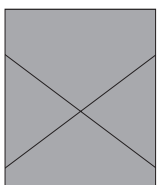


Understanding clinical practice challenges: a survey performed with wound care clinicians to explore wound assessment frameworks



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TIME (Tissue, Inflammation, Moisture, Edges) and other similar wound assessment tools are based on the concept of wound bed preparation. A survey was developed to explore the role and utility of wound assessment tools in current wound care practice. The survey was answered by attendees of the European Wound Management Association (EWMA) 2018 conference in Krakow, Poland. Out of 300 attendees invited to answer the survey, 250 fulfilled the requirements to complete the survey. Fifty-four questionnaires were considered invalid due to significant data missing. Data analysis was based on the answers of 196 questionnaire. TIME is the most commonly used wound assessment tool in Europe. Despite clinicians being aware of frameworks for wound bed assessment, 40% of respondents did not use them, and those who used them did so in very variable forms. Data showed variability about beliefs and unbalanced implementation of therapeutic decisions. Variation in wound size and in the characteristics of the wound bed were considered the main factors for the assessment of wound progression. Ideally, assessment tools should be unambiguous, easy to teach, easy to implement by a large base of HCPs and carers, and should guide the clinician consistently through assessment and reassessment processes towards the best therapeutic decision.

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TIME (Tissue, Inflammation, Moisture, Edges) is a concept that can be used to explain wound bed preparation as an important competency of wound management. It has become clear that healing can be improved through wound bed preparation. This preparation includes attention to non-viable tissue, control of bioburden and inflammation and moisture balance, and stimulation of wound edges to facilitate epithelial migration.

According to Harries et al (2016), the concept of 'wound bed preparation' was first used by Schultz et al (2003). In fact, the term had been coined by Sibbald et al (2000), who described it as a changing paradigm linking treatment to the cause and focusing on three components of local wound care: debridement, wound-friendly moist interactive dressings, and bacterial balance. The term was discussed in 2000, in a *Wound Repair and Regeneration* editorial by Falanga (2000). He

described wound bed preparation (WBP) as an essential element for obtaining maximal benefits from advanced wound care products, i.e. if the wound was not 'prepared' properly first, then it followed that whatever new technology was applied to the wound would not work.

The concept of WBP was quickly adopted, and was the subject of a major symposium in 2000, where the definition was extended to include 'removing the barriers to healing' (Cherry et al, 2001). The annual meeting of European Tissue Repair Society in 2001 also included a satellite symposium on WBP, which resulted in a further publication about the use of two new technologies (which included cadexomer iodine and negative pressure wound therapy [NPWT]) in WBP (Falanga and Harding, 2002).

WBP was again the focus of a meeting attended by a group of wound care experts in 2002, entitled the 'Wound Bed Advisory Board' (Schultz et al,

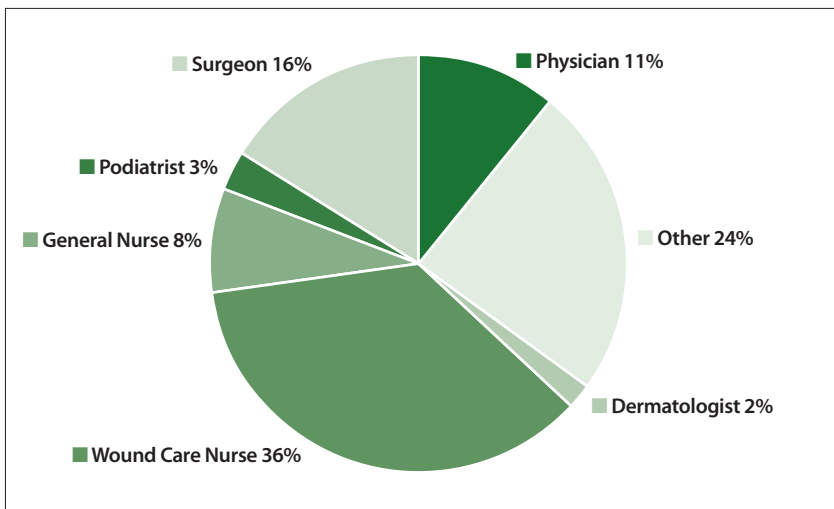


Figure 1. Distribution of respondents by profession.

