

LETTER TO THE EDITOR

Protocols in wound healing: Evidence-based or mere rituals?

Key Messages

- Many recommendations in wound healing protocols are mere rituals, based on beliefs and traditions.
- Wounds with a good evolution may not need to be cleaned or debrided at each dressing change.
- Scabs represent physiological epithelialization and may be the inspiration for research into new dressings.
- In this article, the authors reflect on the need to eliminate traditional recommendations that are not based on evidence and common sense.

Any wound care protocol, whether acute or chronic, begins with the recommendation for wound cleansing, which is considered as a cornerstone of the treatment. In addition, some papers have been published comparing different products (tap water, saline, soap, antimicrobials) and cleansing techniques (different irrigation pressures).¹ However, what is the available evidence that all wounds need cleansing?² Moreover, could not a ritual swabbing or scrubbing be detrimental to the neoformed tissue?³ These same questions could be asked with debridement, which is also often included as a mandatory step in every dressing change. In fact, in the case of venous ulcers, except in certain recalcitrant sloughy wounds,⁴ it is not clear that debridement, in a general way, accelerates healing. In other words, just because we get a venous leg ulcer with less sloughy tissue at each dressing does not mean that we will accelerate healing, as it was shown with larval therapy.⁵ In addition, sharp debridement will have no benefit in cases of white atrophy and will produce pain, and in pyoderma gangrenosum or arteriolosclerotic ulcers, it may worsen the wound. In addition, a recent pilot study shows that, contrary to the traditional belief that slough is a devitalised tissue that delays healing, there are functional proteins in this tissue that can promote healing.⁶

The frequency of dressing changes is another aspect that has not been studied, but in many cases, it is done ritually two to three times a week, or even daily. Thanks to the impossibility of making wound dressing changes during the covid pandemic, some of us realized that not

touching the wound for 1, 2, 3 or even 4 weeks was not only not harmful to venous leg ulcers, but even allowed their complete epithelialization.

We cannot make protocols that include chronic wounds in general, because wounds that are progressing well should be managed differently.⁷

On the one hand, each dressing is an opportunity to promote, with cleansing and debridement, the removal of whatever is hindering healing (excess exudate with pro-inflammatory cytokines, non-viable tissue, bacterial load), which is essential in dirty or infected wounds and in cases of resistant biofilm. On the other hand, any manipulation of the wound bed will have an impact on the cells and growth factors that are promoting wound closure, and may induce inflammation² that, in those wounds with a good progression, could impede wound healing. Wound exudate, especially in acute wounds and wounds that are having a good evolution, is a source of cells and growth factors that promote healing. Additionally interactions between commensal microbiota and the multiple cell types involved in cutaneous wound healing have been shown to regulate the immune response and promote barrier restoration.⁸ Consequently, in acute non-complicated wounds and those chronic wounds that present a good evolution, it would be wise not to interfere with the created microenvironment that is favouring healing. It is going to be extremely relevant according to new research focusing on cells and proteins whose presence in the exudate would be able to define and

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2024 The Author(s). *International Wound Journal* published by Medicalhelplines.com Inc and John Wiley & Sons Ltd.

differentiate it as “toxic” or “physiological”.^{7,9} As wounds with a “toxic” wound fluid should probably be better cleansed and debrided, those with a “physiological” wound fluid should not. This reflection leaves open the question of what would be the most appropriate debridement, and ultimately, all these questions should be better investigated in randomized controlled trials.

For this maximum spacing of dressing changes, optimal treatment of the cause of the wound is essential, in the case of venous ulceration, with compression therapy, endovenous ablation or surgery, exercise and leg elevation during rest. In fact, it is this aetiological treatment that will reduce exudate, not the dressing selected.¹⁰ However, in the last decades, professionals have focused a lot on the importance of moist wound healing dressings since Winter's famous, but little read article,¹¹ which included only 12 acute wounds on the back of two pigs. The results of this letter to the editor highlight that in the first 3 days, the epithelialization rate was twice higher in the wounds covered with polyurethane film in comparison with those wounds left open air, but, surprisingly, from day 7, there is no difference between both groups.

Since then, despite the generalization of the concept of moist wound healing following the higher rate of initial epithelialization in Winter's study, little evidence has been generated in chronic wounds.¹² Most clinical trials with dressings have been conducted on acute wounds (mainly graft donor site) and without significant differences between them, perhaps because these wounds will close in less than 3 weeks without needing any specific care. But the choice of alginate fibres allowed the dressing to be left in place without touching until complete epithelialization.^{13,14}

The authors think that rather than talking about a “moist” environment, one should talk about an “optimal” environment, including scabs. We agree with Nelson¹⁵: “Since we have used scabs as a wound cover for thousands of years, we should try to improve their performance, rather than ignore the benefits of this very effective dressing”. Along these lines of simulating wound scabs would be the use of fibres (such as alginate fibres), which generate matrices that can remain in the wound for weeks, promoting underlying epithelialization, both in acute and chronic wounds, spacing out dressing changes. Additionally, it would make sense to add zinc oxide, which has already been shown to benefit wound healing in an old but well-designed study with leg ulcers.¹⁶

Zinc oxide has anti-inflammatory and antibacterial properties, promotes re-epithelialization and,¹⁷ consequently, has been shown to be beneficial in different inflammatory skin disorders.¹⁸ Zinc oxide is a combination routinely used by some of the authors, spacing dressings as much as possible and without cleansing or

debridement of wounds that do not need it, with good results, even in hard-to-heal wounds treated with punch grafting.¹⁹

In addition to being beneficial for the wound, avoiding the pain and trauma involved in each dressing change is also an eco-responsible strategy. But the benefits of this strategy, so far, are only based on observation. Clinical trials are needed to break rituals and to be able to establish protocols with a real benefit for the wound and the person and more sustainable for the planet. And not to forget the benefit for healthcare professionals, especially nurses. Currently, there are multiple obstacles in the application of nursing care due to gaps in wound healing studies, variability in wound training, different care settings (primary care, specialized care) and the overwhelming number of dressing types. Undoubtedly, there is a need for rational simplification of wound care.²⁰

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

All data underlying the results are available as part of the article and no additional source data are required.

