

LIVRO BRANCO

CICATRIZAÇÃO DE FERIDAS: ALCANÇANDO A CURA DE FERIDAS COM CONFIANÇA



INTRODUÇÃO

O conceito de "equilíbrio de feridas" é multifatorial, abrangendo questões interconectadas relacionadas ao processo de cicatrização de feridas e à prática clínica. O conceito de equilíbrio de feridas tem como objetivo integrar vários parâmetros críticos que oferecem continuidade, cuidado individualizado e apoiam a tomada de decisões clínicas, colocando o paciente no centro de todo o cuidado [Figura 1, ver página 4].

Fundamentalmente, buscar o "equilíbrio de feridas" constitui uma mudança de foco, passando da gestão de feridas para alavancar a intenção clínica de cicatrização de feridas sempre que possível e o mais cedo possível. O paciente e o clínico estão nessa jornada juntos, com as necessidades e preferências de qualidade de vida do paciente, bem como os resultados clínicos esperados, no centro do processo de tomada de decisão. O engajamento do paciente é crucial, tanto para alcançar os resultados acordados quanto para melhorar a experiência do paciente.

A qualidade de vida é um componente-chave que muitas vezes é mal compreendido, pois pode ser um desafio medir ou quantificar, e muitas vezes é mais difícil aplicar isso à prática baseada em evidências. Viver com uma ferida é frequentemente diferente de viver com outras condições crônicas, e o cuidado precisa ser individualizado de acordo, com a comunicação e a escuta do paciente no centro de todas as interações.

Embora os sistemas e ambientes de cuidados de saúde possam variar, essa mudança de foco é necessária para facilitar uma transformação na prática clínica. A prática ritualística precisa ser eliminada por meio de uma compreensão da ciência da cicatrização de feridas e uma aplicação disso ao paciente individual e suas necessidades únicas. A falta de conhecimento especializado ou confiança dos clínicos em cuidados de feridas pode levar a uma prática subótima, como não abordar os fatores contribuintes subjacentes ou não selecionar o curativo ideal para as necessidades do paciente individual. Considerar se uma abordagem de tratamento específica é do melhor interesse de um determinado paciente é essencial, e os clínicos devem sempre se perguntar se o produto mais familiar para eles é o mais adequado para o paciente.

A abordagem de equilíbrio de feridas visa fornecer aos clínicos as informações necessárias para entender a ciência da cicatrização de feridas, além das habilidades necessárias para comunicá-la efetivamente aos pacientes, ajudando-os a obter o melhor de seus tratamentos e, em última análise, alcançar bons resultados clínicos.

Uma mudança na maneira como pensamos e discutimos sobre feridas é necessária, focando na cicatrização, quando apropriado - em vez de apenas gerenciar as feridas. Isso pode reduzir o fardo acumulado de feridas, aliviando a pressão e o estresse psicológico tanto nos pacientes quanto nos clínicos.

Este documento fornece orientações para alcançar o 'equilíbrio de feridas', e especificamente como isso pode ser aplicado na prática para melhorar os resultados. Os objetivos são ajudar os clínicos a:

- Compreensão da ciência da cicatrização de feridas
- Identificação do que pode estar impedindo a progressão de uma ferida, incluindo fatores externos e barreiras à cicatrização;
- Reconhecimento precoce de feridas que provavelmente se tornarão não cicatrizantes ou crônicas, em vez de esperar até 12 semanas, que às vezes é considerado o período de tempo para uma ferida ser considerada crônica; no entanto, esse é um intervalo e diferentes países têm prazos variados;
- Compreensão da importância da adoção de uma abordagem centrada no paciente, identificando assim as necessidades individuais do paciente e garantindo que o paciente esteja no centro de todos os processos de tomada de decisão - um processo que começa no início e continua em cada estágio da jornada do paciente;
- Utilização de uma linguagem positiva para otimizar a cicatrização de feridas, em vez de apenas gerenciar feridas;
- Consideração e mensuração da qualidade de vida do paciente, determinantes sociais da saúde e o impacto de viver com uma ferida, para melhorar os resultados e construir evidências;
- Aplicação do conhecimento adquirido para alcançar resultados de maneira adequada e oportuna.

Este documento é o resultado de uma reunião de especialistas em cuidados com feridas internacionais realizada em Frankfurt, Alemanha, em novembro de 2022. Isso representa o primeiro passo na jornada de educação do 'equilíbrio de feridas'. Trabalhos adicionais estão planejados para expandir o conceito e fornecer aos clínicos uma compreensão aprimorada das melhores práticas para ajudar a otimizar os resultados para os pacientes, alcançando o equilíbrio de feridas.



Figura 1: O conceito de equilíbrio da ferida.

THE SCIENCE OF WOUND HEALING: REMOVING THE BARRIERS

Wound healing is achieved through four phases: haemostasis, inflammation, proliferation, and remodelling. For a wound to heal successfully, all four phases must occur in the proper sequence. However, many factors can interfere with one or more phases of this process, thus causing improper or impaired/delayed wound healing (Guo and LaPietro, 2010).

There are key elements that can influence the patient’s healing trajectory. If barriers to healing can be identified, these can be addressed. The focus should be on achieving wound balance and optimising the healing process.

An understanding of the pathophysiology of wound repair, and how this relates to the individual patient and their wound, can help to achieve a shift in focus that will result in increased rates of healing and improved patient quality of life. Identifying and addressing the factors that may cause a wound to become chronic can help wounds to heal quicker and, in many cases, avoid long-term chronicity.

If potential factors that may prevent a wound from progressing can be identified early and addressed in practice, then the appropriate treatment decisions can be made in collaboration with the patient, considering their individual situation, needs and preferences [Table 1].

