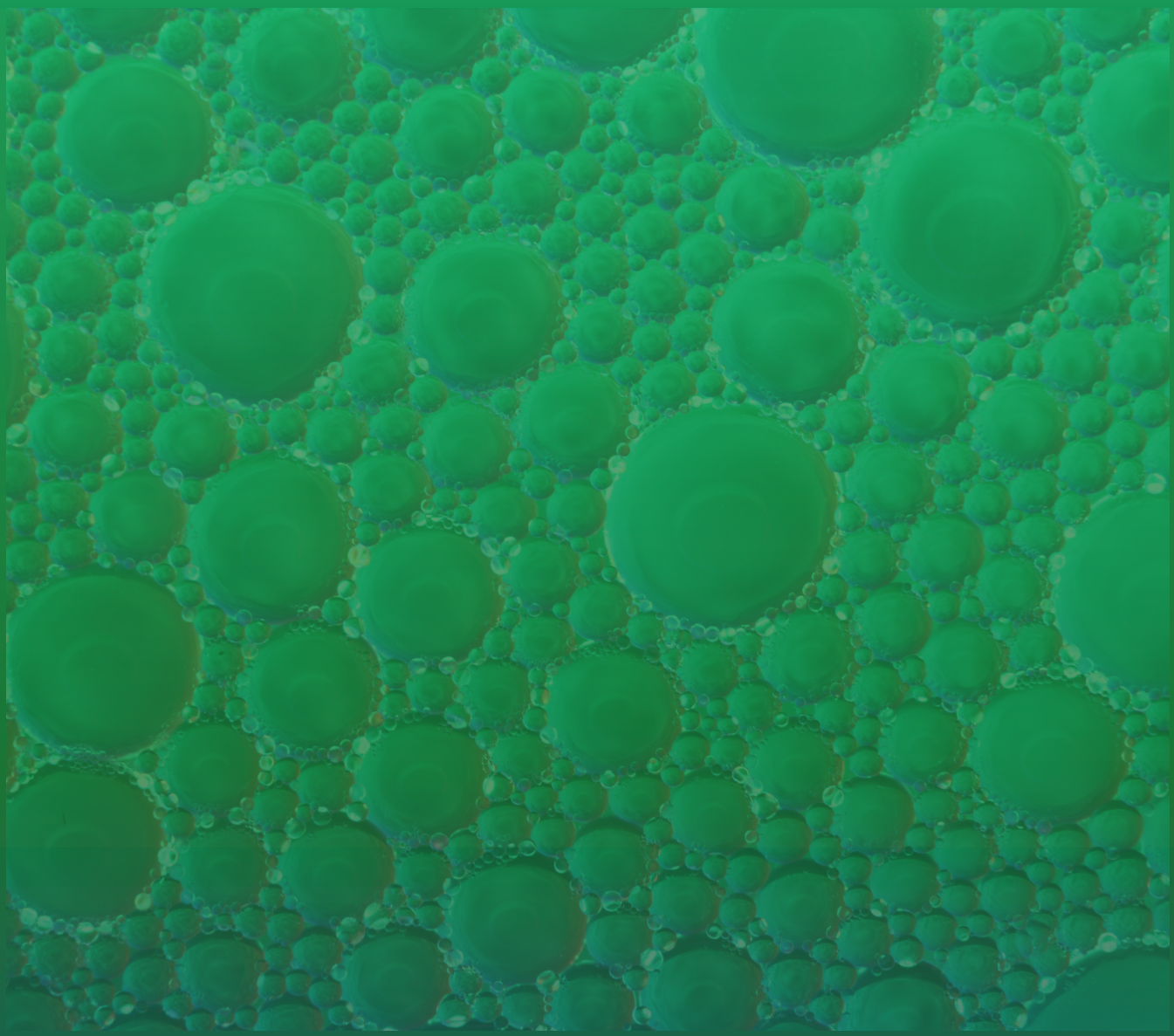

AUTOLYTIC CONTINUOUS DEBRIDEMENT WITH A FOCUS ON BIOFILM MANAGEMENT: CONSENSUS DOCUMENT FOR THE APAC REGION

WOUNDS | INTERNATIONAL

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Expert panel

Harikrishna KR Nair (Chair), Professor and Head of the Wound Care Unit, Department of Internal Medicine, Kuala Lumpur Hospital, Kuala Lumpur, Malaysia; President, World Union of Wound Healing Societies

Subramanian Balasubramaniam, Medical Officer, Head of Wound Unit, Kajang Hospital, Kajang, Malaysia

Nicoletta Frescos, Podiatrist, Northern Health and Adjunct Lecturer, School of Allied Health, Human Services and Sport, La Trobe University, Melbourne, Australia

Rajeev Singh, Director and Founder, Murari Healthcare Centre, S L Raheja Hospital, Mumbai, India

Gulapar Srisawasdi, Physiatrist and Pedorthist; Director, Sirindhorn School of Prosthetics and Orthotics, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand; President, Asia-Pacific Association for Diabetic Limb Problems

Dr Sanjay Vaidya, Professor of Diabetic Foot Surgery (MUHS), Consultant Plastic and Diabetic Foot Surgeon, SL Raheja Hospital, Hinduja Hospital, Founder of Feet First Clinics, Mumbai, India

Francis Wong, Consultant, Department of Orthopaedic Surgery, Sengkang General Hospital, Singapore

Review panel

Professor Wuquan Deng, Professor of Endocrinology and Deputy Dean, Department of Endocrinology and Metabolism, Chongqing Diabetic Foot Medical Research Centre, Chongqing University Central Hospital, Chongqing Emergency Medical Centre, Chongqing University, Chongqing, China

Tran Quang Nam, Associate Professor, MD, PhD, Department of Endocrinology, University Medical Center, Ho Chi Minh City, Vietnam

Karen Ousey, Professor of Skin Integrity; Director for the Institute of Skin Integrity and Infection Prevention, Department of Nursing, University of Huddersfield, United Kingdom

Steven L Percival, BSc, PGCE, MSc, MSc, PhD, CEO, 5D Health Protection Group Ltd, Professor (hon), Faculty of Biology, Medicine and Health, University of Manchester, United Kingdom

Terry Swanson, NPWM, MHSc, FMACNP, Fellow AWMA; Chair International Wound Infection Institute (IWII); Wound Education Research Consultancy; Victoria, Australia

Dot Weir, Wound Clinician, Saratoga Hospital Center for Wound Healing and Hyperbaric Medicine, Saratoga Springs, New York, United States

Foreword

Debridement is a key step in wound bed preparation (WBP), removing barriers to healing and facilitating successful treatment. Autolytic debridement—through topical treatment or wound dressings—may be an ideal option for many patients and their wounds.

As well as removing dead tissue, slough and debris from the wound, continuous debridement can play an important role in biofilm management. With biofilm present in most chronic wounds, debridement for biofilm disruption represents a key step.

A panel of experts in the Asia-Pacific (APAC) region met in March 2024, in Bangkok, Thailand, to discuss autolytic continuous debridement with a focus on biofilm management. There are issues and challenges unique to the APAC region that were discussed during the meeting. This consensus document represents the information and guidance agreed on by the expert panel.

The aims and objectives of this document are:

- To provide a clear overview of the importance of debridement
- To provide guidance on debridement methods and techniques, and product selection in practice, with a focus on autolytic debridement
- To address challenges in practice and how effective debridement can be incorporated into practice in different patient groups and a variety of care settings
- To guide practice through a practical care pathway
- To identify gaps and potential needs for the future.

With the global burden of wounds growing exponentially, and with significant challenges in practice unique to the APAC region, the overall aim of this document is to increase knowledge and confidence for clinicians and ultimately improve outcomes and experiences for all patients living with a wound.

Harikrishna KR Nair, Chair

Overview of debridement

Debridement is defined as 'the removal of non-viable tissue, including necrotic material, slough, microorganisms, biofilm and contaminants from or adjacent to a wound' (International Wound Infection Institute [IWII], 2022). It is a key step in wound bed preparation (WBP) and an important consideration in all wounds, especially when necrotic tissue, slough or other non-viable tissue is present in the wound bed.

Non-viable tissue can be found in acute wounds (e.g. dehisced surgical wounds, skin tears, burns and other traumatic wounds), as well as in chronic wounds, such as diabetic foot ulcers (DFUs), venous leg ulcers (VLUs), pressure ulcers (PUs; also known as pressure injuries) and ischaemic ulcers (Percival and Suleman, 2015). For more information on non-viable tissue, see **Box 1**.

Chronic wounds

A chronic wound (also known as non-healing, hard-to-heal or complex) is defined as a wound that progresses slowly through the healing phases or displays delayed, interrupted or stalled healing. Inhibited healing may be due to intrinsic and/or extrinsic factors that impact the person, their wound and their healing environment (IWII, 2016; 2022). There are wounds of certain aetiologies, such as DFUs **[Figure 1]**, that are likely to be chronic and contain non-viable tissue and slough **[Figure 2a–d]** that harbour microorganisms and increase the risk of infection (Nair et al, 2022). These wounds are more likely than others to require debridement as a matter of course.

How debridement aids wound healing

Non-viable tissue, particularly necrotic tissue **[Figure 3a–f]** and slough, creates an abnormal wound environment that can interfere with the wound healing process (Vowden and Vowden, 2011). This environment hinders the migration of healthy cells and the formation of new blood vessels, impeding the wound's ability to progress towards healing. Additionally, non-viable tissue serves as a source of nutrients for bacteria (e.g. aerobic, microaerophilic and anaerobic) to multiply (Manna et al, 2023). This promotes microbial proliferation and enhanced biofilm formation, while also reducing the effectiveness of topically applied antibiotics and antiseptics (Anghel et al, 2016; IWII, 2023).

