WORLD UNION OF WOUND HEALING SOCIETIES

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CONSENSUS DOCUMENT

Wound exudate:

Effective assessment and management

Updated 2nd Edition

Global Wound Care Journal

WOUNDS INTERNATIONAL

Published by:
Global Wound Care Journal and Wounds International
108 Cannon Street
London EC4N 6EU, UK
Tel: + 44 (0)20 3735 8244

Global Wound Care Journal

WOUNDS INTERNATIONAL

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How to cite this document:
Nair HKR, Ousey K, Dissemond J et al (2026) Wound exudate: Effective assessment and management; Second edition. *Global Wound Care Journal*

Global Wound Care Journal, London. Available at: https://globalwoundcarejournal.com/

Expert Panel

- **Harikrishna K. R. Nair,** President, World Union of Wound Healing Societies; Director, Wound Care Unit, Kuala Lumpur Hospital, Malaysia; Professor, Faculty of Medicine, Lincoln University, Malaysia; Professor, Institute of Health Management, Austria; Adjunct Professor, Department of Surgery, Institute of Medical Sciences, Banares, Hindu University, India; Executive Director, College of Wound Care Specialists, Malaysia
- **Karen Ousey,** PhD, MA, PGDE, DPPN, BA, RN, FHEA, CMgr MCMI, Professor of Skin Integrity, Department of Nursing, Director of the Institute for Skin Integrity & Infection Prevention, University of Huddersfield, UK; Adjunct Professor, Wound Care, Monash University, Australia
- **Joachim Dissemond,** Professor of Dermatology and Venerology, Department of Dermatology, Venerology and Allergology, University of Essen, Germany
- **Caroline Dowsett,** Tissue Viability Nurse Specialist, East London NHS Foundation Trust, UK
- **Christine Moffatt,** Emeritus Professor, Nottingham University, UK
- **Zena Moore,** Professor of Tissue Viability, Skin Wounds and Trauma (SWaT) Research Centre, School of Nursing & Midwifery, Royal College of Surgeons in Ireland, University of Medicine and Health Sciences, Dublin, Ireland
- **Christine Murphy,** Registered Nurse and Nurse Specialized in Wound, Ostomy & Continence (NSWOC), The Ottawa Hospital, Canada
- **Sebastian Probst,** HES-SO University of Applied Sciences and Arts Western Switzerland, Geneva, Switzerland; Geneva University Hospitals, Geneva, Switzerland; Monash University, Melbourne, Australia; University of Galway, Galway, Ireland
- **Debora Sanchez Pinto,** Plastic Surgeon, Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo (FMUSP); President and Founder, Sociedade Brasileira de Tratamento Avançado de Feridas (SOBRATAFE), Brazil
- **Terry Swanson,** NPWM, MHSc, FMACNP, Fellow Australian Wound Management Association (AWMA); Wound Education Research Consultancy, Victoria, Australia
- **Laura Swoboda,** DNP, APRN, FNP-C, FNP-BC, CWOCN-AP, WOCNF, FAANP; Translational Scientist, Professor of Health & Social Welfare, Department of Nursing, University of Wisconsin, Green Bay; Family Nurse Practitioner, Certified Wound Specialist, Milwaukee, Wisconsin, USA

Foreword

It is well accepted that exudate plays a vital role in wound healing by maintaining moisture balance, promoting tissue repair, and facilitating the transport of cells and mediators essential for healing. However, excessive volumes, inappropriate distribution, or altered composition can delay healing and contribute to skin complications. Inadequate exudate management can also negatively impact patients' quality of life (QoL), increase clinical burden and place additional demands on healthcare resources.

The World Union of Wound Healing Societies (WUWHS) last published guidance on exudate management in 2019 with the first edition of the consensus document 'Wound Exudate: Effective Assessment and Management'. Since then, the wound care landscape has advanced. New and more sophisticated approaches to wound healing and exudate management have emerged, alongside an increasing emphasis on patient-centred care, integrated treatment pathways and cost-effective healthcare delivery.

Furthermore, there is increasing recognition of the role of compression therapy in supporting wound healing by controlling oedema. Updated guidance is therefore needed to reflect these developments and to clarify the role of exudate management within contemporary clinical practice.

As a result of identifying the need for updated guidance, an international group of experts met in May 2026 to discuss current evidence and experiences of exudate management, with the aim of developing the consensus document for this updated second edition.

The document was developed through a modified consensus process. During the initial group meeting, areas of agreement were reviewed and confirmed with the group by the Chairs; after which the draft was developed and circulated to all members for review, with the opportunity to propose amendments, raise queries, or express disagreement. Majority consensus on the draft was reached before publication.

As this is a global document that aims to be useful to relevant clinicians in all geographical and care settings, we would like to acknowledge that not all products and treatment options will be available to all. These recommendations represent the 'gold-standard' options for care, which should be aimed for where possible, but may not always be practicable, particularly in low- and middle-income countries (LMICs).

This new consensus document provides up-to-date practical guidance that will assist clinicians to effectively assess and manage exudate within current treatment pathways while considering all available products and evidence. The overall aim is to support clinicians to prevent exudate-related complications, with a focus on improving outcomes for patients, with the patient being at the centre of treatment and decision-making.

Harikrishna K. R. Nair and Karen Ousey, Co-chairs

Exudate and its impact on individuals

Findings from current research indicate that excessive wound exudate not only delays healing but, if treated improperly, also has extremely adverse effects on patients and their caregivers (Mervis, 2025).

Impact on individuals

The impact of exudate on individuals should not be underestimated and must remain central to all clinical decision-making. Living with uncontrolled exuding wounds can have a significant effect on all aspects of life. Poorly controlled exudate may lead to complications affecting the individual's health and wellbeing, such as prolonged periwound moisture exposure contributing to maceration and moisture-associated skin damage (MASD), which have been associated with delayed healing, pain, reduced QoL and increased healthcare costs to the patient.

From a patient perspective, exudate leakage can be highly distressing and have a profound impact on mental health, wellbeing and the ability to carry out daily activities. Malodour, which frequently accompanies excessive exudate, is particularly distressing and can contribute to feelings of embarrassment, social isolation and stigma. The constant fear of leakage and odour may undermine individuals' wellbeing, leading to feelings of disgust, self-consciousness, self-loathing, low self-esteem and loss of confidence. As a result, some individuals withdraw from work or social activities to avoid potential embarrassment. In addition, frequent dressing changes and the ongoing burden of laundering soiled clothing and bed linen can significantly increase the physical, emotional and financial burden of wound care. This burden is compounded when dressing changes are time-consuming, painful or uncomfortable, further reducing QoL and overall wellbeing (Mervis, 2025).

Person-centred care

All treatment decision-making needs to have the patient at the centre of the process, and be individualised to their needs and preferences (WUWHS, 2020). The patient's overall wellbeing and lifestyle must be considered. Listening to the individual's perspective and remembering that they are the expert in their own health and experiences is key (Dhoonmoon et al, 2026).

Engaging patients in their own care, building a relationship of trust and improving their experiences has been proven to improve outcomes. Considering the patient's QoL, and the aspects that matter to them as an individual, is beneficial to every stage of their wound healing journey (Nair et al, 2025a).

Patient-reported outcomes and experiences

With a focus on patient QoL, recent findings have shown that patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs) should form an important part of decision-making and therapy selection (Armstrong et al, 2026; Probst et al, in press). PROMs and PREMs are tools that gather feedback directly from the individual patient, so are vital to ensuring the patient's voice is heard and treatment is influenced accordingly.

Improving the individual's QoL should form a key element of treatment, which needs to be assessed and monitored, through communication with the individual and considering their evolving needs and preferences, and the impact of their wound and associated treatment on their daily life (Nair et al, 2025a).

Shared care

Supported self-care or shared care is a key topic that needs to be considered in terms of individuals' willingness and ability to be involved, and how this can help improve QoL – for example, being able to change their own dressings may mean less disruption to the patient's daily life. Patients/carers undertaking dressing changes will need to be educated about hand hygiene, cleansing and dressing change techniques, as well as dressing disposal (Parfitt et al, 2021; Clemett et al, 2024; Yu et al, 2026).

While shared care is often encouraged, it is crucial that appropriate attention is given to how this will work in practice, ensuring it does not negatively affect the patient or the care they are receiving. Care in the home environment can be challenging and requires special consideration, such as hygiene and infection control (e.g. keeping the environment as clean as possible, educating the individual about hygiene at home).

Exudate and wound healing

Wound exudate is a normal physiological component of the wound healing process and is not inherently pathological. However, an imbalance in exudate volume, whether excessive or insufficient, can compromise wound healing. This in turn increases the workload of healthcare staff/carers, and incurs significant costs for healthcare systems as a whole (Mervis, 2025). This can have broader healthcare resource implications and result in increased economic burden associated with hard-to-heal wounds (Guest et al, 2020).

Importance of wound exudate

Wound exudate is an essential component of the wound healing process. The importance of a moist wound healing environment has been recognised for decades. Winter (1962) demonstrated that wounds maintained in a moist environment heal more rapidly than those exposed to drying, which results in scab formation. Importantly, most moist wounds heal 2–3 times faster than dry wounds and produce better quality of healing (Swezey, 2014; Nuutila and Eriksson, 2021).

The process of wound healing can be divided into four overlapping phases: haemostasis, inflammation, proliferation and remodelling (Almadani et al, 2021). In general, exudate production is highest during the inflammatory phase and decreases as healing progresses (Mervis, 2025; Schultz et al, 2011). See **Box 1** and **Figure 1** for more information on the links between the inflammatory phase and wound exudate.

Box 1: Wound exudate and inflammation

Inflammation is a normal and essential part of the wound healing process and is closely linked to exudate production. Following tissue injury, blood vessels become temporarily more permeable, allowing fluid, proteins and inflammatory cells to move into the wound bed. This response supports the body's natural defence mechanisms by helping to remove debris and microorganisms while delivering the cells and mediators required for tissue repair.

In wounds that are following the standard phases of wound healing, exudate supports the healing process by (WUWHS, 2019):

- Providing a moist wound environment
- Enabling the diffusion of immune mediators and growth factors across the wound bed
- Acting as a medium for the migration of tissue-repairing cells across the wound bed
- Supplying essential nutrients for cell metabolism
- Promoting the separation of dead or damaged tissue (autolysis).

Of note is the increase in capillary permeability induced during inflammation. The tight junctions between the cells that form the capillary walls of endothelial cells and the porous carbohydrate-rich lining of capillaries have important roles in regulating fluid, protein and cell release into surrounding tissues. Inflammatory mediators break down the proteins that hold the endothelial cells tightly together and disrupt the lining, allowing fluid, proteins and cells to escape more readily (Lipowsky et al, 2011; Schött et al, 2016; Reglero-Real, 2016; WUWHS, 2019). The consequence of increasing vascular permeability is allowing fluid, proteins, and immune cells to move into tissue, thereby contributing to exudate formation. Increased vascular permeability can also lead to higher exposure to inflammatory cytokines, which further adds to the state of chronic inflammation, with continuous elevated exudate levels (Claesson-Welsh et al, 2021).

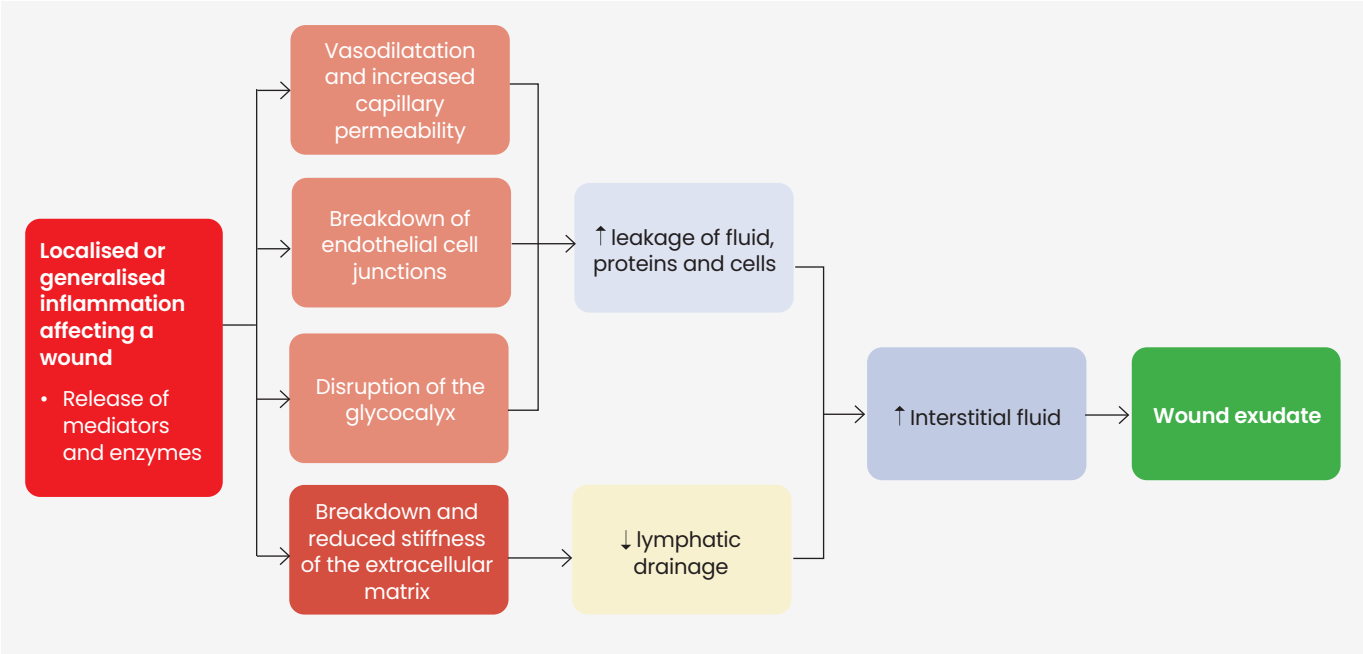


Figure 1. The relationship between inflammation and wound exudate production

What is exudate?

Wound exudate is derived from interstitial fluid found in the interstitium, the spaces between cells in body tissues. Interstitial fluid is formed from the blood in capillaries and has similar components to blood plasma (Kiang et al, 2017). Interstitial fluid acts as a transport medium for cell nutrients, signalling molecules and metabolic waste (Kiang et al, 2017). When it leaks into a wound cavity, it forms the basis of wound exudate (WUWHS, 2019).

Table 1. Examples of exudate components (adapted from WUWHS, 2019)

Exudate component	Comments
Water and electrolytes	Medium for other components; prevent tissues drying out, maintain a moist wound environment and support cellular activity
Plasma proteins (e.g. fibrin and fibronectin)	Contribute to provisional matrix formation and provide a scaffold for cell migration
Glucose	Cellular energy source
Immune cells and mediators (e.g. neutrophils and macrophages)	Support host defence and wound cleansing
Platelets	Blood clotting
Proteins (e.g. albumin, globulins)	Transport of other molecules, anti-inflammatory effects, blood clotting, immune functions
Growth factors and cytokines	Help regulate inflammation, angiogenesis, granulation tissue formation and epithelialisation
Proteolytic enzymes, including MMPs	Useful in controlled amounts, as they help remove damaged extracellular matrix and remodel tissue during physiological repair
Metabolic waste products	By-products of cellular metabolism
Microorganisms	All wounds contain some microorganisms
Wound debris/dead cells	Proteases in exudate aid autolysis of devitalised tissue

Exudate composition

Wound exudate contains a wide variety of components, many of which serve functions for wound healing (Table 1; WUWHS, 2019). The composition of wound exudate varies considerably between patients and wound types, and changes throughout the healing process. These changes and variances influence wound healing and management (Gefen et al, 2024). An example would be that wound exudate with a higher protein content is often more viscous (thicker), which may influence dressing selection and the ability of a dressing to absorb and retain the exudate effectively (Forss, 2022). Understanding characteristics of exudate, including volume, viscosity and composition, can assist clinicians in selecting the most appropriate and effective treatments.