Biomarkers and wound balance

Biomarkers are objective medical signs used to measure the state of a disease or the effects of treatment. Biomarkers can be useful in practice, as they provide an identifiable and measurable way of tracking healing and identifying the barriers to healing. Therefore, wound biomarkers should be considered to assess the wound healing journey and identify barriers that may delay healing. This, in turn, allows treatment and decision-

making to be tailored to the individual patient and their wound, ensuring that their healing potential is optimised.

Biomarkers that affect wound balance include (Wounds International, 2017):

- Matrix metalloproteinases (MMPs; principally MMP-2 and MMP-9)
- Elastase from polymorphonuclear granulocytes (PMN elastase)
- Growth factor inactivation/matrix destruction
- Aberrant local inflammation (M1/M2-dominated inflammation, oxidative stress)
- Missing angiogenesis/granulation tissue induction/epithelial cell migration
- Nutrient/oxygen deficiency.

A recent study (Mikosinski et al, 2022) showed that treating hard-to-heal wounds with superabsorbent polymer (SAP)-containing dressings results in a major shift in the pattern of biomarkers towards more normal healing within 14 days, which persisted for 12 weeks. A total of 57 patients with a venous leg ulcer were treated with a protease-modulating polyacrylate wound dressing, and within the first 14 days, levels of neutrophil elastase, MMP-2 and fibronectin reduced significantly and remained stable.

The role of MMPs

MMPs are a key biomarker in wound healing and are part of the larger family of metalloproteinase enzymes that play important roles in wound healing (Page-McCaw et al, 2007) and several aspects of the normal wound healing process [Table 2, see page 6].

Table 1. Factors that may prevent a wound from progressing

Systemic inhibitors of wound healing	Local inhibitors of wound healing	Normalisation of wound healing
<ul style="list-style-type: none"> • Venous insufficiency (venous hypertension) • Diabetes mellitus (acute and long-term complications) • Nutritional deficiency • Inflammation (autoimmune disease, immunosuppression) • Carcinogenesis (progression from wound healing to cancer) • Arterial insufficiency 	<ul style="list-style-type: none"> • Excessive protease levels (MMPs, PMN elastase) • Growth factor inactivation/matrix destruction • Aberrant local inflammation (M1/M2 dominated inflammation, oxidative stress) • Missing angiogenesis/granulation tissue formation/epithelial cell migration • Nutrient/oxygen deficiency • Persistent trauma 	<ul style="list-style-type: none"> • Angiogenesis • Granulation tissue formation • Epithelial cell migration • Normalisation of inflammation • Change of the microenvironment towards normal healing



Table 2. The role of MMPs in the process of wound healing (adapted from Wounds International, 2009)

Role of MMPs	Phase of healing
<ul style="list-style-type: none"> Removal of bacteria Removal of damaged ECM (extracellular matrix reorganisation) 	Inflammation
<ul style="list-style-type: none"> Degradation of capillary basement membrane for angiogenesis Migration of epidermal cells 	Proliferation
<ul style="list-style-type: none"> Contraction of scar ECM Remodelling of scar ECM 	Remodelling

While MMPs play an important role in wound healing, substantial evidence has amassed that MMP levels are highly elevated in wounds with delayed healing compared to acute healing wounds (Wysocki et al, 1993; Beidler et al, 2008; Muller et al, 2008; Rayment et al, 2008; Liu et al, 2009). The potentially damaging effect of these high levels of MMPs is compounded by the fact that levels of tissue inhibitors of metalloproteinases (TIMPs) in chronic wounds are generally slightly lower than in acute wounds (Tregrove et al, 1999).

Studies of exudate from chronic leg ulcers found particularly elevated levels of MMP-2 and MMP-9 (Wysocki et al, 1993; Tregrove et al, 1999). A range of studies have identified further biomarkers that have a role to play and may prevent or delay wounds from healing (Grinnell et al, 1992; Buchstein et al, 2009; Theocharidis et al, 2022). Growth factors have a key role: in healing wounds, growth factors are active; in non-healing wounds, despite being present, they are inactive. These factors can provide a picture of potential to heal, and barriers to healing, that are not immediately visually identifiable.

Acute versus chronic wounds

Studies of wound exudate have identified that biomarkers are elevated in chronic wounds. The effect of chronic wound exudate, when surrounding tissues are exposed to chronic wound fluid, results in inhibited healing (Tregrove et al, 2000; Ulrich et al, 2005).

This scientific evidence can be directly applied to practice and improve healing, as these factors characterise chronic wounds and can therefore be addressed to improve the wound environment and kickstart delayed or stalled healing (Cho et al, 2020).

If the factors associated with chronic wounds can be reversed, the chronic wound environment can be converted to a healing wound environment and the healing process can be activated. Improving the healing potential of wounds and avoiding delayed healing is a key step in achieving wound balance [Box 1].

The expert group agreed that appropriate intervention should be made as soon as possible: the clinician should not wait for a wound to become chronic before realising that there is a problem. Within the first 2 weeks there may already be signs that the wound is not likely to heal in a timely manner, and

Box 1. Definitions of chronic and hard-to-heal wounds

In 2017/2018, there were an estimated 3.8 million patients with a wound managed by the NHS in the UK, of which 70% healed in the study year, including 89% and 49% of acute and chronic wounds, respectively (Guest et al, 2020). Therefore, it is clear that a new approach is required around chronic/hard-to-heal wounds. Chronic wounds are generally defined as 'wounds that fail to proceed through the normal phases of wound healing in an orderly and timely manner', which, in practice, often means wounds that are stuck in the inflammation phase (Frykberg and Banks, 2015).

Definitions of 'a timely manner' may vary; different geographical areas and individual clinicians may have differing interpretations and approaches, which can lead to a significant variation in timeframes. While these definitions vary, they can generally mean a timescale of anything up to 12 weeks (Cho et al, 2020). However, in some wounds (e.g. larger wounds), the healing time may be longer, with the wound showing signs of progression each week.

clinicians should identify risk factors to indicate chronicity, so interventions could be initiated earlier, to prevent the wound from stalling (Wounds UK, 2018; WUWHS, 2020a). This may include addressing factors which may impede healing, including the patient's overall health status, presence of comorbidities or underlying conditions, a high risk of infection/bioburden or a growing wound size/deteriorating wound bed.

