Setting treatment goals

For the majority of patients, treatment choices should aim to correct the underlying cause (e.g. compression therapy to address underlying venous disease and offloading/pressure relief for the management of diabetic foot ulcers and pressure injuries) and aim to manage the local wound environment to promote wound healing.

Treatment goals may be to:

- **protect granulation/epithelial tissue[24]**
- **debridement of non-viable tissue (e.g. necrosis and slough) to reduce risk of infection[25,26]**
- **manage moisture balance (rehydrate or reduce exudate levels to create a moist wound environment, e.g. using an appropriate dressing)[27,28]. The exception is dry gangrene where the goal is to keep the digit dry not moist**
- **reduce wound bioburden/manage infection (e.g. topical antimicrobial therapy — including antiseptic agents — may be used for local infection and combined with antibiotic therapy for spreading or systemic infection)[17,29]**
- **protect surrounding skin (e.g. reduce risk of maceration due to excess moisture or rehydrate dry skin)[30,31]**
- **improve patient wellbeing (e.g. reduce pain and minimise wound odour)[32,33].**

Treatment goals will change over time as the wound progresses towards healing. It is important to set dressing change frequency against these goals and document the reasons for how often the dressing needs to be changed (e.g. exudate level, expected wear time). The wound should be reassessed at each dressing change, with regular reassessment of the current therapy to ensure it remains effective. For example, exudate production usually decreases as wounds heal. Any change in the colour or consistency of exudate or increase in odour or level of production should prompt further review and a reassessment of the management plan[9].

Documenting wound assessment

Formal wound assessment charts are useful to ensure that all relevant areas are covered during assessment, and to act as a guide in terms of what should be documented.

All observations and assessments (including photographs), the management plan and rationale, and schedule for reassessment should be documented to aid monitoring and facilitate communication between caregivers[34,35]. Accepted terms and commonly understood language should be used for clarity.

Involving the patient in wound assessment

Patients with wounds may experience feelings of powerlessness because of a lack of control over their management[36]. Seeking and including the patient's experiences and priorities in the assessment process, and sharing the consequent decision-making, are important ways of empowering patients[37].

In addition to improving the quality of the relationship between the patient and the healthcare practitioner, such empowerment is likely to result in better outcomes by enhancing concordance with treatment interventions and encouraging self-monitoring and management[31].

In the recent anthropological study[5] quantitative evaluation confirmed that the majority of patients and their relatives in the study were actively engaged in their wound treatment, with 64% of patients perceiving themselves or their relative to be the most important helper in taking care of their wound. Over 90% of patients had a desire to know more about their wound and wound treatment and sought information from one or more source.

The Triangle of Wound Assessment is a simple tool that can be used to further engage patients in the management of their wound. Information should be provided to patients using language that is easily understood. Printed material is a useful way of reinforcing verbal information[38,39]. An understanding of the Triangle of Wound Assessment will enable patients to be able to recognise signs indicating positive progress, or that reassessment or further intervention is required.

Benefits of using the Triangle of Wound Assessment

The Triangle of Wound Assessment is intended to provide an easy-to-use framework that can be fully integrated into a holistic patient assessment. The simplicity of the three zones of the triangle lends itself to being used to involve and engage patients in the management of their wound.

The development of an intuitive wound assessment tool that goes beyond the wound edge to include the periwound skin extends the opportunities for improved decision-making. It advances practice by facilitating early identification of patients at risk of periwound problems and the implementation of appropriate prevention and treatment strategies. As such, the tool offers a natural evolution in current thinking and is based on recent anthropological research[5] that has shown integration of the periwound area within wound assessment is:

- **important to the patient**
- **important to the clinician**
- **important for healing**
- **important for good patient outcomes.**