In dressing performance testing, simulated wound exudate is commonly used to assess fluid-handling properties. Recently, exudate simulation has developed to allow use of a more complex composition, resembling the protein, salt, and buffer concentrations found in real-world clinical exudate, allowing for a more clinically relevant dressing performance assessment and improving testing of dressings for exudate management (Svensby et al, 2024).

Exudate from acute versus hard-to-heal wounds

There are differences between exudate from acute and hard-to-heal wounds, with the latter being highly toxic to the healing environment (Forss, 2022). The links between exudate and wound duration are complex and interrelated, with the differences in the biochemical composition of exudate from hard-to-heal and healing wounds suggesting possible causes of wound chronicity relating to the exudate itself (WUWHS, 2019; Forss, 2022). This can result in a vicious cycle whereby healing is delayed and exudate causes problems such as maceration and damage to the periwound skin.

In recent years, there has been increased focus on the role of proinflammatory components such as matrix metalloproteases (MMPs; see Box 2). These enzymes play an essential role in physiological wound healing by facilitating debridement and tissue remodelling. However, when present in excessive amounts or for prolonged periods, they degrade growth factors, extracellular matrix (ECM) proteins and newly formed tissue, disrupting the physiological healing process (WUWHS, 2019; Forss, 2022). During the proliferative and remodelling phases, MMPs break down the provisional matrix to pave the way for cell migration, blood vessel formation for angiogenesis, and tissue reshaping (Almeida et al, 2022).

Box 2: Role of MMPs in exudate and wound healing

MMPs and inflammation can create a feedback loop, whereby: inflammation → MMP activity → tissue degradation → inflammation

MMPs are synthesised as inactive precursor enzymes (pro-MMPs or zymogens). Their activation requires disruption or removal of the propeptide domain, which exposes the catalytic site. Inflammatory mediators can increase pro-MMP production and thereby indirectly enhance MMP activity. Activation may occur through proteolytic cleavage by other proteases, such as plasmin or active MMPs, through oxidative modification by reactive oxygen species (ROS), or via cell surface activation mediated by membrane-type MMPs (MT-MMPs; de Almeida et al, 2022).

If MMP levels become chronically elevated in the exudate, they can go 'off-target' and destroy healthy growth factors. In combination with persistent inflammation and oxidative stress, this contributes to delayed wound closure. Therefore, while MMPs are essential for physiological tissue repair, their activity must be regulated, primarily through their antagonists, the tissue inhibitors of metalloproteinases (TIMPs; Kandhwal et al, 2022). Other compositional differences observed between healing and hard-to-heal wound exudate (e.g. altered cytokine milieu, changes in growth factor availability and ROS) may also contribute to wound chronicity.

Exudate-related clinical problems

Wound exudate can delay healing, severely affecting a patient's QoL and producing significant socioeconomic burden when:

- Amount of the exudate is excessive or insufficient

and/or

- Composition of the exudate is altered

and/or

- Exudate is in the wrong place, such as when leakage causes periwound skin damage or soiling of clothing and bed linen (Moore and Strapp, 2015; WUWHS, 2019; WUWHS, 2020).

The amount of exudate produced varies between wounds and is influenced by several factors, including:

Wound aetiology – different wound types are commonly associated with different levels of exudate production [Box 3]

Phase of healing – exudate production is usually greatest during the inflammatory phase and generally decreases as healing progresses

Wound size, depth and location – larger and deeper wounds often produce more exudate, as may wounds in certain anatomical locations, such as the lower leg

Patient factors and complications – comorbidities, infection, oedema, medications and other clinical factors can influence both the amount and characteristics of wound exudate (WUWHS, 2019).

Box 3: Exudate levels of different wound types (adapted from WUWHS, 2019)

High levels of exudate

- Large, deep or cavity wounds – wound size/depth increases the surface area for fluid production
- Lower-limb wounds with oedema or lymphoedema, especially where compression is absent or insufficient
- Infected wounds or wounds with biofilm – a sudden increase in exudate can be a clinical sign of infection
- Venous leg ulcers (VLUs)
- Dehisced surgical wounds
- Malignant/fungating wounds
- Burns
- Inflammatory ulcers – e.g. vasculitic ulcers, pyoderma gangrenosum
- Skin donor sites.

Low levels of exudate

- Wounds in areas with significant ischaemia
- Arterial wounds
- Dry necrotic wounds, especially where the treatment aim is to keep tissue dry (e.g. uninfected ischaemic non-viable toe)
- Diabetic foot ulcers (DFUs)
- Superficial acute wounds.

Excessive exudate production

Effective exudate management begins with a holistic assessment to identify and address the underlying cause(s), rather than simply managing the imbalance of exudate. This helps to distinguish between wound factors, systemic factors, and environmental factors to ensure that no aspect of treatment is missed.

Wound factors:

- Wound infection, biofilm, persistent inflammation or trauma (e.g. surgical debridement)
- Poor perfusion status
- Foreign body within the wound bed (e.g. suture)
- Oedema near the wound
- Sinus tract
- Fistula (e.g. urinary, enteric, lymphatic or joint space)
- Malignancy (primary or metastatic)
- Ongoing trauma (e.g. inadequate or missing pressure offloading).

Systemic factors:

- Heart, renal or hepatic failure
- Chronic venous insufficiency (CVI), lymphatic dysfunction, lymphoedema and compression not optimised
- Systemic infection
- Endocrine disorders (e.g. poor glycaemic control)
- Systemic medication (e.g. calcium channel blockers, non-steroidal anti-inflammatory drugs [NSAIDS], corticosteroids, glitazones, gabapentinoids, hormonal therapies, monoamine oxidase inhibitors [MAOIs])
- Obesity
- Immobility
- Fluid overload (e.g. during intravenous fluid therapy)
- Malnutrition
- Advanced age
- Hypalbuminaemia (low serum albumin).

Management and environmental factors:

- Wound position (e.g. wound is in a dependent position on the lower limbs or sacral area)
- Reduced willingness or ability of the patient to engage with pharmacological or non-pharmacological treatment
- Detrimental effects of insufficient exudate management (e.g. dressing/device selection; insufficient or lack of accompanying treatment such as compression therapy or offloading)
- Environmental/climate-related factors such as heat and humidity.

Effects of excessive exudate production

Excessive exudate production can be associated with a wide range of clinical, practical and psychosocial problems [Box 4]. Leakage and soiling can be particularly distressing to patients and carers, increasing the burden of wound care and affecting everyday activities. Leakage or strikethrough may be associated with malodour (which is sometimes, but not always, an indicator of increased wound bioburden or infection). Leakage/strikethrough may compromise the protective function of the dressing by providing a potential pathway for microorganisms to enter the wound. Leakage and odour are generally reported by patients as being among the most distressing aspects of living with a hard-to-heal wound (WUWHS, 2020).

Dressings may require more frequent changes when exudate levels are high to maintain an optimal wound environment, prevent leakage and allow ongoing wound assessment. However, dressing changes should be performed only when clinically indicated, balancing exudate management with maintaining an optimal wound environment (IWII, 2026). Unnecessary dressing changes may disrupt the wound healing process, increase pain and anxiety, damage the wound bed or periwound skin, and increase healthcare costs (WUWHS, 2020). Frequency of dressing change can also impact on clinicians, particularly those with heavy caseloads in the community and workforce challenges. More recent evidence has focused on the benefits of undisturbed wound healing – avoiding unnecessary dressing changes and disruption to the wound – which need to be balanced with exudate management (Sandy-Hodgetts et al, 2022).

Excessive exudate can also damage the periwound skin through prolonged moisture exposure, leading to maceration and an increased risk of skin breakdown, causing pain and discomfort (Rippon et al, 2025). Conversely, if exudate levels reduce, the dressing may begin to dry the wound excessively (Dowsett, 2012; WUWHS, 2019); therefore, appropriate and timely reassement of moisture levels is required with each dressing change to assess moisture balance requirements.

High levels of exudate may also result in significant protein loss and put the patient at risk of fluid/electrolyte imbalance. For example, it has been estimated that a patient with a Category/Stage IV pressure ulcer/injury (i.e. a pressure ulcer/injury with full-thickness tissue loss with exposed bone, tendon or muscle), could lose 90–100g/day of protein in exudate (Benbow and Stevens, 2010). This is more than the recommended daily intake of protein for many adults (Wolfe et al, 2017). Significant losses of protein in wound exudate have further been reported across other wound types (Hourigan et al, 2010; Wolfe et al, 2017).

Excessive exudate can have a serious psychosocial impact on patients and reduce QoL (Benbow and Stevens, 2010; Mervis, 2025). The impact of excessive exudate extends beyond the wound itself. Persistent leakage, malodour, frequent dressing changes and concerns about embarrassment may disrupt work, family and social activities, contributing to anxiety, depression, social isolation and reduced QoL. This can result in serious consequences to individuals' mental health and wellbeing, with conditions such as depression, anxiety and isolation often associated with hard-to-heal wounds (Mervis, 2025; WUWHS, 2020).

Box 4: Potential major consequences of uncontrolled exudate

- Delayed healing
- Maceration
- Leakage and strikethrough
- Odour
- Patient distress and decrease in quality of life; impact on wellbeing and mental health
- Increased dressing usage/frequency of change
- Increased cost of care (direct and indirect costs)
- Increased staffing pressures.

Insufficient exudate production

Just as too much exudate can negatively affect the wound healing trajectory, so can too little exudate. Again, low exudate production can be due to wound- or patient-related factors.

Local factors:

- Wounds with dry eschar
- Reduced perfusion or ischaemia.

Systemic factors:

- Dehydration
- Hypovolaemic shock
- Microangiopathy
- Poor peripheral perfusion.

Practical factors:

- Inappropriate dressing/device use or intervention
- Overly absorbent dressing
- Unnecessary frequency of dressing changes.

Effects of insufficient exudate production

Insufficient exudate production causes reduced cell migration, which may delay autolytic debridement and so delay healing (WUWHS, 2019). Adherence of dressings to the wound bed in wounds with low exudate production often causes wound bed damage and pain during dressing removal. In such cases, wound dressings that donate moisture may help to balance the lack of sufficient moisture and prevent pain. Alternatively, non-adherent dressing materials, such as silicone-coated dressings or other atraumatic wound contact dressings, may be used.

Pain at dressing change is a key factor that must be considered in terms of patient wellbeing and engagement with treatment (WUWHS, 2020). Patients should always have a pain assessment, and pain management should be an integral part of wound care. In many cases, pain can be alleviated by adjusting the dressing selection or treatment strategy.

Periwound skin damage

The periwound is the area around a wound that may be affected by wound itself, its exudate, treatment or underlying disease. The periwound area is particularly vulnerable to MASD when exudate is uncontrolled (LeBlanc et al, 2021). While a moist, hydrated wound bed is optimum, excessive moisture can damage the skin (WUWHS, 2019; Rippon et al, 2022).

The distinction between hyper-hydration and maceration is important (Rippon et al, 2016). Hyper-hydration, in which the wound bed is exposed to higher than usual levels of any fluid, is always reversible with early intervention. Conversely, maceration is a result of destruction produced by excessive enzymes contained in exudate and prolonged skin exposure to excessive moisture – presenting as a softening of the skin due to prolonged exposure to moisture and proteolytic enzymes, which predisposes skin to breakdown (Voegeli, 2012). Maceration can cause colour changes within the skin, which may vary depending on the individual's baseline skin tone (Dhoonmoon et al, 2026). Changes of colour in macerated skin are potentially important and should be monitored. Macerated skin typically presents as swollen, pale, wrinkled, or fragile, but this may vary (Ousey, 2026).

It is important to note that, once the skin is damaged (e.g. through maceration or other forms of MASD), it is more susceptible to the effects of irritants and more prone to develop infections (Woo et al, 2017). Protecting the periwound skin is therefore an important component of effective exudate management. Maceration can delay wound healing and is an additional driver of unnecessary healthcare costs (Woo et al, 2017; Nokaneng et al, 2025).

Health economic impact of exudate-related problems

Exudate management is a major contributor to the overall cost of wound care because it influences dressing selection, frequency of dressing changes, clinician time and, ultimately, healing outcomes. Although the specific cost attributable to exudate-related problems is difficult to quantify, ineffective exudate management contributes to delayed healing, increased complications and greater use of healthcare resources (WUWHS, 2019; Gefen, 2025).

The management of wounds is known to place a huge burden on healthcare systems worldwide. Therefore, any factors that delay healing and extend treatment time, including exudate-related problems, will have a detrimental health economic and societal impact. As such, it is vital to consider the underlying factors contributing to persistent or poorly controlled exudate (e.g. inflammation, infection, oedema or venous disease).

In considering the financial cost of exudate-related problems – further to dressing/product costs and the cost of providing care – additional costs include those related to:

- Prolonged healing time and associated complications
- Increased frequency of dressing changes and clinician visits
- Management of damaged periwound skin and associated healthcare resource use (such as additional dressing changes, monitoring requirements and clinician time)
- Additional laundering or replacement of clothing and bed linen
- Reduced productivity, time away from work and increased carer burden
- Transportation costs for clinic appointments.

Healthcare costs have been found to increase when periwound complications develop, such as delayed healing, increased wound size, increased pain and additional care time; careful monitoring and ongoing assessment of both the wound and periwound skin will aid in identifying skin changes and ensuring early intervention with appropriate and cost-effective treatment options (Bianchi, 2012; LeBlanc et al, 2021).

When evaluating wound management strategies, consideration should be given to the total cost of an episode of care rather than the purchase price of an individual dressing or device. Selecting products solely on unit cost may increase overall expenditure if they result in more frequent dressing changes, increased clinician time or delayed healing (WUWHS, 2019).

The time burden associated with managing exudate-related complications should not be underestimated. Frequent dressing changes, increased monitoring requirements, and the treatment of periwound skin damage require significant healthcare professional time. In healthcare systems already challenged by workforce shortages, prolonged wound management and additional care interventions place further pressure on limited staffing resources. Consequently, effective exudate management has the potential not only to improve clinical outcomes and reduce treatment duration, but also to alleviate workload demands and support more efficient use of healthcare personnel.

Poor exudate control may contribute to delayed healing, increased dressing change frequency and periwound complications, all of which can increase overall resource utilisation and highlight that exudate management should be evaluated in terms of total episode-of-care costs rather than product acquisition costs alone. Using dressings that effectively manage exudate has been associated with reduced overall costs (Veličković et al, 2020; Walzer and Vikingson, 2025).