Rather than categorising wounds as 'chronic' or 'hard-to-heal', clinicians should proactively identify red flags that may indicate or trigger stalled healing, or factors that may cause healing to become stalled. Wounds could then be categorised as 'high risk', with a need for increased observation and comprehensive care, ensuring that any underlying factors are addressed, barriers removed and the potential for healing increased. This process of observation and categorisation should be ongoing, ensuring that no developing red flags are missed or assumptions are made.

Key points and recommendations

- » Do not wait for a wound to become chronic – engage in early identification and modification of 'red flags' that may cause a wound to be at high risk of stalling and becoming chronic (e.g. patient-related factors such as comorbidities or underlying conditions, high risk of infection)
- » Understand that chronic wounds are characterised by the predominance of inhibitory factors which impair wound healing
- » Recognise and identify imbalances in biomarkers that may potentially impair healing
- » Appreciate that several factors inhibiting healing have been identified: excessive protease levels are the most significant
- » Consider treatment options that provide an optimal wound balance environment and deliver relief from bacterial load and excessive levels of proteases as appropriate.

BALANCING THE HEALING TRAJECTORY

Balancing the wound environment is a key element in optimising the patient's potential for healing. Wound balance can be achieved through interventions such as:

- Wound bed preparation
- Debridement
- Exudate management
- Dressing selection.

Wound bed preparation

It is widely acknowledged that wound bed preparation is an important concept that is key to wound healing (Schultz et al, 2003). Wound bed preparation is the management of a wound in order to accelerate healing or to facilitate the effectiveness of other therapeutic measures. The 'TIME' acronym – consisting of tissue debridement, infection, moisture balance and edge effect – summarises the principles of wound bed preparation, including:

- Tissue debridement and removal of sloughy and necrotic tissue
- Infection control and the management of bacterial bioburden
- Maintenance of moisture balance
- Epidermal advancement.

Debridement

Debridement is the removal of necrotic, devitalised or infected tissue to help to balance the wound environment and promote healing. Debridement is a key step in wound bed preparation that aims to remove barriers to healing and expedite the wound healing process. Debridement is also known to help reduce bacterial burden and biofilm, minimising the risk of infection and further complications that may delay healing (Atkin, 2014).

Debridement is an essential step in balancing the wound environment, converting a non-healing wound stalled in the inflammatory phase to revert it back into a state that is capable of healing (Thomas et al, 2021).

Approaches to debridement may vary depending on care settings, clinician skill and practitioner confidence. The ability to identify which wounds need debridement and the most effective method of debridement is a necessary skill. Identifying the debridement needs of the wound is required in order to improve healing. A proactive approach to debridement is recommended in order to improve healing potential before a wound becomes chronic.

Exudate management

Although production of wound exudate is a necessary part of the healing process, exudate can adversely affect wound healing when in the wrong amount, in the wrong place, or of the wrong composition (Moore and Strapp, 2015). Exudate management aims to optimise the wound bed moisture

level as appropriate for the patient, protect the surrounding skin, manage symptoms and improve the patient's quality of life. In the context of comprehensive and holistic wound management, effective handling of exudate requires consideration of a number of factors that (WUWHS, 2019):

- Optimise patient condition and quality of life by considering patient preferences
- Provide patient/caregiver education
- Initiate further investigations and make specialist referrals
- Manage the factors contributing to the deterioration of the wound
- Optimise the condition of the wound bed and surrounding skin
- Optimise wound bed moisture level
- Prevent and treat any other exudate-related problems.

Dressing selection

Dressings are available that help to address the wound healing environment and promote healing. Superabsorbent dressings that contain polyacrylate polymers (SAPs) have a very high fluid absorption capacity (up to 100 times their own weight), and additionally have the ability to bind and sequester potential wound inhibitors (e.g. proteases such as MMP2 and elastase, or microorganisms) inside the core of the dressing, ensuring that exudate or inhibitors do not further damage the tissue and inhibit healing (Eming et al, 2008). The mechanism of action of SAP-containing dressings has been described (WUWHS, 2020a) [Figure 2]. It has been shown in vitro that SAP-containing dressings possess a significant binding capacity for MMPs (Wiegand and Hipler, 2013) and reduce bioburden (Wiegand et al, 2013).

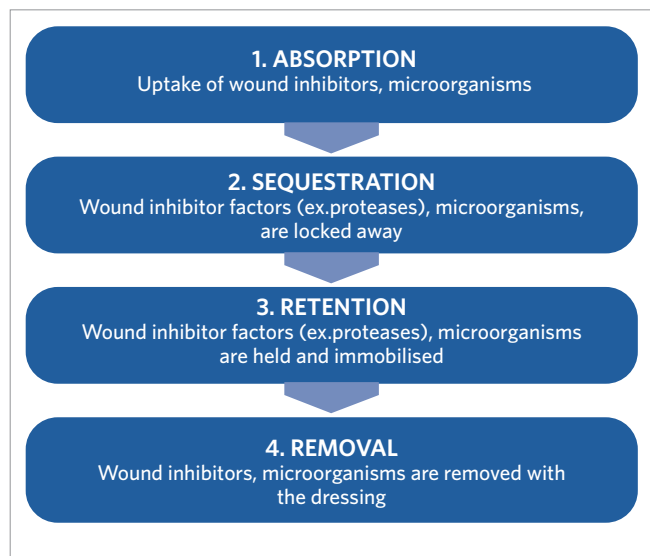


Figure 2: Mechanism of action of SAP-containing dressings (WUWHS, 2020a)

