Review Article

Rethinking Wound Care: Why Moisture and the Right Dressing Choice Matters

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Abstract

Wound care practices have evolved significantly with advances in scientific understanding; however, traditional beliefs such as maintaining a dry wound environment continue to persist in clinical practice. These longstanding practices are often deeply rooted in historical training and clinical habits, making them difficult to change despite emerging evidence. Substantial evidence demonstrates that a moist wound environment accelerates healing compared to dry conditions. This concept was first established by George D. Winter in 1962, who demonstrated enhanced epithelialization under moist conditions. Since then, multiple studies have consistently supported the superiority of moist wound healing in both acute and chronic wounds. Fibroblasts play a central role in wound healing through collagen synthesis, extracellular matrix formation, and the secretion of growth factors that regulate tissue repair and angiogenesis. Their activity is highly influenced by the local wound environment, including moisture levels and oxygen availability. A moist wound environment enhances fibroblast activity, thereby promoting faster and more efficient healing. It also facilitates cell migration, reduces dehydration and necrosis, and supports autolytic debridement. In addition, appropriate dressing selection based on the phase of wound healing is critical for optimal outcomes. Health care professionals must consider wound characteristics, exudate levels, and infection status while choosing dressings. Modern wound dressings not only maintain moisture balance but also reduce pain, minimize trauma during dressing changes, and improve patient quality of life. This review highlights the importance of moisture balance and phase-specific dressing selection in optimizing wound healing outcomes.

Keywords: Dressing selection, fibroblasts, moist wound environment, tissue repair, wound healing

Introduction

Clinical perceptions in wound care are often influenced by longstanding beliefs that may not align with current scientific evidence.[1] The traditional preference for a dry wound environment persists despite substantial evidence supporting moist wound healing. The local wound environment is a critical determinant of healing, with moist conditions shown to be superior to dry or excessively wet environments. Winter demonstrated that wounds maintained in a moist environment heal approximately twice as fast as those exposed to air.[2] This effect is associated with enhanced cellular activity and more efficient tissue repair processes.[3] Clinical perceptions are often influenced by long-standing beliefs that may not always align with current scientific evidence.[1] In wound care, this has contributed to the persistence of traditional practices, such as maintaining a dry wound environment, despite substantial evidence supporting alternative approaches.

One of the most critical determinants of wound healing is the local wound environment. Wound environments can broadly be categorized as dry, moist, or excessively wet. Among these, a moist wound environment has been consistently demonstrated to be optimal for healing. Winter's landmark study showed that wounds maintained under moist conditions healed approximately twice as fast as those exposed to air.[2] Moisture facilitates cellular migration, enhances epithelialization, and supports tissue regeneration.[3]

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Role of Fibroblasts in Wound Healing

Fibroblasts are essential cells in the wound healing process and contribute through multiple mechanisms, including collagen synthesis, extracellular matrix (ECM) formation, growth factor secretion, angiogenesis, and fibrin remodeling.[4-6] These cells play a central role in tissue repair by providing structural integrity and regulating the healing cascade.

A moist wound environment significantly enhances fibroblast proliferation and function.[6] The key functions of fibroblasts are shown in Figure 1.

- Hyaluronic acid production: Fibroblasts produce hyaluronic acid, a glycosaminoglycan that binds large amounts of water, maintaining tissue hydration and facilitating cell migration
- ECM formation: Fibroblasts synthesize ECM components, including collagen, elastin, and proteoglycans, which provide structural support for tissue regeneration
- Collagen synthesis: Fibroblasts produce primarily Type I and Type III collagen, essential for tensile strength and scar formation
- Growth factor secretion: These cells secrete growth factors such as transforming growth factor-beta, fibroblast growth factor, and platelet-derived growth factor, which regulate cell proliferation, angiogenesis, and tissue repair
- Glycosaminoglycan production: These molecules maintain the hydration, viscosity, and resilience of connective tissues.

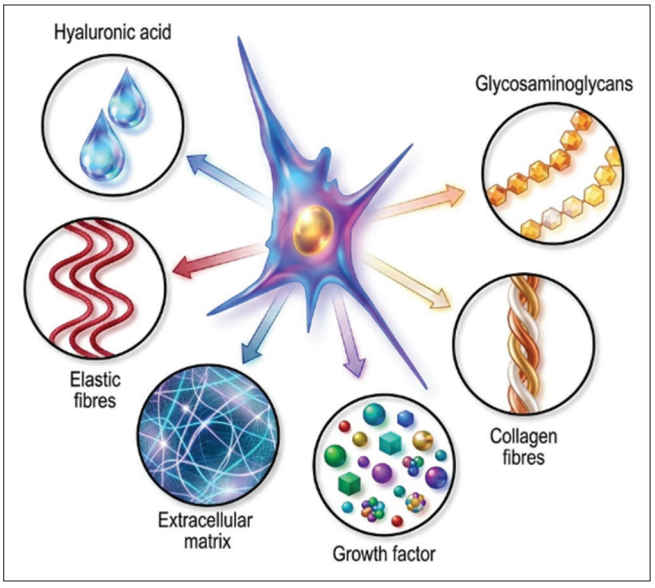

Figure 1: Key functions of the fibroblast in tissue repair

The optimal environment for fibroblast activity is a moist one, which facilitates efficient cellular function and accelerates wound healing compared to dry conditions.