Assessment frameworks in context

It is important that exudate is not assessed in isolation but is instead considered as part of an integrated full holistic assessment. The patient's healing trajectory will be multifactorial and related to their overall health and wellbeing, as well as the wound itself.

Assessment of wound exudate should be incorporated into a structured holistic wound assessment using locally adopted assessment frameworks and documented according to local policy (WUWHS, 2019). The findings from exudate assessment should be used alongside other clinical information to guide treatment decisions, referral options and monitor progress over time.

A holistic assessment should include:

- **Overall health:** comorbidities, nutrition, hydration, medication, mobility, age, vascular status, diabetes, oedema, infection, inflammation
- **Wound cause and healing potential:** aetiology, duration, location, size/depth, tissue type, perfusion, infection/biofilm risk
- **Exudate assessment:** amount/control, type, colour, consistency, odour, leakage/strikethrough, impact on dressing wear time
- **Periwound skin:** maceration, erythema, oedema, eczema, skin fragility, pain, signs of deterioration
- **Current treatment:** dressing/device suitability, compression/offloading, cleansing/debridement, frequency of dressing changes
- **Patient perspective:** pain, odour, leakage, anxiety, confidence, daily activities, work/social life, sleep, preferences and treatment goals
- **Practical and care setting factors:** ability to self-care, carer support, access to products/services, follow-up, referral needs.

Structured assessment and documentation of periwound maceration may support more consistent monitoring of change over time and help inform reassessment of the exudate management strategy. Tools such as the Maceration Assessment Tool for Exudate (MATE) may provide a structured approach, although further validation is required (Ousey, 2026).

Wound assessment frameworks

Assessment of exudate should be undertaken as part of the structured holistic wound assessment rather than in isolation. Several wound assessment frameworks are available to guide clinical decision-making and support the development of an individualised management plan.

A well-known framework such as TIMERS (Atkin et al, 2019), an evolution of the original TIME framework (Schultz et al, 2003), includes all the elements that should be considered when developing a wound bed preparation (WBP) and personalised wound care strategy (EWMA, 2025).

The TIMERS framework consists of the following clinical parameters, expanded from the TIME framework (Atkin et al, 2019):

T Tissue viability
I Infection/inflammation
M Moisture balance
E Edge
R Repair/regeneration
S Social- and patient-related factors.

Another commonly used framework is M.O.I.S.T., which expands the concepts of WBP by emphasising oxygen balance and supporting strategies (Dissemond et al, 2017):

M Moisture balance
O Oxygen balance
I Infection control
S Supporting strategies
T Tissue management.

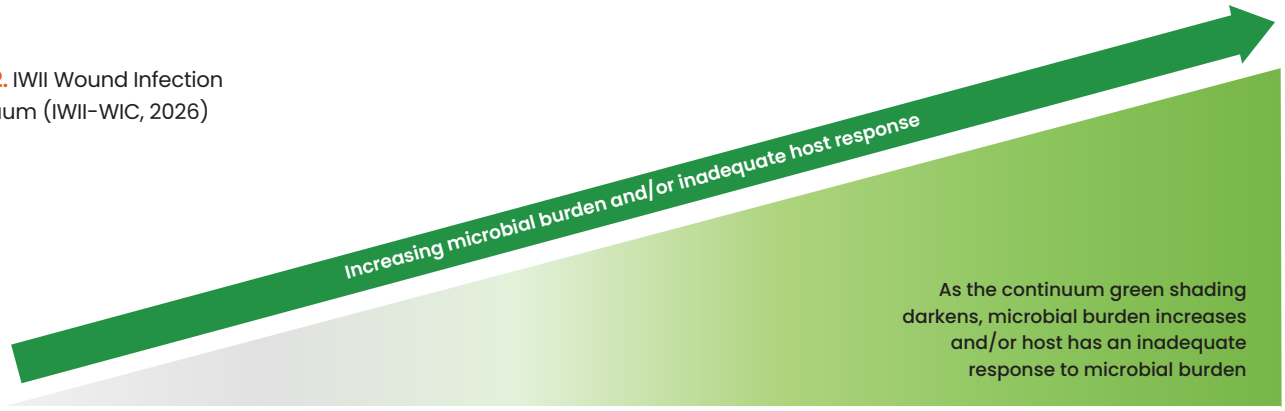
Giving due consideration to these parameters, WBP is an important foundation for all treatment, using assessment to identify and address barriers to healing to create an optimal wound healing environment.

Due to exudate being closely linked to inflammation and infection, infection assessment should also form part of routine wound assessment. The International Wound Infection Institute Wound Infection Continuum (IWII-WIC) [Figure 2] provides a framework for recognising the progression from contamination through to systemic infection and is recommended when assessing wounds for signs and symptoms of infection (IWII, 2026).

For a local infection assessment framework for use in practice, the Therapeutic Index for Local Infections (TILI) score was designed for health professionals at all levels, including those who are not specialised in wound care, and has been found to be concordant with the expert assessment of patients and with good diagnostic characteristics (Dissemond et al, 2020).

No single assessment framework can replace clinical judgement. Assessment frameworks should be used to support clinical reasoning, with findings interpreted in the context of the individual patient, their wound and their treatment goals.

Figure 2. IWII Wound Infection Continuum (IWII-WIC, 2026)



CONTAMINATION	COLONISATION	LOCAL WOUND INFECTION COVERT (subtle)	LOCAL WOUND INFECTION OVERT (classic)	SPREADING INFECTION	SYSTEMIC INFECTION
• Microorganisms present within the wound • No significant host reaction is evoked • No delay in healing is clinically observed		• Delayed wound healing beyond expectations • Hypergranulation • Bleeding, friable granulation • Increasing exudate • Epithelial bridging and pocketing in granulation tissue	• Erythema <2 cm from wound edge • Local warmth • Swelling • Purulent discharge • Wound breakdown and enlargement • New or increasing pain • Increasing malodour	• Extending induration • Spreading erythema • Inflammation or erythema > 2 cm from wound edge • Crepitus • Wound breakdown/ dehiscence with or without satellite lesions • Lymphangitis (swelling of lymph glands)	• Malaise • Lethargy or nonspecific general deterioration • Loss of appetite • Fever/pyrexia • Sepsis • Septic shock • Organ failure • Death

Be aware that signs and symptoms may present differently across diverse skin tones and wound aetiologies at all stages of infection

Holistic wound assessment

Holistic assessment will help to determine realistic short- and long-term treatment goals. It will aid in the selection and implementation of appropriate management measures required to achieve those goals, including interventions to treat the underlying cause of the wound and to manage exudate and exudate-related problems. Holistic assessment also provides a baseline from which to assess progress and the effectiveness of the management measures.

Assessment of the individual's overall health, medical history and lifestyle may identify factors contributing to wound development or delayed healing, such as oedema. Understanding the current wound management regimen is equally important when evaluating effectiveness and determining the need for adjustment. Assessment of the periwound area and the wound provides valuable information about wound progression and may help identify causes of excessive, insufficient or altered exudate (WUWHS, 2019).

Several practical approaches support holistic wound assessment. The Wound Balance concept encourages clinicians to consider the patient and their wound as a whole, balancing many facets of wound healing while developing realistic and achievable goals (Nair et al, 2025a). The Wound Hygiene concept focuses particularly on hard-to-heal wounds and addressing barriers to healing through systematic WBP and ongoing assessment (Nair et al, 2025b).

Patient perspective

Understanding the individual's perspective on their wound, skin and overall health is an essential part of holistic wound assessment. Taking time to listen to the person's experiences, concerns and treatment preferences helps establish realistic, patient-centred goals and supports shared decision-making.

The use of open-ended questions can help patients/carers to voice their concerns:

- What concerns you most about your wound?
- How is your wound affecting daily living or relationships?
- What issue or problem do you want to improve first?
- What do you want to achieve in the next couple of weeks/longer term?

It may also be helpful to ask questions directly about the effect of exudate:

- Does fluid from your wound cause problems in your daily life?
- Does your wound have an odour that concerns you?
- Does wound leakage affect your clothing, bedding or ability to leave home or participate in activities?
- How often do you need to change your dressing because of leakage?

The psychosocial impact of exudate should always be considered and the patient treated with respect for their preferences and lifestyle needs. To assess and monitor the patient's QoL within a structured framework, the Wound-QoL tool (Janke et al, 2024) can be used to measure health-related QoL for people living with non-healing wounds. This validated tool is a questionnaire that has been translated into several languages and can be used in routine wound care to assess the overall impact of a wound on a patient's QoL throughout their healing journey (Janke et al, 2024).

Assessment of exudate

Exudate assessment should include:

- Amount/volume
- Type, colour and consistency/viscosity
- Odour (it is not recommended to assess the odour of a dressing, but rather to cleanse the wound then assess for generalised wound odour)
- Effectiveness of current exudate management dressing/device, including dressings or other management interventions, such as absorption and retention capacity under compression therapy (if indicated).

Exudate amount

Assessment of exudate volume is a key component of wound assessment. Clinicians should determine whether the amount of exudate is appropriate for the wound aetiology, anatomical location, stage of healing and the individual patient's clinical circumstances.

While there are approaches to assessing exudate level that have been proposed over the years, these have tended to be subjective, and to vary in complexity and ease of use: no one approach has been found to be ideal (WUWHS, 2019).

Recognised terms used in clinical practice for exudate levels are a useful descriptor – such as 'low', 'moderate' and 'high'. However, they are potentially subjective so a practical approach would be to use these in conjunction with the terms 'controlled', 'partially controlled' or 'uncontrolled', representing a change in outlook and approach towards exudate. This aims to assess exudate in a practical way and to link the assessment to action – assessing the level of exudate (low, moderate, high), while also considering how to control the exudate through dressing selection and other treatments.

The terms low, moderate and high may be of specific necessity in some geographical areas (e.g. the USA), in which dressings are generally provided based on the subjective amount terms (e.g. low for hydrocolloids, moderate for foams).

Exudate levels in terms of management can be defined as follows:
Controlled: Moisture balance maintained; wound and periwound skin protected. Continue current management and monitor
Partially controlled: Some leakage, dressing nearing capacity, early periwound changes. Review dressing performance and reassess contributing factors
Uncontrolled: Leakage, strikethrough, periwound skin damage or insufficient dressing change frequency. Reassess the underlying cause, optimise wound management and consider alternative interventions.

Exudate should be assessed and documented at each dressing change or clinical review, and any changes throughout treatment documented. Changes in exudate level should trigger action where necessary (stepping up or down of treatment; reassessing the treatment plan and goals).

Exudate type

Exudate type, colour and consistency (viscosity) can provide useful indicators of the stage of healing and associated problems. Table 2 summarises the different types of exudate, their clinical appearance and potential significance.

The consistency of exudate may vary from thick and viscous to thin and watery, and is dependent on the amount of fluid being produced by the wound and the number of white cells and bacteria in the wound (Romanelli et al, 2010; Vowden et al, 2015; WUWHS, 2019). Low viscosity (thin, runny) indicates low protein content, whereas high viscosity exudate (thick and sometimes sticky) indicates high protein content, which may result from increased levels of bacteria in the wound or the inflammatory process (Vowden et al, 2015; WUWHS, 2019).

Any changes in exudate consistency may be clinically relevant, so changes should be monitored. The presence of white blood cells and bacteria in the wound will thicken exudate (Davies, 2012; WUWHS, 2019). A change from clear, thin exudate to opaque, discoloured, thick exudate may indicate the development of wound infection (Vowden et al, 2015; WUWHS, 2019). Some patients with long-term wounds develop thick tan-coloured exudate, which is not associated with acute soft tissue infection.

Exudate and wound odour

Most wounds have a slight odour (Nix, 2016; WUWHS, 2019) and some dressings, such as hydrocolloids, are associated with a distinctive odour (WUWHS, 2019). However, malodour can be a red flag and arise from clinical factors including the presence of necrotic tissue,

Table 2: Types of wound exudate (adapted from WUWHS, 2019)

Type	Colour/ opacity	Consistency	Comments
Serous	Clear, amber or straw-coloured	Thin, watery	• Normal during inflammatory and proliferative phases of healing • An increase in serous exudate may be a sign of infection • In excessive amounts may be associated with congestive cardiac failure, venous disease, malnutrition or be due to fluid draining from a urinary or lymphatic fistula
Serosanguineous	Clear, pink to light red	Thin, slightly thicker than water	• May be considered normal during inflammatory and proliferative phases of healing • Pinkish due to the presence of red blood cells • May also be found post-operatively or after traumatic dressing removal
Sanguineous	Red	Thin, watery	• Reddish due to the presence of red blood cells • May indicate new blood vessel growth or disruption of blood vessels • May be associated with hypergranulation
Seropurulent	Cloudy, creamy, yellow or tan	Thin	• Serous exudate containing pus • May be due to liquefying necrotic tissue • May signal impending infection
Fibrinous	Cloudy	Thin, watery	• Cloudy due to the presence of fibrin strands • May indicate inflammation, with or without infection
Purulent	Opaque, milky, yellow, tan or brown; sometimes green	Often thick	• Mainly pus (neutrophils, inflammatory cells, bacteria) and may include slough/liquefied necrotic tissue • Indicates infection • Green colouration may be due to infection with *Pseudomonas aeruginosa* • May be associated with odour
Haemopurulent	Reddish, milky, opaque	Thick	• Mixture of blood and pus • Often due to established infection
Haemorrhagic	Red, opaque	Thick	• Mostly due to the presence of red blood cells and indicative of increased capillary friability or trauma to the wound • May indicate bacterial infection

microorganisms, high levels of exudate, poorly vascularised tissue and/or a sinus/enteric or urinary fistula (Gethin et al, 2014; WUWHS, 2019). Malodorous, purulent exudate can be indicative of wound infection (Nix, 2016; IWII, 2026).

Patients and carers state that malodour is the most distressing and socially isolating wound-related symptom (WUWHS, 2020). Malignant or fungating wounds are often associated with malodour that can be particularly distressing and hard to manage for patients, carers and clinicians (Ousey et al, 2024).

There remains no internationally agreed method of assessment of wound odour (Gethin et al, 2014; Ousey et al, 2024). Assessment of odour is subjective and relies on clinical judgement and variation in individuals' abilities to detect smell impacts on the assessment. Even so, odour should be assessed, particularly for any changes over time and the impact on the patient and their overall wellbeing (Ousey et al, 2024).

Dressing/device evaluation

Examining the dressing or device before removal from a wound and then again after removal will provide valuable information about the nature of the exudate present and whether the exudate is currently being well controlled (WUWHS, 2019).

For example, if the dressing or device is leaking, but not saturated, a better seal or a dressing with better retention capabilities may be required. However, if the dressing is saturated, a more absorbent dressing or more frequent dressing changes may be considered. To protect the wound and assure optimal healing, dressing changes should be as infrequent as possible. The aim of dressing selection is to maintain moisture balance while protecting the wound and periwound skin. Dressings should remain in place for as long as clinically appropriate without compromising wound assessment or increasing the risk of leakage, maceration or other complications. Achieving longer wear times requires dressings that can effectively absorb and retain exudate while maintaining a moist wound healing environment (WUWHS, 2019).

When assessing dressings, the effect of compression therapy towards dressing capabilities should always be considered, as compression is a vital component of treatment for many patients, particularly those with lower limb wounds or lymphoedema.