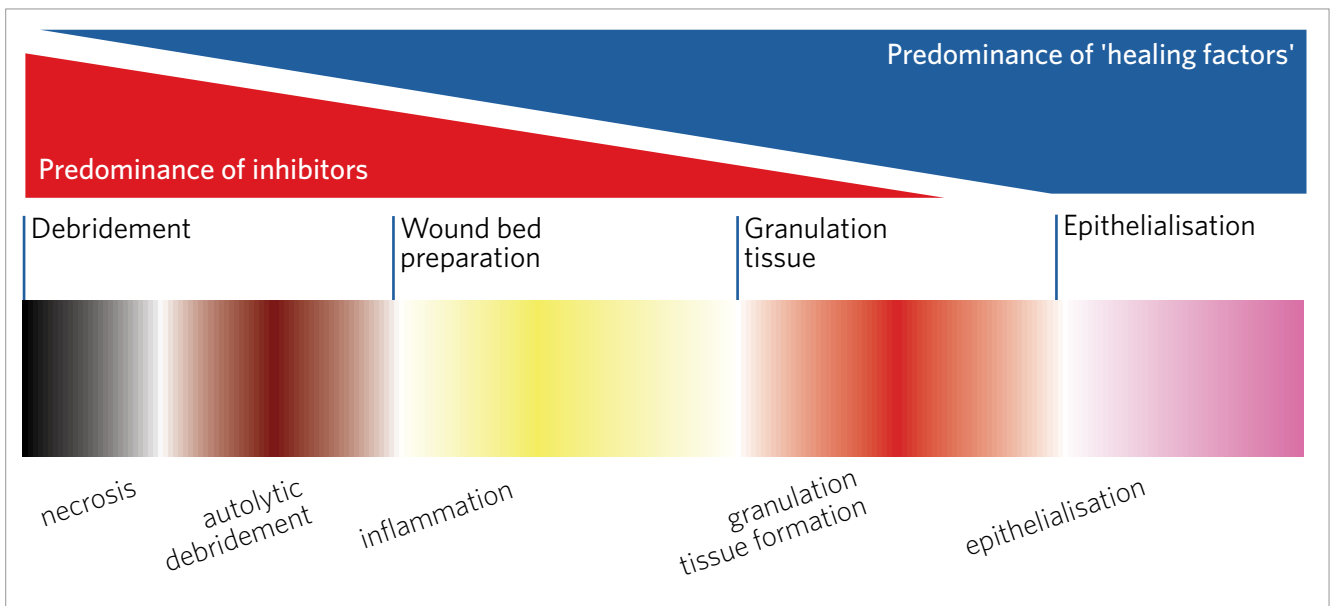


Figure 3: Changing the balance of factors to reduce barriers and promote healing

In practice, this means that the appropriate dressing can limit or reverse the factors that may impede wound healing. Thus, this decision-making can improve the healing of wounds, or help ensure that high-risk wounds do not become chronic (Humbert et al, 2014). For example, SAP-containing dressings that improve the wound environment through protease-modulation have been found to be effective in a range of wounds including venous leg ulcers and skin graft donor site wounds (Mikosinski et al, 2022). Notably, in 61.4% of the 57 patients within the study presenting with venous leg ulcers, treated with protease-modulating polyacrylate wound dressings, a relative wound area reduction of $\geq 40\%$ was achieved.

To achieve wound balance, practical measures should be taken that reduce factors that inhibit healing, and increase 'healing factors' to allow the wound to progress [Figure 3].

Key points and recommendations

- » Practical steps can be taken to use the science behind wound healing to improve patient outcomes
- » Balancing the wound requires a proactive approach to wound bed preparation, debridement, exudate management and dressing selection
- » Dressings can be selected that address factors associated with stalled healing through protease-modulation (SAP-containing dressings).

THE IMPORTANCE OF TAKING A PATIENT-CENTRED APPROACH

A thorough patient-centred approach is the first step in wound care and is the start of the healing journey. However, this is often easier in theory than in real-world practice.

Depending on the healthcare setting, there are several assessment constraints. Limited time, access to resources and differences in clinicians' knowledge and expertise are common challenges. However, experienced and astute clinicians can often notice and assess a patient's functional abilities throughout every contact, paying special attention to their demeanour, cognition, emotional state and abilities.

A comprehensive wound assessment, therefore, encompasses not only analysing the wound, but also taking a whole-person approach to evaluating the patient holistically.

Factors that may affect the patient's healing and wellbeing can be generally categorised as intrinsic (related to the patient and their health) and extrinsic (relating to outside factors such as environment and care).

It is important to use assessment to explore intrinsic factors such as:

- The patient's medical history
- Overall health/wellbeing in the past and present moment; it is important to establish the patient's baseline and what is 'normal' for them
- Any underlying factors that may affect healing - e.g. health conditions, medications, chronic illnesses and nutrition
- The wound characteristics
- Wound-related history - e.g. has the patient had a wound previously (or a recurring wound), and how did that wound heal?
- The surrounding skin and general skin integrity
- The patient's mobility, nutritional status, smoking/alcohol use.

It is also important to take the opportunity to assess less direct factors such as:

- The patient's support network, including caregivers, friends and family
- Environment and hygiene
- Psychosocial factors
- The financial impact of living with a chronic wound
- Level of education and literacy
- Financial resources
- Access to medical care
- Transportation and mobility
- The personal impact on the patient of living with a wound.

While performing a skin inspection, clinicians can ask questions to establish the patient's perspective on how the wound is impacting their life. Not all features of wounds are

Box 2. Questions to consider as part of assessment (adapted from Dhoonmoon et al, 2021)

- What is the wound/periwound skin like in comparison to the surrounding skin?
- Are there any differences in colour?
- Does the skin feel warm/cool? Are there any changes in temperature?
- Does the skin feel spongy/boggy or firm to the touch?
- Does the skin look or feel shiny or tight/taut?
- Is there any swelling, oedema or inflammation?
- Are there any changes in the texture of the skin and underlying tissue?
- How is the overall condition/integrity of the skin?
- Is there any pain, itchiness or change in sensation?
- Does the patient have access to a caregiver and/or support network?

visibly noticeable, especially in patients with dark skin tones. (Francis, 2023). Using touch to notice alterations in texture or temperature may be necessary [Box 2].

