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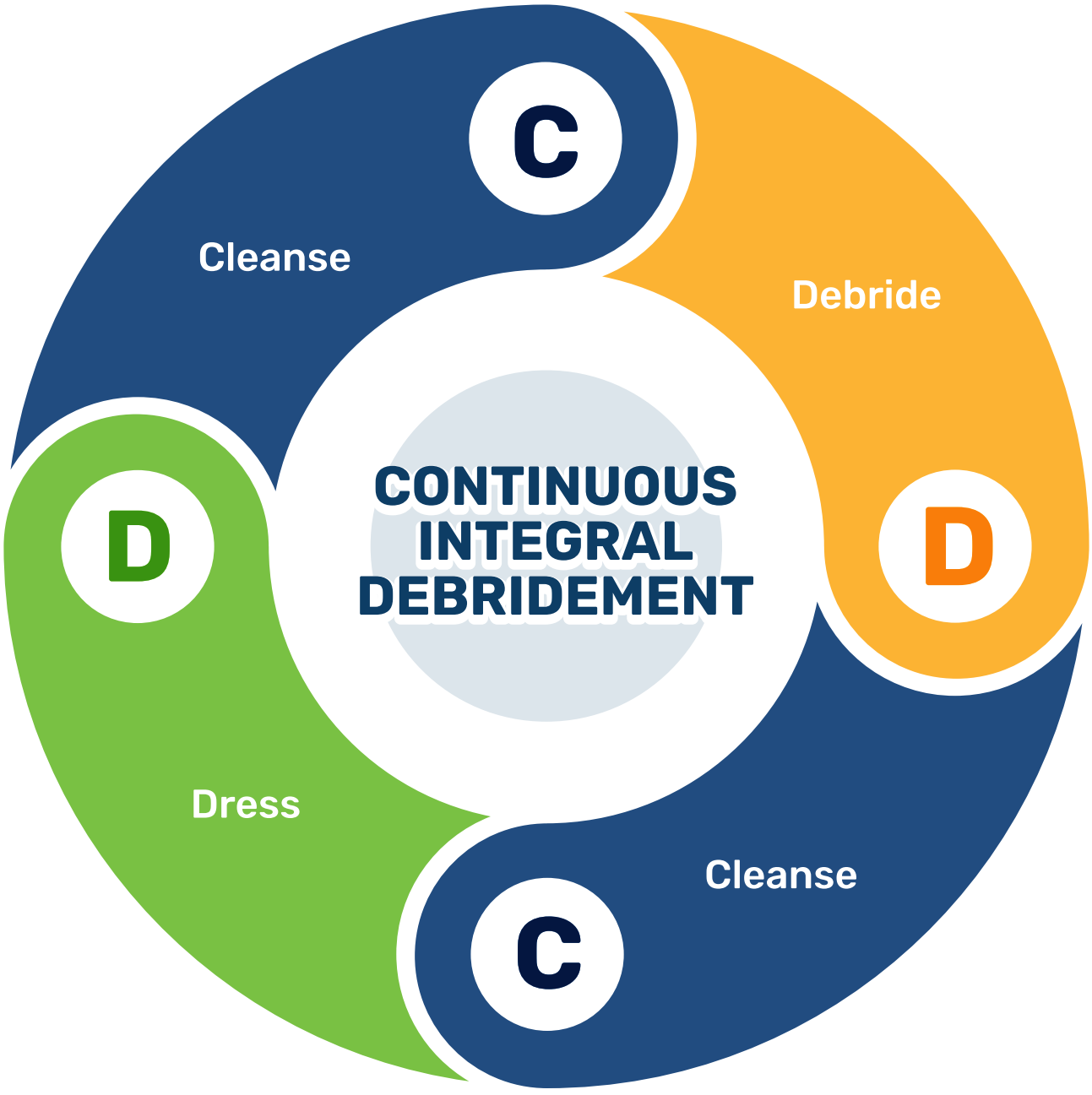

Continuous integral debridement:

optimising wound bed preparation through the cleanse, debride, cleanse and dress cycle

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Director of medical communications: **Camila Fronzo**
Deputy managing director: **Andrew Iafrati**
andrew.iafrati@markallengroup.com
Managing director: **Rob Yates**
rob.yates@markallengroup.com
CEO: **Ben Allen**

Produced by Mark Allen Medical Communications
www.mamedcomms.com

Published by MA Healthcare Ltd
St Jude's Church, Dulwich Road, London, SE24 0PB, UK
+44 (0)20 7738 6726
www.markallengroup.com

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Author panel

Lead co-chair: **Dieter O Mayer**, General & Vascular Surgeon, University Hospital of Zurich, Department of Dermatology, Switzerland

Leanne Atkin, Vascular Nurse Consultant/ Associate Professor, Mid Yorkshire NHS Teaching Trust and University of Huddersfield, UK

Caroline Dowsett, Consultant Nurse Tissue Viability, East London NHS Foundation Trust, UK

Viviana Gonçalves, Tissue Viability Nurse Consultant, São João Local Health Unit, Porto, Portugal

Lindsay Kalan, Associate Professor, Michael G. DeGroote Institute for Infectious Disease Research, McMaster University, Hamilton, Ontario, Canada

Irena Pastar, Professor, Wound Healing and Regenerative Medicine Research Program, Dr Phillip Frost Department of Dermatology and Cutaneous Surgery, University of Miami, Miller School of Medicine, Miami, USA

M Mark Melin, Medical Director Wound Clinic, Gonda Vascular Center, Mayo Clinic, Rochester, Minnesota, USA

Prashini Moodley, Clinical Microbiologist, School of Medicine, Nelson R Mandela Campus, University of KwaZulu-Natal, South Africa

Co-chair: **Ewa Klara Stuermer**, General & Trauma Surgeon, Head of Translational Research & Comprehensive Wound Centre UKE, Department for Vascular Medicine, University Medical Centre Hamburg-Eppendorf, Germany

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Reviewer panel

Natalia Maella, Advanced Practice Nurse in Wound Care, Institut Català de la Salut, Spain

Monira Nou Howaldt, Vascular Medicine Physician, Hôpital Saint-Eloi, CHU de Montpellier, France

Sebastian Probst, Full Professor in Tissue Viability and Wound Care, Geneva School of Health Sciences (HEdS-Genève), HES-SO University of Applied Sciences and Arts Western Switzerland, Geneva, Switzerland

Kevin Woo, Professor, Queen's University, School of Nursing and School of Rehabilitation, Kingston, Canada

Continuous integral debridement: optimising wound bed preparation through the cleanse, debride, cleanse and dress cycle

Abstract

In 2024, the *Journal of Wound Care* (*JWC*) published best-practice guidance on wound debridement. This introduced the concept of integral debridement, defined as the combined use of complementary debridement methods on the same wound to optimise healing outcomes. This typically involves combining less invasive approaches, such as autolytic debridement, with more active adjunctive methods, including mechanical and/or sharp debridement.

In 2026, *JWC* convened an expert panel to explore how this concept can be effectively implemented in non-specialist settings. The panel concluded that debridement is most effective when applied repeatedly throughout the healing process and introduced the concept of continuous integral debridement (CID), a cyclical four-step approach comprising cleanse, debride, cleanse and dress (CDCD). The panel propose that, when performed regularly, this will help disrupt microbial and non-microbial barriers to healing and maintain a clean wound environment.

The panel consider that CID is compatible with established frameworks, such as TIME/TIMERS and the International Wound Infection Institute wound infection continuum, and complements antibiofilm strategies, including Wound Hygiene. This document provides practical guidance for integrating CID into routine wound care across all clinical settings, including recommendations on cleansing solutions, debridement methods and dressing selection, with the aim of supporting evidence-based practice and improving patient outcomes.