References

1. Nix D. Skin and wound inspection and assessment. In: Bryant RA, Nix DP (eds). *Acute and chronic wounds*. Missouri, USA: Elsevier Mosby, 2012.
2. Falanga V. Classifications for wound bed preparation and stimulation of chronic wounds. *Wound Repair Regen* 2000; 8(5): 347–52.
3. Schultz G, Sibbald G, Falanga V, et al. Wound bed preparation: a systematic approach to wound management. *Wound Repair Regen* 2003; 1: 1–28.
4. Greatrex-White S, Moxey H. Wound assessment tools and nurses' needs: an evaluation study. *Int Wound J* 2013; doi: 10.1111/iwj.12100.
5. Dowsett C, Gronemann M, Harding K. Taking wound assessment beyond the wound edge. *Wounds International* 2015; 6(1): 6–10.
6. Ousey K, Stephenson J, Barrett S, et al. Wound care in five English NHS Trusts: results of a survey. *Wounds UK* 2013; 9(4): 20–8.
7. Cartier H, Barrett S, Campbell K, et al. Wound management with the Biatain Silicone foam dressing: a multicentre product evaluation. *Wounds International* 2014; 10(4): 26–30.
8. Ferretti DE, Harkins SM. Assessment of periwound skin. In: Milne CT, Corbett LQ, Dubuc DL (eds). *Wound Ostomy, and Continence Nursing Secrets*. Philadelphia, PA: Hanley & Belfus Inc; 2003: 45–8.
9. Brown A, Flanagan M. Assessing skin integrity. In: Flanagan M (ed). *Wound healing and skin integrity. Principles and Practice*. Wiley-Blackwell, 2013: 52–65.
10. Anderson K, Hamm RL. Factors that impair wound healing. *J Am Coll Clin Wound Specialists* 2012; 4(4): 84–91.
11. Guo S, DiPietro LA. Factors affecting wound healing. *J Dent Res* 2010; 89(3): 219–29.
12. Gethin G. The importance of continuous wound measuring. *Wounds UK* 2006; 2(2): 60–8.
13. Langemo D, Anderson J, Hanson D, et al. Measuring wound length, width and area: which technique? *Adv Skin Wound Care* 2008; 21(1): 42–7.
14. Baranoski S, Ayello EA, Langemo DK. Wound assessment. In: Baranoski S, Ayello EA (eds). *Wound care essentials: practice principles*. Philadelphia: Lippincott Williams and Wilkins, 2012: 101–25.
15. Leaper D, Schultz G, Carville K, et al. Extending the TIME concept: what have we learned in the past 10 years? *Int Wound J* 2012; 9(Suppl. 2): 1–19.
16. RCN Clinical Guidelines. *Management of patients with venous leg ulcers. Audit protocol,* 2000. Available from: http://bit.ly/117usyt
17. World Union of Wound Healing Societies (WUWHS). *Principles of best practice: wound infection in clinical practice. An international consensus*. London: MEP Ltd, 2008. Available from: www.woundsinternational.com
18. Cutting K, White R, Mahoney P. Clinical identification of wound infection: a Delphi approach In: European Wound Management Association (EWMA) *Position Document. Identifying criteria for wound infection*. MEP: London, 2005.
19. Eagle M. Wound assessment: the patient and the wound. *Wound Essentials* 2009; 4: 14-24.
20. Grey JE, Enoch S, Harding KG. Wound assessment. In: Grey JE, Harding KG (eds). *ABC of Wound Healing*. Blackwell Publishing, 2006: 1-4.
21. McManus J. Principles of skin and wound care: the palliative approach. *End of Life Care* 2007; 1(1): 8-19.
22. Lawton S, Langøen A. Assessing and managing vulnerable periwound skin. *World Wide Wounds* 2009. Available from: www.worldwidewounds.com
23. Cameron J. Exudate and the care of the peri-wound skin. *Nursing Standard* 2004; 19(7): 62–8.
24. Dowsett C, Newton H. Wound bed preparation: TIME in practice. *Wounds UK* 2005;1(3): 58-70.
25. Strohal R, Apelqvist J, Dissemond J et al *EWMA Document: Debridement. An updated overview and clarification of the principle role of debridement.* MA Publishing, 2014.
26. Wounds UK. *Debridement in a changing NHS. A consensus document.* Wounds UK, 2014. Available from www.wounds-uk.com
27. Romanelli M, Vowden K, Weir D. Exudate Management Made Easy. *Wounds International* 2010; 1(2): Available from: www.woundsinternational.com
28. World Union of Wound Healing Societies (WUWHS). *Principles of best practice: wound exudate and the role of dressings. A consensus document*. London: MEP Ltd, 2007. Available from: www.wounds international.com
29. Swanson T, Grothier L, Schultz G. Wound infection made easy. *Wounds International* 2014. Available from: www.woundsinternational.com
30. Langøen A, Lawton S. Dermatological problems and periwound skin. *World Wide Wounds* 2009. Available from: www.worldwidewounds.com
31. Bianchi J. Protecting the integrity of the periwound skin. *Wound Essentials* 2012; 1: 58-64.
32. Wounds International. *Optimising well being in people living with a wound. An international consensus*. London: Wounds International, 2012. Available from: www.woundsinternational.com
33. European Wound Management Association (EWMA). *Position Document: Pain at wound dressing changes*. London: MEP Ltd, 2002.
34. Ousey K, Cook L. Wound assessment made easy. *Wounds UK* 2012: 8(2). Available from www.wounds-uk.com/made-easy
35. Bradshaw LM, Gergar ME, Holko GA. Collaboration in wound photography competency development: a unique approach. *Adv Skin Wound Care* 2011; 24: 85–92.
36. de Jesus Pereira MT, Salome GM, Openheimer DG, et al. Feelings of powerlessness in patients with diabetic foot ulcers. *Wounds* 2014; 26(6): 172–7.
37. Aujoulat I, d'Hoore W, Deccache A. Patient empowerment in theory and practice: polysemy or cacophony? *Patient Educ Couns* 2007; 66(1): 13–20.
38. Bastable SB. *Essentials of Patient Education*. Jones and Bartlett, 2004.
39. Protz K, Verheyen-Cronau I, Heyer K. Use of comprehensive brochures supporting patient education in MRSA, compression therapy and wound knowledge. *Pflegewissenschaft* 2013; 15(12:) 658–78.