For wound healing to occur, the molecular and cellular environment of the wound must resemble that of a healing acute wound (Schultz et al, 2003; Thomas et al, 2021). The primary goal of debridement is to remove non-viable tissue, including senescent cells, from the wound bed, eliminating barriers to healing and promoting processes such as re-epithelialisation, angiogenesis, granulation tissue formation, and extracellular matrix development (Manna et al, 2023). It also helps reduce bioburden, including biofilm, and stabilises the microbiome of the periwound skin, creating a more favourable environment for healing and reducing the risk of recurring infection (Young et al, 2013; Sen et al, 2021; Thomas et al, 2021). Debridement effectively transforms a chronic wound environment into an acute one, restoring the wound to a normal healing trajectory. Therefore, debridement is an important step in infection prevention, management and biofilm removal (IWII, 2023).

Debridement as part of wound assessment

An additional benefit of debridement is that it allows the clinician to accurately assess the full extent, severity and dimensions of a wound. Without debridement, non-viable tissue can obstruct visibility, potentially mask underlying infection (Manna et al, 2023) and prevent accurate staging or grading.

Assessment drives the foundation of all wound management and treatment strategies. Debridement, along with other procedures, should be guided by a thorough and accurate holistic assessment of the

Box 1. Types of non-viable tissue

Non-viable tissue (also referred to as devitalised, necrotic or dead tissue) can include eschar, slough and fibrinous tissue and compromised tissue. It may also contain inert contaminants such as dressing residue or detritus.

Non-viable tissue can vary in colour, including yellow, white, grey, blue, green, brown or black. It may have a soft or firm consistency, or form a hard eschar. It can be loose or firmly attached to the wound bed, and may appear slimy, stringy, fibrous or as a thick coagulum (European Wound Management Association [EWMA], 2004; Vowden and Vowden, 2011; IWII, 2022; 2023).

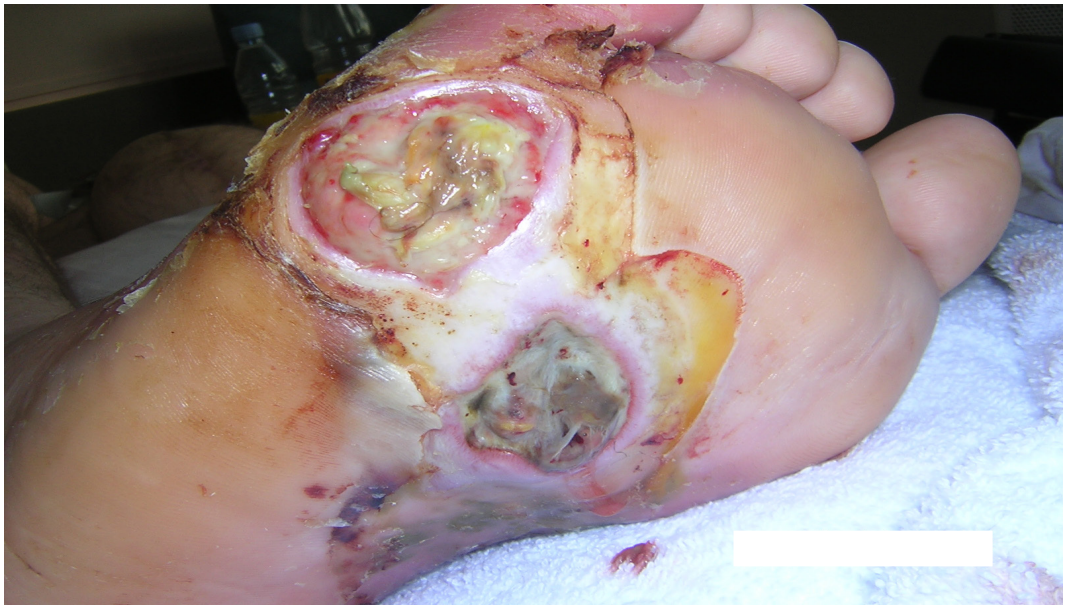


Figure 1: Example of two adjacent diabetic foot ulcers with slough (photograph courtesy of Jacqui Fletcher)

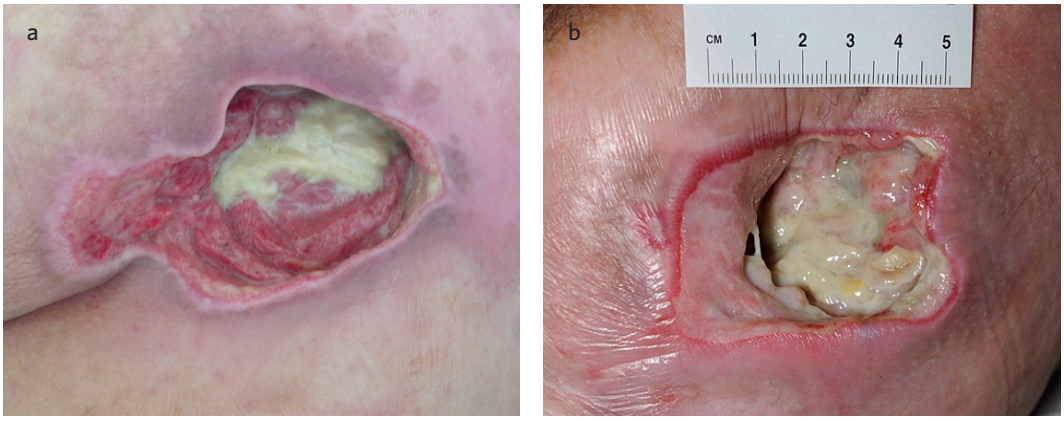


Figure 2a–b: Examples of sloughy sacral pressure ulcers (photographs courtesy of Jacqui Fletcher)

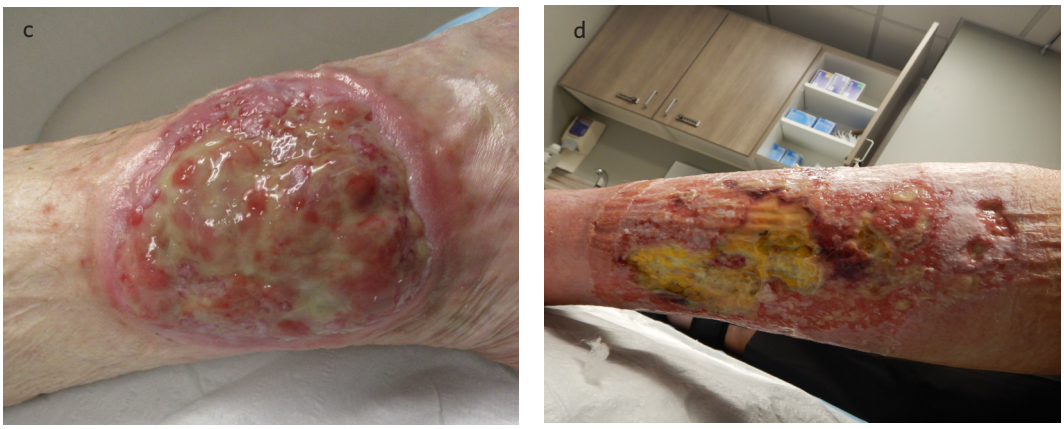


Figure 2c–d: Examples of sloughy leg ulcers (photographs courtesy of Dot Weir)

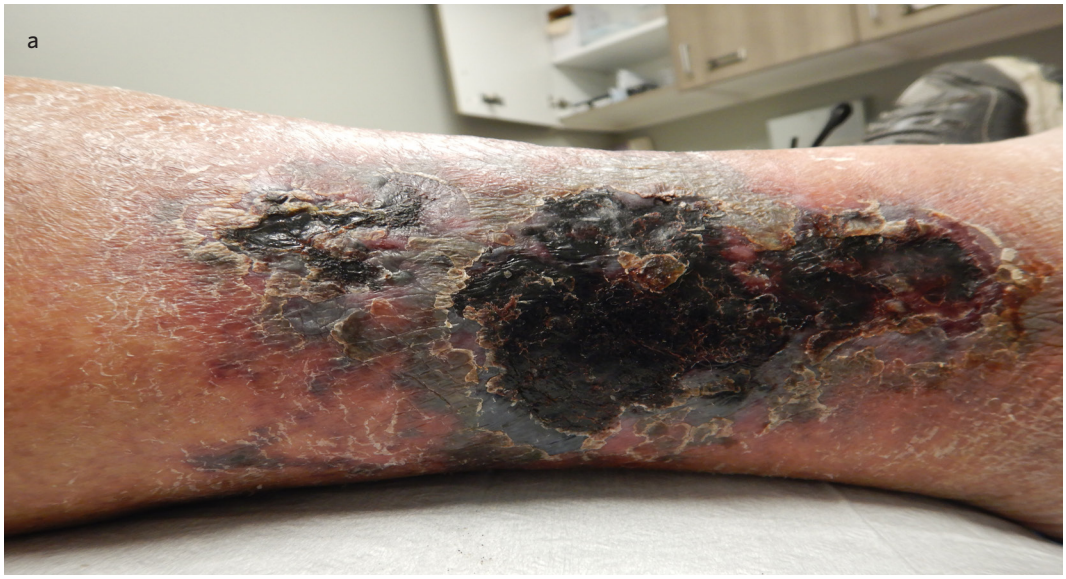


Figure 3: Examples of necrosis in (**a**) a venous leg ulcer (photograph courtesy of Dot Weir)