Benefits of a Moist Wound Environment

Moist wound healing offers several clinical advantages beyond accelerated tissue repair. It creates an optimal microenvironment that supports cellular activity and minimizes complications.

Key benefits include

- Prevention of scab/eschar formation and maintenance of tissue hydration
- Facilitation of growth factor activity and cellular interactions
- Promotion of autolytic debridement
- Enhancement of angiogenesis
- Reduction in infection risk
- Reduction in wound pain and trauma during dressing removal
- Potential reduction in scarring with improved cosmetic outcomes.

Collectively, these benefits contribute to improved patient comfort, faster healing, and better overall clinical outcomes.[7-9]

Challenges Associated with Dressing Changes

Dressing changes are often associated with pain and trauma, which can negatively impact patient compliance and quality of life. Traditional dry dressings may adhere to the wound bed, causing tissue damage on removal. In contrast, moist wound dressings reduce adherence, thereby minimizing pain and trauma during dressing changes.[7] This not only improves patient experience but also reduces the time and effort required for wound management.

Dressing Selection Based on Wound Healing Phases

Appropriate dressing selection should be tailored to the specific phase of the wound healing process rather than using a uniform approach[4] as illustrated in Table 1.

Hemostasis phase

This initial phase involves cessation of bleeding through vasoconstriction and clot formation. Hemostatic agents, such as hemostatic gauze, are recommended to achieve rapid hemostasis.[4]

Table 1: Wound healing phases and dressing selection

Phase	Key characteristics	Clinical objective	Recommended dressing types
Hemostasis	Clot formation, platelet activation	Control bleeding	Hemostatic, alginate dressings
Inflammatory	Clot formation, platelet activation	Infection control, debridement	Antimicrobial, Deslough/debride, foam dressings
Proliferative	Granulation tissue, angiogenesis, fibroblast activity	Promote tissue growth, maintain moisture	Hydrocolloids, foams, hydrogels dressings
Remodeling	Collagen maturation, epithelialization	Protect tissue, prevent trauma	Low-adherent, silicone dressings

Inflammatory phase

The primary objective during this phase is wound cleansing and control of microbial burden. Dressings should assist in reducing bioburden and facilitating the removal of necrotic tissue, slough, and exudate. Antimicrobial dressings are commonly used during this stage.[10]

Proliferation phase

This phase is characterized by fibroblast proliferation, angiogenesis, and ECM formation. Dressings should maintain a moist wound environment to promote granulation tissue formation and support tissue reconstruction.[11]

Remodeling phase

Also known as the maturation phase, this stage involves collagen remodeling and tissue strengthening, which may continue for several months. Advanced dressings are typically not required unless clinically indicated.[11]

Regardless of the phase, maintaining an optimal moist environment remains essential to support cellular activity and promote efficient healing.

Conclusion

Modern wound care evidence strongly challenges the traditional concept of dry healing. A moist wound environment has been consistently shown to accelerate epithelialization, enhance fibroblast activity, and support efficient tissue repair. Furthermore, appropriate dressing selection tailored to the phase of wound healing is critical for optimizing outcomes. Evidence-based clinical practice should guide decision-making to ensure effective wound management, improved healing rates, and enhanced patient quality of life.

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Conflicts of Interest

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References

1. Grol R, Grimshaw J. From best evidence to best practice: Effective implementation of change in patients' care. Lancet 2003;362:1225-30.
2. Winter GD. Formation of the scab and the rate of epithelization of superficial wounds in the skin of the young domestic pig. Nature 1962;193:293-4.
3. Junker JP, Kamel RA, Caterson EJ, Eriksson E. Clinical impact upon wound healing and inflammation in moist, wet, and dry environments. Adv Wound Care (New Rochelle) 2013;2:348-56.
4. Boateng JS, Catanzano O. Advanced therapeutic dressings for effective wound healing--a review. J Pharm Sci 2015;104:3653-80.
5. Schultz GS, Wysocki A. Interactions between extracellular matrix and growth factors in wound healing. Wound Repair Regen 2009;17:153-62.
6. Park HE, Foster DS, Longaker MT. Fibroblasts and wound healing: An update. Regen Med 2018;13:491-5.
7. Upton D, Andrews A. Pain and trauma in negative pressure wound therapy: A review Int Wound J 2015;12:100-5.
8. Atiyeh BS, Hayek SN, Gunn SW. New technologies for burn wound closure and healing--review of the literature. Burns 2005;31:944-56.
9. Ramundo J, Gray M. Enzymatic wound debridement. J Wound Ostomy Continence Nurs 2008;35:273-80.
10. Schultz GS, Sibbald RG, Falanga V, Ayello EA, Dowsett C, Harding K, *et al*. Wound bed preparation: A systematic approach to wound management. Wound bed preparation. Wound Repair Regen 2003;11:S1-28.
11. Gurtner GC, Werner S, Barrandon Y, Longaker MT. Wound repair and regeneration. Nature 2008;453:314-21.

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