Keywords: Biofilm, continuous integral debridement (CID); cleansing; debridement; desloughing dressing; wound dressing; wound bed preparation

Once a patient's underlying conditions and wound cause have been addressed with gold-standard treatment, wound bed preparation becomes the main focus of care.[1] Bacterial proliferation creates an environment rich in non-microbial wound components, such as pro-inflammatory cytokines and proteases, which can degrade healthy tissue, leading to slough, necrosis and increased exudate.[2]

Debridement – the removal of slough, necrotic tissue and debris – eliminates both microbial and non-microbial barriers to healing, making it an essential part of wound bed preparation.

This document aims to promote implementation of best-practice guidance for wound debridement by all clinicians, including those without specialist wound-care training. It builds on the concept of integral debridement introduced in the 2024 *Journal of Wound Care* (*JWC*) international consensus document on wound debridement.[2] Integral debridement is a concept based on the premise that not all debridement methods are sufficient when used alone, and some less-invasive methods need an adjunct to be fully effective. Thus, integral debridement introduced a distinction between standalone methods and those that require an adjunct (*Figure 1*).[2]

This document advances the 2024 *JWC* consensus document framework[2] to emphasise that debridement must be regular and routine. This concept is based on clinical understanding that to promote healing, integral debridement must be performed regularly and routinely throughout the wound trajectory, otherwise the microbial and non-microbial barriers will re-emerge and delay healing.

Continuous integral debridement

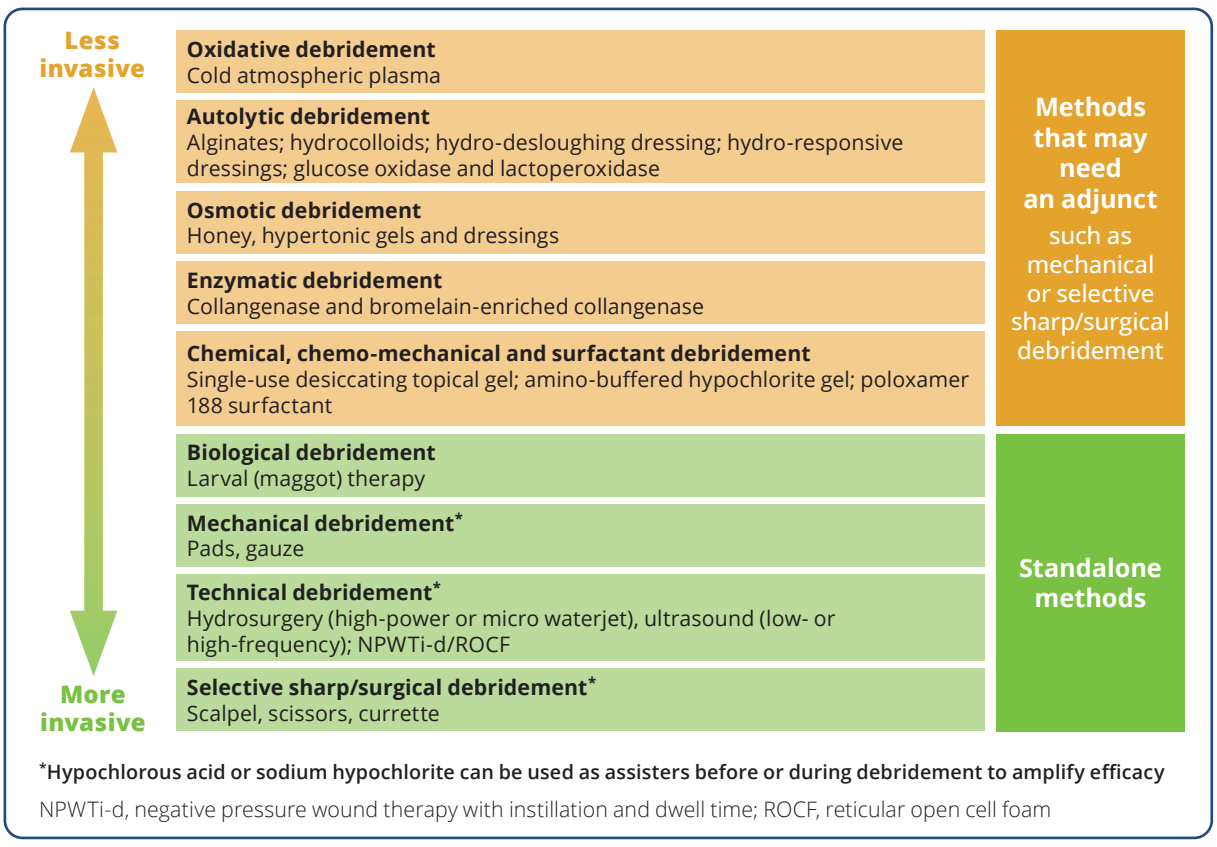
In routine clinical practice, debridement is often performed as an isolated or infrequent intervention, rather than as part of a structured and repeated process. This inconsistency contributes to the rapid re-accumulation of slough and biofilm, delaying healing and increasing the risk of chronicity. To address this gap, the continuous integral debridement (CID) procedure comprises four sequential steps: cleanse, debride, cleanse and dress (CDCD). These four components, none of which is sufficient alone to promote wound healing, are implemented in turn, forming an integrated cycle of wound care (*Figures 2–4* and *Table 1*).

Incomplete implementation of CID creates an environment in which the microbial and non-microbial barriers to wound healing can flourish. Furthermore, once removed, slough and biofilm can quickly reform, promoting the release of pro-inflammatory cytokines, potentially followed by an increased exudate volume and other clinical signs associated with raised bioburden and non-healing.[3] To progressively reduce both wound bioburden and the inflammatory burden, the CDCD cycle needs to be repeated regularly and routinely throughout the wound-healing trajectory. The frequency should be guided by wound characteristics, particularly exudate levels. In many cases, this is every 2–4 days. When more frequent dressing changes are required, such as daily changes for highly exuding wounds, cleansing alone may be sufficient between CDCD cycles. Similarly, active debridement is not necessarily required at every dressing change, again depending on the wound characteristics.

Regular, routine implementation of the CDCD cycle can help reduce the risk of wound chronicity and complications, including local or systemic wound infection and lower-limb amputation, thereby increasing patient quality of life and wellbeing.

Through its focus on tissue management, infection control and inflammation reduction, CID aligns with the TIME and TIMERS frameworks[1,4] and the International Wound Infection Institute (IWII) Principles of Best Practice.[3] It is also complementary to the Wound Hygiene protocol, which assumes that all non-healing wounds contain biofilm and, therefore, advocates regular cleansing and debridement to remove as much biofilm as possible from the wound bed edges and/or prevent its (re)formation.[5]

Figure 1. Debridement methods: standalone and requiring an adjunct[2]



*Hypochlorous acid or sodium hypochlorite can be used as assisters before or during debridement to amplify efficacy

NPWTi-d, negative pressure wound therapy with instillation and dwell time; ROCF, reticular open cell foam