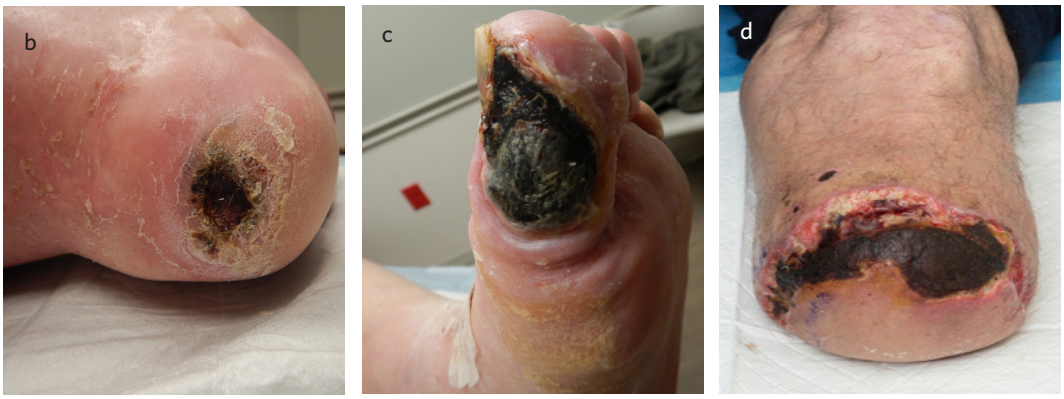


Figure 3: Examples of necrosis on (**b**) heel of foot (**c**) hallux (photographs courtesy of Dot Weir) (**d**) amputated knee (photograph courtesy of Multimedia Design, Royal Perth Hospital, Perth, Western Australia; Donna Larsen)

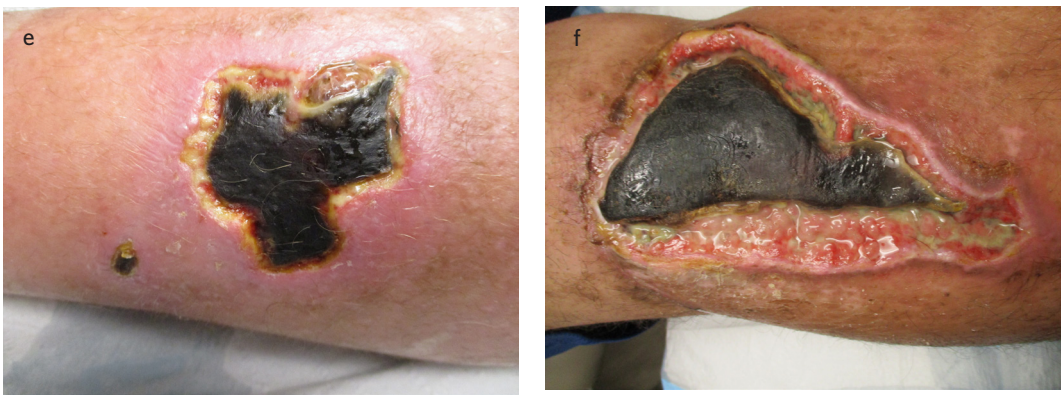


Figure 3e–d: Examples of necrosis on leg ulcers (photographs courtesy of Dot Weir)

patient, their wound and desired outcomes (Gray et al, 2011; Foot in Diabetes UK, 2014; Jones, 2018). This assessment should also consider any underlying comorbidities and the patient's current health status. For example, a thorough assessment might reveal that debridement is inappropriate for certain patients, such as those with stable, dry eschar on a PU, where the eschar serves as a natural protective barrier for underlying tissues. In such cases, involving a multidisciplinary team is essential to ensure appropriate management.

Red flags for debridement

When the appropriate debridement method is chosen, there are relatively few wounds where it is unsafe to proceed. However, certain wound and patient conditions require caution and may necessitate referral to a specialist due to a high risk of complications.

Wounds that should not be debrided without specialist involvement include (Vowden and Vowden, 2011; Jones, 2018):

- High-risk areas (e.g. wounds on the hands, feet or face). These patients require multidisciplinary involvement
- Lower limb wounds in patients with arterial disease. These patients require assessment and advice from the vascular team
- Wounds associated with congenital malformation, suspected malignancy or changes in normal anatomy. The wound location will determine the appropriate team involvement; this will usually be the plastics surgical team
- Wounds with exposed (or in close proximity to) blood vessels, nerves, tendon **[Figure 4]** or bone
- Any wound that has not been properly assessed by a competent practitioner (see **page 11** for definition of a competent practitioner)
- Wounds in patients with inflammatory conditions such as pyoderma gangrenosum, where active debridement may lead to wound deterioration. These patients require review by the dermatology or rheumatology team
- Wounds in patients with a prosthetic implant near the wound. These patients require review and advice from the appropriate surgical team
- Wounds in patients unable to give informed consent or on palliative treatment regimens, which may require special consideration and alternative approaches where possible
- Wounds in patients with blood clotting disorders
- Wounds in patients with possible implants and/or dialysis fistulas
- Wounds in patients with untreated calciphylaxis
- Wounds in patients experiencing extreme wound pain.

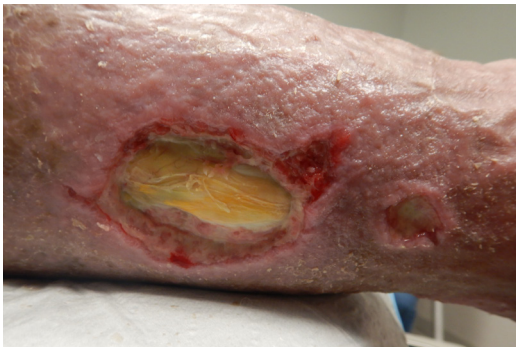


Figure 4: Wound where specialist involvement is required before proceeding with debridement due to exposed tendon (photograph courtesy of Dot Weir)

Immediately escalate if the following are suspected:

- Spreading infection, gas or air in tissues
- Limb-threatening ischaemia
- Red, hot, swollen leg or foot
- Suspected deep vein thrombosis
- Suspected skin cancer.

Importance of multidisciplinary team

The expert group agreed that an integrated, collaborative and "joined-up thinking" approach is required when making decisions regarding debridement. For example, issues related to polypharmacy, such as patients on blood thinners or anticoagulant therapy (which may increase the risk of excessive bleeding), may require input from the multidisciplinary team. Good communication and thorough documentation are also important.

Considerations for skin tone

It is important to consider the patient's baseline skin tone: for example, age-related pigmentation, such as dark patches of skin, may be misdiagnosed as necrosis but could be a natural occurrence for the patient **[Figure 5]**. It is not uncommon for dark skin to present with age-related dark patches of skin on the palms and soles of the feet, which may be relevant when examining the foot of a diabetic patient as it should not be confused with eschar, so caution is needed during debridement (Dhoonmoon et al, 2023).

Additionally, erythema, defined as a change in the colour of an area of skin caused by increased blood

Overview of debridement

(Continued)

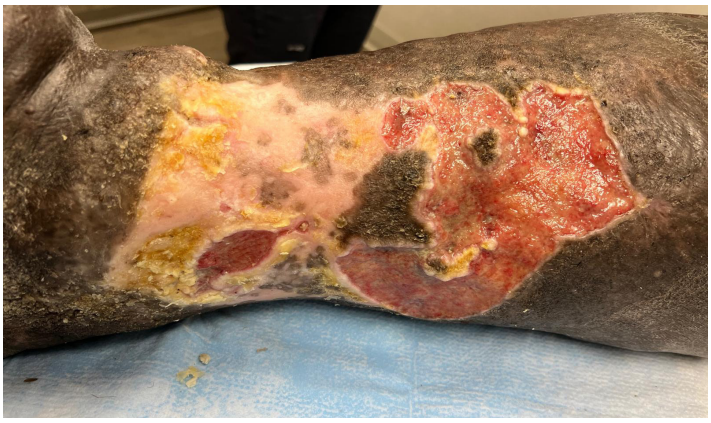


Figure 5: An example where a patient's normal skin tone may be misinterpreted as necrosis due to its proximity to the wound. Caution should be exercised to avoid debriding healthy skin. The patient's baseline skin tone should also be considered during assessment (photograph courtesy of Dot Weir)

flow (British Association of Dermatologists, 2021), has traditionally been used to detect skin areas that may be infected or other abnormalities. Although the term 'redness' is commonly used, it is important to note that erythema does not always appear as 'red' in many skin tones. While redness can be an obvious symptom in individuals with less deeply pigmented skin, where it contrasts clearly against lighter skin tones, this is not necessarily the case for those with dark skin tones, such as black, brown or olive.

Debridement as part of WBP

WBP is defined as 'the management of the wound to accelerate endogenous healing or to facilitate the effectiveness of other therapeutic measures' (Schultz et al, 2003; IWII, 2023). Initially described by Schultz et al (2003), the concept of WBP was expanded by Atkin et al (2019) to include T.I.M.E.R.S, an extension of the original T.I.M.E framework (Tissue, Infection/Inflammation, Moisture, Edge), which now incorporates six components: Tissue, Inflammation/Infection, Moisture balance, Edge of wound/Epithelialisation, Repair and Regeneration, Social factors.