Exudate management in the context of holistic wound treatment

Effective management of wound exudate will take place in the context of comprehensive and individualised treatment that aims to (adapted from WUWHS, 2019):

- Identify and manage any factors contributing to the wound, and to excessive insufficient or altered exudate
- Optimise patient overall health, wellbeing and QoL, while respecting individual preferences and treatment goals
- Engage patients/carers in shared decision-making and support participation in care whenever appropriate
- Optimise the condition of the wound bed and periwound skin, using the Harikrishna Periwound Skin Classification (HPSC) framework (Nair et al, 2020)
- Maintain appropriate moisture balance to support healing
- Prevent and treat any other exudate-related problems, such as wound and periwound macerations
- Undertake further investigation and make specialist referrals where necessary.

See **Figures 3a** and **3b** for the care pathway of exudate management in the context of comprehensive and individualised wound management.

Given the complexity and wide range of issues that a patient with a wound often faces, a multidisciplinary team approach is often necessary, with the patient always at the centre of decision-making (Moore et al, 2014; WUWHS, 2020).

Treating underlying causes

Treatment should extend beyond management of exudate, focusing on the causes of exudate imbalance. This may include factors such as:

- Oedema
- Maceration
- Infection
- Inflammation
- Wound depth
- Systemic disease
- Underlying pathology.

Aims of management

The overall aim of wound management for many patients is to achieve healing and closure of the wound. However, healing is not always the aim, or may not be possible, especially for palliative patients. In these situations, management should focus on realistic, patient-centred goals that optimise QoL, control symptoms and prevent complications. Treatment goals should always be developed in partnership with the patient, considering their preferences, values and overall health status (Ousey et al, 2024).

For example, for a patient with a malignant wound whose evolution depends on chemotherapy, radiotherapy or surgery, symptom control is likely to be important along with containment of exudate and factors such as odour, bleeding and pain (WUWHS, 2019; Ousey et al, 2024). For a patient with an uninfected ischaemic non-viable toe, the aim may be to dry the tissues to produce mummification and to prevent wet gangrene (WUWHS, 2019).

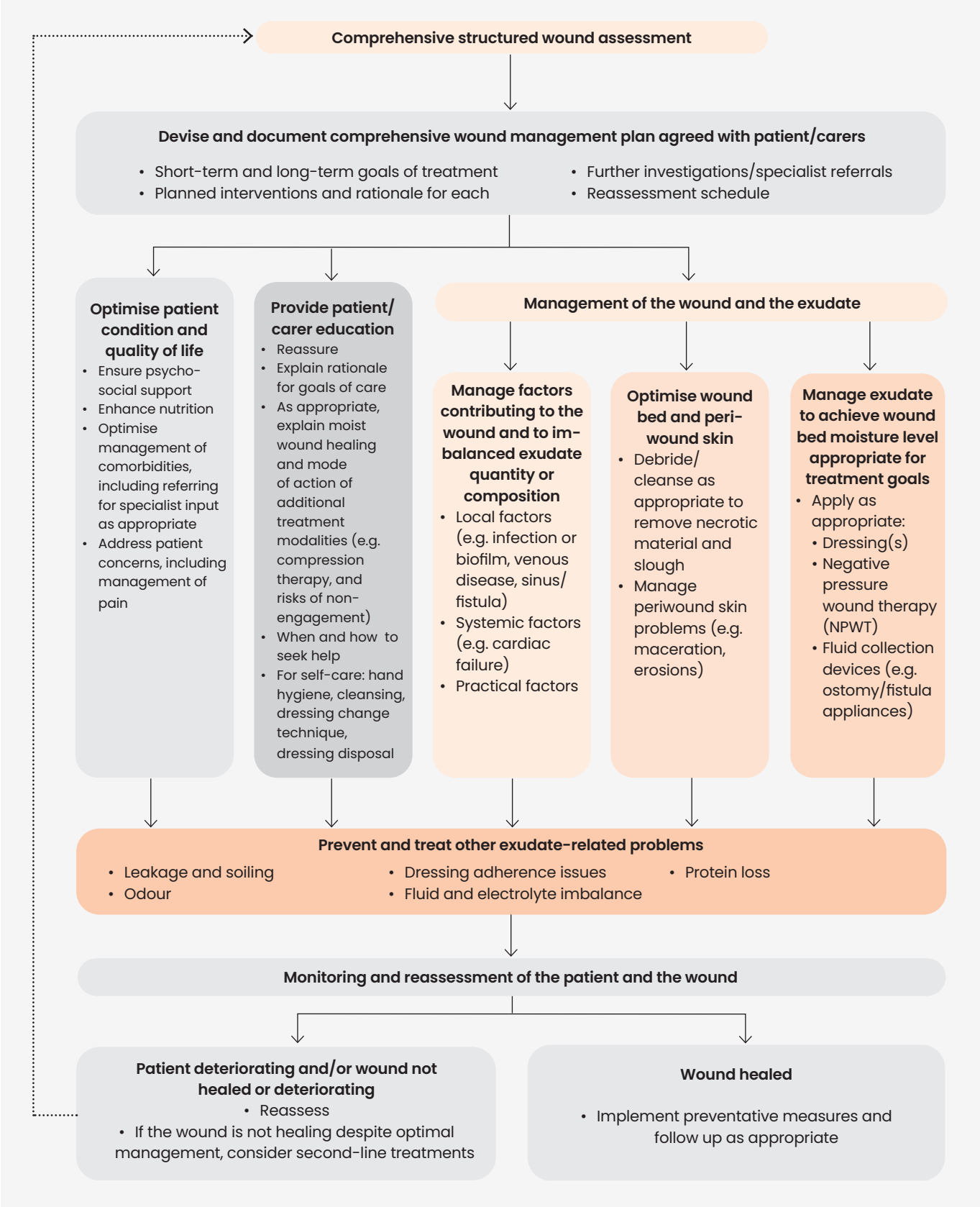


Figure 3a. Exudate management in the context of comprehensive and individualised wound management

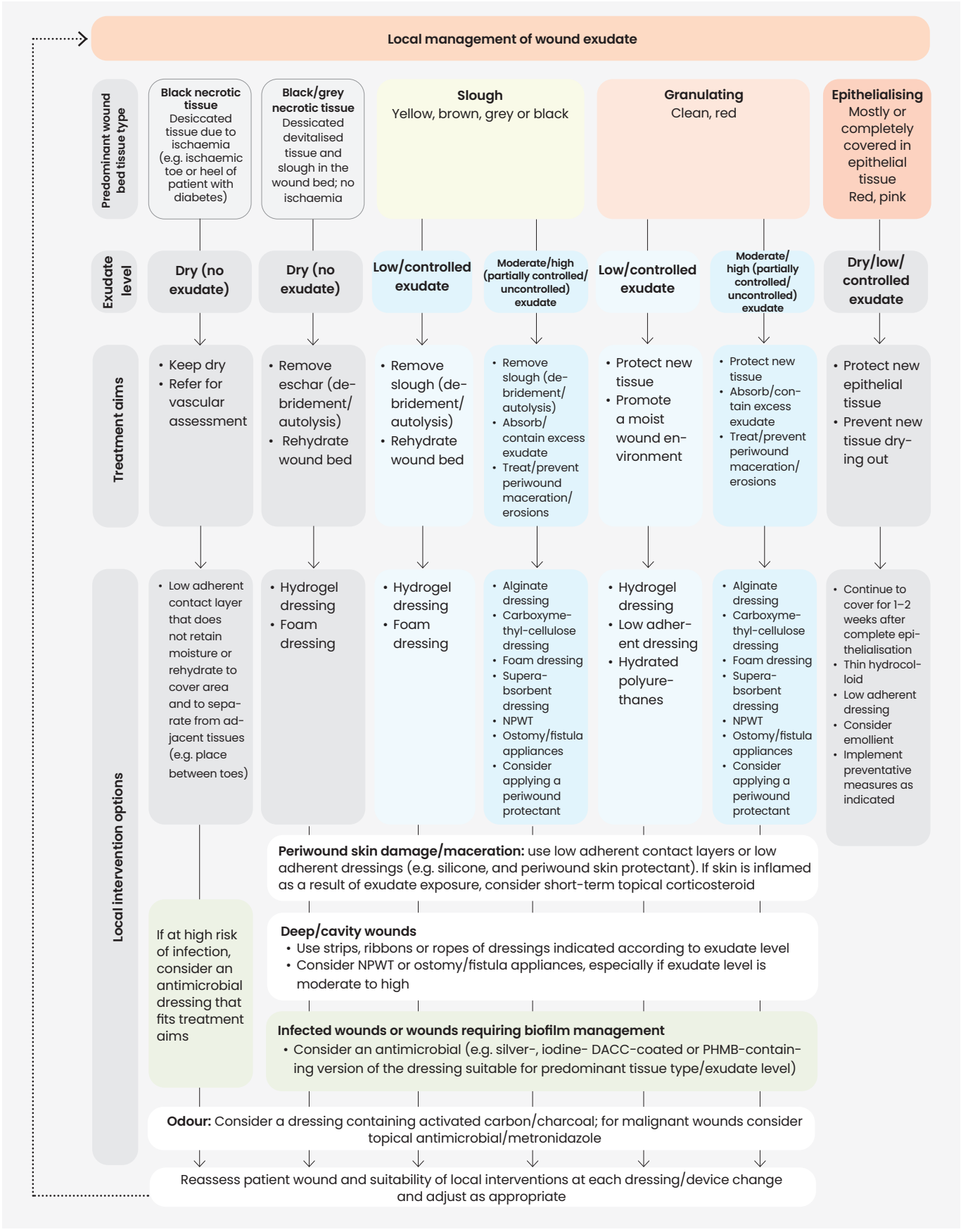


Figure 3b. Local management of wound exudate

Management plan

The individual management plan should be devised in consultation with the patient/carer(s) and, as appropriate, the multidisciplinary team. It should include short-term and long-term goals, planned interventions, rationale for the interventions, any further investigations or specialist referrals needed, and a date when reassessment will take place. The individualised management plan should be documented in line with local policy and communicated as appropriate within the multidisciplinary team (WUWHS, 2019; WUWHS, 2020).

The individual's overall health and wellbeing – incorporating factors such as mental health, psychosocial factors and support network, plus nutrition and lifestyle – are all important to their healing journey and should be considered as such (WUWHS, 2020; Nair et al, 2025a). Respectful and empathetic communication with the individual and listening to their concerns and preferences will contribute to engagement with the treatment plan and, ultimately, result in better experiences and potentially healing.

Specialist referral for assessment and management of any comorbidities may be appropriate, particularly where comorbidity management is not optimal or involves the use of systemic medication (e.g. corticosteroids, mTOR inhibitors such as sirolimus, or cytotoxic chemotherapy) known to impair wound healing (WUWHS, 2019).

Education

Educating patients and carers is a fundamental component of patient-centred wound care. They should be provided with clear evidence-based information about the cause of the wound and contributory factors, the rationale for treatment and when/how to seek help if problems arise. Education is fundamental to shared decision-making and successful engagement with treatment (Clemett et al, 2024; Yu et al, 2026).

Education is not a single event but an ongoing process. As the wound, treatment goals and the individual's needs change over time, education should be reviewed and adapted to support informed decision-making, effective self-management and optimal wound outcomes.

Practical exudate management

Effective exudate management aims to restore and maintain an appropriate moisture balance while addressing the underlying causes of imbalanced exudate production. Successful management should support wound healing where this is achievable, protect the periwound skin, minimise complications and improve the individual's comfort and QoL.

The aims of exudate management are to:

- Maintain an appropriate wound moisture balance as appropriate for the patient, aetiology and treatment goals
- Protect the surrounding skin
- Manage symptoms such as leakage, odour and discomfort to improve patient QoL
- Support wound healing where appropriate or optimise symptom control when healing is not the primary goal.

In patients with wounds that are expected to heal, the aim will generally be to achieve a moist wound healing environment that supports healing while protecting the wound from contamination.

The main modalities of local management of wound exudate are:

- Wound dressings
- Negative pressure wound therapy (NPWT)
- Fluid collection devices (e.g. ostomy/fistula appliances)
- Adjunctive therapies that address the underlying cause of excessive exudate (e.g. gradient compression).

Many factors will affect selection of treatment modality, such as wound bed tissue type, exudate level, wound depth, infection, biofilm and odour. In practice, dressing/device availability and capability (e.g. absorption and retention even under pressure, which is especially important for pressure ulcers of the sacral region or ulcers requiring compression therapy), reimbursement issues, clinician familiarity and patient preference are also likely to play important roles.

There is no individual wound product suitable for use throughout the course of management of a wound, including not only dressings but other interventions such as compression and offloading. The condition of the patient and their wound should dictate treatment and needs ongoing reassessment. Clinicians should expect to adjust management and be prepared to 'step up' and 'step down' treatment as needed to ensure the appropriate treatment is used at the appropriate time (WUWHS, 2019; IWII, 2026).

The overarching aims of treatment are described in the following section, with subsequent sections detailing approaches to exudate management, including dressings, compression therapy and advanced therapies.

Optimise wound bed moisture level

Successful exudate management depends on identifying and treating the causes of moderate to high exudate levels, or altered exudate production, rather than simply absorbing wound fluid. Local therapies, including dressings, should be used to maintain an appropriate moisture balance while the underlying pathology is addressed. As the wound changes, treatment should be reviewed and modified to ensure that the management strategy remains appropriate.

There needs to be a shift in mindset from 'managing' exudate – i.e. 'just mopping it up' – to treating the causes. Appropriate dressings and adjunctive therapies, such as compression, should be used to optimise exudate levels while treatment is adjusted according to the patient's needs.

Reduce periwound oedema

Swelling or oedema in the tissues around the wound will increase exudate production and can be caused by a wide variety of issues, ranging from wound infection to venous hypertension to heart failure (WUWHS, 2019; Fletcher et al, 2023). It is important to assess and treat the cause so that both oedema and exudate production can be managed.

Oedema and specifically lymphoedema are often issues that go undiagnosed and can impact all aspects of healing. Chronic oedema of the lower limbs can lead to an increased incidence of infections, such as cellulitis/erysipelas, which in turn cause further oedema and promote increased exudate production. This creates a cycle of non-healing.

When used appropriately in suitable patients, compression therapy plays a central role in the management of CVI by enhancing venous return, reducing oedema, promoting venous leg ulcer (VLU) healing, improving skin integrity, and helping to prevent recurrence. Earlier initiation of compression therapy is generally associated with better clinical outcomes (Fletcher et al, 2024). Compression therapy should only be commenced following an appropriate vascular assessment.

Additionally, manual lymphatic drainage (MLD) is a specialised manual therapy technique used mainly in the management of lymphoedema. However, it may also have a role in reducing chronic oedema in the lower limb when incorporated into a comprehensive oedema management programme (Blanchfield, 2018; Ramadan, 2024). Evidence on MLD is mixed and there is increasing evidence it does not improve outcomes in lymphoedema over and above compression therapy, and is not recommended in lipoedema as this is not a lymphatic issue.

Reducing oedema often results in a reduction in exudate production because it addresses one of the underlying mechanisms driving excessive wound fluid, rather than simply managing its consequences.

