



Wound Bed Preparation

It's About TIME

Wound bed preparation and the TIME principle facilitate evaluation and treatment of chronic wounds. Earlier articles in this series discussed the components of TIME and how this approach can be used to treat specific wound types such as venous ulcers and diabetic foot ulcers.

However, clinicians still may want to know how to pull together all of the aspects of TIME into a treatment regimen to help manage the patient with a chronic wound.

The Wound Bed Preparation Care Cycle is a simple tool that can successfully direct wound management. It can be used in conjunction with other tools and guidelines that help improve care. The Care Cycle addresses the practical aspects of wound bed preparation — the established wound management paradigm for chronic wounds.

This is the tenth of 12 supplements that address various aspects of the TIME principle.



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The Problem — How to Manage the Wound as Part of Total Patient Care

The TIME framework provides the basis for chronic wound care, neatly separating care management into four components: T for tissue, I for infection or inflammation, M for moisture imbalance, and E for edge of wound (non-advancing or undermined). When incorporating these concepts and their corresponding protocols or algorithms, the clinician must acknowledge the most important consideration: the patient.

The Solution — Treat the Whole Patient Not the Hole in the Patient

The Care Cycle is intended to ensure that the patient, not just the wound, is at the center of care (see Figure 1). The Care Cycle was devised by Caroline Dowsett, a Nurse Consultant from Newham, East London, and member of the International Advisory Board on Wound Bed Preparation, in order to provide a way to practice Wound Bed Preparation at the bed side. The cycle starts with the patient's individual concerns. Next, wound type is identified as part of clinician assessment. Wound status should be ascertained using the TIME principle (tissue, infection/inflammation, moisture imbalance, and the status of wound edge).

Similarly TIME can be used to determine interventions appropriate to wound status, as well as to evaluate whether the wound is improving. If/when the wound is healing, the Care Cycle can be replaced by a prevention program. If the wound is not healing, clinician and patient should re-visit the Care Cycle from the beginning.

Start with the patient. Although it may seem obvious, clinicians need to recognize all of the factors affecting the patient before the wound is assessed. These factors include not only medical conditions that compromise healing (eg, diabetes), but also personal concerns such as pain and discomfort and the patient's individual understanding of his/her condition. Specific factors include the patient's treatment goals, lifestyle, cause of the condition, the form and site of the wound, wound stage, and the healthcare system available to provide treatment.

Identify the wound etiology. What is the type of chronic wound requiring treatment? For example, a leg ulcer could be of venous, arterial, or mixed origin. A pressure ulcer can range in severity from Stage I to Stage IV. Diabetic foot ulcers may be neuropathic or neuroischemic. Some chronic wounds are malignant or fungating; others are complicated postoperative wounds.