Figure 2. Continuous integral debridement

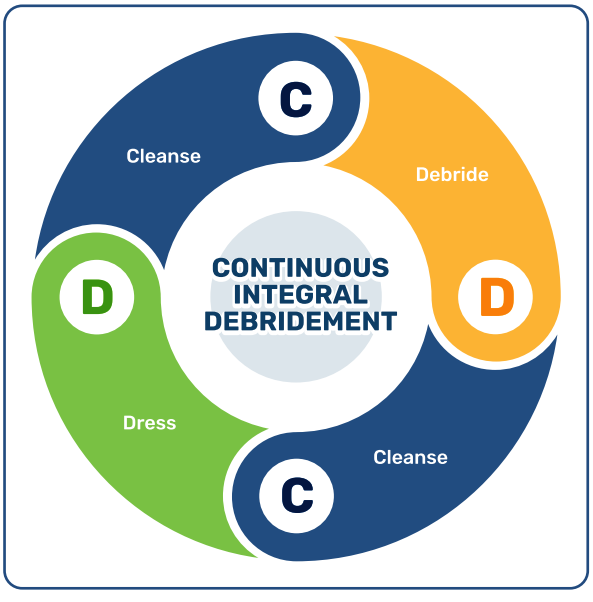
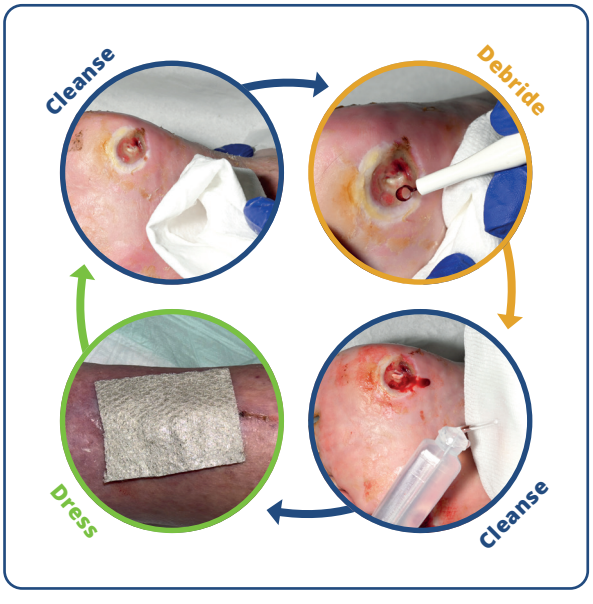


Figure 3. Steps of continuous integral debridement



- CID extends beyond Wound Hygiene – where debridement is often performed as a one-off intervention, without maintenance – by emphasising ongoing cleansing, debridement and appropriate dressing application to maintain or promote a clean wound environment, which will promote healing and help avoid complications.

Figure 4. Wound appearance between steps of continuous integral debridement

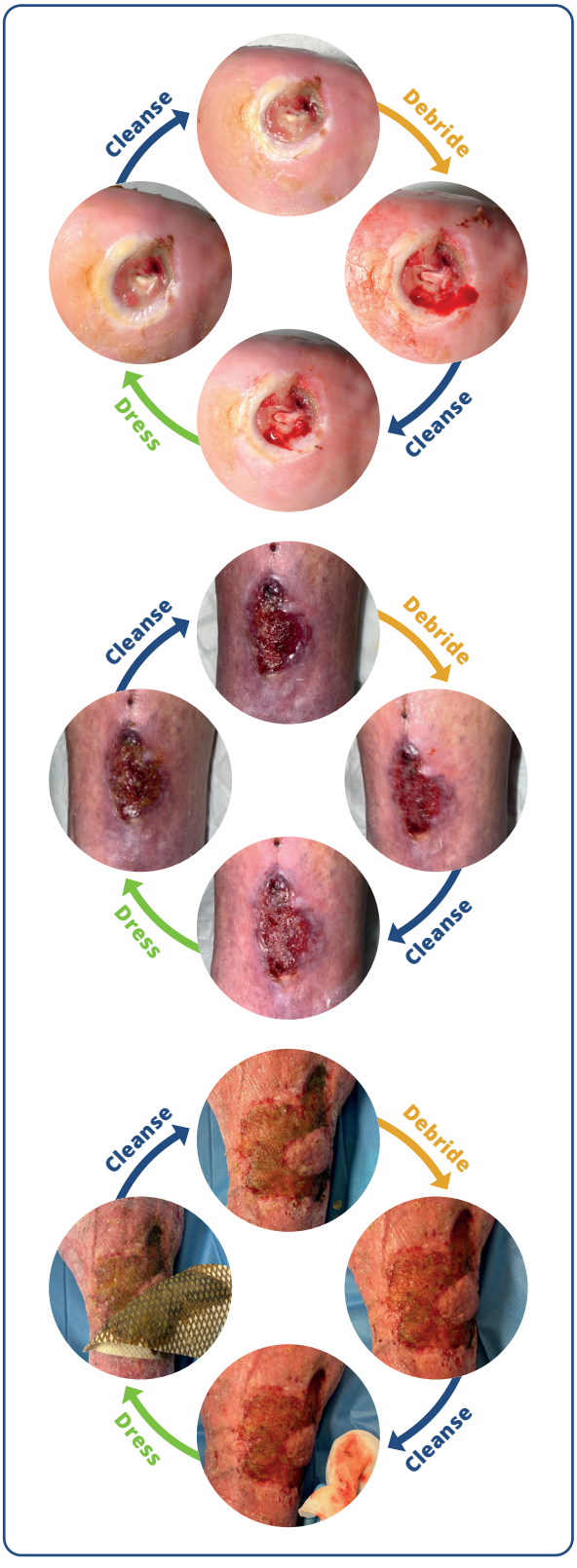


Table 1. Four steps of continuous integral debridement (adapted from Mayer et al)[2]

Step 1. Cleanse	
What	Rinsing, irrigating or soaking of the wound bed, edges and surrounding skin and then wiping with sterile wet gauze or similar
Why	To soften adherent slough and reduce bioburden by removing loose surface materials (debris), microorganisms and other contaminants; this will help produce a clean environment that promotes granulation-tissue formation and reduce risk of infection
How	By using an inert or antiseptic cleansing solution appropriate to the risk or presence of infection – antiseptic solutions should be minimally cytotoxic while still clinically effective, and they should maintain a slightly acidic pH close to that of healthy skin to support the natural barrier function and help limit microbial proliferation
When	At each dressing change, after dressing removal and before debridement
Step 2. Debride	
What	Removal of adherent and non-adherent devitalised tissue (necrotic tissue and slough) and foreign materials from the wound bed and edges by various methods
Why	To minimise wound components that impede healing (which may or may not be microbial), including microorganisms, biofilm and extracellular polymeric substance
How	By using the most effective and safest (with the least risk of side effects) method available to the clinician, depending on training, expertise and site of service, guided by the healing trajectory and wound status
When	At each dressing change, after initial cleansing and before re-cleansing
Step 3. Cleanse (post-debridement)	
What	Rinsing, irrigating or soaking of the wound bed, edges and surrounding skin with an appropriate cleansing solution and then wiping with sterile wet gauze or similar
Why	To remove non-adherent bacteria, biofilm fragments and micro-debris present in the wound environment released from tissue and biofilm disrupted by mechanical, technical or sharp/surgical debridement; this step is frequently overlooked but critical to reducing the risk of rapid bacterial reseeding, biofilm reformation and recurrence of slough, thus optimising outcomes
How	By using an inert or antiseptic cleansing solution appropriate to the risk or presence of infection – antiseptic solutions should be minimally cytotoxic while still clinically effective, and they should maintain a slightly acidic pH close to that of healthy skin to support the natural barrier function and help limit microbial proliferation
When	At each dressing change, after debridement and before dressing
Step 4. Dress	
What	Application of a primary dressing over the wound
Why	To control exudate, maintain a moist environment and protect the wound, edges and surrounding skin from maceration and external contamination, as well as, potentially, to modulate inflammation or remove slough via electrostatic attraction to support continuous debridement – this can all help sustain and enhance the effects of cleansing and debridement, limit microbial proliferation and control biofilm, optimising healing between cycles
How	By selecting a dressing with appropriate properties, based on a holistic assessment of the patient and wound
When	At each dressing change, after re-cleansing

Infection, inflammation and non-healing

All wounds contain microorganisms, including bacteria, that have the potential to delay wound healing by disrupting the normal balance between host repair and microbial control. As microbial load increases, bacteria compete with host cells for oxygen and nutrients, while releasing toxins and enzymes that damage tissue. This sustains local inflammation, with the excessive proteases and inflammatory mediators now degrading healthy tissue.