Assessing the impact of living with a wound

Wound balance embraces the patient's overall health and wellbeing, including physical and psychological factors, in addition to the impact on the patient's lifestyle.

Living with a wound is often different to living with other chronic conditions, and may have a significant impact on the patient, affecting their overall wellbeing, mental health and lifestyle. There are specific factors relating to living with a wound (e.g. exudate/leakage, malodour) that may have a negative effect on the patient and need to be addressed, as well as factors such as pain, mobility, and ability to carry out activities of daily living (ADLs).

Listening and understanding the patient is key. Engaging the patient in their own care and the decision-making process can help to improve outcomes and concordance, as well as the patient's experience.

Living with a wound can cause many psychological and social issues, which may be a sensitive or emotional subject for the individual, or may result in feelings of isolation - approaching the individual with empathy and understanding is key (WUWHS, 2020b).

Tailoring care to the individual

The concept of wound balance includes balancing the patient's individual needs and expectations, as well as the physiological healing factors.

Starting with assessment, it is important to listen to the patient's individual needs and preferences, and tailor care accordingly. Different patients will have different priorities, which can change over the course of the wound healing trajectory, and these may also differ from the priorities of the clinician. For example, a patient may have a particular goal or event in mind, such as being able to work or attend a particular social occasion without having to worry about their wound.

It may be useful to ask the patient direct questions to establish their individual priorities before commencing treatment, such as (WUWHS, 2020b):

- What are your priorities regarding your wound and dressing selection?
- What are your goals to help you live with your wound and improve your quality of life?
- Are there any lifestyle issues we should bear in mind?
- Do you have any concerns?
- Do you have any questions about how the dressing will work?

Consider use of the Patient Needs Questionnaire component of the Patient Benefit Index to address a full range of individual patient priorities (Augustin et al, 2009).

It is also important to remember that patient capacity will vary, and some patients may need additional support. This may include additional assistance where there is limited mental capacity, literacy issues, language barriers, mental health concerns, practical issues such as mobility and environment, and the support that a patient has available to them.

Talking to the patient clearly and assessing their capacity and willingness to engage will help to maximise the efficacy of treatment. Particularly in terms of long-term treatment (e.g. compression), it is important that the individual understands the commitment and what requirements are necessary. Access to appropriate treatment and devices, such as offloading, and options that may benefit the patient should be considered.

As well as considering the needs and capacity of the patient, their relatives and any informal carers should also be considered. Patient support is a critical consideration when developing a treatment plan (Moore, 2016). It may be worth considering using tools such as building a patient mind-map with the patient at the centre and mapping the support that the patient has available.

Ownership and responsibilities in wound care

While a multidisciplinary team (MDT) approach may be necessary from assessment onwards, responsibilities for treatment should be clearly defined and a clinician designated who is accountable for coordinating the patient's wound care. This can help to ensure decision-making is carried out

according to a well-defined treatment plan and to avoid multiple treatments being used potentially incorrectly.

Trust is a key component to the patient-clinician relationship. Clear and respectful communication, between the provider and patient, as well as within the interdisciplinary team, helps to build that trust. Effective communication also promotes consistency of care, which has been shown to be important to patients. Consistency of care is important from the patient's point of view (Klein et al, 2021). The patient should always be at the centre of decision-making, and the patient (plus their family or carers) should be considered part of the MDT and a partner in their care.

Using patient-centred tools such as a 'patient passport' or wound care diary can provide useful communication between healthcare professionals as well as with the patient. The responsibility for the document is with the patient (bringing this to their appointments) but it is the clinicians' responsibility to make sure that appropriate information is continually recorded and monitored.

To ensure the balance of the wound and the patient's needs, factors to be monitored by the patient and their team may include patient-centred assessment and diagnostics, in order to balance the wound environment, normalise healing and improve outcomes for patients, such as (WUWHS, 2020b)

[Figure 4]:



Figure 4: Achieving healing outcomes for patients - interconnected factors

- Pain levels, reporting on severity of any symptom that is an issue for the patient (e.g. pain, malodour, leakage, itchiness)
- Visible changes to the wound (the patient could also take pictures on their phone if possible/advised)
- Dressing changes
- Quality of life and any emotional/psychological issues relating to their wound
- Impact on clinical decision-making and questions for the clinician
- Wound research and scientific translation.

Balanced patient communication

Making care accessible and ensuring the patient fully understands their treatment and plan is key to outcomes. Clinicians should communicate clearly and avoid complicated language, jargon and medical terminology, taking the time to make sure the patient understands.

Patients should also be offered information in a format that suits them and guidance should be followed to make sure capacity is fully considered, such as (General Medical Council, 2016):

- Discussing the patient's care and options in a time and place that helps the individual to understand and remember what is said
- Asking whether having a friend or relative present might help them to remember information or help them to make a decision
- Offering audio or written information if this will help, considering any potential language barriers or literacy issues
- Speaking to the patient's friends, relatives and others in the healthcare team about how best to communicate with the individual.

Creating a friendly and calming environment wherever possible can help to reduce patient anxiety and improve engagement. In the clinical environment, asking the patient how they are, offering a drink or even playing music can make a difference to the patient's overall experience and how they feel about the care they receive; if visiting the patient at home, where such resources may not be available, it may be helpful to ask the patient what helps to relax them. A suggestion can then be made to the patient to use this method of relaxation upon a clinical visit.

Challenges in practice

While 'getting it right first time' is always a priority, there may be challenges in practice.