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Summary

A new approach to wound assessment has been developed following research indicating that healthcare practitioners consider the wound as three distinct areas or axes. These are the wound bed, the wound edge and the periwound skin; assessment of these forms the Triangle of Wound Assessment. Using the tool as part of a holistic assessment will help healthcare practitioners look beyond the wound itself, which has been found to be important for clinical and patient outcomes.

Triangle of Wound Assessment made easy

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Introduction

Wound assessment is essential in informing the selection of appropriate therapeutic strategies to achieve clinical goals, e.g. wound healing and improved patient wellbeing. This Made Easy describes a new approach to wound assessment that encourages clinicians to look beyond the wound edge to routinely assess and manage the periwound skin using the new Triangle of Wound Assessment.

Authors: Dowsett C (UK), Protz K (Germany), Drouard M (France), Harding KG (UK). Full author details can be found on page 6.

Importance of wound assessment

Wound assessment can be defined as information obtained using observation, questioning, physical examination and clinical investigations in order to formulate a management plan[1]. It can also provide a baseline from which to monitor the wound, the effectiveness of therapeutic strategies over time and impact on patient wellbeing.

The concepts of wound bed preparation and the TIME framework were devised to aid decision-making by linking assessment findings to clinical actions[2,3]. Since then a number of wound assessment tools have been developed using the principles of wound bed preparation[4].

Is a new approach to wound assessment needed?

A global anthropological study was conducted in 2013–14 with the aim of better understanding the impact of a wound on patients and to explore everyday wound management practice[5]. A key finding from the study showed that practitioners separate wounds into three distinct, yet interconnected, zones or axes: the wound bed, the wound edge and the periwound skin. Although the wound bed was judged to be the most intensely monitored zone, the study revealed that both healthcare practitioners and patients view management of the periwound skin as an integral part of wound healing[5].

The literature confirms that periwound skin problems are common. A survey of five English NHS Trusts (n=4772) found that 70% of patients had surrounding skin that could be characterised as dry, macerated, excoriated, or inflamed[6] and a recent publication reported that, depending on exudate level, between 60% and 76% of wounds (n=958) were surrounded by problematic or unhealthy periwound skin[7]. Given that unhealthy periwound skin is a significant problem in chronic wounds, further exploration of assessment of the periwound skin and its relevance to wound progression needs to be considered within the wound healing paradigm.