Progression towards healing is also impaired by biofilm, a polymicrobial community formed of microbes embedded within a dense extracellular polymeric substance (EPS), which protects against immune clearance and antimicrobial treatments (*Figure 5*).[6] Biofilm is present in most non-healing wounds, located mostly in devitalised tissue, such as slough. Established biofilm exhibits altered bacterial metabolic activity and is highly resistant to antibiotics and topical antiseptics, which cannot easily penetrate the protective EPS layer.[3]

If the microbial burden exceeds the host's defence response, or bacterial virulence increases, the process can shift from local inflammation and colonisation to infection (*Figure 6*).[3] In most patients, the greater the microbial burden, the more pronounced the host response and associated inflammation. In such an environment, biofilm can become established and mature, and very resistant to treatment modalities.[3]

Figure 5. Biofilm formation and maturity

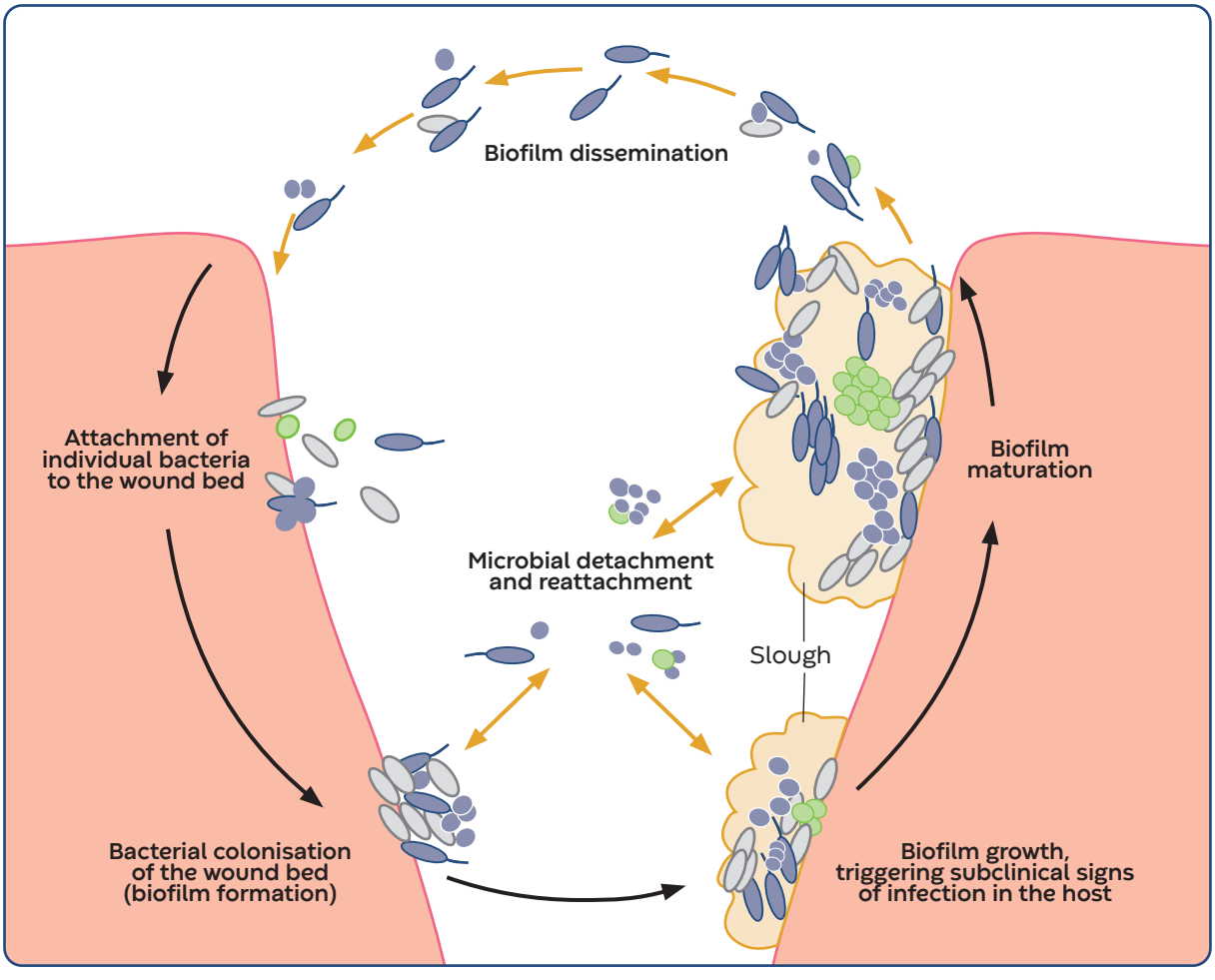


Figure 6. Wound infection continuum[3]

Colonisation	Local wound infection	Spreading infection	Systemic infection
Microorganisms are present and able to multiply but remain controlled by the host, with no clinical signs of infection or delayed healing. In non-healing wounds, they can form established communities, including biofilm, which may persist without visible inflammation due to poor local immune competence.	Microbial activity sufficient to cause host response, with biofilm increasingly established. Covert (subtle) signs include delayed healing, high exudate and unhealthy tissue (e.g. hypergranulation). Overt signs include wound breakdown, increasing size, redness, purulent exudate, malodour and pain.	Infection extending beyond wound edges, indicating loss of local host control and increasing microbial bioburden, often with biofilm involvement. Signs include wound breakdown and dehiscence, possibly with satellite lesions, spreading erythema, extended induration and swollen lymph glands.	Infection spreads beyond the local site, resulting in systemic involvement. Clinical signs include fever and malaise, with risk of sepsis and even death.

One of the first clinical signs of wound infection is non-healing, with its hallmark characteristics of slough (and possibly necrotic tissue) and increased exudate production. This creates the ideal environment for excess levels of pro-inflammatory cytokines and proteases. An infected wound is therefore also an inflamed wound.

Non-healing wounds have significant microbial burden, including biofilm, not only within the wound bed but also on the wound edges, particularly when these have rolled under (epibole) or hardened (induration).[2] It is essential to minimise the microbial burden on the edges, given that epithelial tissue migrates inwards from the healthy skin margins to achieve wound closure.

Holistic care

Continuous integral debridement is most likely to be effective if the patient comorbidities and wound aetiology are assessed and managed. A full comprehensive holistic assessment must be undertaken to identify the wound type and underlying comorbidities, as well as relevant social and environmental factors, patient and family concerns and other psychosocial issues (*Box 1*).[2]

Box 1. Aspects of holistic wound assessment[2]

Patient factors
- Comorbidities that can impair wound healing, such as diabetes mellitus, cardiovascular disease, immunosuppression, neurological conditions and obesity
- Demographics: advanced or very early years
- Lifestyle: e.g. smoking, nutritional status, mobility
- Patient's needs, preferences and priorities
- Treatments that may impair wound healing (e.g. chemotherapy, corticosteroid therapy)

Wound factors
- Underlying aetiology, e.g. neuropathy; peripheral arterial disease; venous hypertension; pressure, friction and/or shear
- Potential for healing, e.g. whether the patient is receiving palliative care or has very fragile, friable skin
- Tissue type (necrotic, slough, granulation, epithelial) and presence of microbial and non-microbial components
- Overall wound characteristics (location, size and depth)

Social factors
- Support networks available
- Access to adequate nutrition
- Caregiver capacity to perform debridement

Setting
- Availability of medical resources and equipment
- Clinician training and expertise in debridement

Taking time to listen to patients and understand their needs and preferences, and then set treatment goals with them, will facilitate a more personalised approach to care, increasing patient satisfaction and engagement with treatment.[7]

Treatment should reflect the patient's needs and priorities. For example, reducing malodour or leakage might be more important to the patient than wound closure, if these are making socialising embarrassing and awkward. Working in collaboration with patients and involving them in clinical decision-making are likely to increase adherence to treatment and therefore an optimal outcome.[7]

Patient factors

Treatment of comorbidities and management of lifestyle-related risk factors, such as smoking cessation, will help support immune response, which can hinder excess proliferation of harmful wound components. For the most common wound types, established gold standard treatments for underlying aetiology are available.