Constraints on time and resources may limit a clinician's ability to adequately care for a wound. An honest and realistic approach may help to manage a patient's expectations and improve patient satisfaction. Understaffing in healthcare is also a significant issue that may affect practice, with a variety of

complex reasons contributing to this, and current attention is being paid to how to recruit and retain staff (Roth et al, 2022).

Labelling patients such as using terms 'non-compliant' or 'non-concordant' is unhelpful and can lead to barriers to patients accessing care (WUWHS, 2020b). Non-concordance denotes a failure in the interaction between the patient and care provider; therefore, clinicians need to take responsibility for developing a therapeutic and communicative relationship with the patient to find a solution.

Achieving wound balance and focusing on healing wounds is crucial to ensuring limited resources are used effectively and the burden of wounds is reduced, on patients, clinicians and healthcare systems.

Key points and recommendations

- » A comprehensive assessment is key but can be a challenge due to practical factors such as time or staffing constraints, therefore more than one visit may be required to obtain a full picture of the patient's healing needs
- » While gathering a full assessment, consider the patient's treatment plan and what can be applied to kick-start the wound balance journey and prevent deterioration
- » As part of assessment, it is important to consider extrinsic (e.g. environment, care setting) versus intrinsic/patient (e.g. comorbidities, aetiology) and direct wound-related factors that may affect the patient's healing and wellbeing
- » It is important to establish the patient's individual priorities (e.g. odour or leakage), and to tailor this to factors such as their environment, and the support they have available
- » Communication with the patient (and within teams) is critical and any potential barriers, such as language or capacity, must be addressed wherever possible
- » It is essential that both the clinician and the patient take ownership and accountability, and that the patient is at the centre of all decision-making processes
- » Reviewing language and ensuring that the patient understands their treatment has been found to improve outcomes
- » The patient, plus their friends, family or carers, should be considered an important part of the MDT.

PATIENT QUALITY OF LIFE

Living with a wound can have a severe impact on patient quality of life and this has a key role to play in all treatment (WUWHS, 2020b). The quality of life of patients living with chronic wounds is often considered poor according to qualitative evidence based on patients' own perspective (Vogt et al, 2020) and quantitative research (Kapp and Santamaria, 2017). This is why it is crucial to consider patient preferences and priorities at every stage of treatment, aiming to minimise the adverse effects of living with a wound on the lives of patients, with the patient and their quality of life at the centre of all decision-making.

However, quality of life is an aspect that is often overlooked. Traditionally, quality of life has been a factor that is difficult to quantify; additionally, living with a chronic wound has a unique impact that is different from other chronic conditions, which is not necessarily considered. For example, there are specific wound-related quality of life factors that can have a substantial impact and cause anxiety or isolation (e.g. exudate/leakage, malodour) that are not included in most patient quality of life assessment tools. Patients have reported that living with a chronic wound is not taken as seriously as living with other chronic conditions (WUWHS, 2020b).

Additionally, some wound treatments, such as compression, can involve a significant long-term commitment that may be difficult for the patient to fit into their lifestyle, which causes another unique set of issues. From a clinician perspective, clear and honest communication is required to set realistic goals and priorities based on the patient's needs and preferences. It is paramount that treatment is needs-based, and not just medically-based, and offering alternatives (e.g. different compression systems or wraps as opposed to bandages) for suitable patients may be beneficial (Corbett and Ennis, 2014). Listening to the patient and actively involving them in their own care and treatment can positively benefit wound healing, patient engagement and quality of life.

In tracking patient outcomes, it is important to continue to monitor patients beyond healing if possible. Recurrence in wounds such as venous leg ulcers is common, with over half of all wounds likely to recur within 12 months (Finlayson et al, 2018). In this case, compression therapy should be seen as a long-term treatment, and it is important to continue to monitor the patient and their wellbeing if possible.

The Wound-QoL questionnaire

The Wound-QoL (Blome et al, 2014; see Appendix 1, page 15) is a validated questionnaire measuring quality of life in patients with chronic wounds, which has been developed based on three established disease-specific instruments (the

Freiburg Life Quality Assessment for wounds, the Cardiff Wound Impact Schedule, and the Würzburg Wound Score), and condensed for ease of use in practice. The questionnaire includes 17 items that can be attributed to three subscales on everyday life, body and psyche (Blome et al, 2014). The questionnaire focuses on the patient's experience within the past 7 days.

The questionnaire is specific to wound care and the needs of patients, and has been found to be easy to use in practice and appealing to patients (Blome et al, 2014). It has been validated and found to have excellent reliability, and is fit for use to measure outcomes in both clinical trials and routine practice, representing a significant step forward in measuring patient quality of life for those living with chronic wounds (Sommer et al, 2017). A further study of the questionnaire also found it to be reliable and valid for use in practice, noting the questionnaire's simplicity and ease of use in practice, resulting in high responsiveness from patients (Augustin et al, 2017).

In care settings where time constraints are an issue, a revised and shortened Wound-QoL questionnaire has been developed, from 17 items to 14 items (von Stülpnagel et al, 2021). The questionnaire was still found to be reliable and accurate for use in practice.

There has been good utilisation of the questionnaire internationally, with translation into a variety of different languages. Further information on the questionnaire can be found at Wound-QoL.com.

The importance of quality of life measurement

Gathering information about patient quality of life is beneficial on an individual level and can also provide scope for change, providing evidence that can inform practice and make a difference. The existence and use of the measurement tool can help patients to feel validated, and potentially reassured that they are not alone in experiencing specific wound-related quality of life issues.

Completing the questionnaire also gives patients the opportunity to communicate information that may not be visible in person, or that they might not choose to raise if not directly invited to. Many patients have developed coping strategies that may mean their issues are not visible. Additionally, the questionnaire may help to uncover issues that may have gone unnoticed – for example, issues with pain or sleep may be indicative of an underlying problem.