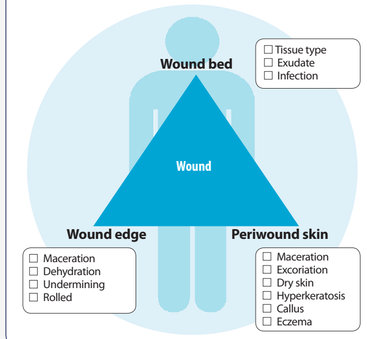
The periwound area has previously been defined as the area of skin extending up to 4cm beyond the wound edge[8]; for some wounds damage may extend outward, whereby any skin under the dressing may be at risk of breakdown and should be included in any assessment. Frequent problems in the periwound area include maceration, excoriation, dry (fragile) skin, hyperkeratosis, callus and eczema.

While current tools offer a standardised approach to wound assessment, they focus on the wound itself and use limited descriptors to describe the periwound area[4]. There is a need for an easy-to-use wound assessment tool that fully integrates assessment of the periwound area into the wound healing paradigm[5,9].

The Triangle of Wound Assessment

The Triangle of Wound Assessment is a new tool that extends the current concepts of wound bed preparation and TIME beyond the wound edge[5]. It divides assessment of the wound into three areas: the wound bed, the wound edge, and the periwound skin. It should be used in the context of a holistic assessment that involves the patient, caregivers and family (Figure 1).

Figure 1 | Triangle of Wound Assessment. Adapted from[2]



Triangle of Wound Assessment made easy

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Using the Triangle of Wound Assessment

The Triangle of Wound Assessment identifies three distinct, yet interconnected, zones or axes[5], which call for different approaches:

- **Wound bed: look for signs of granulation tissue, while seeking to remove dead or devitalised tissue, manage exudate level and reduce the bioburden in the wound.**
- **Wound edge: lower barriers to wound healing by reducing undermining for dead space, debriding thickened or rolled edges, and improving exudate management to minimise risk of maceration.**
- **Periwound skin: rehydrate dry skin and avoid exposure to exudate/moisture to minimise the potential for damage.**

Figures 2–4 show how the Triangle of Wound Assessment can be applied to practice, with recommendations for documentation and treatment aims (Figure 5) to guide clinical decision-making. The Triangle of Wound Assessment should be used as part of a holistic patient assessment.

Performing a holistic assessment

A holistic assessment aims to gain an overview of the patient's medical condition, the cause, duration and status of the wound, together with any factors that may impede healing[10,11] including:

- **comorbidities, e.g. diabetes, cardiovascular disease, respiratory disease, venous/arterial disease, malignancy**
- **medications, e.g. corticosteriods, anticoagulants, immunosuppressants, chemotherapeutic agents, non-steroidal anti-inflammatory drugs**
- **systemic or local infection (e.g. osteomyelitis)**
- **reduced oxygenation and tissue perfusion**
- **increased age**
- **pain**
- **poor nutrition and hydration**
- **lifestyle, e.g. high alcohol intake, smoking**
- **obesity.**

In addition, it is important to understand how the wound is affecting patient daily living, e.g. pain levels between and during dressing changes, sleep disturbance, strikethrough and malodour.

Certain wound types may indicate the need for additional investigations, e.g. patients with venous or arterial leg ulcers will require an ABPI[16]. However, the diagnosis of wound infection is a clinical decision. Microbiological tests should not be used routinely, but when necessary, wound biopsy provides the most accurate information[17]. The signs and symptoms of wound infection may vary according to wound type, e.g. diabetic patients with neuropathy and an infected foot ulcer may not report pain[18].

During the assessment procedure it is important for clinicians to recognise the limits of their knowledge and refer the patient for specialist opinion. For the less experienced, immediate referral to a more experienced clinician may be appropriate after the first visit[19].

Devising a management plan

The key to successful wound management is accurate and timely wound assessment of each individual. Once assessment is complete, an appropriate management plan can be devised. Patients should be included in setting treatment goals to ensure that their concerns and priorities are identified and taken into account.

The main goal is often wound healing[20], although this may not be appropriate in some patients, e.g. in a palliative care situation[21], when the objective may be to provide comfort and to control exudate and odour.

Figure 2 | Using the Triangle of Wound Assessment — Wound bed

Baseline and serial measurements of the **wound size** (length, width or area, and depth), **appearance** and **location**, will help to establish a baseline for treatment and monitor any response to interventions[12,13]. The method of measurement should be used consistently to aid meaningful tracking of changes over a specified number of days (e.g. 7–14 days)[14]. Problems identified in the wound bed may extend beyond the wound edge to the surrounding skin (e.g. maceration, erythema, swelling).