WBP is a framework for the assessment, diagnosis and treatment of wounds. It involves therapeutic wound cleansing, debridement and the prevention of biofilm reformation (Haubner et al, 2012). Its goal is to help create a balanced, moist environment that optimises conditions for debridement and wound healing, by producing a well-vascularised, stable wound bed to reduce microbial load, manage exudate levels and increase granulation tissue formation (Schofield and Ousey, 2021; Barrigah-Benissan et al, 2022).

Although both cleansing and debridement contribute to wound healing, it is important to distinguish between them, as they represent different steps in the WBP process (IWII, 2023).

Cleansing as part of WBP

Wound cleansing is defined as the 'active removal of surface contaminants, loose debris, non-attached non-viable tissue, microorganisms or remnants of previous dressings from the wound bed, wound edge, periwound area and surrounding skin' (adapted from Haesler et al, 2022). Wounds should be cleansed before and after debridement.

The primary goal of cleansing is to reduce the bioburden, including bacteria, debris and contaminants, as well as to remove any remaining loose material such as dried blood and dressing residue and eliminate excess wound exudate. Depending on the technique and concentration of the cleansing solution used, it may also soften and assist in the removal of slough and necrotic tissue (Olszowski et al, 2003; Pattison et al, 2003; Brown, 2018). While cleansing improves the visibility of the wound bed, facilitates accurate assessment and allows access to non-viable tissue, its main function is not the comprehensive removal of devitalised tissue—that is the role of debridement.

Several types of solutions can be used for wound cleansing, including potable tap water, saline, povidone-iodine and agents containing antimicrobials and/or active preservatives (e.g. hypochlorous acid [HOCl], sodium hypochlorite, octenidine dihydrochloride and polyhexamethylene biguanide [PHMB]). However, there is no consensus on the ideal wound cleansing solution, as the choice depends on multiple factors, including the wound assessment (e.g. aetiology, and anatomical location), the person's risk of wound infection, goals of care and local policies and resources (IWII, 2022).

Each solution offers distinct benefits and carries various risks. Saline has low toxicity but bacterial growth can occur in an open container within 24 hours (Wolcott and Fletcher, 2014). Povidone-iodine has broad-spectrum antimicrobial activity but has

dose-dependent cytotoxicity (IWII, 2022) and may irritate the periwound area. In contrast, PHMB has an increased ability to penetrate hard-to-remove coatings, lifting debris, bacteria and biofilm from the wound. It also has a broad spectrum of activity against bacteria, viruses and fungi, with no evidence of resistance (Wolcott and Fletcher, 2014). HOCl can soften devitalised tissue and slough, disrupting it during irrigation or debridement with gauze or a debridement pad. HOCl is capable of damaging the cellular components of microorganisms, depending on the dose and concentration (Harriott et al, 2019). It also exhibits biocidal properties and a broad spectrum of activity against Gram-positive and Gram-negative bacteria, including *Staphylococcus aureus* and *Pseudomonas aeruginosa*, as well as viruses, spores and fungi (Sakarya et al, 2014; Kiamco et al, 2019; Nair et al, 2019). As a naturally occurring molecule with a high therapeutic index, HOCl does not harm healthy tissue or cause a stinging sensation, making it suitable for frequent application (Mayer et al, 2024).

In practice, wound cleansing is not always carried out effectively, despite its importance in optimising debridement. Effective cleansing depends on the clinician's skill and confidence. It is also important to ensure that cleansing solutions remain in contact with the wound for the recommended amount of time to achieve thorough cleaning (Nair et al, 2023).

Wound care in the APAC region

The expert panel agreed that there are factors specific to the APAC region which influence practice and may create challenges. The global prevalence of diabetes and DFUs is increasing, with a growing threat of morbidity, amputation and mortality (Win Tin et al, 2014; Kool et al, 2019). While many different wound types require debridement, DFUs are high-risk wounds that may be particularly prone to infection and other complications such as peripheral arterial disease, neuropathy and gangrene (Nair et al, 2022).

In the APAC region, this issue is particularly urgent, and while data specific to the APAC region is limited, globally, the International Diabetes Federation estimates that there were 537 million people living with diabetes in 2021 and that this number will increase to more than 700 million by 2045; Western Pacific and Southeast Asia regions are included in the area where diabetes is expected to increase most rapidly (International Diabetes Federation, 2021). Up to a third of people with diabetes worldwide will develop a DFU over the course of their lifetime, and direct costs of diabetes-related care were $237 billion in 2017 (Armstrong et al, 2017; 2020).

Few studies have examined the recent trajectory of DFU development in the APAC region; however, a study in Thailand found the prevalence of peripheral arterial disease among Thai patients had increased significantly, resulting in increased rates of DFUs and amputations, plus lower healing rates (Thewijitcharoen et al, 2020).

There are additional factors unique to the APAC region—cultural, geographical, health-related and socio-political—which require specific considerations. For example, in some cultures, there may be mistrust of 'mainstream' medicine, leading to individuals initially seeking traditional remedies rather than medical treatment (World Health Organization [WHO], 2023). In some geographical areas—and, again, in rural areas including India or Indonesia—availability of products may be an issue for clinicians, which impacts patients (Nair et al, 2022) and delays treatment. Moreover, gender-specific challenges are evident, with too many people, especially women, being unable to receive the medical treatment they need due to high costs and difficulties in seeing a clinician or healthcare provider in rural areas (Nair et al, 2022).

Variance in healthcare systems across different countries in the APAC region—and how this works in terms of access and economics—can also have an impact on patients and in how care is delivered.

Summary

- Debridement involves removing non-viable tissue from a wound to promote healing. It is a key step in WBP and must be guided by a thorough patient and wound assessment
- Non-viable tissue (also known as devitalised, necrotic or dead tissue), includes sloughy, fibrinous and compromised tissue, possibly containing debris or dressing residue. It can be various colours (yellow, white, grey, blue, green, brown or black) and may be soft, hard, slimy, stringy or fibrous
- Cultural, geographical and socio-political factors, impact wound care practices in the APAC region.

Debridement use and techniques

With a range of debridement techniques available, it is important to select the method that is most appropriate and effective for the patient. This decision should take into account the patient and their overall health (including factors such as wellbeing, lifestyle and preferences), and their wound.

Clinicians should also consider the following questions before proceeding (adapted from Vowden and Vowden, 2011):

- What is the cause of the wound, and where is it anatomically located?
- How much non-viable tissue needs to be removed?
- What is the aim of treatment?
- What are the risks and benefits of the proposed debridement method?
- What speed of debridement is required?
- Which method would be most appropriate?
- Are the necessary skills and/or equipment required to perform the treatment available in your practice or care setting?

Different debridement methods—autolytic, biosurgical, enzymatic, hydrosurgical, mechanical, sharp, surgical and ultrasonic—may be suited to individual patients and wound types and require varying levels of clinician expertise. See **Table 1** for an overview of the mechanism of action, as well as the advantages and disadvantages of each method, including the time taken, patient acceptability and ease of use.

Table 1. Types of debridement methods (adapted and updated from Gray et al, 2011; Vowden and Vowden, 2011; Holmes et al, 2019)

Type of debridement method	Mechanism of action	Potential advantages	Potential challenges and contraindications	Care setting/skill level
Autolytic	• Uses the body's own enzymes to soften and liquefy devitalised tissue and slough • Can be aided by using topical agents and contemporary wound dressings that promote autolysis, including fibre-gelling, polyabsorbent fibres, as well as hydrofibre, alginate, hydrogel and medical-grade honey, dressings	• Can be used before other types of debridement (e.g. sharp) and in cases where other debridement methods are inappropriate • Can be used in conjunction with other forms of debridement • Suitable for continuous debridement	• Wounds may require more immediate debridement in the short term • May necessitate dressings to create a moist environment and enhance phagocytic activity • Process can be slow, potentially increasing infection and maceration • Not suitable when access to appropriate dressings is limited	• Suitable for all care settings, including GP surgeries, patients' homes and inpatient facilities **Skill level:** • Generalists or specialists; requires low levels of skills and knowledge. However, advice should be sought for high-risk individuals
Biosurgical	• Uses larvae of the green bottle fly (*Lucilia sericata*) to remove moist slough, necrotic and devitalised tissue from the wound	• Treatment is relatively fast and highly selective • Can be used on infected wounds	• Initial costs may be higher compared to autolytic debridement • Access to larvae may be an issue • Patients may experience altered sensations while larvae are in use • Contraindicated in patients with highly exuding wounds, wounds requiring occlusion, patients with clotting issues, malignancies or wounds close to large blood vessels	• Suitable for a variety of settings, including community, primary and secondary care **Skill level:** • Generalist or specialist practitioner with the appropriate level of skill, training and competence

Table 1. Types of debridement methods (adapted and updated from Gray et al, 2011; Vowden and Vowden, 2011; Holmes et al, 2019) *(Continued)*