2003). They reported that before deciding on local wound applications, it was vital to consider the possible causes of a non-healing wound and to review and correct, if possible, patient factors that may impede healing, by: assessing and correcting causes of tissue damage; ensuring adequate blood supply; and assessing and monitoring wound characteristics.

A key message from this group was that chronic wounds needed to be managed in a different way to acute wounds to optimise their healing. The Advisory Board went on to define WBP as: "The management of the wound to accelerate endogenous healing or to facilitate the effectiveness of other therapeutic measures" (Schultz et al, 2003). Their key paper revisited the concepts first suggested by Sibbald et al (2000), while agreeing that a fourth component needed to be added to the observations — non-advancing or undermined epidermal margin. They produced a table to illustrate the principles of WBP, including the four components of TIME, although the actual acronym did not appear in the paper, as the fourth component did not start with an 'E'.

A further paper from the same Advisory Board in 2004 appears to be the first where the actual term TIME is used in several places (Schultz et al, 2004). In this paper, the fourth component became 'Edge of wound — non-advancing or undermined.' This change in terminology is recognised by the European Wound Management Association (EWMA) wound bed preparation editorial advisory board, in the EWMA position document of the same year (EWMA, 2004).

In 2012, the entire TIME concept was reviewed, under the auspices of the International Wound Infection Institute (IWII; Leaper et al, 2012). Their purpose was to examine how new data and evidence generated in the intervening

decade affected the original concepts of TIME, and how it was translated into current best practice. Four developments were singled out: recognition of the importance of biofilms; use of NPWT; evolution of topical antiseptic therapy as dressings; and expanded insight of the role of molecular biological processes in chronic wounds.

Perhaps the main change was to the letter 'E' component, which became "Edge of wound: assessment of non-advancing or undermined wound edges (and state of the surrounding skin)." This was the first occasion where a component was to be assessed that was not actually a part of the wound. The IWII concluded that TIME was still relevant and with continuing important developments that incorporated new evidence into the model. The principles of wound bed preparation have also been applied for the development of other assessment tools, some of them inspired directly from TIME.

Given the apparent wide use of TIME as a concept for effective WBP, we developed a survey to explore current practice on standard wound care and the use of wound-assessment frameworks to identify ways for improvement in wound care diagnosis, management and healing outcomes.

Methods and results

The survey was undertaken involving attendees at the EWMA conference, held in Krakow, Poland, in May 2018. It included 20 questions, including a screening section of four questions and the questionnaire itself (16 questions) exploring attitudes and clinical practice in chronic wound care. The survey was presented in an electronic form (tablet) and took, on average, 7 minutes to complete.

Three hundred participants were invited to participate. Out of these, 50 were excluded after the screening section and 250 completed the questionnaire. The professional categories of this group are presented in Figure 1. The 'other' category included educators, researchers, medical students, infection control nurses, microbiologists, biophysicists and laboratory specialists.

Survey participants were from five continents (Europe 68%, Asia 23%, North America 4%, Africa 4% and South America 1%), including 52 different countries. The most highly represented countries in the survey were the United Kingdom 13%, Poland 8%, Italy 5% and the Netherlands 5%.

Over 74% of respondents ($n=186$) were responsible for the clinical management of patients. A similar number of respondents ($n=187$) were involved in or directly responsible for therapeutic decisions related to wound care.