Management of infection and biofilm

Changes to the wound status - including pain, oedema, erythema, exudate level, odour - may indicate the development of a wound infection and should prompt an immediate reassessment. Wound infection should be managed in accordance with local protocols and antimicrobial stewardship (AMS) principles, using antimicrobial interventions or intervention with microbial-binding dressings with antimicrobial effect when clinically indicated (IWII, 2026).

When a wound fails to heal despite appropriate assessment and optimal management, the presence of biofilm should be considered as one of several factors contributing to delayed healing. Seminal studies demonstrated that biofilm is present in many hard-to-heal wounds, with prevalence estimates ranging from approximately 60% to 100% (Bjarnsholt et al, 2017; Malone et al, 2017). However, understanding of biofilm has evolved. Current evidence suggests that wound duration and treatment failure are not determined by the presence of biofilm alone, but rather by the complex interaction between the host, microorganisms and the altered wound microenvironment (Bjarnsholt et al, 2026; Nair et al, 2024). Biofilm should therefore be viewed as an important component of this pathological microenvironment rather than the sole driver of delayed healing.

Management of wounds in which biofilm is suspected should focus on optimising the wound microenvironment while disrupting and removing biofilm (Nair et al, 2024). This involves:

- Regular WBP, including therapeutic cleansing of the wound, wound edge, periwound and surrounding skin, debridement and maintenance desloughing to disrupt and remove biofilm, slough and devitalised tissue
- Addressing factors that promote microbial persistence and delayed healing, including inflammation, infection, altered pH, oedema and impaired perfusion
- Using topical antimicrobial therapies judiciously when clinically indicated, in accordance with AMS principles.

Devitalised tissue and slough contribute to an altered wound microenvironment that supports microbial persistence, including biofilm, and should therefore be removed using the most appropriate method of debridement and maintenance desloughing (Nair et al, 2024; Townsend et al, 2023). The goal of treatment is not simply to remove biofilm, but to restore a healthy wound microenvironment that supports healing.

Debridement

Debridement is one component of a holistic wound management strategy. Where clinically appropriate, removal of devitalised tissue, slough, debris and microorganisms, including biofilm, helps optimise the wound microenvironment and supports healing (Mayer et al, 2024; Bjarnsholt et al, 2026). In wounds where exudate is an issue, and in dry wounds, hydrolytic debridement may be a priority, which can be addressed through dressing selection, and used in conjunction with other debridement methods where necessary (Nair et al, 2024).

The choice of debridement method should be individualised and based on the patient's overall condition, wound characteristics, treatment goals, clinician competence and the care setting. No single method is appropriate for every wound, and the approach may need to change as the wound progresses. The clinician must be competent in the chosen debridement method.

In many cases, combining debridement methods is more effective than relying on a single technique because different methods complement one another. For example, autolytic debridement may be used to soften and hydrate devitalised tissue, making subsequent conservative sharp, mechanical or other methods of debridement more effective and less traumatic (Mayer et al, 2024). Ongoing maintenance debridement and desloughing may also be required to help maintain a healthy wound microenvironment and reduce the microbial burden.

Continuous integral debridement is a concept defined as 'the combined use of complementary debridement methods on the same wound to optimise healing outcomes' (Mayer et al, 2026).

Not all wounds are suitable for all kinds of debridement. The need for debridement and the method selected should always be determined following a comprehensive assessment of the patient and wound.

Therapeutic wound and skin cleansing

Therapeutic wound and skin cleansing refers to the active removal of surface contaminants, excess exudate, loose debris, non-adherent devitalised tissue, microorganisms and remnants of previous dressings from the wound, periwound and surrounding skin using an appropriate cleansing solution and mechanical action (IWII, 2025). This process should be tailored to the individual.

Therapeutic cleansing should address each of the three cleansing zones: the wound and wound edge; the periwound; and the surrounding skin. The intensity of cleansing, the solution selected and the technique used should be determined by the assessment findings for each zone, the wound aetiology, phase of healing and treatment goals.

By optimising the wound microenvironment through the removal of contaminants, excess exudate and microorganisms, therapeutic wound and skin cleansing supports WBP. This process facilitates assessment of all three cleansing zones, and prepares the wound for subsequent interventions, including debridement and dressing application. As such, it is an important component of holistic wound management (IWII, 2025).

Dressings and exudate management

Dressings are a key component of exudate management and holistic wound care. Beyond managing wound fluid and maintaining an appropriate moisture balance, dressings may facilitate hydrolytic debridement, act as a vehicle for topical antimicrobials when clinically indicated, modulate the wound microenvironment, protect the periwound skin and support wound healing (WUWHS, 2019; Nair et al, 2025a).

Since the publication of the 2019 exudate management consensus (WUWHS, 2019), advances in dressing technologies have expanded the options available for exudate management. Greater understanding of the wound microenvironment, together with increasing emphasis on AMS and supported self-care, has also influenced dressing selection and clinical practice.

Dressing selection should always be individualised and based on a comprehensive assessment of the patient, the wound and treatment goals. Factors such as wound aetiology, exudate characteristics, periwound skin condition, patient preferences, ability to participate in care and product availability should all be considered. As wound characteristics change over time, dressing selection should be reviewed and modified to ensure that management remains appropriate.

Dressing performance principles

Research has demonstrated that the fluid-handling capacity of modern wound dressings – including absorbency, retention and evaporation performance – is influenced by the characteristics of the inflowing exudate (e.g. flow rate, composition, viscosity, surface tension, pH), as well as by the properties of the dressing materials, structure and manufacturing process (Gefen et al, 2024).

As wound characteristics vary between patients and change throughout healing, dressing selection should be based on regular assessment of the wound, exudate characteristics and treatment goals, rather than relying solely on dressing category or absorbency potential (Gefen et al, 2024).

Fluid-handling mechanisms

In general, dressings manage fluid by absorbing it and/or allowing it to evaporate from the dressing surface (WUWHS, 2019). Dressings made from cotton, viscose or polyester textiles and some simple foam dressings absorb fluid and hold it in the spaces within the dressing material. When placed under pressure, part of the fluid may be released from the spaces and leak out of the dressing.

Effective evaporation requires a dressing design that uniformly spreads exudate away from the wound dressing surface, considering factors such as wound aetiology, fluid viscosity, treatment protocol, environment and patient behaviour (Gefen et al, 2024).

Some dressing materials – e.g. hydrocolloids, alginates, gelling fibres and some superabsorbent dressings/multipurpose dressings – absorb fluid to form a gel. When placed under pressure, the gel can change shape but retains a large amount of the fluid. Materials that form uniform cohesive gels are more likely to stay intact during use and may aid lateral wicking of fluid and reduce the risk of periwound maceration. This property may be particularly useful under compression therapy. Some gel-forming dressings also trap exudate components and microorganisms (WUWHS, 2019; Brumberg et al, 2021; Lev-Tov and Hermak, 2024).

Many dressings allow moisture to evaporate from their outer surface. This characteristic can be quantified as the 'moisture vapour transmission rate' (MVTR). Many dressings combine absorption and evaporation. Dressings with a very high MVTR may be useful in managing exudate where minimal bulk is preferable. However, it must be considered that factors such as MMPs may be concentrated under dressings with a very high MVTR, which can then impair wound healing (WUWHS, 2019). Secondary therapy such as compression can also influence MVTR.

Laboratory testing

During the development and licensing processes, dressings are subject to a variety of tests of fluid-handling performance. Tests may include free swell absorptive capacity, fluid retention capacity, absorption under compression, fluid-handling capacity, strength of the dressing when wet or dry, lateral wicking (the extent of spread of fluid laterally within a dressing), waterproofness, MVTR and bacterial barrier properties (Mennini et al, 2016; WUWHS, 2019; Gefen et al, 2024). These tests often use a simulated wound fluid to obtain more realistic values (Gefen et al, 2024).

However, laboratory test methods are not fully standardised internationally, and differences in testing protocols, simulated exudates, pressure conditions and outcome measures make direct comparison between dressing products difficult (Nygren and Gefen, 2024; Nygren et al, 2025). Laboratory data provide valuable information about dressing performance under controlled conditions but should be interpreted alongside clinical evidence, clinician judgement, and individual patient and wound characteristics when selecting a dressing.

Additionally, findings suggest that current testing methods may not accurately reflect the challenges posed by high-viscosity exudates in hard-to-heal wounds, potentially leading to suboptimal care (Melotto et al, 2024).

Using dressings to manage exudate

Some primary dressings (those in direct contact with the wound) require a secondary dressing or fixation, while others combine both wound contact and fluid-handling functions within a single product. In general, layering or 'sandwiching' of dressings should be avoided. The dressing or dressing combination selected should have sufficient fluid-handling capacity to:

- Maintain a moist wound environment without causing desiccation, leakage or periwound skin damage
- Provide appropriate absorbency, retention and/or evaporation according to the volume and characteristics of the exudate
- Remain effective for an appropriate wear time
- Be compatible with any periwound skin protection products in use (WUWHS, 2019).

A wide range of dressing materials and technologies is available, and products within the same dressing category may differ considerably in their design, construction and clinical performance. Factors such as the type and amount of absorbent material, pore size, internal structure, fluid distribution, retention capacity and evaporation characteristics all influence dressing performance (Gefen et al, 2024). Consequently, dressings should not be considered interchangeable solely because they belong to the same product category.

Bordered foam dressings, for example, a central category of wound dressings, differ significantly among manufacturers in size, shape, thickness and the types and number of internal layers they contain. They typically feature a foam component for absorption and adhesive borders, serving as both primary and secondary dressings, offering exudate absorption, covering and mechanical protection. As primary dressings, they create a moist wound healing environment. When used as secondary dressings, they act as reservoirs for absorbed fluids, providing additional biological and mechanical protection. The wear time of these dressings in clinical practice depends on factors such as exudate level, infection status, periwound skin condition, contours and movement of the anatomical area, body weight, external forces and the need for clinical evaluations (Gefen et al, 2024).

Dressing factors such as pore size, shape and the pore gradient will also affect the extent and rate of exudate absorbency into the dressing materials (Gefen et al, 2024). This may help to determine whether the dressing can handle the appropriate exudate viscosity/consistency (e.g. thick exudate), as well as the volume of fluid.

Exudate handling capacity should be considered, along with the appropriate wear time and whether care needs to be stepped up or down as the patient's wound progresses. As wound healing progresses, the quantity and characteristics of exudate often change. Dressing selection should therefore be reviewed regularly to ensure that the fluid-handling properties remain appropriate, with treatment stepped up or stepped down according to the patient's changing needs. Clinicians should be familiar with the indications, contraindications, precautions and instructions for use of the dressings they select (WUWHS, 2019).

Exudate 'reflux' needs to be considered as part of fluid-handling, ensuring that exudate when absorbed is 'locked away' and does not re-enter the wound environment, potentially causing further damage to the wound and periwound skin. For wounds with moderate-to-high or poorly controlled exudate, superabsorbent dressings with high absorbency and reliable retention, particularly under compression or pressure, should be considered a first-line option because they help to maintain moisture balance, reduce leakage and minimise the risk of periwound maceration (Feng et al, 2024).

Effective exudate management depends not only on how much fluid a dressing can absorb, but also on how effectively it retains that fluid and maintains an optimal wound microenvironment throughout the intended wear time.

Box 5 lists the properties of the ideal wound dressing, and Table 3 summarises fluid-handling capacity according to exudate level of a range of dressing materials. Table 3 also provides a broad overview of the potential uses of different dressing materials for exudate management. The fluid-handling properties and licensed usages of individual dressing products – which often contain more than one dressing material and varying quantities of those materials – will vary and may differ from the broad generalisations made.

Dressing materials

Dressing materials frequently used in the management of exuding wounds include:

- **Foams** – e.g. formed from synthetic polymers, polyurethane or silicone – a category with very wide-ranging fluid-handling properties that may also be formed of composites with other materials; may provide cushioning but may not perform well with regards to absorption and retention under compression therapy
- **Gel-forming materials** – when gel-forming dressings such as alginates, hydrocolloids or fibres become saturated, their integrity on removal should be considered, as loss of

Box 5: Considerations for selecting an appropriate wound dressing

When selecting a wound dressing, consider the following factors:

Clinical performance

- Maintains an appropriate moisture balance according to the wound and exudate characteristics
- Provides appropriate fluid-handling properties (absorbency, retention and/or evaporation) for the volume and characteristics of the exudate
- Prevents leakage and strikethrough
- Retains fluid under pressure (e.g. compression therapy or offloading devices)
- Supports the wound microenvironment
- Facilitates autolytic debridement where appropriate
- Helps manage wound infection when clinically indicated, in accordance with AMS principles
- Modulates excessive inflammatory activity where appropriate (e.g. protease modulation)

Protection and safety

- Protects the periwound skin from maceration and MASD
- Atraumatic and maintains integrity during removal
- Unlikely to cause sensitisation or allergic reactions
- Remains intact and securely in place throughout wear

Person-centred considerations

- Comfortable to wear and minimises pain during wear and dressing changes
- Easy to apply and remove
- Conformable to the wound and body site
- Does not unnecessarily restrict physical activity
- Allows showering where appropriate
- Available in a range of shapes and sizes to suit the wound and body location
- Acceptable to the patient, considering lifestyle, preferences and cosmetic concerns

Practical considerations

- Appropriate for the care setting and clinician or patient/carer skill level
- Does not require a secondary dressing where possible
- Suitable wear time according to the clinical situation
- Cost-effective when considering the overall episode of care rather than the unit cost of the dressing alone

Emerging technologies

- May incorporate sensor technology to provide information on dressing performance, the need for dressing change and changes in wound condition, which may be reality in future and in well-funded healthcare systems.