- Revascularisation is essential in patients with severe peripheral arterial disease (PAD) to restore adequate perfusion and enable wound healing.
- Glycaemic control is required for patients with diabetes, supplemented with offloading for those with diabetic foot ulcers.
- Compression therapy is effective in managing venous hypertension in patients with chronic venous insufficiency (CVI); in cases of mixed arteriovenous disease, it may be applied at reduced pressure, under close supervision,[8] only after confirming that the arterial component does not represent critical limb-threatening ischaemia (CLTI).
- Pressure redistribution can promote healing in pressure injuries.

A biopsy may be required for conditions such as vasculitis, vasculopathy, pyoderma gangrenosum or malignant wounds, or when a wound fails to improve after 4 weeks of care.[9]

Full holistic assessment within 4 weeks of presentation, followed by treatment of the patient comorbidities and wound aetiology, will substantially increase the likelihood of a good healing outcome.[1,10]

Debridement is contraindicated in CLTI until the limb has been revascularised.[2] Vascular assessment must therefore be performed to exclude PAD. This usually involves palpation of foot pulses and use of a hand-held Doppler to determine the ankle brachial pressure index (ABPI). In addition, assessment of arterial flow using hand-held Doppler ultrasound waveforms (e.g.

multiphasic signals) provides a subjective point-of-care assessment to further assess wound-relevant PAD.[11] If a Doppler is not available and no foot pulses can be detected, an ABPI should be obtained and a specialist referral made. Similarly, if ischaemia is present, the patient should be referred to a vascular specialist for consideration of revascularisation options. If the ischaemia is not critical and waiting lists are long, gentle debridement of biofilm and slough can be considered.[2,12]

Wound factors

CID aims to minimise devitalised tissue, including necrotic tissue and slough, which may be adherent or loose (*Figure 7*). Devitalised tissue, having lost its physiological function and being no longer viable, forms an ideal environment for bacterial proliferation, biofilm and excessive levels of pro-inflammatory cytokines and proteases.

Granulation tissue exposed to biofilm can become 'unhealthy', presenting with clinical signs of inflammation. This unhealthy granulation tissue can vary from pale red and light yellow, or even very dark red, in contrast to the healthy pink or red colour characterising granulation tissue in healing wounds. Full definitions of necrotic tissue, slough and unhealthy granulation tissue can be found in Mayer et al.[2]

When to refer to a specialist

Wound healing progress should be assessed at each stage of the CID cycle to determine if the cleansing solution, debridement method and dressing selected are still appropriate to achieve the clinical goal. Lack of response to appropriate wound care requires a full holistic reassessment to review diagnosis of wound aetiology and patient comorbidities and adjust treatment regimen accordingly.

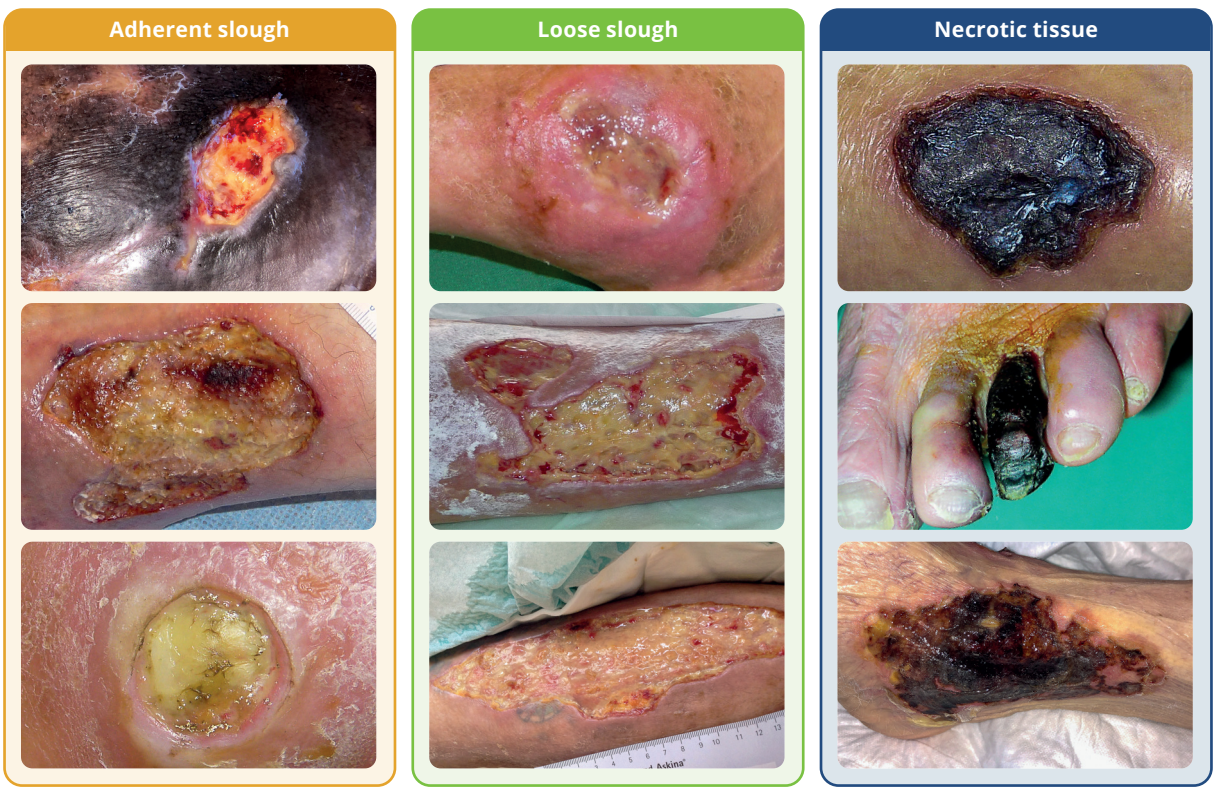
Exposed bone or tendon or suspected ischaemia warrant strong consideration of early specialist referral.

- After 4 weeks of initiation of CID as part of standard of care, no improvement (measurable by formation of healthy granulation tissue or a wound-size reduction of around 40%) should trigger specialist referral.[1]

Step 1. Cleanse

Cleansing aims to remove loose debris and non-adherent devitalised tissue, along with any microorganisms, biofilm and metabolic waste it contains, leaving a cleaner and visible wound environment with a reduced bioburden.[2,5]

Figure 7. Examples of devitalised tissue adherent slough, loose slough and necrotic tissue



- Cleansing does not remove adherent slough or necrotic tissue and so cannot replace debridement. Instead, cleansing is an essential complementary precursor to debridement, helping remove some loose surface contaminants and non-viable tissue and thus making the area easier to debride.

Cleansing methods and solutions should be chosen according to the wound status and clinical objectives. For example, healing wounds may require gentle cleansing with an inert solution to help promote existing granulation and epithelialisation, while infected hard-to-heal wounds may require more intensive cleansing to remove as much bacteria as possible.

Cleansing methods

Cleansing can be achieved by one or a combination of irrigation, soaking, swabbing and/or wiping of the wound bed and edges and up to approximately 20 cm of the periwound skin (*Box 2*).[2,5]

If the wound is progressing towards healing, a gentle technique is required to avoid damaging growing granulation and/or epithelial tissue. However, if the wound is not healing, a more vigorous approach may be needed, and health professionals should provide pain relief in advance if necessary.

Inert versus antimicrobial cleansing solutions

Inert cleansing solutions, such as normal saline, sterile saline and potable tap water, have no intrinsic antimicrobial activity and work by simply loosening and then rinsing away surface contaminants, devitalised tissue and some surface microorganisms. Normal saline (0.9% NaCl) is isotonic, with an osmolarity similar to that of wound fluid and plasma. In contrast, sterile water is hypotonic, having a lower solute concentration relative to the wound environment. Inert solutions will not damage healthy tissue, as they are non-cytotoxic.

