Debridement options: BEAMS made easy

Learn how the various debridement methods promote wound healing.

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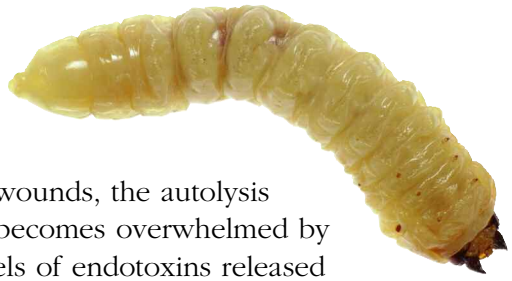
At one time or another, all wound care professionals encounter a chronic wound, defined as a wound that fails to heal in an orderly and timely manner. Globally, about 67 million people (1% to 5% of the world's population) suffer chronic wounds. In the United States, chronic wounds affect 6.5 million people and cost more than $25 billion annually to treat.

The normal healing process is complex and can contribute to wound chronicity, which causes delayed healing. Local and systemic factors that can impede wound healing include lack of growth factors, a prolonged inflammatory response, abnormal matrix metalloproteinases, desiccation or decreased perfusion of the wound bed, wound hypoxia, infection or increased bacteria, aged cells, necrotic tissue, excessive or sustained pressure at the wound site, poor nutritional status, and certain medical conditions.

Autolysis, a natural process that occurs during wound healing, requires a moist vascular environment and a functioning immune system. During the inflammatory stage, neutrophils and macrophages digest and remove devitalized tissue debris. In



chronic wounds, the autolysis process becomes overwhelmed by high levels of endotoxins released from damaged tissue and use of other debriedement methods are necessary.

Managing chronic wounds requires a holistic and comprehensive approach that considers all factors that can affect wound healing. Debridement remains a standard of care. Fundamental to proper wound healing, it can be done by surgical or nonsurgical methods. Debridement is integral to transforming the hostile environment of a chronic wound to a receptive environment that promotes healing. This article gives an overview of debridement techniques.

Why debridement is crucial to healing

Debridement refers to removal of dead, devitalized, or contaminated tissue or foreign material from a wound to reduce the number of microbes, toxins, and other substances that inhibit healing. Wound care clinicians must strive to achieve a stable, well-vascularized wound bed with minimal exudates. Presence of necrotic or compromised tissue is common in chronic nonhealing wounds. Devitalized tissue provides a growth medium for bacteria, increasing the infection risk. Also, it exudes endotoxins that inhibit migration of fibroblasts and keratinocytes to the wound. Necrotic tissue prevents formation of granulation tissue, wound contraction, and epithelialization.

While all components of wound bed preparation are crucial to an optimal wound-healing environment, both historical and current research indicates that removing exudates and devitalized tissue is essential. Many wounds with underlying

Wound bed preparation

Wounds are dynamic. Although a wound gradually may approach a healed state, it also may regress. For this reason, wound bed preparation must be flexible and should reflect the wound state at any given time.

The ultimate goal for all wound care clinicians is to promote a clean, healthy wound bed based on wound bed preparation principles. A comprehensive approach to chronic wounds, wound bed preparation promotes removal of local barriers to healing and stimulates the healing process.

Wound bed preparation has four major components, which form the framework of a comprehensive approach to wound healing. The acronym **TIME**, created by the Wound Bed Preparation Advisory Board, describes these components:

- **T**: Tissue management
- **I**: Inflammation and infection control
- **M**: Moisture balance
- **E**: Epithelial edge advancement

pathologies that are untreatable or hard to treat require repeated debridement. (See *Wound bed preparation.*)

Debridement methods can be selective or nonselective. Selective methods remove only devitalized tissue. Nonselective methods don't differentiate between viable and nonviable tissue.

Debridement methods

Five major debridement methods exist, collectively known as **BEAMS**—an acronym made up of the first letters of each method. Selective methods include **B**iological/**B**iosurgical, **E**nzymatic, and **A**utolytic debridement. Nonselective methods include **M**echanical and **S**harp debridement. (See *Choosing the right debridement method.*)

In some cases, more than one debridement method may be appropriate. In others, no method may be appropriate. For instance, stable eschar (eschar that's dry, adherent, and intact with no erythema or fluctuance) on the heels serves as a natural covering and shouldn't be removed. Another example is when healing isn't an option, as when decreased blood flow from arterial insufficiency delays or impedes wound healing.