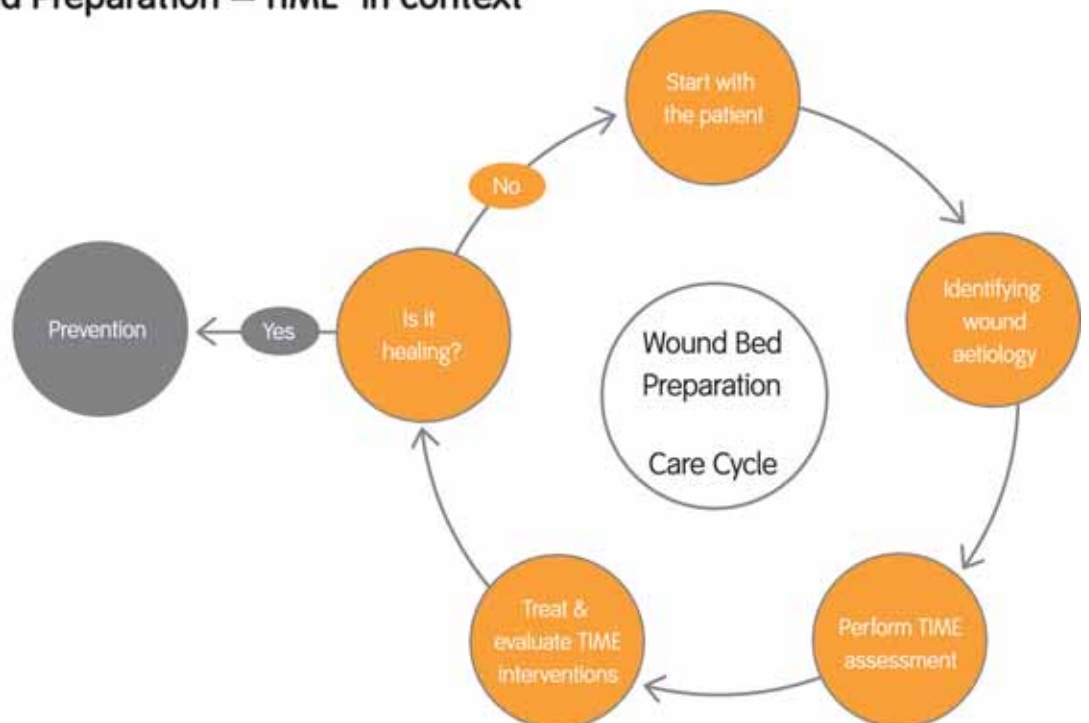
Perform the TIME assessment. Although chronic wounds exhibit a number of common characteristics, assessment and treatment will differ according to wound type. Managing the underlying condition is essential to successful outcomes. Wound assessment begins with an overall appraisal of the location, duration, size, and grade of the wound along with the condition of the surrounding skin.

Within the TIME framework, the clinician needs to assess:

Tissue. Note wound color and tissue perfusion

Infection/Inflammation. Note wound temperature, odor, type and volume of exudate, color, and pH.

Wound Bed Preparation – TIME* in context



* Courtesy of the International Advisory Board on Wound Preparation

Moisture imbalance. Determine level of imbalance by assessing exudate levels, wound perimeter, color of the surrounding skin, and extent of trans-epidermal water loss.

Edge of wound. Examine the wound edge, regularly documenting measurement of wound area and depth. Measurement tools must be sterile. Healing is determined by percentage of reduction in wound area in the first 4 weeks of treatment. Products such as the VISITRAK* system from Smith & Nephew can be used to assess the advancing wound margin. VISITRAK technology provides quick, accurate, and repeatable wound measurement. Rather than approximating the size using length times width or counting squares methods, VISITRAK provides instant data on several wound size metrics using a portable planimetry-based device.

Treat and evaluate TIME intervention. The TIME framework recommends performing a series of clinical actions.

Tissue. Debridement has been shown to be the most effective way to remove non-viable or deficient tissue. Debridement methods include autolytic, sharp/surgical, enzymatic, mechanical, or biological and may be performed episodically or continuously. Some clinicians may choose to use more than one method for debridement. For example, enzymatic debridement with papain-urea products such as GLADASE* or GLADASE* C may be used alone or between episodes of sharp or surgical debridement to facilitate the removal of necrotic tissues.

Infection/inflammation. The best way to control infection and inflammation is to remove the infected foci and to apply compression. Topical antimicrobials, such as ACTICOAT* Nanocrystalline Silver Dressings, should be considered before initiating systemic treatments, anti-inflammatories, or protease inhibitors. ACTICOAT has been shown to kill bacteria two to five times faster than other forms of silver. ACTICOAT 7 remains effective for up to 7 days when used as a bacterial barrier under compression bandages such as PROFORE* and PROGUIDE that may be changed at the same 7-day interval. Clinicians who manage patients with venous ulcers have used four-layer, high-compression PROFORE for years. PROGUIDE, a relatively new product, features Vari-Stretch* technology that utilizes a breathable outer, latex-free compression layer marked with indicators to help the user determine a 50% stretch. The product can be stretched 30% to 70% and still achieve an appropriate level of compression.