Table 3: General considerations for dressing selection in exudate management

Dressing category	Fluid-handling capacity	Primary action	Typical clinical use	Advantages	Precautions /limitations
Films	Minimal (+)	Provide a semi-permeable barrier that retains moisture while allowing moisture vapour exchange	Superficial wounds with no to minimal exudate	Transparent for wound observation and provide a barrier to external contamination	Minimal fluid-handling. Adhesive removal may cause medical adhesive-related skin injury (MARSI), particularly in people with fragile skin
Hydrogels	Minimal (+)	Donate moisture and support autolytic debridement	Dry to minimally exuding wounds	Rehydrate dry tissue and may help soften devitalised tissue	May contribute to maceration if exudate increases
Hydrocolloids	Moderate (++)	Absorb exudate and form a gel that maintains a moist wound environment	Low to moderately exuding wounds	Support autolytic debridement and may allow longer wear time in appropriate wounds	Gel residue and odour may be mistaken for infection. Careful patient and wound selection is required
Foams	Moderate (++) to very high (++++)	Absorb and retain exudate and, depending on product design, allow evaporation	A wide range of wounds with varying exudate levels	Versatile and available in many formats, with cushioning and protection	Performance varies considerably between products and manufacturers. Match the individual dressing to exudate viscosity, wear time and treatment goals
Alginates	High (+++)	Exchange calcium for sodium in wound fluid to form a hydrophilic gel	Moderately to heavily exuding wounds; selected bleeding wounds	High absorbency, conformability and possible haemostatic effect	Usually require a secondary dressing and sufficient exudate to gel
CMC fibre dressings	High (+++)	Absorb exudate vertically and form a cohesive gel that conforms to the wound bed	Moderately to heavily exuding wounds	High fluid retention may reduce lateral spread of exudate and help protect the periwound skin	Usually require a secondary dressing and sufficient exudate to gel
Super-absorbent dressings	Very high (++++)	Rapidly absorb and lock away large volumes of exudate, including under pressure	A wide range of wounds with moderate to very high exudate levels, particularly when used in combination with compression therapy	Excellent rentention and reduced risk of infection	May be unsuitable for wounds with low exudate as excessive fluid removal may dry the wound bed, but some may be indicated for dry wounds (check product information)
Secondary absorbent dressings	Variable	Provide additional absorbency, retention and/or fixation when used with a primary dressing	When the primary dressing requires addtional fluid-handling or secure fixation	Can increase total fluid-handling capacity and support fixation	Must be compatible with the primary dressing, the wound, and the treatment goals

Key consideration:

- Match the dressing's fluid-handling properties to both the volume and characteristics of the exudate, including viscosity and consistency
- Consider the patient's goals and preferences, wound aetiology, location, periwound skin condition, wear time and other treatments such as compression or offloading
- Reassess dressing performance regularly and step treatment up or down as the wound and exudate changes
- Always consult the manufacturer's indications, contraindications and precautions and instructions for use.

cohesion may increase the risk of dressing residue, retained fragments and trauma to the wound bed or periwound skin during dressing change; calcium alginate dressings may assist haemostasis in appropriate wounds

- **Superabsorbent polymers** – e.g. polyacrylate polymers (SAP-containing dressings), are highly absorbent dressing materials with a growing use in exuding wounds. Previous studies showed that polyacrylate superabsorber particles reduce the MMP concentration in hard-to-heal wounds by multiple mechanisms (direct binding, inhibition of MMPs' activity through competition for divalent ions), thus, reducing wound inhibitors factors; superabsorbent dressings maintain their fluid retention capacity under compression, provide high MVTR, provide cushioning; some are available with silicone contact layer (Veličković et al, 2023; Lipinska et al, 2026; Wiegand et al, 2013)
- **Multipurpose composite dressings** – combine different materials to address several needs, such as exudate management, odour control and sequestration of bacteria and proteases. For example, a superabsorbent polyacrylate dressing with activated carbon reduced wound area and periwound maceration more effectively than a silver-containing foam dressing in one short-term trial (Probst et al, 2022).

Using dressings to optimise wound moisture balance

Table 4 summarises general strategies for maintaining or restoring an appropriate wound moisture balance through dressing selection. Where a primary and secondary dressing are required, consideration should be given to the fluid-handling characteristics of each dressing, their compatibility, the overall bulk of the dressing combination and the patient's comfort and mobility.

There may be times when an adjustment to the dressing regimen may be necessary – e.g. because the patient is going away on holiday or has a social event to attend. Such adjustments may include maximising dressing wear time, simplifying the regimen so the patient can undertake dressing changes, minimising bulk or endeavouring to make the dressing unobtrusive.

Effective dressing selection requires an understanding of the fluid-handling characteristics of individual dressings—including absorbency, retention and evaporation—and how these interact with the wound microenvironment. These factors should always be considered alongside holistic assessment, patient preferences, treatment goals and regular reassessment to ensure the dressing remains appropriate throughout the healing journey.

Advanced dressings and therapies

Advanced therapies in relation to exudate management may include:

- **Negative pressure wound therapy (NPWT)** to assist exudate management, wound contraction and granulation tissue formation where indicated
- **Protease-modulating dressings,** such as collagen/oxidised regenerated cellulose (ORC) dressings, for wounds with evidence of excessive protease activity
- **DACC-coated dressings** with antimicrobial binding effect
- **Superabsorbent polymer (SAP)-containing dressings** or **multipurpose dressings**, where management of moderate to high exudate levels remains a challenge.

Selection of advanced therapies should form part of a comprehensive wound management plan and should not replace ongoing optimisation of the wound microenvironment, management of the underlying cause and regular reassessment. Treatment should include therapies such as compression, rather than focusing on dressings alone.

Negative pressure wound therapy (NPWT)

NPWT devices apply controlled negative pressure (suction) over a wound or closed surgical incision and the nearby tissues to promote healing (WUWHS, 2019). NPWT has been shown to be effective in reducing exudate levels in highly exuding wounds. It is important that this is viewed as part of the wider picture of healing, with NPWT often being used to kickstart healing in stalled wounds and to help reduce inflammation and oedema. In most cases, reduction in exudate levels can be considered a sign of healing (Zeng et al, 2026).

Table 4: Strategies to adjust wound bed moisture level when using dressings (adapted from WUWHS, 2019)	
Clinical objective	**Strategies**
Increase wound moisture (dry or dehydrated wound)	• Select a dressing that conserves or donates moisture (e.g. semi-permeable film or hydrogel) where clinically appropriate • Reduce dressing change frequency where clinically appropriate • Review factors contributing to wound dehydration (e.g. ischemia, dehydration or inappropriate dressing selection) • Monitor for hyperhydration or periwound maceration and adjust treatment if required.
Maintain moisture balance	• Continue the current dressing regimen if treatment goals are being achieved • Reassess the wound, exudate characteristics, wound edge, periwound and surrounding skin at each dressing change • Modify the dressing regimen as wound characteristics, patient needs and treatment goals change.
Reduce excessive wound moisture (excess exudate)	• Select a dressing with fluid-handling characteristics appropriate for the volume and characteristics of the exudate (absorbency, retention and evaporation) • Change the primary dressing or add/change a secondary absorbent dressing where appropriate • Increase dressing change frequency if clinically indicated • Consider superabsorbent dressings, negative pressure wound therapy (NPWT) or wound drainage/fluid collection devices where appropriate • Identify and treat factors contributing to excessive exudate (e.g. infection, inflammation, oedema, venous hypertension, lymphatic dysfunction or fistula).

New developments in NPWT have made the technology more accessible to patients and with increased clinical uses in a wider variety of wounds (Normandin et al, 2021). However, NPWT should still be monitored and clinic visits will be required. NPWT generally has a higher product cost than standard dressings but may be associated with shorter healing times, so overall costs are variable (Kim et al, 2021).

A variety of factors should be taken into account when selecting an NPWT device for a patient and wound (adapted from WUWHS, 2019):

- Volume of wound drainage – the device selected should have the capacity to deal with the anticipated volume of drainage – e.g. if wound drainage is (for example) <300 ml/week, canister-less single-use NPWT may be appropriate; if drainage is >300 ml/week, a canister-based device of appropriate capacity may be more suitable
- Size (area) of the wound – the NPWT device selected must be suitable for the size (area) and shape of the wound
- Depth of the wound – deep wounds may require fillers and the NPWT device should be compatible with the use of fillers; some canister-less single-use NPWT devices cannot be used with fillers and should not be used on some deep wounds (check product information)
- Location of the wound – the NPWT dressing needs to conform to the three-dimensional shape of the anatomical region of the wound sufficiently well to avoid dead space and to form the seal needed for the device to work
- Infection – an antimicrobial interface may be required and should be compatible with the NPWT device being considered; if NPWT with instillation (NPWTi) is considered necessary, the device needs to be instillation-capable
- Care setting – the NPWT device should be of a type that can be used appropriately and safely in the setting in which it will be used
- Patient needs and preferences – patients who are physically active or working are likely to prefer a portable device that is as small as possible and fits with their lifestyle needs with minimum disruption.

Cautions and contraindications to assess patient suitability for NPWT use include (adapted from WUWHS, 2019):

- Necrotic tissue with eschar
- Untreated osteomyelitis
- Enteric, non-enteric and unexplored fistulae
- Wound malignancy (unless treatment is palliative)
- Exposed blood vessels, nerves, organs or anastomotic sites in wound or near the vagus nerve
- Patients at high risk for uncontrolled bleeding
- Additionally, the NPWT unit should be removed for patients requiring treatment such as: magnetic resonance imaging (MRI), treatment in a hyperbaric oxygen chamber (HBOT), defibrillation.

As treatment progresses, patients may be transferred from one NPWT device to another in response to changes in exudate volume and the need to escalate or de-escalate therapy.

Protease-modulating dressings

Protease-modulating dressings, such as collagen/oxidised regenerated cellulose (ORC), bind and inactivate excess proteases that may degrade the extracellular matrix and growth factors, thereby supporting granulation and wound healing (Lobmann et al, 2006). They may be considered for hard-to-heal wounds that fail to progress despite appropriate standard care. However, evidence of improved healing remains limited and uncertain, particularly for VLUs (Theodorakopoulos and Armstrong, 2025; Westby et al, 2018). Their use should complement management of the underlying wound aetiology. However, an evaluation of a Ringer's solution pre-activated polyacrylate-containing wound dressing found the pattern of relative biomarker abundance in VLU wounds shifted within 2 weeks towards a pattern reminiscent of acute wound healing (Mikosinski et al, 2022).

Superabsorbent polymer-containing (SAP) dressings

Superabsorbent polymer-containing (SAP) dressings are increasingly recognised as an effective option for exudate management. By absorbing and retaining large volumes of wound fluid, they can help maintain an optimal moisture balance while protecting the periwound skin from the detrimental effects of excessive exudate. In wounds with moderate-to-high or uncontrolled exudate, SAP-containing dressings may provide advantages over conventional absorbent dressings through enhanced fluid management, retention under compression, reduced leakage risk and the potential for extended wear time (Veličković et al, 2023; Lipinska et al, 2026; Lev-Tov and Hermak, 2024).

These dressings have demonstrated clinically meaningful improvement in various wound aetiologies, showing effective exudate management and improved wound bed quality (Veličković et al, 2023; Lipinska et al, 2026) and benefits in terms of cost-effectiveness (Veličković et al, 2026; Walzer and Vikingson, 2025). Based on their specific mechanism of action, these dressings are able to modulate pro-inflammatory biomarkers such as MMPs and thereby support the healing progress (Ball et al, 2025). Importantly, patient-reported outcomes have been positive, supporting both wound improvement and patient wellbeing (Armstrong et al, 2026).

In moderate-to-high exuding wounds, particularly those with uncontrolled exudate, leakage, existing maceration or a risk of maceration, or requiring compression therapy, SAP dressings should be considered a key dressing option due to their high absorption and fluid-retention capabilities, which contribute to effective exudate management and protection of the periwound skin.

SAP dressings may support effective exudate management through their ability to absorb and retain excess wound fluid, helping to maintain an optimal moist wound healing environment, minimise the risk of leakage, and preserve the integrity of the periwound skin. SAP dressings also bind and inhibit the action of wound healing inhibitors, such as MMP2 and elastase, as well as microorganisms. In a recent *in vitro* study, Ball et al (2025) compared the effectiveness of

six silicone foam dressings versus a silicone SAP dressing in removing MMPs, human neutrophil elastase (HNE) and calprotectin (HCP) from a test solution. An enzyme-linked immunosorbent assay indicated that, by 24 hours, SAP versus silicone foam dressings removed HNE and HCP to a greater extent and achieved complete elimination of MMPs.

Multipurpose (multifunctional) dressings

Multipurpose dressings combine different materials or technologies to address several wound management needs simultaneously. Depending on their composition, they may provide exudate management, protection of the periwound skin, odour control, antimicrobial activity, protease sequestration or support for tissue repair (Soylu et al, 2025).

Superabsorbent components can absorb and retain exudate while sequestering bacteria and MMPs, although performance varies between products (Singh et al, 2022). In a short-term randomised controlled trial, a composite dressing combining superabsorbent polyacrylate polymers with activated carbon achieved greater reductions in wound area and periwound maceration than a silver-containing foam dressing (Probst et al, 2022). Multipurpose dressings may therefore be considered when wounds present several concurrent challenges, such as moderate-to-high exudate, leakage, maceration or malodour. Selection should be based on the wound's clinical needs and the demonstrated performance of the dressing's individual components, as much of the broader evidence on multifunctional dressings remains preclinical.

Wear time and undisturbed wound healing

Wear time has become an increasingly important factor in dressing selection, with a focus on the benefits of undisturbed healing, moving away from ritualistic dressing change and onto clinical indicators and need. Extended wear time should only be pursued when the selected dressing can maintain moisture balance, retain exudate and protect the periwound skin from maceration throughout the intended wear period.

Wear time is not determined solely by the wound and dressing. It is also influenced by:

- Availability and frequency of wound care services
- Access to dressings and reimbursement/funding
- Clinician availability and local models of care
- Carer availability and competence
- The individual's ability and willingness to undertake self-care, including their lifestyle (e.g. work, travel and social commitments).

Dressing change frequency impacts on community nursing visits and associated costs for the patient, such as travel and time away from work (Dowsett et al, 2015; WUWHS, 2020). Leaving dressed wounds undisturbed for longer periods of time is proven to help healing and this should be considered as part of treatment and dressing selection in appropriate cases (Sandy-Hodgetts et al, 2022).

The principle of undisturbed wound healing has been demonstrated most clearly in acute wounds, particularly surgical wounds healing by primary intention (Sandy-Hodgetts et al, 2022). In hard-to-heal wounds, dressing wear time should be optimised to balance the benefits of minimising unnecessary disturbance with the need for ongoing assessment, therapeutic wound and skin cleansing, debridement and exudate management.

Where possible, the choice of dressing should aim to reduce dressing change frequency to avoid disruption to the healing environment, which needs to be balanced with exudate management needs and factors such as the individual's infection risk. Increased wear time with the correct dressing may in fact lead to reduced risk of infection and complications, and have a positive economic impact in terms of reducing both product usage and waste, in suitable patients (Sandy-Hodgetts et al, 2022).

Optimising dressing wear time may reduce unnecessary dressing changes, improve patient comfort and QoL, support participation in daily activities, reduce healthcare costs and product waste, and enable care to be delivered in a manner that is both clinically appropriate and acceptable to the individual (Dowsett et al, 2015; Sandy-Hodgetts et al, 2022; WUWHS, 2020).

Appropriate dressing use

Dressings should be selected and used according to the clinical needs of the patient and the wound, along with compatibility with accompanying treatment (e.g. compression therapy, offloading). Inappropriate dressing selection or application—including the unnecessary layering or 'sandwiching' of dressings to manage uncontrolled exudate—may compromise dressing performance, increase the risk of leakage or periwound skin damage, delay healing and increase healthcare costs. Where exudate remains difficult to control, clinicians should avoid simply increasing the number or absorbency of dressings without reassessing the patient and wound. Persistent excessive exudate should prompt review of the underlying cause, including factors such as infection, inflammation, oedema, venous hypertension, lymphatic dysfunction, fistula formation or other comorbidities. Where appropriate, referral for specialist assessment should be considered.

Availability of products and therapies

It is recognised that the ideal dressing or treatment may not always be available. Factors such as local formularies, reimbursement policies, product availability, healthcare resources, clinician expertise and access to wound care services may influence dressing selection. This is particularly relevant in rural and remote settings, humanitarian environments and low-resource countries, where access to advanced wound products and specialist services may be limited.

Regardless of the resources available, clinicians should have a comprehensive understanding of the mechanisms of action, indications, contraindications, precautions, fluid-handling characteristics, application and removal techniques, recommended wear time, and potential allergies or sensitivities associated with the dressings they use. This knowledge enables clinicians to select the most appropriate dressing from those available, apply it safely and effectively, and adapt treatment as the wound, patient and available resources change.