Type of debridement method	Mechanism of action	Potential advantages	Potential challenges and contraindications	Care setting/skill level
Enzymatic	• Uses exogenous enzymes or chemicals (e.g. enzymatic debriders, wound cleaners and gels) to enhance the breakdown of devitalised tissue and hard necrotic eschar. These products contain surfactants at high or low concentrations to facilitate tissue removal	• Suitable when surgical debridement is not possible • Can be combined with other therapies for enhanced efficacy	• Potential risk of allergic reactions or sensitivities to the enzymatic agents used • Not suitable for large wounds with eschar, severely necrotic wounds, heavily infected wounds or patients with sepsis	• Suitable for a variety of settings, but requires a controlled environment due to potential for aerosol spread **Skill level:** • Specialist practitioner with relevant training
Hydrosurgical (jet lavage)	• Uses a high-energy saline stream that creates a localised vacuum that cuts and removes devitalised tissue from the wound bed	• Treatment is fast and selective • Capable of removing most, if not all, devitalised tissue without compromising healthy tissue • Allows for precise visualisation of the wound bed	• Requires specialist equipment • Associated with higher costs • Potential for bacterial aerosolisation • Contraindicated in patients with dry necrotic wounds with eschar. Caution is required in highly exuding wounds, wounds close to large blood vessels, wounds needing occlusion and in patients with clotting issues or malignancies	• Suitable for a variety of settings but requires a controlled environment due to the risk of bacterial aerosolisation **Skill level:** • Specialist practitioner with relevant training
Mechanical	• Involves the physical removal of devitalised tissue and debris from the wound bed • Traditional method include wet-to-dry gauze that dries and adheres to the top layer of the wound bed, which is 'pulled' away when the dressing is changed; however, this method is not generally recommended • Other methods include monofilament/ microfibre debridement pads and therapeutic irrigation (4 to 15 psi)	• Newer methods are available that are fast and more selective • Relatively low pain with newer methods (e.g. the use of debridement pads)	• Traditional methods (e.g. wet-to-dry gauze) requires frequent dressing changes and can be painful for the patient • Not suitable for wounds with hard, dry eschar. • Caution is required for patients on anticoagulant therapy, with bleeding disorders or peripheral arterial disease	• Suitable for most care settings including GP surgeries, patient's home and inpatient setting **Skill level:** • Requires minimal training and can be performed by both generalists and specialists. However, advice should be sought for high-risk individuals

Table 1. Types of debridement methods (adapted and updated from Gray et al, 2011; Vowden and Vowden, 2011; Holmes et al, 2019) *(Continued)*

Type of debridement method	Mechanism of action	Potential advantages	Potential challenges and contraindications	Care setting/skill level
Sharp **[Figure 6a–c]**	• Involves the removal of dead or devitalised tissue using instruments such as a scalpel, curette, scissors, and/or forceps, typically cutting just above the level of viable tissue	• Fast and selective • Can be combined with other therapies (e.g. autolytic debridement)	• Requires in-depth knowledge of tissue types and anatomy, as there is a risk of damaging blood vessels, nerves or tendons • Topical anaesthesia or oral pain medication is often used as it can be painful for the patient • Caution required around sensitive areas (e.g. exposed bone, ligaments, tendons, temporal areas, neck, axilla, groin and areas near major blood vessels, nerves, and tendons) • Special consideration is needed for patients on anticoagulant therapy or with bleeding disorders	• Suitable for performing at the patient's bedside or in a clinic setting **Skill level:** • Competent practitioner with specialist training
Surgical	• Involves the excision or wider resection of non-viable tissue, sometimes removing healthy tissue from the wound margins, until a healthy, bleeding wound bed is achieved	• Selective • Suitable for large areas where rapid removal of tissue is necessary	• Can be painful for the patient; general, light or local anaesthesia is usually required • Generally associated with higher costs • Caution required around sensitive areas (e.g. exposed bone, ligaments, tendons, temporal areas, neck, axilla, groin and areas near major blood vessels, nerves, and tendons) • Special consideration is needed for patients on anticoagulant therapy or with bleeding disorders	• Requires a procedure room with appropriate resources to manage potential complications, such as bleeding **Skill level:** • Physician, surgeon, podiatrist or specialist nurse with appropriate training and skills
Ultrasonic (classified as mechanical debridement)	• Delivers ultrasound energy directly to the wound bed or through an atomised solution (mist) • Most devices also feature a built-in irrigation system and offer various probes for different wound types	• Fast and selective • Suitable for both excisional debridement and maintenance debridement over multiple sessions	• Limited availability due to higher costs and need for specialist equipment • Requires longer setup and cleanup times, including the sterilisation of handpieces, compared to sharp debridement • Full PPE required due to risk of bacterial aerosolisation • Contraindicated in patients with vascular abnormalities, haemorrhagic conditions, malignancies and tissue previously treated with deep X-ray or irradiation	• Suitable for a variety of settings, including controlled environments **Skill level:** • Skilled practitioner with specialist training and competence

Clinician knowledge and confidence: who should debride?

The decision to debride a wound is often complex and may require input from a multidisciplinary team. Although it is not necessary for practitioners to personally perform every form of debridement, they should have appropriate training and be competent in the techniques used, in accordance with local policy. Once the decision to proceed with debridement and the preferred method has been determined, clinicians must assess their skills and competency to carry out the procedure safely and effectively.

Competent clinicians performing wound debridement are expected to have (Vowden and Vowden, 2011):

- Good knowledge of relevant anatomy
- Understanding of the range of wound debridement methods available
- Capability to identify viable tissue and differentiate it from non-viable tissue
- Ability to manage pain and discomfort before, during and after the procedure
- Appropriate skills to handle potential complications (e.g. bleeding)
- Awareness of infection control procedures.

In general, the expert panel agreed that debridement is often underused in practice, likely due to a lack of clinician knowledge and confidence. Since debridement is a vital step in the healing process for many wounds, it is important that clinicians know how best to debride a wound whenever necessary.

It is also important to note that some debridement methods require a lower level of skill and can be performed by generalist healthcare professionals.

Frequency of debridement

For some wounds, a single session of debridement may be sufficient, but other wounds may require repeated (continuous) sessions of debridement to prevent them from reverting to a chronic unhealthy state, as devitalised tissue often resurfaces due to underlying causes. These wounds need to be monitored at every clinical visit, a practice referred to as maintenance debridement (EWMA, 2004; Jones, 2018; Thomas et al, 2021).

Patient selection and preference

Before initiating any form of debridement, it is important to engage the patient in their care and involve them in the decision-making process. An informed and engaged patient is better equipped to understand their treatment options and make informed decisions about their care.

Medical practitioners have a legal responsibility to ensure that patients understand key information, including the benefits and implications of any medical intervention. When discussing debridement options, it is important to explain all available methods and potential outcomes, such as reducing the risk of wound infection or the possibility of the wound getting larger in size (Haycocks and Chadwick, 2012). These conversations should ideally be supported by evidence-based information and tailored to meet the individual patient's specific needs, supported by written materials to enhance understanding.

Valid consent from the patient should be obtained before debridement. If the patient is unable to provide consent, the next of kin may be approached. Verbal consent is typically sufficient for a single procedure or treatment; however, for more invasive debridement procedures, such as those involving deeper structures (e.g. tendons and bones), written consent is recommended.

Individual patient requirements may vary according to geographical area and personal/demographic

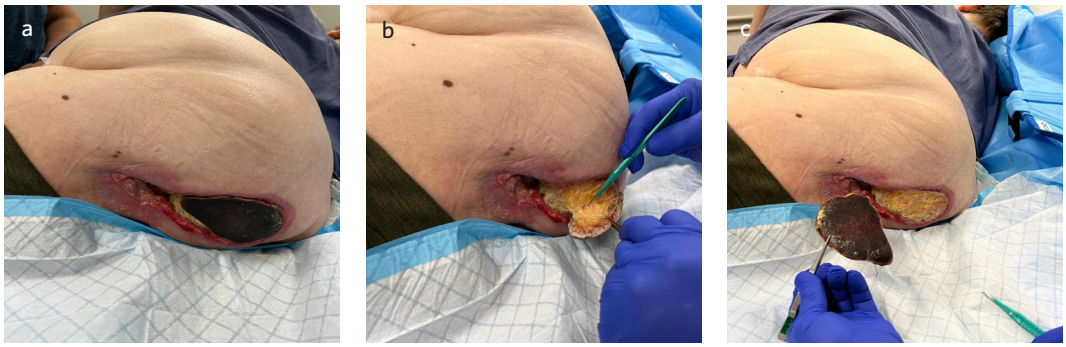


Figure 6a–c: Sharp debridement (using a curette) of a sacral pressure ulcer to remove necrosis (photograph courtesy of Dot Weir)

Box 2. Covert signs of infection include (adapted from IWII, 2022)

- Friable, bright red granulation tissue
- Increased malodour
- New/increased pain or change in sensation
- Epithelial bridging, and pocketing in granulation tissue
- Delayed wound healing beyond expectations
- Wound breakdown and enlargement or new ulcerations of the periwound.

characteristics of the patient (Dhoonmoon et al, 2023). In all patient groups, it is important that respect is given to the patient's individual cultural beliefs, and care is tailored appropriately whenever necessary. In some cultures, there may be mistrust of 'mainstream' medicine, so it is necessary to work with the patient at a level that feels comfortable for them (Sandy-Hodgetts et al, 2022).

It is important to be culturally sensitive and considerate of all patients' belief systems. In some cases, it may be necessary to work alongside traditional healers or other leaders within the patient's community according to their beliefs and preferences (Sandy-Hodgetts et al, 2022).

Infection

Infection is a common and serious complication in wound care and can develop in any wound type. Clinicians must be skilled in recognising and assessing signs of wound infection. In healthy individuals with acute wounds, an experienced clinician will often identify overt signs of infection easily, such as purulent discharge, erythema, swelling, localised warmth, malodour, and new or increasing pain (IWII, 2022). However, in immunocompromised individuals and those with chronic wounds, infection may present with more subtle or covert signs, which require careful observation (IWII, 2022). Covert signs of wound infection to consider include friable, bright red granulation tissue and an increase in malodour; see **Box 2** for more information.