Moisture imbalance. Compression and negative pressure therapies, as well as moisture balancing dressings, can be used to address moisture imbalance. Many dressings manage wound exudates; the ALLEVYN* family of hydrocellular foam dressings offers a wide variety of products designed for wounds with low, moderate, and heavy exudate levels.

Edge of wound. Epidermal edge advancement is the most obvious sign of healing and should occur once the first three factors of TIME have been addressed. When these factors are not enough to set the wound on a healing course, adjunctive approaches such as using DERMAGRAFT* human fibroblast-derived skin substitute, skin grafts, biological agents, or other wound therapies should be considered.

Patient understanding and concurrence with any treatment plan is crucial.

Is the wound healing? Vital questions must be answered before healing progress can be determined:

- Is the wound base viable?
- Have infection and inflammation been reduced?
- Has moisture balance been achieved?
- Is the edge of the wound advancing?

If the answer is *yes* to all of these, the care cycle can be replaced by a prevention program. If the answer is *no*, the care cycle should be repeated until healing commences. Remember, epithelial edge advancement is the clearest sign of healing. A 20% to 40% reduction of wound area within 2 and 4 weeks is seen as a reliable predictive indicator of healing. Regular and accurate measurement will document healing progress.

Prevention. Effective prevention involves the allocation of preventive devices, inclusion in support groups, empowering the patient for self-prevention, overall health promotion, educating the patient's immediate family or caregivers, adequate compression therapy, and a regimen to ensure adequate mobility. Mobility regimens may include exercise plans for a patient with a healed leg ulcer or a turning schedule for a patient with a healed pressure ulcer.

In addition, the patient's lifestyle needs to be addressed. Smoking, lack of exercise, excessive alcohol consumption, poor nutrition, and continuing comorbidities prolong wound healing and confound wound prevention. Identifying and managing these factors are necessary to the success of the patient's care program. Chronic wounds are almost always an indication of the presence of other factors that affect health.





Conclusion

If only the wound is considered, the quality of treatment may be compromised. By addressing the whole patient, clinicians can successfully treat the hole in the patient.

WOUND BED PREPARATION

Removing the barriers

TIME[†] - Principles of Wound Bed Preparation

Clinical Observations	Proposed Pathophysiology	WBP Clinical Actions	Effect of WBP Actions	Clinical Outcome	SOLUTIONS
T issue Non-viable or Deficient	Defective matrix and cell debris impair healing	Debridement (episodic or continuous): – Autolytic, sharp surgical, enzymatic, mechanical or biological – Biological agents	Restoration of wound base and functional extra-cellular matrix proteins	Viable wound base	GLADASE[®] Papain-Urea Debriding Ointment**  GLADASE[®] C Debriding, Deodorizing and Healing Ointment**
I nfection or Inflammation	High bacterial counts or prolonged inflammation: + Inflammatory cytokines + Protease activity – Growth factor activity	Remove infected foci Topical/systemic – Antimicrobials – Anti-inflammatories – Protease inhibition	Low bacterial counts or controlled inflammation: + Inflammatory cytokines + Protease activity – Growth factor activity	Bacterial balance and reduced inflammation	 ACTICOAT[®] (with SILCRYST Nanocrystals)†
M oisture Imbalance	Dessication slows epithelial cell migration Excessive fluid causes maceration of wound margin	Apply moisture balancing dressings Compression, negative pressure or other methods of removing fluid	Restored epithelial cell migration, dessication avoided Edema, excessive fluid controlled, maceration avoided	Moisture balance	 ALLEVYN[®]
E dge of Wound Non Advancing or Undermined	Non-migrating keratinocytes Non-responsive wound cells and abnormalities in protease activity	Reassess cause or consider corrective therapies: – Debridement – Skin grafts – Biological agents – Adjunctive therapies	Migrating keratinocytes and responsive wound cells Restoration of appropriate protease profile	Advancing epidermal margin	 DERMAGRAFT[®] Human Fibroblast-Derived Dermal Substitute**

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