Box 2. Methods of wound cleansing[13]

Irrigation
Mechanically flushes the wound, diluting inflammatory mediators and reducing the microbial burden

Soaking
Hydrates and loosens devitalised tissue, enabling removal

Swabbing
A soaked pad or gauze is used to actively dislodge and remove exudate, debris and loose devitalised tissue

Compress application
Applies an astringent effect that absorbs excess moisture and assists in the removal of loose debris

Wiping
Achieved with a soaked pad or gauze

Antimicrobial cleansing solutions contain antimicrobial agents that actively kill pathogenic microorganisms, which are then rinsed away. The solution's antimicrobial agent is designed to support its rinsing, dilution or wiping action. Some solutions contain an oxidising agent and/or have surfactant properties. These also exert antimicrobial (and biofilm) effect, enhancing their debridement properties.[14,15] Antimicrobial cleansing solutions are essential in infected wounds, whether the infection is local (covert or overt), spreading or systemic.[3]

- Antimicrobial cleansing solutions should have a broad spectrum of activity.

Cytotoxicity of cleansing solutions

When selecting an antimicrobial cleansing solution, the guiding principle is to select the least cytotoxic solution that is clinically effective, based on needs of the wound characteristics and what the patient can tolerate, as identified during assessment. The aim of this is to reduce or eradicate pathogenic microorganisms without impairing the viability of host cells essential for healing.

A solution's therapeutic index (TI) – defined as the ratio between the concentration that is toxic to human cells and the concentration required to kill bacteria (MBC) – reflects its ability to kill microorganisms without harming healthy cells. A higher TI indicates a greater margin of safety.

- An ideal antimicrobial wound cleansing solution should demonstrate a high TI (>1) and minimal cytotoxicity at effective concentrations.

In cases of more severe wound infection/bioburden, where there are clinical signs of overt or spreading infection and established biofilm is present, short-term management with a more potent (so more cytotoxic) classic antiseptic may be required. Whatever the clinical objective, it is essential to ensure that the patient is not sensitive or allergic to any of the cleansing solution ingredients. Moreover, it is important to always bear in mind what the patient can tolerate and what the care setting is able to provide.

When the clinical signs of infection have resolved, the clinician should step down to a less cytotoxic cleansing solution, based on the wound characteristics. This approach, with its stepwise selection and targeted and time-limited use of topical antiseptics, aligns with the principles of antimicrobial stewardship.

Antimicrobial cleansing solutions are preferred for repeated, cyclical use (CID), while classic antiseptics are

reserved for short-term escalation when microbial burden exceeds control. Although cleansing solutions with antimicrobial properties are not always strictly required when healing is progressing without delay, there is increasing expert consensus that they should be used whenever feasible to reduce microbial burden and limit rapid bacterial regrowth and biofilm reformation.[2,3,5,16] This is especially true in patients with PAD where reduced blood flow to the wound location will impair the immune response.

Role of pH in cleansing solutions

The pH of a wound environment can affect microbial growth. Non-healing wounds often have an alkaline environment, with a pH of 7.4–8.9,[17] which is associated with bacterial proliferation, persistent biofilm and elevated protease activity, resulting in sustained inflammation and delayed healing.[18,19] In contrast, healthy skin is typically mildly acidic, with a pH of 4.1–5.8, which supports the protective dermal microbiome and contributes to the protective acid mantle.

- Mildly acidic cleansing solutions (pH 4.0–5.5) are compatible with the wound or skin environment and will help create a less favourable wound environment for microbial growth.[20] This will help preserve the skin barrier and microbiome of intact periwound skin.[13]

However, extremely acidic solutions, such as acetic acid (pH ~2.4), can be cytotoxic even at low concentrations (≥0.25%) and should therefore be avoided,[21] unless no other antimicrobial is available.

Selection of the most appropriate antimicrobial cleansing solution

Both the TI and pH should be considered when selecting an antimicrobial cleansing solution (*Table 2*). More detailed information on the properties, concentration, pH, TI, safety profile and mode of action of wound cleansing solutions can be found in Haessler et al.[13]

The limited high-quality comparative clinical evidence on wound-cleansing practices and product selection has resulted in widespread variation, although the clinical rationale for wound cleansing is not disputed. A comprehensive bibliography of the existing evidence base is included in Haessler et al.[13]

- More high-level evidence is required on the efficacy and cost-effectiveness of wound cleansing solutions. Until stronger evidence becomes available, practice should be guided by clinical judgement based on a full holistic patient and wound assessment, product availability and local policy.

When considering a cleansing solution, it is important to note that the concentration of its molecules (and therefore active ingredients) will vary between solutions. A higher concentration generally allows for better efficacy, but increases the risk of cytotoxicity, with levels varying based on the TI (a solution with a higher TI tolerates a higher concentration without being cytotoxic). A highly concentrated solution will generally be classified as an antiseptic and is intended for use on confirmed infection. Less concentrated solutions are cleansing solutions and are appropriate for all other wounds.

- Antiseptics can be classified and marketed differently across countries and healthcare settings, often due to variations in local regulatory frameworks. The instructions for use should always be checked for information on the product's antimicrobial activity and tissue compatibility.

Table 2. Therapeutic index and pH values of different cleansers[9]

Cleanser	pH	Bacterium	TI
Chlorhexidine	5.5–7.0	*E. coli*	1.15
		MRSA	2.43
		P. aeruginosa	0.70
		S. aureus	0.07
Octenidine dihydrochloride (OCT)	1.6–12.2	*E. coli*	1.33
		MRSA	3.33
		P. aeruginosa	0.95
		S. aureus	1.15
Polyhexanide (PHMB)*	6–8	*E. coli*	0.66
		MRSA	12.12
		P. aeruginosa	1.14
		S. aureus	0.60
Povidone-iodine (PVP-I)	4	*E. coli*	0.40
		MRSA	0.35
		S. aureus	0.69
Hypochlorous acid (HOCl)	3.5–7	*E. coli*	5.49
		P. aeruginosa	8.81
		S. aureus	6.31
Polyhexanide surfactant	≈5.0–7.0	No data	
Sodium hypochlorite (NaOCl)†‡	9–12	*E. coli*	0.004
		MRSA	0.008
		P. aeruginosa	0.002
		S. aureus	0.003

Abbreviations: *E.=Escherichia*; *P.=Pseudomona*; MRSA=methicillin-resistant *S. aureus*; *S.=Staphylococcus*; TI=therapeutic index

Note: *Studies in this analysis used PHMB without added betaine at a range of concentrations; †used diluted; ‡blended oxidising solutions containing both HOCl and low concentrations of NaOCl are generally considered to occupy an intermediate position between pure HOCl solutions and traditional higher-concentration hypochlorite preparations (e.g., Dakin's solution) – correspondingly, the antimicrobial activity and toxicity to host tissue of these blended solutions lie approximately midway between that of HOCl and hypochlorite solutions

Step 2. Debride

Debridement is the removal of viable (living) and non-viable wound components, including necrotic tissue, slough, microorganisms, biofilm, EPS and foreign material.[2] It disrupts biofilm and free-floating (planktonic) microorganisms, removing this along with adherent and loose slough, necrotic tissue and pro-inflammatory cytokines and proteases. It aims to remove the microbial and non-microbial barriers to healing, reducing the wound bioburden and creating a clean environment that promotes granulation tissue formation and epithelialisation.[2] By removing devitalised tissue, debridement can also enable full visualisation of the wound bed and edges.

📌 **The safest and most effective debridement method should be used, based on the clinician's training, expertise and site of service, as well as the patient and wound needs, the patient's preferences and social environment.**

Depending on their mode of action and the therapeutic objective, two debridement methods may be used adjunctively in sequence on the same wound to complement each other and so optimise the outcome. For example, autolysis can soften devitalised tissue, making it easier to remove with mechanical or selective sharp debridement later on.[2]

📌 **It is important to debride the wound edges as well as the wound bed, since the increased bioburden, including biofilm, in the wound edges is a significant barrier to healing.[5] Rolled or abnormally thickened (hyperkeratotic) wound edges should be refashioned (removed), as these inhibit epithelial migration.**

Importance of regular debridement

Even after thorough removal of slough and visible debris, bioburden can reaccumulate and slough reappear within 24–48 hours.[22] Similarly, biofilm can re-establish within 24–72 hours after disruption.[23] Therefore, only regular, repeated debridement is adequate, as it is essential to maintain the clean wound environment conducive to healing. This is true of all wounds – acute, stalled or progressing well towards healing – as the underlying principle is the same. The debridement method required will vary depending on the wound characteristics and should aim to remove non-viable tissue with the least amount of damage to locally healthy tissue.