Ultimately, effective exudate management depends less on access to a particular dressing than on the clinician's ability to undertake a comprehensive assessment, understand the properties and appropriate use of the dressings available, address the underlying cause of the wound, and apply clinical judgement to optimise patient outcomes.

Emerging technologies and future developments

Advances in biomaterials, dressing design and digital technologies continue to improve the management of wound exudate and enhancement of the wound microenvironment. Modern wound dressings are increasingly designed not only to manage fluid but to optimise moisture balance, protect the periwound skin, reduce dressing-related trauma, facilitate debridement where appropriate, manage infection risk and support patient-centred care (Alberts et al, 2025).

Research is focused on the development of smart wound dressings capable of monitoring changes within the wound environment. Emerging technologies include dressings incorporating sensors that detect parameters such as pH, temperature, moisture and biomarkers associated with inflammation or infection, and trigger alarms when pathological values are detected. Some systems are designed to provide visual or digital indicators of dressing saturation or the need for dressing change, with the potential to support earlier intervention and more individualised wound management (Alberts et al, 2025). In addition to dressing technologies, therapies are developing, such as compression with sensors that use smart, flexible electronic devices placed under compression to measure and adjust real-time pressure.

Although many of these technologies - especially when supported by artificial intelligence (AI) - show considerable promise, further clinical evaluation is required to determine their effectiveness, cost-effectiveness and impact on patient outcomes across different wound types and healthcare settings. As these technologies evolve, clinicians will require an understanding of their indications, limitations and appropriate integration into holistic wound management. Emerging technologies should be viewed as tools to support, rather than replace, clinical decision-making.

Dressings for clinical need

Dressings should be selected based on the individual patient, their wound and their needs and preferences. This section outlines common clinical needs relating to wound exudate that may influence treatment decision-making.

Exuding wounds

The management of exuding wounds aims to maintain an appropriate moisture balance while protecting the wound and periwound skin, optimising the wound microenvironment and supporting progression towards healing. Dressing selection should be based on exudate status (controlled, partially controlled, or uncontrolled), volume, location, and exudate characteristics, the condition of the wound and periwound skin, treatment goals and regular reassessment.

Dressings used for exuding wounds include foams, those incorporating gel-forming materials (e.g. alginates, hydrocolloids, fibre-gelling dressings), or SAP-containing dressings.

Dehydrated wounds

The management of dehydrated wounds aims to restore an appropriate moisture balance to facilitate cell migration, support autolytic debridement where indicated, and optimise the wound microenvironment. Dressing selection should be based on the cause of wound dryness, the presence of devitalised tissue, the condition of the periwound skin and the overall treatment goals. Ringer-preactivated polyacrylate-containing dressings may be used, which donate moisture and facilitate autolytic debridement (Mayer et al, 2024).

Dressing materials used on dry wounds that need to be rehydrated include:

Semi-permeable films

- Reduce evaporative moisture loss while allowing gas exchange
- Suitable for superficial wounds with minimal or no exudate
- May help maintain or restore a moist wound environment
- Adhesive films should be used with caution on fragile skin because removal may cause medical adhesive-related skin injury (MARSI).

Hydrogels

- Donate moisture to dry wounds and facilitate autolytic debridement of devitalised tissue
- Some formulations are also capable of absorbing small amounts of excess fluid
- May be useful for dry wounds, dry slough or stable dry eschar where rehydration is clinically appropriate
- Care should be taken to avoid prolonged overlap onto healthy periwound skin, as excessive moisture may result in hyperhydration and/or maceration. Hyperhydration is reversible if recognised early and managed promptly.

Odorous wounds

Most wound odours are thought to arise from the metabolic processes of bacteria and/or tissue degradation and/or poor tissue perfusion (Fletcher et al, 2024). The underlying cause of the odour should be managed, such as debridement to remove necrotic tissue and appropriate treatment if the wound is infected. SAP dressings containing charcoal or activated carbon may help to absorb odour. Some superabsorbent dressings also show sequestration of odour, and NPWT devices use charcoal filters attached to the canister that help odour management (WUWHS, 2019; Fletcher et al, 2024).

Malodour is particularly common in malignant or fungating wounds and may have a profound impact on dignity, psychosocial wellbeing and QoL (Fletcher et al, 2024). Guidelines advocate treatment with topical or systemic metronidazole in malodourous (or infected) fungating tumours.

Systemic treatment is often required to reduce malodour, but topical metronidazole can be considered when systemic treatment is impractical or causes unacceptable side-effects, the cancer is relatively small and easily accessible for topical application, and/or the cancer is poorly vascularised and very sloughy (Palliative Care Formulary, 2022; NICE, 2024). This treatment in palliative care should not be applied in the same way to other wounds treated with a curative approach.

Managing infection risk

Active measures to prevent infection may be indicated for patients at risk of infection. These include use of antiseptic solutions (e.g. octenidine, polyhexamethylene biguanide [PHMB], sodium hypochlorite or benzalkonium chloride) or non-medicated dressings where their physical mode of action helps remove and retain microorganisms or other components of wound bioburden without releasing an antimicrobial agent (Bjarnsholt et al, 2020; Idensohn et al, 2026). Given the growing emphasis on AMS, this approach may support a reduction in inappropriate antimicrobial use while ensuring effective wound management throughout the treatment pathway.

Antimicrobial resistance (AMR) is a key issue that needs to be considered when making treatment decisions. As signs and symptoms of infection resolve, advanced non-antimicrobial dressings that continue to provide exudate management, bacterial sequestration, periwound skin protection and support for autolytic debridement can play an important role as a step-down option from antimicrobial dressings. See also sections on debridement and therapeutic cleansing, in addition to dressing selection.

If infection is present, it is important to follow a management protocol and select dressings with a high level of clinical evidence demonstrating their effectiveness in treating infection while providing optimal exudate management.

Autolytic debridement

Autolytic debridement is generally considered the most conservative debridement method, which can be facilitated by 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, inducing softening of the necrotic tissue and detachment of this tissue from the wound bed (IWII, 2026). It is a highly selective process whereby only necrotic tissue will be affected (Manna et al, 2023).

Autolytic debridement can be facilitated using various wound dressings, such as polyabsorbent fibres, fibre gelling, as well as hydrofibre, alginate, hydrogel, hydrocolloid and transparent film dressings that promote autolysis of necrotic tissue (Nair et al, 2024). These can be used in conjunction with other debridement methods where necessary (see section on debridement).

Deep (cavity) wounds

Cavity wounds may be defined as a wound in which tissue loss extends beyond the dermis into the subcutaneous tissue or deeper, creating a void or dead space beneath the wound margins (Fletcher et al, 2025a). These wounds present unique challenges for exudate management because fluid may collect within the cavity and delay healing if not managed appropriately. Assessment should include careful evaluation of the wound dimensions, depth, undermining, sinus tracts or tunnelling, and can be packed with a dressing material appropriate for exudate level in rope, ribbon or strip form. The dressing material should be in contact with the wound surfaces and should eliminate dead space. However, overpacking should be avoided, with consideration of potential volume increase when absorbing fluid. The tensile strength of a packing material should be sufficient to prevent retained dressings due to breakage or disintegration in deep cavities or narrow sinuses (WUWHS, 2019).

NPWT may be appropriate for selected cavity wounds, particularly those with moderate to high levels of exudate, large tissue defects or complex wound anatomy. By removing excess exudate, assisting wound contraction and promoting granulation tissue formation, NPWT can support progression towards healing when used as part of a comprehensive wound management plan (Fletcher et al, 2025a). As the wound cavity decreases in size and exudate levels reduce, the dressing regimen should be reviewed and modified to meet the changing needs of the wound.

Exudate management and compression therapy

Compression therapy is a fundamental component of exudate management in patients with wounds and oedema of the lower limb. By reducing oedema and improving venous and lymphatic movement, compression therapy addresses one of the major causes of excessive exudate rather than simply managing its consequences.

When used in conjunction with appropriate wound dressings, compression therapy can reduce exudate levels, improve periwound skin condition and support progression towards healing. It remains the gold standard treatment for VLUs and is an important intervention in other lower limb conditions where oedema contributes to delayed healing (Hopkins, 2026; EWMA, 2025).

Mechanisms contributing to oedema and excessive exudate

Under normal physiological conditions, a balance exists between fluid filtration into the tissues and its removal via the lymphatic system. Disruption of this balance results in oedema, increased interstitial fluid accumulation and, in many patients, excessive wound exudate. High fluid filtration into the tissues may occur through one or more of the following mechanisms (Burian et al., 2022; EWMA, 2025):

- **Increased capillary hydrostatic pressure** (e.g. venous hypertension), resulting in enhanced fluid filtration into the interstitial space
- **Reduced capillary oncotic pressure** (e.g. hypoalbuminemia), leading to decreased reabsorption of fluid
- **Increased capillary permeability** (e.g. glycocalyx shedding), promoting leakage of fluid and proteins into the tissue
- **Impaired lymphatic drainage** (e.g. primary lymphoedema, lymphatic vascular anomalies or malformations), secondary lymphedema (damage or obstruction due to obesity, surgery, radiation, infection, cancer), leading to ineffective clearance of interstitial fluid (EWMA, 2025; Todd et al, 2017).

Since all interstitial fluid is cleared via the lymphatic system, and there is no significant net reabsorption by the capillary bed (Bjork and Hettrick, 2018), impaired lymphatic drainage leads to an imbalance whereby fluid influx exceeds removal. This excess fluid may reach the wound surface, resulting in increased exudate formation. Therefore, these processes are intrinsically linked and compression therapy benefits both oedema and exudate production.

Fluid differentiation

It is important to differentiate exudate from transudate, such as the body fluid produced in lymphorrhoea. In this context, impaired lymphatic drainage leads to elevated interstitial pressure that exceeds the skin's containment capacity. Consequently, ultrafiltered fluid continuously leaks and appears on the skin surface. Importantly, transudate differs from wound exudate in composition, containing lower levels of protein and fewer cells (EWMA, 2025; O'Connor, 2025).

See Table 5 for further information on differentiating exudate and transudate.

Table 5: Overview of exudate and transudate (adapted from WUWHS, 2019)

Characteristic	Exudate	Transudate
Mechanism of formation	• Increased capillary permeability usually due to inflammation (e.g. infection or other inflammatory process)	• Increased capillary hydrostatic pressure (e.g. due to venous stasis) • Decreased capillary oncotic pressure (e.g. due to low serum protein from malnutrition)
Composition	• High protein • High cell count (e.g. high white blood cell count)	• Low protein • Low cell count

Regardless of composition, prolonged exposure of the skin to excess fluid - even for short periods - impairs the barrier function of the stratum corneum, the outermost layer of the skin. This increases the risk of skin damage, irrespective of the underlying cause of fluid accumulation. Wounds and chronic oedema frequently coexist, particularly in the lower extremities. Chronic oedema is often multifactorial, with contributing factors including primary or secondary lymphedema, venous insufficiency, cancer, obesity and immobility, and has become increasingly common due to the growing prevalence of underlying chronic disease in ageing populations (EWMA, 2025).

Practical use of compression therapy

Oedema control is crucial and should always be considered an important part of exudate management, particularly in the lower legs through compression therapy (EWMA, 2025). Excessive exudate from leg ulceration can generally be attributed to unmanaged oedema (EWMA, 2025).

Many hard-to-heal wounds occur on the lower limbs and, given the detrimental impact of oedema on wound healing, effective management of oedema in these wounds is essential. Compression therapy improves both inflammation and microvascularity, lowering venous hypertension, decreasing capillary filtration, and increasing lymphatic drainage (EWMA, 2025). Therefore, it is the recommended treatment for chronic oedema and gold standard with a high level of evidence for treatment and prevention of VLU and ulcers caused by combined arterial and venous insufficiency, if not strictly contraindicated – such as severe neuropathy involving sensory loss, extra-anatomical bypass or severe PAD, severe cardiac insufficiency, contact allergies to compression materials (EWMA, 2025; Isoherranen et al, 2023).

In addition to its well-established use in venous and lymphatic disorders, there is increasing evidence that compression therapy supports the healing of inflammatory dermatoses (Dissemond et al, 2023).

Although multiple guidelines support the use of compression therapy to prevent and treat wounds, an international, cross-sectional, multicentre study showed that less than half of patients had well-controlled oedema (Burian et al, 2022). Lack of compression therapy was reported to be a significant reason for uncontrolled oedema, which was also associated with high levels of exudate (Burian et al, 2022).

The fixation of wound dressings under compression therapy is well established and widely accepted in clinical practice. Secure dressing fixation is particularly important during compression therapy, as increased dressing weight following exudate absorption may lead to dressing displacement and/or leakage. Such events can adversely affect the periwound skin and wound environment, potentially resulting in complications such as maceration. In addition, leakage may reduce patient comfort, increase treatment burden, and negatively impact QoL.

Patient engagement with compression therapy is a key determinant of treatment success (WUWHS, 2020; EWMA, 2025). Therefore, maintaining comfort and minimising dressing-related complications are important considerations in supporting engagement. As compression systems are frequently removed and reapplied during routine care, dressing fixation should ensure that the dressing remains securely in place throughout wear and during compression changes. This helps maintain wound stability, protects the healing environment from unnecessary disturbance, and may reduce the need for unplanned dressing changes.

A variety of materials and systems are available for effective compression therapy. In addition to traditional short-stretch and long-stretch bandages, current approaches increasingly include multi-component compression systems, adaptive adjustable compression devices with Velcro fasteners, and medical compression stockings. New technologies are becoming available, such as multi-component compression systems with integrated sensors for digital pressure management via an app.

The selection of the most appropriate system depends on several factors, including the clinical situation, the required level of compression, the extent of oedema, and the patient's individual circumstances and preferences (Isoherranen et al, 2023).

Protection of periwound skin

Protection of the periwound skin should be proactive rather than reactive, with the aim of maintaining skin integrity and preventing MASD. Effective exudate management, appropriate dressing selection and protection of the periwound skin are fundamental to preventing skin damage and optimising the wound microenvironment. Effective exudate retention can help minimise lateral spread of fluid, reducing the risk of maceration and MASD.

Periwound maceration

Periwound maceration should not be viewed solely as an adverse skin condition, but as a potential indicator of suboptimal exudate management. Even in the absence of visible strikethrough or leakage, maceration may indicate inadequate fluid retention, lateral spread of exudate within the dressing, poor dressing fit, excessive wear time, or insufficient protection of the surrounding skin. The presence of maceration should therefore prompt reassessment of the wound management plan, including dressing performance, wear time and skin protection strategies.

The presence or progression of maceration should prompt structured reassessment and documentation of the periwound skin, dressing performance, wear time and underlying causes of excessive moisture exposure. Structured tools such as MATE may support consistent assessment, while further validation is ongoing (Rippon et al, 2025; Ousey, 2026; Fletcher et al, 2026).

A key aim of exudate management is to prevent prolonged exposure of the wound edge and periwound skin to fluid, thereby reducing the risk of maceration and MASD.

Protection strategies

Contact between periwound skin and exudate should be minimised with appropriate dressing/device use and using skin protection products where necessary. Prolonged exposure to exudate can cause the skin to become macerated, which may delay healing and further lead to wound expansion and cause pain or discomfort (Nokaneng et al, 2025).