Record wound size: length __cm width __cm depth __cm
Record wound location

Tissue type

Please tick

- Necrotic △ __%
- Sloughy △ __%
- Granulating △ __%
- Epithelialising △ __%

Record tissue types and % of tissue visible in the wound bed

Aim to remove non-viable tissue (e.g. reduce infection risk) Protect and promote new tissue growth

Exudate

Please tick all △ that apply

Level	Type
Dry △	Thin/watery △
Low △	Thick △
Medium △	Cloudy △
High △	Purulent (yellow/brown/green) △
	Pink/red △

Record level and type (e.g. consistency and colour)

Aim to treat cause (e.g. compression therapy) and manage moisture balance (exception: dry gangrene)

Infection

Please tick all △ that apply

Local	Spreading/systemic
↑Pain or new onset △	As for local, plus:
Erythema △	↑ Erythema △
Oedema △	Pyrexia △
Local warmth △	Abscess/pus △
↑ Exudate △	Wound breakdown △
Delayed healing △	Cellulitis △
Bleeding/friable granulation tissue △	General malaise △
Malodour △	Raised WBC count △
Pocketing △	Lymphangitis △

Record signs and symptoms. These may be aetiology-specific

Aim to identify infection Manage bioburden to treat infection/ control odour

Figure 3 | Using the Triangle of Wound Assessment — Wound edge

During healing, epithelial cells migrate across the wound bed to cover the surface of a wound (epithelisation). To allow migration, wound edges need to be moist, intact and attached to and flush with the base of the wound[1]. Assessment of the edge (or rim) of the wound can provide information on wound aetiology, how healing is progressing, and whether the current management plan is effective[15]. Common problems include:

Please tick all △ that apply

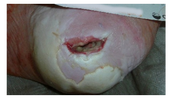
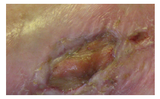
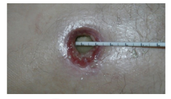
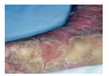
Maceration	Dehydration	Undermining	Rolled edges
			
△	△	△ extent ____cm	△
Assess edge of the wound for moisture level	Assess edge of the wound for moisture level	Use clock positions to record position Record extent of undermining	Assess amount of rolling (may be associated with thickening)
Aim to establish cause and correct Address patient concerns Refer to specialist	Aim to establish cause and correct (e.g. rehydrate) Refer to specialist	Aim to reduce the amount of undermining/allow the edge to reattach (e.g. stimulate granulation)	Aim to return the wound edge to a condition that will permit epithethial advancement

Figure 4 | Using the Triangle of Wound Assessment — Periwound skin

Problems of the periwound skin (**i.e. the skin within 4cm of the wound edge as well as any skin under the dressing**) are common and may delay healing, cause pain and discomfort, enlarge the wound, and adversely affect the patient's quality of life[5,7,22]. The amount of exudate is a key factor for increasing the risk of periwound skin damage. Greater moisture exposure reduces skin barrier function and increases the risk of skin breakdown and maceration. This may make patients more susceptible to developing a contact dermatitis[23]. Erythema and swelling may also indicate infection, which should be treated according to local protocols. In addition to the periwound skin, patients with wounds should also be assessed for problems that may be affecting their skin more widely.

Please tick all △ that apply

Maceration	Excoriation	Dry skin	Hyperkeratosis	Callus	Eczema
					
△ __–__cm	△ __–__cm	△ __–__cm	△ __–__cm	△ __–__cm	△ __–__ cm

Assess periwound skin and record extent of any problems, e.g. <1–4cm of the wound edge

Aim to protect periwound area and maintain intact healthy skin Establish cause and correct, e.g. minimise contact with moisture or rehydrate periwound skin

Aim to remove hyperkeratotic skin plaques and rehydrate

Aim to remove callus and offload to prevent recurrence

Aim to relieve symptoms and avoid allergens

Figure 5 | Using the Triangle of Wound Assessment — Devising a management plan

Accurate and timely wound assessment is important to ensure correct diagnosis and for developing a plan of care to address patient, wound and skin problems that impact on healing.

Identify treatment goal, e.g. 100% granulation tissue/ healed wound. **If no signs of improvement after 2–4 weeks, review treatment plan/refer to specialist**