Elena Conde-Montero¹
Axelle Moreau²
Justin Gabriel Schlager³
Damien Pastor⁴
Jürg Hafner⁵

¹*Dermatology Department, Hospital Universitario Infanta Leonor y Virgen de la Torre, Madrid, Spain*

²*Service de Medecine vasculaire Hôpital Saint Joseph, Paris, France*

³*Dermatology Department, Clinica Universitaria de Navarra, Madrid, Spain*

⁴*Dermatology Department, Hôpitaux Universitaires Genève, Genève, Switzerland*

⁵*Dermatology Department, University Hospital Zürich, Zürich, Switzerland*

Correspondence

Elena Conde-Montero, Dermatology Department, Hospital Universitario Infanta Leonor y Virgen de la Torre, Madrid, Spain.

Email: elenacondemontero@gmail.com

REFERENCES

1. Fernandez R, Griffiths R, Ussia C. Effectiveness of solutions, techniques and pressure in wound cleansing. *JBI Libr Syst Rev.* 2004;2(7):1-55.

2. Lindsay E. To wash or not to wash: what is the solution for chronic leg ulcers? *Wound Essentials*. 2007;2:74-83.
3. Brown A. When is wound cleansing necessary and what solution should be used? *Nurs Times*. 2018;114(9):42-45.
4. Williams D, Enoch S, Miller D, Harris K, Price P, Harding KG. Effect of sharp debridement using curette on recalcitrant non-healing venous leg ulcers: a concurrently controlled, prospective cohort study. *Wound Repair Regen*. 2005;13(2):131-137.
5. Greene E, Avsar P, Moore Z, Nugent L, O'Connor T, Patton D. What is the effect of larval therapy on the debridement of venous leg ulcers? A systematic review. *J Tissue Viability*. 2021;30(3):301-309.
6. Townsend EC, Cheong JZA, Radzietza M, et al. What is slough? Defining the proteomic and microbial composition of slough and its implications for wound healing. *Wound Repair Regen*. Published online April 1. 2024.
7. Stacey MC, Phillips SA, Farrokhyar F, Swaine JM. Evaluation of wound fluid biomarkers to determine healing in adults with venous leg ulcers: a prospective study. *Wound Repair Regen*. 2019;27(5):509-518.
8. Canchy L, Kerob D, Demessant A, Amici JM. Wound healing and microbiome, an unexpected relationship. *J Eur Acad Dermatol Venereol*. 2023;37(Suppl 3):7-15.
9. Doerfler P, Schoefmann N, Cabral G, et al. Development of a cellular assay as a personalized model for testing chronic wound therapeutics. *J Invest Dermatol*. Published online July 1. 2024.
10. Isoherranen K, Montero EC, Atkin L, et al. Lower leg Ulcer Diagnosis & Principles of treatment: including Recommendations for Comprehensive Assessment and Referral Pathways. *J Wound Management*. 2023;24(2 Sup1):s1-s76.
11. Winter GD. Formation of the scab and the rate of epithelization of superficial wounds in the skin of the young domestic pig. *Nature*. 1962;193:293-294.
12. Jones J. Winter's concept of moist wound healing: a review of the evidence and impact on clinical practice. *J Wound Care*. 2005;14(6):273-276.
13. Fernandes de Carvalho V, Paggiaro AO, Isaac C, Gringlas J, Ferreira MC. Clinical trial comparing 3 different wound dressings for the management of partial-thickness skin graft donor sites. *J Wound Ostomy Continence Nurs*. 2011;38(6):643-647.
14. Läubli S, Hafner J, Ostheeren S, Mayer D, Barysch MJ, French LE. Management of split-thickness skin graft donor sites: a randomized controlled trial of calcium alginate versus polyurethane film dressing. *Dermatology*. 2013;227(4):361-366.
15. Nelson EA. Moist wound healing: critique II. *J Wound Care*. 1995;4(8):370-371.
16. Strömberg HE, Agren MS. Topical zinc oxide treatment improves arterial and venous leg ulcers. *Br J Dermatol*. 1984;111(4):461-468.
17. Lansdown AB, Mirastschijski U, Stubbs N, Scanlon E, Agren MS. Zinc in wound healing: theoretical, experimental, and clinical aspects. *Wound Repair Regen*. 2007;15(1):2-16.
18. Schuermann M, Richter C, Tanadini M, et al. Zinc oxide patches are a highly effective treatment for chronic Prurigo: a randomized Split-body study. *Dermatology*. 2023;239(6):996-1006.
19. Orbea Sopeña A, Conde ME. Punch grafting for the treatment of ulcerated atrophie blanche. *Phlebology*. 2023;38(10):695-697.
20. Gagnon J, Lalonde M, Polomeno V, Beaumier M, Tourigny J. Le transfert des connaissances en soins de plaies chez les infirmières: une revue intégrative des écrits. *Rech Soins Infirm*. 2021;143:45-61.