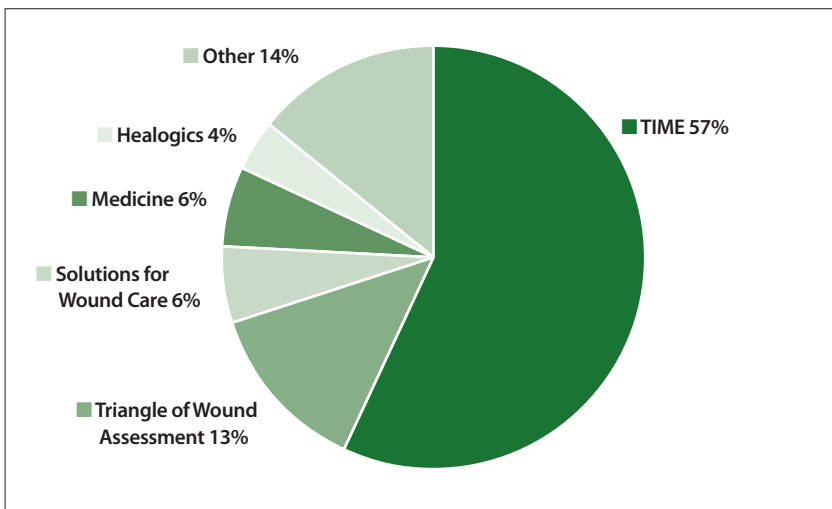


Figure 2. Wound assessment tools currently in use.

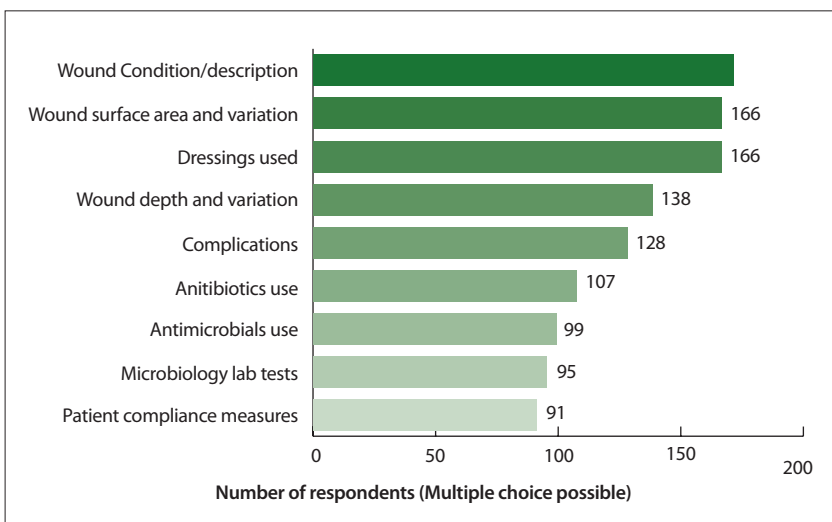


Figure 3. What data do you record as part of wound assessment?

Fifty-four respondents out of 250 did not complete the questionnaire in full. These were considered invalid as they showed different levels of data missing. Unless expressly indicated, the analysis corresponds to the data from 196 fully completed questionnaires.

Forty-one percent of respondents ($n=81$) had seen and treated more than 40 patients over the 6 months preceding the survey. Assessment tool/frameworks most commonly used are presented in Figure 2.

Among the users of assessment frameworks, the most frequently used tool was TIME, by 57% ($n=128$) of respondents. Seventy-two percent of TIME users were from Europe. The category 'others' included: MOIST (Management of exudate, Oxygen, Infection control, Support, and Tissue management), TIMES (Tissue Inflammation, Moisture, Edges, Surrounding skin), CAWC (Canadian Association of Wound Care), Wound

Care Society, WIFI (Wound Ischaemia and Foot Infection), University of Texas classification, and Welsh framework.

To the question 'How do you document the progression of wound healing in your standard clinical practice?' Seventy percent of respondents ($n=134$) use photographic records, 60% ($n=118$) use electronic records and 45% ($n=89$) use paper records. Thirty-six percent ($n=71$) reported using only a single type of record and 64% ($n=125$) the use of two or more types of records.

Answers to the question 'What do you consistently document in wound management in your standard clinical practice?' are presented in Figure 3.