When using such tools, it is important that this is followed up with the patient – for example, if the patient is given a quality

of life questionnaire to complete, this can be discussed at their next visit and used to establish new treatment goals. To achieve wound balance, it needs to be ensured that such tools are utilised, with the patient assessed and re-assessed to identify improvements or potential problems along the healing journey.

Patient quality of life and wound balance

Understanding – both of the science and the individual patient – is essential to the wound balance concept. As clinicians, if we understand the patient, their wound and their overall health and wellbeing, we can address the relevant issues and reduce barriers to healing.

Engaging patients in their own care, building a relationship of trust and improving their experiences has been proven to improve outcomes (WUWHS, 2020b). Considering the patient's quality of life, and the aspects that really matter to them as an individual, is beneficial to every stage of their wound healing journey.

The right approach can save clinical time and resources; this means that costs and pressure on clinicians and healthcare systems can be reduced. Accurately gauging patient risk and need allows clinicians to see the patients that really need more care, improving all outcomes.

Ultimately, a shift in focus is required that aims to heal wounds – as opposed to manage them – which necessitates an understanding of the science of wound healing and the needs of the individual patient.

Key points and recommendations

- » Patient quality of life can be significantly affected by living with a wound
- » Patient engagement and addressing quality of life factors to improve the patient's experience has been proven to improve outcomes
- » Using a structured validated tool such as the Wound-QoL questionnaire can help to quantify patient quality of life, and provides scope to build evidence and improve practice, as well as improving outcomes for individuals
- » Wound balance requires an understanding of both the science of wound healing and the individual patient's needs.

FINAL CONCLUSIONS

'Wound balance' encompasses balancing the wound in terms of physiological factors, plus patient care balance and clinical practice balance. In discussing the issues relating to 'wound balance', the expert panel agreed that steps need to be taken to focus on healing and optimise patient quality of life, which need to be embedded into daily practice.

The expert panel recommend

- » Early local intervention based on early identification of wounds that have the potential to become non-healing so that contributory factors can be correctly addressed
- » Awareness of balancing the wound environment and biomarkers to facilitate a positive healing trajectory
- » Recognising the importance of the patient-clinician partnership in achieving healing outcomes and improving patient QoL
- » Assessment and measurement of QoL to improve the clinician-patient relationship
- » Therapeutic solution(s) with a role in balancing key biomarker patterns (e.g. SAP-containing dressings) and improving patient QoL
- » Awareness of the 'wound balance' concept to encourage a transition in clinicians' focus from managing wounds to healing wounds.