Choosing the right debridement method

Choice of debridement method depends on many factors, including:

- wound size, position, and type
- amount of necrotic tissue in the wound
- efficiency and selectivity of the debridement method
- patient's medical history and overall medical condition
- pain management
- exudate levels
- infection risk
- cost of the procedure.

Biological/biosurgical debridement

Also known as maggot debridement, larval therapy, or larvae therapy, this method uses medicinal maggots to remove nonviable tissue. Sterile maggots are applied to the wound and covered by a dressing, which remains in place 1 to 3 days. Maggots have three actions:

View: a video for teaching patients about how maggot therapy works

- They debride the wound by liquefying and digesting necrotic tissue.
- They disinfect by killing and consuming bacteria.
- They stimulate wound healing by promoting fibroblast growth.

Rapid and selective, biological debridement has proven effective in debriding chronic wounds and aiding limb salvage.

Enzymatic debridement

Enzymatic debridement involves application of collagenase ointment, which doesn't harm healthy tissue. Fast acting and highly selective, it involves once-daily application of Santyl, a prescription product with no generic equivalent. This collagenase ointment works from the bottom up by selectively degrading (dissolving) collagen anchored to the wound. It breaks down only denatured collagen, leaving other proteins unaffected. Also, it doesn't harm the collagen needed to form a scaffold, which is crucial for healing during the second phase of the wound healing cascade.

Enzymatic debridement is faster than autolytic debridement but more conservative than sharps surgical debridement. While Santyl is the only enzymatic debriding ointment available, other topical agents, such as Iodosorb, Oakin, and Mesalt, can promote debridement in the wound bed as well.

View: enzymatic debridement

Autolytic debridement

A natural physiologic process, autolytic debridement uses the body's own enzymes to soften and break down necrotic tissue. White blood cells and enzymes enter the wound site during the inflammatory phase of healing, liquefying necrotic tissue. All wounds go through autolytic debridement to some extent. Products that support a moist wound environment can enhance this type of debridement.

Autolytic debridement is slow, selective, painless, and noninvasive. However, it's not used for infected wounds and isn't the best choice for wounds with a large amount of necrotic tissue.

Mechanical debridement

Mechanical debridement uses an external force great enough to separate or break the adhesive forces of necrotic tissue. This nonselective method, which can be painful, may involve a whirlpool, wet-to-dry dressings, scrubbing, and irrigation. Contraindications include epithelializing wounds and granulating wounds.

View: a video of administering low-pressure irrigation, a type of mechanical debridement

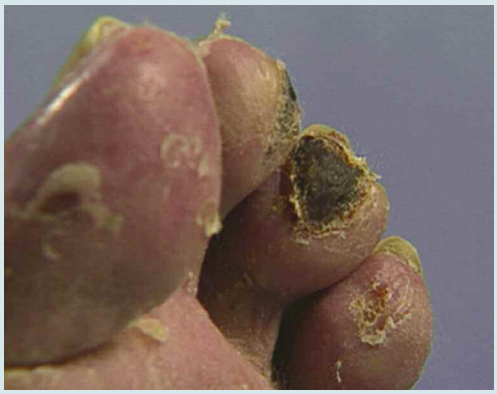
Sharp debridement

Sharp debridement refers to removal of necrotic devitalized tissue by sharp instruments, such as scalpels, scissors, lasers, curettes, or forceps. Nonselective, this method is the fastest debridement method. It can be either surgical or conservative.

- *Surgical* debridement is a major procedure performed by a surgeon, another physician, or a podiatrist. It involves complete debridement and transforms a chronic wound to an acute wound. It produces rapid results but sacrifices some viable tissue. Pain control during and after the procedure is important and can be accomplished with analgesics.

Sharp debridement

The images below show a wound before and after sharp debridement.



(See *Sharp debridement*.)

- *Conservative* debridement is done at the bedside by a trained clinical practitioner (such as a therapist or nurse, if the state practice act allows) or a physician. This minor procedure, which involves use of scalpels, scissors, or curettes, removes only devitalized tissue. It may require several sessions.

One type doesn't fit all

Not all patients with necrotic wounds are candidates for every debridement method. To choose the most appropriate method, clinicians must understand the need for debridement and the available options. Keep in mind that in many cases, debridement isn't a one-time intervention but must be repeated until healthy granulation tissue appears. Be sure to reassess the patient and wound regularly to ensure the best care. ■

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