Other items mentioned by some of the respondents included: the amount of exudate and odour, the description of surgical treatment, the therapeutic plan, and demographic data.

To the question 'Which are the most important factors for the improvement of wound healing and patient outcomes?', answers are provided in Table 1.

To the question about the importance of debridement as a key element in standard care protocols, 81% ($n=159$) considered this 'highly important', 16% ($n=31$) 'quite important' and 3% ($n=6$) 'important'.

Debridement techniques reported as the more frequently used were autolytic 64% ($n=125$), mechanical 60% ($n=118$), surgical in theatre 49% ($n=96$), and sharp 46% ($n=78$). Multiple answers were possible for this question.

To the question 'In your clinic, on which wound is sharp debridement used?' Sixty-eight percent of respondents ($n=133$) stated diabetic foot ulcers (DFU), 55% ($n=107$) for pressure ulcers (PU) and only 42% ($n=82$) in venous leg ulcers (VLU). Other conditions less frequently mentioned included: any other wound type, which contained necrotic tissue and complicated surgical wounds.

To the question 'How do you identify the wound is infected?' 95% of participants answered clinical signs and symptoms of infection, in addition, 61% mentioned the necessity of confirmation through swab/biopsy/tissue culture.

Figure 4 presents the distribution of answers to the question, in your opinion how many chronic wounds contain biofilm? Answers to the question 'How do you know/identify biofilm is present in a wound?' included (multiple answers possible): delayed healing 88% ($n=173$), recurrent infection 60% ($n=118$), history of failure to previous antimicrobial treatment 42% ($n=82$), persistent level of inflammation 41% ($n=80$) and absence of response to antibiotics 40% ($n=38$).

Answers to the question 'What is the one-key measurement you use to decide wound healing

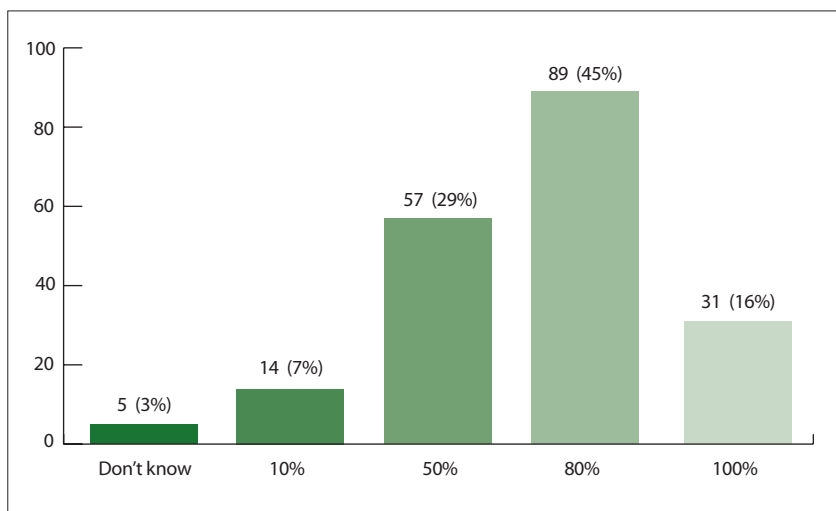


Figure 4. What percentage of chronic wounds contain biofilm?