Pain

The importance of pain should not be underestimated. The presence of wound pain can be an indicator of ineffective wound management where the underlying causal pathology has not been identified or treated, or infection is present (Price et al, 2008). Pain can impact every aspect of an individual, affecting their overall quality of life, including their ability to function, as well as their social and psychological wellbeing (Holloway et al, 2024).

It is essential that pain is addressed in conversations with the patient about debridement. Local pain management may be required for some types of debridement, and, in all cases, it is important that the patient is as prepared as possible for the procedure (or any treatment) and aware of what to expect (WUWHS, 2016).

The WHO analgesic ladder was originally developed to provide adequate pain relief for patients with cancer (Ventafridda et al, 1985). The original ladder was formed of three steps:

- **First Step** – Mild pain: non-opioid analgesics (e.g. nonsteroidal anti-inflammatory drugs or acetaminophen), with or without adjuvants
- **Second Step** – Moderate pain: weak opioids (e.g. hydrocodone, codeine, tramadol), with or without non-opioid analgesics and with or without adjuvants
- **Third Step** – Severe and persistent pain: potent opioids (e.g. morphine, methadone, fentanyl, oxycodone, buprenorphine, tapentadol, hydromorphone, oxymorphone), with or without non-opioid analgesics and with or without adjuvants.

The WHO analgesic ladder has undergone several modifications over the years and has been expanded to include the management of other types of chronic pain, including non-cancer-related pain. Modifications now incorporate both non-pharmacological and non-opioid therapies as first-line treatment options (Yang et al, 2020; Anekar et al, 2023; see **Figure 7**). Studies have shown that following the updated ladder can improve patient outcomes and quality of life, as well as reduce hospital stays (Guiloff and Angus-Leppan, 2016; Anekar et al, 2023).

Focus on autolytic debridement

Autolytic debridement is generally considered the most conservative debridement method, which can be facilitated by generalists or specialist clinicians in any care setting following a full holistic assessment.

This type of debridement is a natural process by which the body's own enzymes break down necrotic tissue. It induces softening of the necrotic tissue and eventual detachment of this tissue from the wound bed. It is a highly selective process whereby only necrotic tissue will be affected (Manna et al, 2023).

Where needed, autolytic continuous debridement can be used in conjunction with other debridement techniques, such as mechanical or sharp debridement, as part of an ongoing care pathway (Vowden and Vowden, 2011).

Autolytic debridement can be facilitated using various wound dressings, such as fibre-gelling,

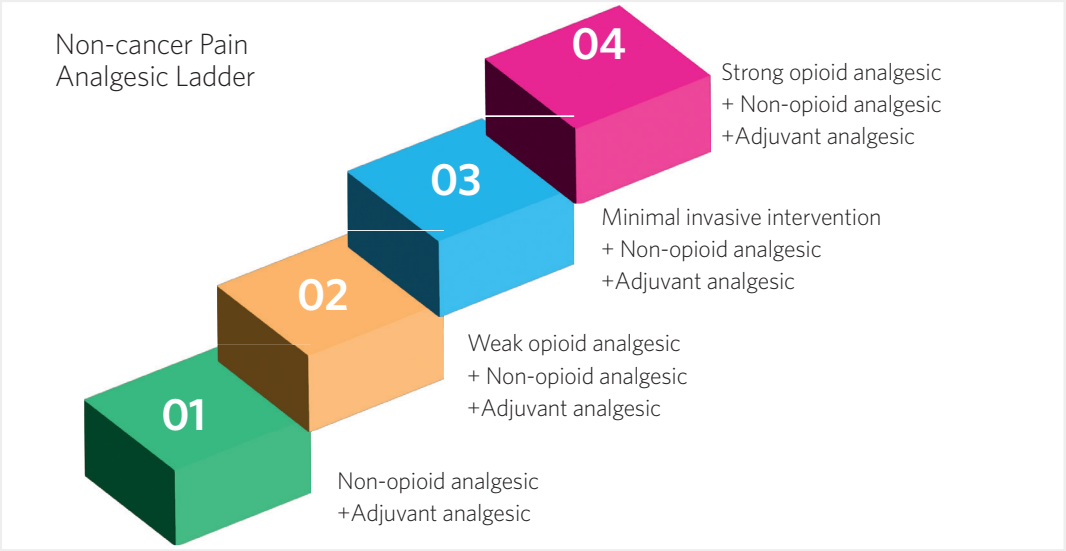


Figure 7: Updated non-cancer pain analgesic ladder (Yang et al, 2020; Anekar et al, 2023)

polyabsorbent fibres, as well as hydrofibre, alginate, hydrogel, hydrocolloid and transparent film, dressings that promote autolysis of necrotic tissue (Sibbald et al, 2021; IWII, 2023).

This method requires maintaining a balanced moist environment, which can be achieved with either moisture-retentive or moisture-donating dressings, depending on the needs of the wound. The effectiveness of autolytic debridement is influenced by the amount of devitalised tissue and the size of the wound (Manna et al, 2023).

Wound dressings for autolytic debridement

- **Alginates and gelling fibres**: Ideal for heavily exudating wounds, these dressings absorb excess exudate and form a gel that promotes autolysis. They typically require secondary dressings (Labib and Winters, 2023)
- **Hydrogel dressings**: Consists of a complex hydrophilic polymer with a base of approximately 90% water. This high water content limits their ability to absorb excess exudate compared to alginate dressings but makes them ideal for wounds with little to no exudate. They help soften necrotic tissue, rehydrate the wound bed and support the healing of devitalised tissue (Choo et al, 2019)
- **Hydrocolloid dressings**: Used in low to moderate exudating wounds such as minor burns and PUs, but should be avoided in clinically infected wound
- **Polyabsorbent fibres dressings**: Made of polyacrylate fibres impregnated with a silver lipido-colloid matrix (Technology Lipido-Colloid-Ag healing matrix [TLC-Ag]). These dressings absorb and bind exudate, slough, bacteria and other non-adherent or devitalised material. They allow for the vertical transmission of fluid away from the wound bed, reducing the risk of periwound maceration. Additionally, they support both autolytic and mechanical desloughing while modulating and reducing protease activity found in chronic wounds by trapping and binding them within the dressing matrix. This prevents the proteases from interfering with protein synthesis or denaturing growth factors.

Summary

- The choice of debridement method should be tailored to the patient, the extent of non-viable tissue and the anatomical location of the wound
- Different methods: autolytic, biosurgical/larval therapy, enzymatic, hydrosurgical (jet lavage), mechanical, sharp, surgical and ultrasound, differ in several ways, including their effectiveness, the level of healthcare professional expertise required, time needed, patient acceptability and ease of use
- The decision may involve a multidisciplinary team
- Pain management must be anticipated, administered and assessed for efficacy
- Autolytic continuous debridement can be performed using specific dressings, such as polyabsorbent fibres dressings. These dressings may or may not be impregnated with silver salts, depending on the wound's status, including any local signs or risk of infection.

Link to biofilm management

Management of biofilm is acknowledged as a primary aim of wound care, particularly in chronic wounds. Biofilms are defined as aggregates of microorganisms that attach to biotic (living surfaces, e.g. biological tissues), abiotic surfaces (non-living surfaces, e.g. wound dressings), or each other. These microorganisms are encased in a self-produced extracellular matrix, known as extracellular polymeric substance, which makes them resistant to antimicrobial agents, including antibiotics and antimicrobials (WUWHS, 2016; Yin et al, 2019). Biofilms are often polymicrobial, involving clusters of different types of bacterial cells growing at different rates, which makes them difficult to treat (Fletcher et al, 2020).

As a biofilm matures, its resistance to host immune responses and conventional therapies increases significantly (Percival and Suleman, 2015). Effective management involves employing antibiofilm therapies and strategies to remove or disrupt both the microorganisms and the extracellular polymeric substance. This helps reduce microbial reattachment and prevents biofilm reformation.

While the exact role of biofilm in chronic wound healing is still under investigation, it is becoming widely accepted that most chronic wounds contain biofilm. Studies suggest that between 60% and 100% of chronic wounds contain biofilm, with the 'true' prevalence likely approaching 100%, indicating that all chronic wounds may have biofilm on at least part of the wound bed (Bjarnsholt et al, 2017; Malone et al, 2017). See **Box 3** for more information on biofilm and its role in delaying or impairing wound healing.

Identification of biofilm

Identification of biofilm in clinical practice is challenging because biofilms are not visible to the naked eye and their protective extracellular matrix allows them to evade standard diagnostic techniques (Barker et al, 2017). Although there are several methods for diagnosing biofilms in research laboratories, no single 'gold standard' method is established for clinical practice (WUWHS, 2016; IWII, 2022). This poses a significant clinical challenge, as distinguishing between planktonic and biofilm phenotypes in chronic wound infections is crucial for effective treatment. Current diagnostic methods, including culture and DNA-based techniques, may identify bacterial species present in wound samples but do not differentiate between microorganisms growing planktonically or as part of biofilm communities (WUWHS, 2016; IWII, 2022).

However, this does not mean that an extensive laboratory study is required before beginning treatment. Instead, a holistic approach to managing biofilm should be adopted, that includes early intervention and an initial aggressive approach to address suspected biofilm, guided by a high index of suspicion (Bjarnsholt et al, 2017).

In all wounds that are failing to heal as expected, biofilm should be suspected, and treatment should be undertaken as if biofilm is present, forming a biofilm-based wound care protocol (Wolcott and Rhoads, 2008).