The importance and clinical benefit of regular debridement is supported by large-scale clinical data from the US.[24,25] Analysis of 82 067 US Medicare episodes between 2015 and 2019 involving patients with non-healing diabetic foot ulcers receiving surgical and/or sharp debridement as part of standard of care had the following outcomes: [24,25]

- Average length of care episode was significantly lower in patients with debridement intervals of 1–7 days versus 8–14 days: 160.2 vs 199.7 days (difference 25%, p<0.0001), with a greater difference in debridement intervals of 1–7 days vs 15 days or more: 160.2 vs 254.0 days (difference 59%, p<0.0001).
- Healing within 1 year was greater in patients with debridement intervals of 1–7 days vs 8–14 days: 98.6 vs 95% (difference -3%, p<0.0001), with a greater difference in debridement intervals of 1–7 days vs 15 days or more: 98.6 vs 89.9% (difference -9%, p<0.0001).
- Debridement intervals of 8–14 days were also associated with better healing outcomes than debridement intervals of 15 days or longer.

Contraindications

During holistic patient and wound assessment, it is important to observe for any contraindications to debridement. A full list of cautions and contraindications for each method of debridement is included in the 2024 *JWC* consensus document.[2] *Table 3* lists a selection of cautions and contraindications relating to widely used methods of debridement: autolytic (hydrolytic), mechanical and selective sharp/surgical.

📌 **A key contraindication to debridement is severe PAD in patients who have not undergone revascularisation, when selective sharp/surgical debridement is being considered.**

Selection of debridement method

Clinicians should select the safest and most effective method(s) that are within their scope of practice; accessible and appropriate for the setting in which the procedure will be performed; and aligned with the patient's clinical needs, tolerability and preferences. Of these, selective sharp/surgical debridement remains the gold standard,[2] but requires training and expertise, so is beyond the competency of many non-specialists in wound care to perform.

A full list of debridement methods is given in the 2024 *JWC* consensus document,[2] which categorised them by their level of invasiveness, with the least invasive option being oxidative debridement (cold atmospheric plasma) and the most invasive selective sharp/surgical debridement, which is often performed with a scalpel, scissors or curette. *Box 3* outlines the principles of the most common methods, autolytic and mechanical debridement.

The wet-to-dry method (leaving saline-moistened gauze to dry on the wound bed for a few hours before removing it) is painful, non-selective and potentially harmful and thus should be avoided.[2]

Table 3. Example of cautions and contraindications for different debridement methods

Method	Contraindications and cautions	Clinical rationale for avoiding debridement
Autolytic	Acute infection or sepsis	May delay urgent control of the source of the infection; risk that infection may spread rapidly
	Diabetic foot ulcer*	Often associated with infection/ischaemia and requires closer monitoring and a more active approach
	Severe peripheral arterial disease with dry necrosis	Moistening dry necrosis increases risk of bacterial growth and infection due to reduced blood flow
Mechanical	Anticoagulant therapy/bleeding disorders*	Increased risk of bleeding and tissue trauma
	Diabetic foot ulcer*	Fragile tissue, neuropathy, and risk of infection, which may cause unintended damage
	Peripheral arterial disease*	Inadequate healing response post-debridement
Selective sharp/surgical	Anticoagulant therapy/bleeding disorders*	Significant risk of bleeding during invasive procedures
	Exposed bone, ligaments, tendons*	Risk of structural damage and functional impairment
	Critical limb ischaemia (no revascularisation)	Removal of tissue without first correcting perfusion may accelerate necrosis and risk of amputation
	Poor general health, immunocompromised, multiple comorbidities	Reduced ability to tolerate procedure and impaired healing capacity

Note: *caution; for a full list, refer to Mayer et al.[2]

Box 3. Autolytic and mechanical debridement methods

Autolytic debridement
Autolytic debridement is a natural process where white blood cells and enzymes selectively degrade devitalised tissue, gradually softening it until it detaches from the wound bed. It is the most conservative approach, requiring no specialist equipment, and is generally well tolerated. Dressings can be used to promote autolysis, with the process taking several days or weeks to achieve the required outcome. However, autolytic debridement depends on adequate moisture balance and a functional host immune response, limiting its effectiveness in large, very sloughy wounds and/or those with biofilm. Autolytic approaches alone have not demonstrated reliable efficacy in managing established biofilm. As such, autolytic debridement is best understood as a preparatory step to soften devitalised tissue, particularly if it is adherent, before implementation of more definitive ways for its complete removal, such as mechanical or selective sharp/surgical debridement.

Mechanical debridement
Mechanical debridement involves the physical removal of devitalised tissue, biofilm and debris through controlled abrasion. It is an accessible, standalone method that can be readily applied in community and outpatient settings and should preferably be performed using medical devices specifically designed for this purpose (e.g. pads, wands or gloves). These facilitate effective removal of slough and superficial biofilm while minimising damage to viable tissue. If unavailable, firm gauze should be used instead. These devices may be used alone or in combination with appropriate wound cleansing solutions. Mechanical debridement is well suited for maintenance within a CID strategy, especially between more invasive interventions or when autolytic approaches alone are insufficient.[2]

Mechanical debridement should only be performed with a saline-soaked gauze when more efficient methods such as debridement pads are not available.

📌 Contraindication for debridement or no wound improvement after 4 weeks of debridement should prompt referral to a wound-care specialist.[10,26]

Step 3. Cleanse (post-debridement)

Cleansing should be repeated after debridement procedure to remove released debris, bacteria and biofilm fragments. The disruption of devitalised tissue during debridement will inevitably release some micro-debris and bacteria into the wound bed, edges and surrounding skin. This is especially relevant for debridement methods that actively disrupt tissue, slough and biofilm, namely mechanical, technical and selective sharp/surgical debridement. Therefore, both the 2024 *JWC* consensus document,[2] the 2025 IWII principles of best practice,[3] and Haessler et al[13] recommend that wounds should be cleansed both before and after debridement.

Cleansing post-debridement can help prevent bacteria reseeding in the wound and maintain the clean environment. In this way, it helps ensure that the wound bed is optimally prepared for dressing application.

Antimicrobial cleansing post-debridement is particularly relevant in the presence of biofilm, as disruption of the extracellular matrix improves antimicrobial access.[2,13]

📌 The same principles apply to cleansing before and after debridement: the most effective and least cytotoxic cleansing solution should always be selected.

Step 4. Dress

Dressing selection and application is the fourth step in the CID cycle and should be regarded as a vital link in the CID chain, without which it will be incomplete and thus ineffective, rather than simply as a protective cover.

Rationale

Dressings usually serve several therapeutic purposes, such as to:

- Promote an environment conducive to healing and that supports debridement
- Manage exudate to promote moisture balance and protect the wound edges from maceration
- Protect the wound from external contamination and bacterial ingress
- Manage the wound bioburden
- Ideally, allow for continuous debridement to assist other methods.

> 📌 Choice of dressing should be based on the wound characteristics and patient needs, as determined by a full holistic wound and patient assessment. For example, the chosen dressings may need to maintain an appropriate balance between microbial control and preservation of host tissue, while also promoting an environment conducive to healing.