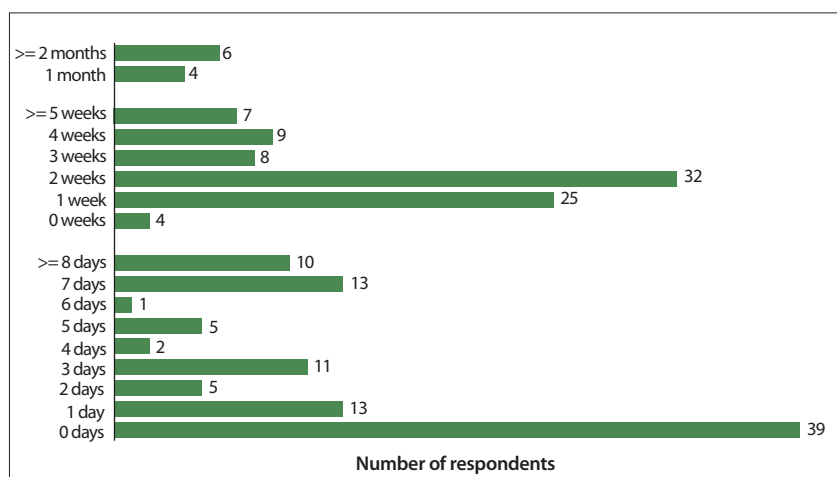


Figure 5. When would you refer to another healthcare professional?

Table 1. Most important factors influencing healing outcomes.	
Factors	Number of respondents
Infection and Inflammation	158 (81%)
Wound bed tissue type	137 (70%)
Moisture balance in wounds	137 (70%)
Improving patient compliance to the treatment	94 (48%)
Initial holistic patient assessment	88 (45%)
Wound edges	87 (44%)
Reassessment of the therapeutic plan and wound evolution	84 (42%)
Addressing underlying health conditions	82 (41%)

is going in the right direction?' included mainly wound size 43% ($n=83$) and wound bed status 28% ($n=55$). Size was mentioned either in isolation, or in combination with other factors, such as shrinking, reduction, decrease, and even more unspecific, as part of an associated idea, such as length, ruler, measuring tape and measurement. Wound bed status was mentioned alone or

through associated ideas, such as WB preparation, granulation, colour, tissue type or tissue change. Other less frequent answers included general concepts, such as healing, wound progression, progress of healing, wound reassessment and clinical condition. Answers also included individual factors, such as smell, moisture and exudate.

To the question 'How long do you wait before referring to other healthcare professionals (HCP)?' Answers were surprisingly variable, with 99 (52%) respondents providing an answer in days, 83 (43%) in weeks and 10 (5%) in months. Detailed information is presented in Figure 5. Two thirds of respondents proceeding to immediate referral were physicians and one third wound care nurses. The distribution of HCP having answered in weeks showed a similar distribution of nurses and physicians.

In response to the question 'How long do you wait before trying a new product or therapeutic approach when a wound is not healing?', 31 (16.5%) answers were in days, 133 (68%) in weeks and 30 (15.5%) in months. The most frequent answer was 2 weeks; details of which are presented in Figure 6. To the question 'How do you assess comorbidities?', 54% ($n=109$) stated they used their local questionnaire, 26% ($n=52$) stated they would perform the assessment on an ad-hoc basis. Other answers less frequent included: patient records, as part of a holistic assessment, clinical history and assessment on admission.

To the question 'Do you use a framework/wound care algorithm to help you choose an appropriate dressing?', 61% ($n=120$) answered in the affirmative. Answers to the question 'What type of information would be beneficial to get from a framework/algorithm?' are presented in Figure 7.

Discussion and conclusions

This survey can be considered a snapshot of current beliefs in clinical practice among wound care experts, regarding wound assessment and wound bed preparation. This work was not intended to assess comparatively the utility of different tools available; instead, the authors wanted to explore their general role in current wound care practice.

The survey demonstrated that TIME is the most commonly used wound assessment tool in Europe. Results established that despite clinicians being aware of frameworks for wound bed assessment, 40% of respondents did not use them, and those who used them did so in very variable forms. Further research would be needed to establish how wound assessment tools are used in other geographic areas.