Biofilm-based wound care

Since the association between wound chronicity and the presence of biofilm was demonstrated, the need to manage and reduce biofilm has been recognised (Desroche et al, 2016).

The consequences of unmanaged biofilms result in downstream effects that present with observable clinical symptoms, such as (Schultz et al, 2017; Percival and Atkin, 2024):

- Delayed wound healing
- Increased visible, slimy, gel-like shiny cover (coagulum) on the wound bed, which detaches easily and can be peeled off without trauma to the wound bed
- High levels of exudate

Box 3. Biofilm and its effects on wound healing

While the role of biofilm in delaying or impairing wound healing is multifactorial, at a basic level, biofilm impacts wound healing by:

- Creating an environment where microorganisms (e.g. fungi, yeasts and viruses) can multiply and evade immune responses (Karlsson et al, 2012; Hirschfeld, 2014)
- Prolonging an inflammatory state and inducing chronic inflammation
- Disabling skin barrier function by interfering with skin permeability (Roy et al, 2014)
- Preventing normal migration of cells.

- Rapid reforming of slough/slimy covering
- Poor-quality/fragile granulation tissue
- Signs of local infection (e.g. pain, erythema, redness, heat and changes in the nature of exudate)
- Low-level erythema
- Persistent recurring infection
- Antibiotic and topical antiseptic failure
- Slow or no response to antimicrobial dressings
- Low-level chronic inflammation or increased inflammation
- Gelatinous material on the wound edge that reforms quickly after removal.

Biofilm management guidelines state that, where either slough or necrosis is present in a wound, this non-viable tissue should be removed, as it may support the attachment and development of biofilm (Percival and Suleman, 2015). The speed of tissue removal should be adjusted according to the patient's ability to undergo the procedure, the skill and competence of the practitioner and the safety of the environment in which the technique is performed (Vowden and Vowden, 2011). It is emphasised that 'repetitive and maintenance debridement is paramount' (Leaper et al, 2010; Ousey and Ovens, 2023).

This management requires removal/disruption via vigorous cleansing and debridement, along with ongoing prevention of reformation, making WBP essential to any biofilm-based management pathway (IWII, 2022). However, it is important that this process does not disrupt the microbiome and microbiota of the periwound skin, as they play a key role in stabilising the local wound ecosystem.

Suitability of autolytic debridement

Principles of biofilm management focus on continuous disruption of the biofilm and prevention of its reformation. Therefore, a dressing that promotes autolytic debridement is ideal, as it facilitates ongoing biofilm disruption through continuous debridement (Desroche et al, 2016; Dalac et al, 2016), as opposed to a 'one-off' instance, for example, through mechanical debridement.

Once biofilm has been removed/disrupted, continuous disruption is needed to prevent reformation. Additionally, after initial disruption, it is important to act quickly with further measures to eradicate the biofilm, such as topical antimicrobials. Hence, dressings that combine the promotion of autolytic continuous debridement with an antimicrobial agent (e.g. silver) may be ideal in biofilm management.

Ionic silver may be particularly useful as an antimicrobial agent when combined with autolytic debridement, as moisture balance is also a key element in the management of such wounds. Other antimicrobials such as medical-grade honey may cause the wound to become overhydrated and potentially cause maceration of the surrounding skin.

In a pre-clinical porcine burn model of biofilm infection with *Pseudomonas aeruginosa*, standard of care debridement performed by a plastic surgeon was insufficient to eradicate the biofilm. The study observed a temporary decline in bacterial burden; however, biofilm can be regenerated from only a few remaining microorganisms, and infection returned to pre-debridement levels within 24 hours (Wolcott et al, 2010; Schultz et al, 2017).

It is thought that there is approximately a 24–48 hour window after debridement and biofilm disruption before biofilm infection is re-established (Wolcott et al, 2010; Schultz et al 2017).

Traditionally, it was assumed that antibiotics and antimicrobials would kill bacteria irrespective of where they were found; however, if bacteria are protected in biofilm, the efficacy of these products may be limited unless the biofilm is efficiently disrupted through vigorous cleansing and debridement (Bjarnsholt et al, 2017).

Antimicrobial stewardship (AMS) is a topic becoming increasingly pertinent in wound care, making it more important than ever to ensure optimal use of treatments to ensure efficacy and avoid the overuse or misuse of antimicrobial products. AMS-based wound care strategies emphasise the importance of physical cleansing and debridement to optimise the use of antimicrobials in wounds where biofilm may be present (Fletcher et al, 2020; EWMA, 2022).

Silver dressings, particularly those with the TLC healing matrix, have demonstrated significant benefits in wound care. International clinical

Link to biofilm management *(Continued)*

guidelines recommend using silver dressings for wounds with established infection or excessive bioburden that is delaying healing, with regular re-evaluation (IWII, 2022). TLC-Ag dressings combine autolytic continuous debridement with antimicrobial properties, making them effective against local infections and biofilms. Importantly, bacterial resistance to silver appears to be rare and there is no evidence to suggest that silver contributes to the development of resistance (Fletcher et al, 2021).

When TLC-Ag dressings come into contact with wound exudate, the matrix forms a gel that maintains a moist environment conducive to wound healing. This environment encourages fibroblast proliferation, contributing to the formation of new tissue (Bernard et al, 2005; McGrath et al, 2014; White, 2015). Simultaneously, the hydro-desloughing polyacrylate fibres absorb excess exudate and bind to sloughy residues, facilitating autolytic continuous debridement (Meaume et al, 2012, 2014). Additionally, these dressings reduce adhesion to both acute and chronic wound surfaces (Meaume et al, 2002), thus enabling atraumatic and pain-free dressing removal (Meaume et al, 2004; 2014).

The release of silver ions from these dressings provides broad-spectrum antimicrobial activity, particularly effective against bacteria such as *Staphylococcus aureus*, *Methicillin-resistant Staphylococcus aureus* (MRSA), *Streptococcus pyogenes* and *Pseudomonas aeruginosa* (Desroche et al, 2016; Desroche and Dropet, 2017). The polyacrylate fibres are negatively charged, which allows them to attract positively charged molecules. Bacterial cells generally have a net negative charge on their cell wall, although this can vary between strains. *Staphylococcus aureus* cells, for example, typically have a moderately negative charge at neutral pH due to the composition of their teichoic acids. These acids contain fewer positively charged D-alanine residues and more negatively charged phosphate groups. In contrast, MRSA strains may exhibit more positive surface charges. In these cases, the positively charged groups of the bacterial cells can bind to the negatively charged carboxyl groups on the polyabsorbent fibres due to electrostatic forces (Desroche et al, 2016).

In vitro investigations have shown that the application of polyabsorbent fibres impregnated with TLC-AG matrix dressing resulted in a significant decrease in the biofilm population within 24 hours of exposure, with this reduction maintained over 7 days. Specifically, the reduction in biofilm of MRSA was reported to be superior to 99.99% (Desroche et al, 2016).

A large, real-life, multicentre observational study of 2,270 patients demonstrated that TLC-Ag dressings are beneficial in reducing clinical signs of local infection as well as wound bioburden, and promote wound healing, regardless of the wound healing stage or exudate levels (Dissemond et al, 2020). Additionally, a randomised controlled trial investigating dressings incorporating the TLC-Ag healing matrix documented that the relative reduction in ulcer area with the silver-releasing dressing was significantly higher than with the control, non-antimicrobial dressing, creating a more favourable microenvironment (Lazareth et al, 2008).

Summary

- Biofilms consist of microorganisms attached to biotic and abiotic surfaces or to each other. They disrupt wound healing by promoting the formation of diverse microbial phenotypes and communities, which increase multiplication and pathogenicity, evade immune responses, prolong inflammation and impair skin barrier function
- Biofilms are not visible to the naked eye, but downstream effects can provide some clinical cues
- For wounds that do not heal as expected, biofilm should be suspected. Use a biofilm-based protocol that focuses on continuous disruption of the biofilm to prevent its reformation
- One option is the use of polyabsorbent fibres dressings impregnated with TLC-Ag matrix, which offer autolytic continuous debridement and antimicrobial properties. They are effective against bacteria such as *Staphylococcus aureus*, *MRSA*, *Streptococcus pyogenes* and *Pseudomonas aeruginosa*.

Debridement in context: Pathway for biofilm management

Debridement always needs to be viewed as part of a wider care pathway for wound management, following a full holistic assessment and setting priorities and treatment goals in collaboration with the patient.