REFERENCES

- Atkin L (2014) Understanding methods of wound debridement. *Br J Nurs* 23: S10-2, 14-5
- Augustin M, Radtke MA, Zschocke I et al (2009) The patient benefit index: a novel approach in patient-defined outcomes measurement for skin diseases. *Arch Dermatol Res* 301: 561-571
- Augustin M, Conde Montero E, Zander N et al (2017) Validity and feasibility of the wound-QoL questionnaire on health-related quality of life in chronic wounds. *Wound Repair Regen* 25(5): 852-7
- Beidler SK, Douillet CD, Berndt DF et al (2008) Multiplexed analysis of matrix metalloproteinases in leg ulcer tissue of patients with chronic venous insufficiency before and after compression therapy. *Wound Repair Regen* 16(5): 642-8
- Blome C, Baade K, Debus ES et al (2014) The 'Wound-QoL': a short questionnaire measuring quality of life in patients with chronic wounds based on three established disease-specific instruments. *Wound Repair Regen* 22(4): 504-14
- Buchstein N, Hoffmann D, Smola H et al (2009) Alternative proteolytic processing of hepatocyte growth factor during wound repair. *Am J Pathol* 174: 2116-28
- Cho SK, Mattke S, Gordon H et al (2020) Development of a model to predict healing of chronic wounds within 12 weeks. *Adv Wound Care* 9(9): 516-24
- Corbett LQ, Ennis WJ (2014) What do patients want? Patient preference in wound care. *Adv Wound Care* 3(8): 537-43
- Dhoonmoon L, Fletcher J, Atkin L (2021) Addressing skin tone bias in wound care: Assessing signs and symptoms in people with dark skin tones. *Wounds UK*
- Eming S, Smola H, Hartmann B et al (2008) The inhibition of matrix metalloproteinase activity in chronic wounds by a polyacrylate superabsorber. *Biomaterials* 29: 2932-40
- Finlayson KJ, Parker CN, Miller C et al (2018) Predicting the likelihood of venous leg ulcer recurrence: The diagnostic accuracy of a newly developed risk assessment tool. *Int Wound J* 15(5): 686-94
- Frykberg RG, Banks J (2015) Challenges in the treatment of chronic wounds. *Adv Wound Care* 4(9): 560-82
- General Medical Council (2016) Mental capacity tool
- Grinnell F, Ho C-H, Wysocki A (1992) Degradation of fibronectin and vitronectin in chronic wound fluid: Analysis by cell blotting, immunoblotting, and cell adhesion assays. *J Invest Dermatol* 98: 410-6
- Guest JF, Fuller GW, Vowden P (2020) Cohort study evaluating the burden of wounds to the UK's National Health Service in 2017/2018: update from 2012/2013. *BMJ Open* 10(12): e045253
- Guo S, LaPietro LA (2010) Factors affecting wound healing. *J Dent Res* 89(3): 219-29
- Humbert P, Faivre B, Veran Y et al (2014) Protease-modulating polyacrylate-based hydrogel stimulates wound bed preparation in venous leg ulcers - a randomized controlled trial. *J Eur Acad Dermatol Venereol* 28: 1742-50
- Kapp S, Santamaria N (2017) The financial and quality-of-life cost to patients living with a chronic wound in the community. *Int Wound J* 14(6):1108-19
- Klein TM, Andrees V, Kristen N et al (2021) Social participation of people with chronic wounds: A systematic review. *Int Wound J* 18(3): 287-311
- Liu Y, Min D, Bolton T et al (2009) Increased matrix metalloproteinase-9 predicts poor wound healing in diabetic foot ulcers. *Diabetes Care* 32(1): 117-9
- Mikosinski J, Kalogeropoulos K, Bundgaard L et al (2022) Longitudinal evaluation of biomarkers in wound fluids from venous leg ulcers and split-thickness skin graft donor site wounds treated with a protease-modulating wound dressing. *Acta Derm Venereol* 102
- Moore Z, Strapp H (2015) Managing the problem of excess exudate. *Br J Nurs* 24(15): S12-7
- Moore Z (2016) Patient empowerment in wound management. *Wound Essentials* 11(1): 32-5
- Muller M, Trocme C, Lardy B et al (2008) Matrix metalloproteinases and diabetic foot ulcers: the ratio of MMP-1 to TIMP-1 is a predictor of wound healing. *Diabet Med* 25(4): 419-26
- Page-McCaw A, Ewald AJ, Werb Z (2007) Matrix metalloproteinases and the regulation of tissue remodelling. *Nat Rev Mol Cell Biol* 8(3): 221-33
- Rayment EA, Upton Z, Shooter GK (2008) Increased matrix metalloproteinase-9 (MMP-9) activity observed in chronic wound fluid is related to the clinical severity of the ulcer. *Br J Dermatol* 158(5): 951-61
- Roth C, Wensing M, Breckner A et al (2022) Keeping nurses in nursing: a qualitative study of German nurses' perceptions of push and pull factors to leave or stay in the profession. *BMC Nursing* 21: 48
- Schultz GS, Sibbald GR, Falanga V et al (2003) Wound bed preparation: a systematic approach to wound management. *Wound Repair Regen* 11: S1-28
- Sommer R, Augustin M, Hampel-Kalthoff, Blome C (2017) The Wound-QoL questionnaire on quality of life in chronic wounds is highly reliable. *Wound Repair Regen* 25(4): 730-2
- Theocharidis G, Thomas BE, Darkar D et al (2022) Single cell transcriptomic landscape of diabetic foot ulcers. *Nat Commun* 13: 181
- Thomas DC, Tsu CL, Nain RA et al (2021) The role of debridement in wound bed preparation in chronic wound: A narrative review. *Annals of Medicine and Surgery* 71: 102876
- Trengove NJ, Stacey MC, Macauley S et al (1999) Analysis of the acute and chronic wound environments: the role of proteases and their inhibitors. *Wound Repair Regen* 7: 442-52
- Trengove NJ, Bielefeldt-Ohmann H, Stacey MC (2000) Mitogenic activity and cytokine levels in non-healing and healing chronic leg ulcers. *Wound Repair Regen* 8: 13-25
- Ulrich D, Lichtenegger F, Unglaub F et al (2005) Effect of chronic wound exudates and MMP-2/9 inhibitor on angiogenesis in vitro. *Reconstr Surg* 116: 539-45
- Vogt TN, Koller FJ, Dias Santos PN et al (2020) Quality of life assessment in chronic wound patients using the Wound QoL and FLQA-Wk instruments. *Invest Educ Enferm* 38(3): e11
- von Stülpnagel CC, da Silva N, Augustin M et al (2021) Assessing the quality of life of people with chronic wounds by using the cross-culturally valid and revised Wound-QoL questionnaire. *Wound Repair Regen* 29(3): 452-9
- Wiegand C, Abel M, Muldoon J et al (2013) SAP-containing dressings exhibit sustained antimicrobial effects over 7 days in vitro. *J Wound Care* 22(3): 120-7
- Wiegand C, Hipler UC (2013) A superabsorbent polymer-containing wound dressing efficiently sequesters MMPs and inhibits collagenase activity in vitro. *J Mater Sci Mater Med* 24(10):2473-8
- World Union of Wound Healing Societies (2019) Consensus Document: Wound exudate: effective assessment and management. *Wounds International*
- World Union of Wound Healing Societies (2020a) The role of non-medicated dressings for the management of wound infection. *Wounds International*
- World Union of Wound Healing Societies (2020b) Optimising wound care through patient engagement. *Wounds International*
- Wounds International (2009) MMPs Made Easy. *Wounds International*
- Wounds International (2017) Proteases Made Easy. *Wounds International*
- Wounds UK (2018) Improving holistic assessment of chronic wounds. *Wounds UK*
- Wysocki AB, Staiano-Coico L, Grinnell F (1993) Wound fluid from chronic leg ulcers contains elevated levels of metalloproteinases MMP-2 and MMP-9. *J Invest Dermatol* 101: 64-8

APPENDIX 1. THE WOUND-QOL QUESTIONNAIRE (BLOME ET AL, 2014)

Wound-Qol-17 questionnaire on quality of life with chronic wounds

With the following questions, we aim to find out how your chronic wound(s) affect(s) your quality of life

Please tick one box per line!

In the last seven days....		not at all	a little	moderately	dauite a lot	very much
1	...my wound hurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	...my wound had a bad smell	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	...there was a disturbing discharge from my wound	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	...the wound had affected my sleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	...the treatment of the wound has been a burden to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	...the wound has made me unhappy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	...I have felt frustrated because the wound is taking so long to heal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	...I have worried about my wound	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	...I have been afraid of the wound getting worse or of new wounds appearing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	...I have been afraid of bumping the wound	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	...I have had trouble moving about because of the wound	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	...climbing stairs has been difficult because of the wound	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	...I have had trouble with day-to-day activities because of the wound	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	...the wound has limited my leisure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	..the wound has forced me to limit my activities with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	...I have felt dependent on help from others because of the wound	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	...the wound has been a financial burden to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Wounds
INTERNATIONAL