The risk of skin trauma associated with dressing application and removal should also be minimised. Appropriate dressing selection, the use of atraumatic silicone contact layers or silicone adhesives where indicated, avoidance of unnecessary adhesive tapes, and careful dressing removal techniques may reduce the risk of MARSI, particularly in patients with fragile or ageing skin. Barrier films or barrier creams may be used where appropriate to protect the periwound skin (Bianchi, 2012; Fletcher et al, 2025b).

If the periwound skin is inflamed due to the irritant effects of exudate, ensure that the skin is protected from the irritant and moisture is controlled, and if this does not quickly resolve then consider short-term use of a topical corticosteroid (Woo et al, 2017).

Monitoring and reassessment

Effective wound and exudate management requires continuous reassessment, ensuring that treatment intensity follows the changing needs of the patient through appropriate step-up and step-down strategies (Schultz et al, 2017).

Monitoring of wounds and formal reassessment enable changes in the wound to be detected and management to be adjusted accordingly. Dressing or device changes provide an opportunity for ongoing monitoring of the wound. Formal holistic reassessment of the wound and the patient in line with assessment guidance should be scheduled at regular intervals appropriate for the condition and type of wound. Formal reassessment should also occur if the patient and/or wound deteriorate (WUWHS, 2019).

Delayed healing in healable wounds

In wounds that are expected to heal but experience delayed healing despite optimal treatment for exudate and treatment/exclusion of infection and biofilm, a 'step up' in management and the use of second-line, or more effective novel therapies, may be indicated (Schultz et al, 2017). After a comprehensive assessment and optimisation of local and systemic management, the reasons for delayed healing should be reassessed before considering advanced therapies. This reassessment should include confirmation of the wound diagnosis, evaluation of patient-related factors and comorbidities, re-evaluation of the underlying aetiology, review of exudate management, and reassessment for infection, biofilm, inadequate perfusion, oedema, pressure, nutritional status and other barriers to healing.

Patient-centred reassessment

Treatment should be monitored with consideration of the individual's needs, preferences, and health status. The patient's experience with compression therapy should be regularly assessed, and alternative compression options (e.g. adjustable wraps or garments) considered where appropriate to support engagement. Any dressing-related issues affecting comfort, daily activities, or QoL should also be reviewed and addressed.

Step up/down approach

While treatment may need to be stepped up in hard-to-heal wounds or where delayed healing is an issue, treatment may also be stepped down in wounds that are healing (Schultz et al, 2017). This may be based on reduction in wound size/depth and reduction in exudate volume as the wound progresses to healing, based on the individual's needs and preferences (WUWHS, 2020). As the management plan evolves, the individual's lifestyle needs should be assessed to ensure ongoing engagement with treatment to prevent deterioration or recurrence. The need for ongoing commitment to compression therapy may need to be discussed.

Conclusions and future directions

Effective exudate management is a foundation of wound care and plays a critical role in creating an optimal environment for healing. Successful management requires a structured, patient-centred approach that integrates comprehensive assessment, regular reassessment, identification and treatment of the underlying cause, and the selection of appropriate therapeutic interventions.

Dressing selection for exudate management is a multifaceted process that should have the patient at the centre of all decision-making, taking into account wound characteristics, exudate level, skin condition, treatment goals, patient preferences and QoL considerations.

The goals of exudate management extend beyond fluid control to include effective oedema management, protection of the periwound skin, reduction of complications, improvement of patient comfort and QoL, and support of timely wound healing. As wound conditions and patient needs change over time, treatment strategies should be adapted accordingly, guided by clinical assessment and evidence-based practice.

Compression therapy is an essential consideration in the treatment of exudate, particularly in cases of oedema, which is often linked to excess fluid. Where clinically indicated, addressing oedema through compression should be considered a fundamental component of an effective exudate management strategy.

As technology continues to develop and dressings become more advanced, it is vital to put the patient and their individual needs at the centre of treatment. Consistent, evidence-based and patient-centred care should always be the aim.

Exudate is more than wound fluid. It provides important information about the wound, the patient and how well healing is progressing. Excessive, inadequate or altered exudate should prompt clinicians to look for the underlying cause rather than simply trying to absorb the fluid. Effective exudate management is about understanding why the exudate is present and treating the factors that are delaying healing.

Successful exudate management requires a holistic, patient-centred approach. This includes assessing the patient and the wound, optimising the wound microenvironment, protecting the wound edge, periwound and surrounding skin, and selecting treatments that match the patient's clinical needs, preferences and goals.

Dressings and advanced therapies play an important role, but they are only one part of wound management. Clinicians need to understand how the dressings and therapies they use work, including their mechanisms of action, indications, contraindications, precautions, fluid-handling characteristics, application and removal techniques, recommended wear time, and any potential allergies or sensitivities. This knowledge enables clinicians to select the most appropriate treatment from the resources available and adapt management as the wound and patient's needs change.

Advances in dressing technology, biomaterials, NPWT and smart wound technologies continue to expand the options available for exudate management. However, technology should support, not replace, clinical judgement. Comprehensive assessment, evidence-informed practice and patient-centred care will always remain the foundation of best practice.

Ultimately, successful exudate management is achieved through comprehensive assessment, sound clinical judgement and patient-centred care. The most appropriate and effective treatment is one that addresses the underlying cause of the wound, meets the patient's clinical needs, preferences and treatment goals, and is practical, cost-effective and appropriate for the resources available. By applying these principles, clinicians can improve treatment outcomes, reduce the burden of hard-to-heal wounds, and support more efficient and sustainable wound care delivery, ultimately improving patients' critically important QoL.

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Appendix 1: Glossary

Absorption/absorbency
Physical and chemical process by which a dressing draws in, takes up, and locks fluid away from the wound bed

Binding
The ability to physically capture and trap microorganisms to prevent or treat wound infections

Biofilm
Community of microorganisms attached to a surface, or a group of microorganisms themselves forming microbial aggregates, encased within an extracellular matrix (ECM) of polysaccharides, proteins and glycoproteins

Compression
Treatment method that applies pressure to tissues to improve venous return, reduce oedema, and thereby promote wound healing and manage associated conditions

Controlled/partially controlled/uncontrolled exudate
Terms to describe exudate management and guide treatment decision-making

Debridement
Removal of devitalised tissue and debris from the wound bed

Dehydration
When referring to a wound, when the healing environment is dry and does not contain enough fluid for optimal healing

Dressing/exudate reflux
Wound dressings that lack the ability to sequester drainage allow drainage to reflux from the dressing back to the wound bed

Dressing failure
Loss of integrity or adhesion of the dressing, resulting in inability to hold exudate or protect the skin

Exudate
Wound fluid, composed of serum, fibrin, and white blood cells; fluid that 'exudes' or flows from the wound

Fluid-handling capacity
Dressing or device's ability to handle/absorb exudate in quantifiable terms

Hyperhydration
Where tissue or skin is intentionally or excessively hydrated beyond normal therapeutic moisture levels

Lateral wicking
Sideways movement of fluid inside or under a dressing

Leakage
When fluid or blood from a wound overwhelms the dressing and soaks through to the outer layer or clothing

Lymphoedema
Chronic condition of the lymphatic system characterised by the accumulation of protein-rich fluid in the interstitial tissues due to impaired lymphatic transport, resulting in persistent swelling, tissue changes, and an increased risk of infection

Appendix 1: Glossary

Lymphorrhea
Leakage of lymphatic fluid through the skin, typically associated with lymphatic insufficiency or lymphoedema, and distinct from wound exudate

Maceration
Damage to the skin due to exposure to fluid (e.g. uncontrolled exudate)

Matrix metalloproteases (MMPs)
Group of natural enzymes that degrade proteins, which are essential to wound healing but can impede healing if left uncontrolled

Moist wound healing
Proven concept that a moist wound environment facilitates healing more effectively than a dry environment

Moisture-associated skin damage (MASD)
Inflammation, irritation or erosion of the skin caused by prolonged exposure to sources of moisture

Moisture vapour transmission rate (MVTR)
Rate at which a dressing allows moisture to evaporate from its outer surface

Negative pressure wound therapy (NPWT)
Advanced, active therapy that uses a vacuum system to apply controlled suction to the wound

Oedema
Tssue swelling caused by excess fluid accumulation

Periwound area
Intact skin immediately adjacent to the wound

Retention
Dressing's ability to absorb and securely lock exudate inside its core, preventing it from leaking back onto the wound or surrounding skin, even under pressure

Sequestering/sequestration
Mode of action by which a dressing absorbs fluid and locks it away from the wound

Slough
Dead tissue and microorganisms in the wound bed

Strikethrough
Fluid or exudate from a wound penetrating through to the outer, top surface of the dressing

Transudate
Low-protein filtrate of blood, which should be differentiated from exudate

Undisturbed wound healing
Reduction in 'ritualistic' dressing changes through dressing selection and clinical judgement to minimise trauma to the patient and their wound

Viscosity
Term used to describe the thickness/consistency of exudate

Wound bed preparation
Preparing a wound for further treatment, usually a dressing or advanced therapy, involving cleansing and debridement

Wound cleansing
Targeted removal of surface contaminants and debris from the wound bed and periwound area using a wound cleansing solution and mechanical action

Appendix 2: Exudate and maceration assessment checklist

STEP 1: Re-/ASSESS EXUDATE

Exudate Status:

☐ Controlled ☐ Partially controlled ☐ Uncontrolled

Exudate Type & Volume:

Type: ☐ Serous ☐ Serosanguinous ☐ Sanguinous ☐ Purulent

☐ Other

Volume: ☐ Low ☐ Moderate ☐ High ☐ Excessive

Red Flags:

☐ Sudden increase in exudate volume

☐ New leakage / strike-through

☐ Dressing saturation before scheduled change

☐ Reduced or inappropriate dressing wear time

☐ New or worsening odour and/or pain

☐ Patient-reported leakage

Exudate Comparison Note:
In case of moderate-to-high uncontrolled exudate or reduced wear time, evaluate the use of Superabsorbent Polymer (SAP) dressings

Wound Impact:

☐ Healing trajectory progressing ☐ Delayed healing

☐ Wound enlargement ☐ Signs of infection or biofilm

☐ Increased signs of inflammation

☐ Edema or swelling of wound edges

☐ Changes compared with previous assessments

Trend:

☐ Improving ☐ Stable ☐ Worsening

Periwound Skin & Maceration:

☐ Intact ☐ Hyperhydration ☐ Maceration

☐ Erythema ☐ Excoriation/Erosion ☐ Fragile skin

☐ Moisture-associated skin damage (MASD)

Clinical note:

The presence of periwound maceration should trigger immediate reassessment of exudate control, dressing performance, wear time, and oedema management.

Patients are at increased risk of maceration when there is:

☐ Moderate-to-high exudate volume

☐ Uncontrolled exudate

☐ Dressing leakage or strike-through

☐ Inappropriate dressing choice under compression therapy or additional external pressure

☐ Fragile or ageing skin

☐ Anatomical locations with movement or contour challenges

☐ Uncontrolled edema or lymphorrhoea

☐ Inappropriate dressing selection, including insufficient absorbency and/or fluid retention capacity for the level of exudate

Maceration Assessment:

Severity:

☐ None ☐ Mild ☐ Moderate ☐ Severe

Trend:

☐ Improving ☐ Stable ☐ Worsening

Clinical Indicators:

☐ Periwound skin involvement ☐ Tissue softening

☐ Whitening/pallor of the skin ☐ Swelling

☐ Skin fragility or breakdown ☐ Peeling of the skin

☐ Erosion/excoriation

Tools such as the Maceration Assessment Tool for Exudate (MATE) may assist clinicians in systematically assessing severity and progression of exudate-related maceration, supporting consistent documentation, reassessment, and treatment decision-making.

Appendix 2: Exudate and maceration assessment checklist

STEP 2: Identify CAUSE (WOUND, HEALTH STATUS, TREATMENT)

Wound-related:

☐ Infection
☐ Suspected biofilm
☐ Inflammation
☐ Increased wound size/depth
☐ Sinus or fistula
☐ Malignancy
☐ Others

Changes in patient health status:

☐ Oedema
☐ Chronic oedema/lymphoedema
☐ Venous insufficiency
☐ Heart failure
☐ Reduced mobility
☐ Malnutrition
☐ Systemic Infection
☐ Medication-related factors
☐ Others

Treatment-related:

☐ Insufficient absorbency for exudate volume
☐ Inadequate fluid retention capacity
☐ Leakage, lateral spread or exudate reflux
☐ Poor dressing fixation
☐ Inappropriate dressing wear time
☐ Compression therapy absent or insufficient
☐ Dressing change frequency not aligned with exudate level
☐ Care visit schedule exceeds safe dressing wear time
☐ Others

STEP 3: ACT AND ADJUST TREATMENT

To minimize moisture damage

☐ Select a dressing with adequate absorption and retention capacity
☐ Consider SAP-containing dressings for moderate-to-high exudate
☐ Reduce lateral spread and exudate reflux
☐ Ensure effective dressing fixation and seal
☐ Use barrier films or skin protectants when indicated

☐ Apply or optimize accompanying treatment, especially compression therapy or off-loading where applicable
☐ Review dressing wear time regularly
☐ Educate patients/ caregivers regarding leakage and early signs of skin damage
☐ Monitor periwound skin routinely using a structured maceration assessment approach (e.g. MATE)

☐ Refer to specialist services if deterioration continues

TREATMENT SELECTION & INDICATION-BASED OPTIONS (DETAILED SAP THERAPIES)

Indication / Finding	Therapeutic Goal	First-Choice Wound Dressings & Products	Concomitant Measures
Exudate low to moderate	Maintain moisture balance, prevent adherence, provide exudate control	Foam dressings, Carboxymethylcellulose fibres, or Superabsorbent Polymer (SAP) dressings indicated for low exudate levels, non-active antimicrobial wound dressing if indicated	Basic skin care of periwound skin, optional SAP integration for exudate spikes
Exudate moderate to high	Maintain moisture balance, prevent adherence, provide exudate control, Maximum retention, leakage protection, maceration prophylaxis	Superabsorbent polymers (SAP) wound dressings, non-active antimicrobial wound dressing, non-active antimicrobial wound dressing if indicated	Skin protectant film (no-sting barrier), shorten change intervals, ensure SAP saturation monitoring
Exudate high to excessive	Maximum retention, leakage protection, maceration prophylaxis	Superabsorbent Polymer (SAP) wound dressings, non-active antimicrobial wound dressing if indicated antimicrobial wound dressing	Skin protectant film (no-sting barrier), shorten change intervals, ensure SAP saturation monitoring

ODOUR ASSESSMENT		COMPRESSION THERAPY IN OEDEMA	
Grade 0: No odour	Standard wound treatment	**Indication**	Oedema, CVI, CAVI, lymphoedema | Check: ABPI/ABI.
Grade 1: Mild odour with dressing removed	Charcoal, biofilm debridement	**ABPI ≥ 0.8**	Compression therapy. SAP dressings should be considered a key dressing option due to their high absorption and fluid-retention capabilities
Grade 2: Moderate odour in room	Charcoal, non-active antimicrobial wound contact layer, debridement	**ABPI < 0.8**	Reduced/no compression after specialist consultation.
Grade 3: Strong odour in room	Charcoal, non-active antimicrobial wound contact layer, assessment of necrosis		

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