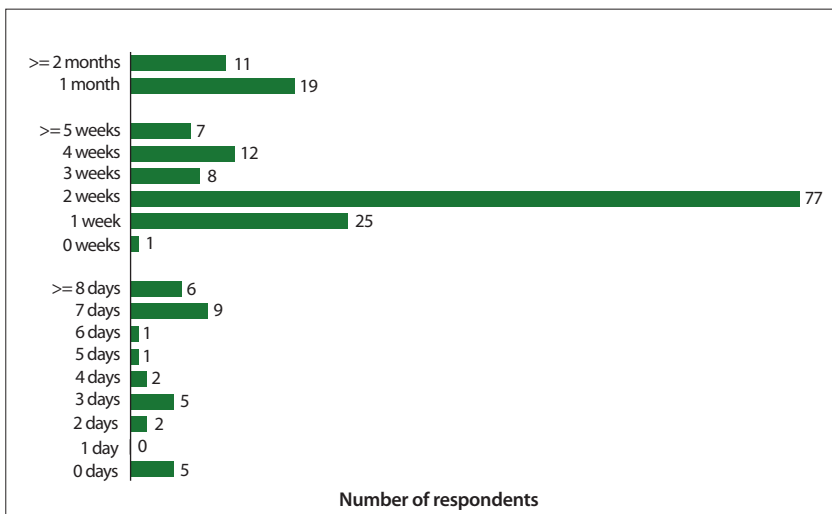


Figure 6. How long do you wait before trying a new product or therapeutic approach when a wound is not healing?

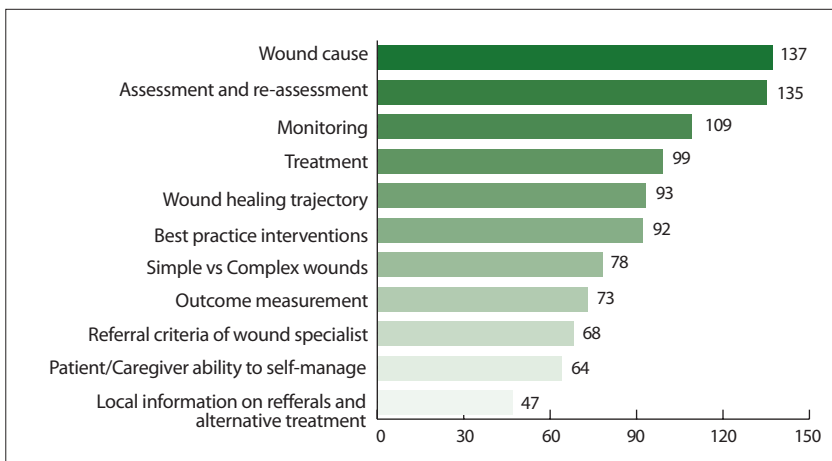


Figure 7. What information would you like to obtain from an assessment framework?

Bioburden and biofilm are concepts integrated in clinical practice, however, the survey revealed an apparent misperception about the presence and role of biofilms in chronic wounds. About 40% of respondents underestimated the amount of chronic wounds containing biofilm (Malone et al, 2017).

Recommendations for wound bed preparation put forward the value of proactive mechanical debridement as a way to accelerate healing and managing biofilm at the same time. In spite of recognising the benefits of other forms of debridement, autolytic continues to be the most commonly used debridement technique. Reasons for this may include education/training, and certification/authorisation factors.

The survey showed also evidence of variability regarding timings used by clinicians to implement changes into therapeutic plans or to refer patients for specialised care. Despite this situation, there was consensus on the need for

wound assessment and reassessment. Variation in wound size and in the characteristics of the wound bed were considered the main factors for the assessment of wound progression.

The importance of early intervention and continuous assessment were considered key drivers to improving wound care and healthcare outcomes using either a validated assessment tool or clinical judgement.

It was also clear that clinicians expect to obtain multiple benefits from the use of a validated tool. Results from what is expected of wound assessment tools showed that ideally, they should be unambiguous, easy to teach, easy to implement by a large base of HCPs and carers, and should guide the clinician consistently through assessment and reassessment processes towards the best therapeutic decision.

As the survey revealed a disjointed and unbalanced use of validated assessment tools, identifying ways to implement a permanent and consistent use of assessment tools requires adapted education, further research and adjustment efforts to allow for simplification and consistency going forward.

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