This should encompass all the needs of the patient and their wound, according to a structured protocol such as T.I.M.E.R.S (Atkin et al, 2019) or referring to local protocol as necessary:

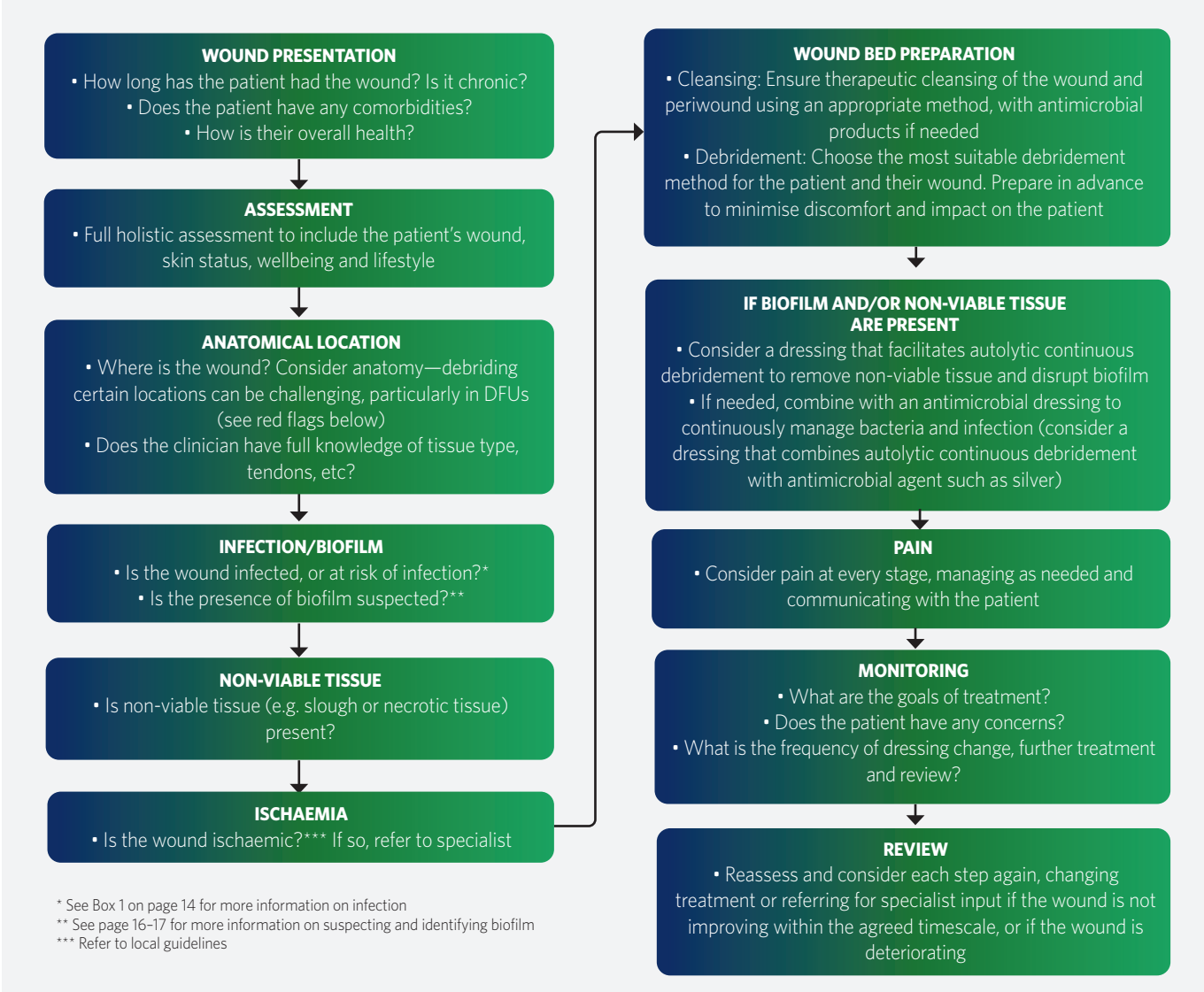
- Tissue
- Inflammation/Infection
- Moisture balance
- Edge of wound/Epithelialisation
- Repair and Regeneration
- Social factors.

In addition to debridement, the care pathway should include cleansing, dressing selection, protection of the surrounding skin, and any other treatments or products that may encourage healing and improve the patient's quality of life. The patient's preferences and factors such as pain and quality of life should be considered at every stage.

Pathway for use in practice

The expert panel developed the following pathway **[Figure 8]** with a checklist for each stage, to aid clinicians in selecting autolytic debridement for management of wounds, particularly those that are chronic and may include biofilm.

Figure 8: Autolytic debridement pathway for use in practice



The importance of documentation

It is important to document throughout every stage of treatment. This should be as specific as possible, to ensure good communication and continuity of care. For example, notes stating 'wound debrided' or 'debridement carried out' are not useful and require context: the type of debridement, rationale for treatment and products used should be documented to ensure optimal ongoing care for the patient.

Summary

- Debridement should be part of a comprehensive care plan, based on a holistic assessment and patient collaboration, using protocols such as T.I.M.E.R.S
- Documentation is important at each stage of treatment. It should be specific, detailing the type of debridement, rationale, and products used to ensure clear communication and continuity of care.

Conclusions and the future

Debridement is a crucial step in wound care, which is often underutilised in practice, possibly due to lack of clinician knowledge and confidence. The expert panel agreed that more debridement needs to be carried out in practice, and it should be seen as a foundation of WBP.

Wherever possible, early intervention is needed so that debridement can be carried out in a timely manner to improve patient outcomes. Patient circumstances, beliefs and geographical location (particularly in remote or rural areas) often mean that patients are seen at a later stage, when early intervention would have been highly beneficial.

As the burden of wounds increases year on year—globally and in the APAC region—early intervention is key, as is prevention. It is acknowledged that, in many parts of the region, sheer numbers of patients requiring treatment for wounds presents a challenge for clinicians and healthcare systems.

Biofilm should be suspected in all chronic wounds, and biofilm-based wound care emphasises the importance of autolytic continuous debridement, which involves a two-step process of removal/disruption followed by prevention of reformation.

Debridement should always be treated as part of a care pathway, following thorough holistic assessment and with clear goals, which should be developed in collaboration with the patient. In all treatment, patient preference is paramount, with the need for effective communication emphasised. When considering debridement in chronic wounds, pain and patient quality of life are considerations.

The future

In the development of this document and pathway, the expert panel found that more evidence is needed in debridement to inform practice, with a lack of up-to-date and comprehensive evidence in the literature. It is evident that this represents a gap, and clinicians need clear guidance to increase their knowledge and build confidence, so that use of debridement can be optimised for patients.

It is evident that, as debridement should be used more in practice, monitoring and documentation are key to increase evidence and demonstrate improved outcomes. As evidence-based practice builds, awareness can increase among clinicians.

In the APAC region, the burden of wounds is expected only to increase, making effective, evidence-based practice increasingly urgent. We must use all available tools to improve patient outcomes wherever possible.

Glossary

Antibiotic: A chemical substance that kills or inhibits the growth of a microorganism (e.g. bacteria, fungi or protozoa) and which can be used both topically and systemically. They can be classified according to their effect on bacteria—those that kill bacteria are bactericidal, while those that inhibit the growth of bacteria are bacteriostatic. Antibiotics are defined according to their mechanism for targeting and identifying microorganisms—broad-spectrum antibiotics are active against a wide range of microorganisms; narrow-spectrum antibiotics target a specific group of microorganisms by interfering with a metabolic process specific to those particular organisms (WHO, 2010)

Antimicrobial: Umbrella term and refers to disinfectants, antiseptics (sometimes called skin disinfectants), antivirals, antifungals, antiparasitics and antibiotics (IWII, 2022)

Autolytic debridement: Natural process by which the body's own enzymes soften, liquefy and break down devitalised tissue and slough. Highly selective process whereby only devitalised tissue will be affected. Can be aided by using topical agents and contemporary wound dressings

Bioburden: Population of viable microorganisms on/in a product, or on a surface

Biofilm: Polymicrobial community involving clusters of different types of bacterial cells growing at varying rates, which attach to biotic, abiotic surfaces or each other, and are encapsulated in a self-produced extracellular matrix. Biofilms are tolerant to antimicrobial agents, including antibiotics and antimicrobials, making them challenging to treat

Biological debridement: Uses maggot larvae of the green bottle fly to remove moist slough, necrotic, and devitalised tissue from the wound

Cleansing: Active removal of surface contaminants, loose debris, non-attached non-viable tissue, microorganisms or remnants of previous dressings from the wound bed, wound edge, periwound area and surrounding skin

Chronic (also known as complex, non-healing, hard-to-heal wounds): A wound that makes slow progression through the healing phases or displays delayed, interrupted or stalled healing. Inhibited healing may be due to intrinsic and extrinsic factors that impact the person, their wound and their healing environment (IWII, 2016; 2022)

Debridement: Removal of devitalised wound components, including necrotic material, slough and biofilm

Devitalised tissue: Tissue that has no blood supply, and will not improve with treatment or time; for example, necrotic tissue, callus or slough

Enzymatic debridement: Breaks down devitalised tissue and hard necrotic eschar using specific enzymes, either endogenous or exogenous

Hydrosurgical (jet lavage) debridement: Uses a high-energy saline beam that creates a localised vacuum to cut and remove tissue through the venturi effect

Mechanical debridement: Physical removal of devitalised tissue and debris using tools such as debridement pads or wet-to-dry gauze

Necrosis: Dead tissue, usually caused by interruption to the blood supply to tissue and cells, resulting in local ischaemia and tissue death

Non-viable tissue: Include necrotic, sloughy, fibrinous and compromised tissue and may contain inert contaminants such as skin debris or dressing residue. May be yellow, grey, blue, brown or black in colour, have a soft or slimy consistency or form a hard eschar

Periwound: Area of skin surrounding the wound

Sharp debridement: The removal of devitalised tissue using surgical instruments such as scalpels, curettes, scissors or forceps, performed just above the viable tissue level to promote healing

Slough: Non-viable tissue of varying colour (e.g. cream, yellow, greyish or tan) that may be loose or firmly attached, slimy, stringy or fibrinous

Surgical debridement: Involves the surgical excision or wider resection of non-viable tissue, including removal of healthy tissue from wound margins until a healthy, bleeding wound bed is achieved

Ultrasonic debridement: Devices deliver ultrasound energy directly to the wound bed or via an atomised solution, aiding in the removal of devitalised tissue while also offering irrigation capabilities

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