Dressings play a vital role in the CID cycle, as they can promote, sustain and even enhance the effects of cleansing and debridement. For example, some wound dressings can help promote the natural body process of autolysis. Others can modulate fibrin accumulation and loosen, absorb or bind slough, enabling it to be removed at dressing change without damaging viable tissue.[27] Some dressings are described as protease modulators, due to their ability to bind or sequester pro-inflammatory cytokines and proteases. Dressings containing antiseptics and/or antimicrobials can help manage bioburden, aiming to keep the wound bed and edges as clean as possible until the CID cycle starts again. Some of these dressings also have antibiofilm properties that can inhibit biofilm reformation after debridement. As such, wound dressings can help facilitate debridement and limit bacterial proliferation, inflammation, slough and biofilm reformation while supporting ongoing wound bed preparation. They are as important as cleansing and debridement.

> 📌 Dressings can enhance or maintain the therapeutic effects of the cleansing and debridement steps until the next cycle.

Dressing selection

The ideal dressing will be able to support and enhance the CID cycle. To achieve this, it would need to achieve the following:

- Bind and remove slough if present
- Help protect against infection
- Prevent slough and biofilm formation post-debridement
- Promote and maintain a good moisture balance
- Be easy to use
- Be comfortable for the patients e.g. fit well and not cause pain at removal (atraumatic for the wound bed).

Selection of a dressing should always consider its properties, mode of action and supporting evidence base to determine how it can best facilitate CID. A dressing should be considered as a vital player in the battle to prevent increasing bioburden, slough and biofilm reformation and ongoing inflammation, rather than simply a protective cover that supports healing. For wounds with signs of infection, the dressing should also have both antibacterial and antibiofilm qualities.

Step-down and step-up

As healing progresses and the wound demonstrates sustained improvement, dressings with primary antimicrobial activity, such as silver-containing or iodine dressings, should be stepped down. Subsequent dressings should continue to provide functions such as antibiofilm activity and desloughing to support ongoing wound bed optimisation and prevent recurrence of local barriers to healing. If the wound deteriorates, treatment should be escalated to include more targeted antimicrobial dressings. Therefore, clinicians must regularly reassess the wound and adapt dressing selection accordingly to maintain optimal wound bed conditions.

> 📌 The step-up, step-down approach aligns with antimicrobial stewardship by supporting the targeted, appropriate and time-limited use of antimicrobial dressings.

Conclusion

Non-healing wounds impose a substantial and growing burden on patients and healthcare systems. A three-pronged therapeutic strategy can help resolve this: address the wound cause, treat comorbidities and implement standard of care wound-management strategies. Despite being one of the most effective standard-of-care wound interventions available, debridement is frequently performed as an isolated or infrequent intervention, rather than as part of a structured and continuous process, likely due to lack of training among clinicians and therefore confidence among non-specialists on how to perform it effectively and safely. This inconsistency contributes to rapid re-accumulation of slough and biofilm, delaying healing and increasing the risk of chronicity. The 2024 *JWC* consensus document on wound debridement[2]

introduced the concept of integral debridement, identifying methods that need an adjunct to be truly effective, and proposed that debridement, cleansing and dressing application are complementary procedures that need to be implemented in sequence to achieve the desired outcome.

This document is designed to aid application of the 2024 *JWC* consensus document's guidance to clinical practice. The CID concept is a simple framework that can be easily and effectively implemented by wound specialist and non-specialists alike. It comprises four simple sequential steps, the CDCD procedure – cleanse, debride, cleanse and dress – that are repeated in a cyclical fashion from presentation to wound closure. Each step has an underlying principle that will help guide product selection and practice:

- **Cleanse:** Select the least cytotoxic antimicrobial cleansing solution that is clinically effective, based on the needs of the wound and what the patient can tolerate, while paying attention to the pH.
- **Debride:** Use the safest and most effective debridement method(s) available, based on the clinician's training, expertise, and site of service.
- **Dress:** Choose dressings that will most effectively sustain and enhance the effects of cleansing and debridement, regarded as a vital link in a complete and effective CID chain.

Given its key role in preventing microbial proliferation, slough and biofilm (re)formation and excess levels of pro-inflammatory cytokines and proteases, CID should be regarded as an essential element of standard of care for all wound types throughout the healing process. This will help improve healing rates, reduce healing times and save precious resources, including nursing time. This should translate into meaningful cost savings for healthcare systems through reduced treatment duration and fewer complications. The ultimate gain is improved patient wellbeing and quality of life. **JWC**

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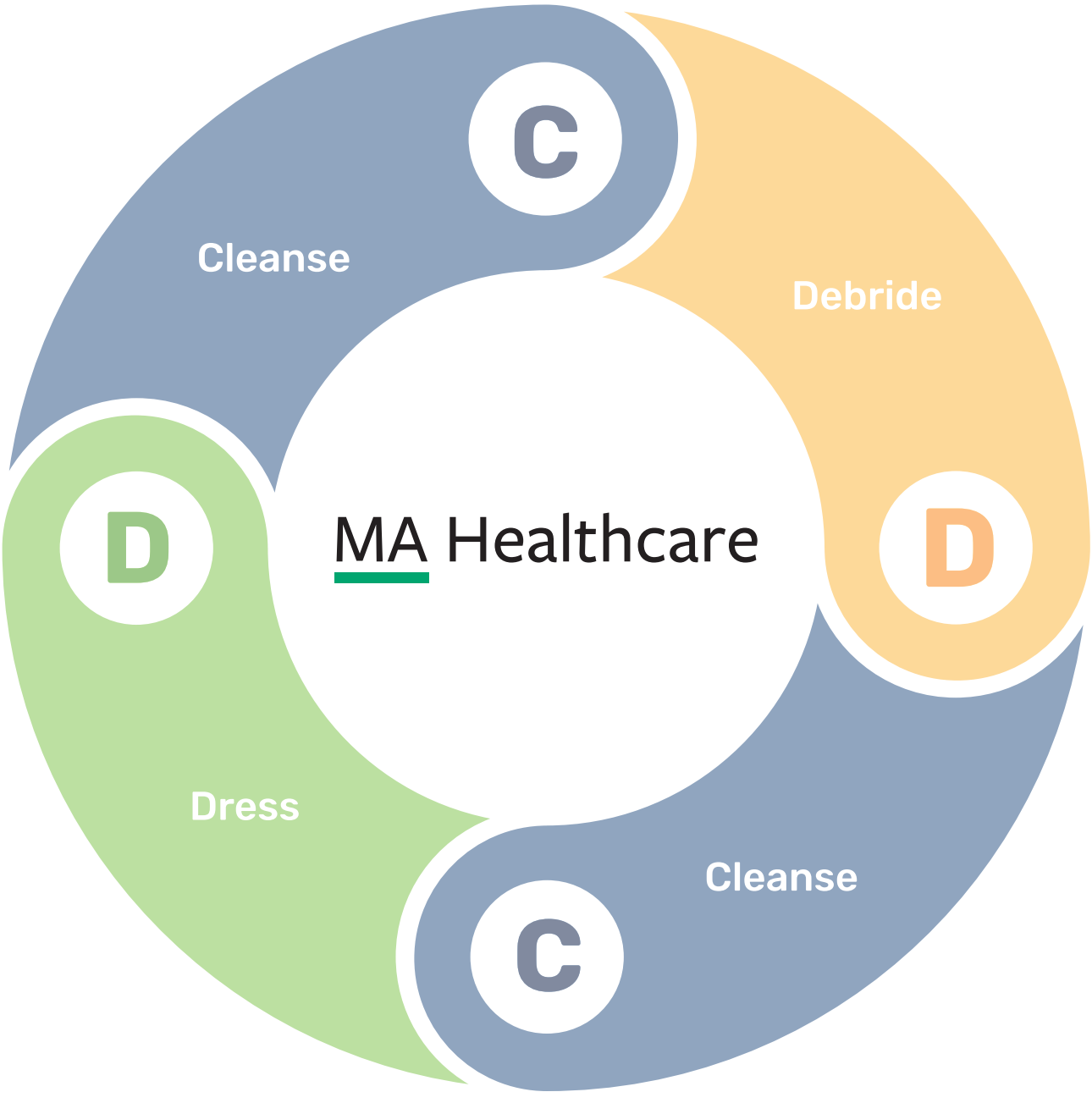
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