Wound debridement (Advanced practice), ambulatory care

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Introduction

Wound debridement is a critical element of wound care in which accumulated necrotic tissue, exudate, and bacteria are removed from the wound bed in preparation for healing.[1] After wound debridement, fibroblasts deposit collagen, which fills in the wound with scar tissue as long as the wound has a good blood supply with adequate oxygen and nutrients.

Necrotic tissue may be moist or dry. Moist necrotic tissue, or slough, is soft yellow or gray stringy material that's loosely attached to the wound. Dry necrotic tissue, or eschar, is hard, black, leathery material that's more firmly attached to the wound. Failure to remove this material allows the wound to remain in the inflammatory phase of wound healing, which can result in local infection of surrounding tissues, systemic infection, amputation, and even death.[1]

Various methods exist for wound debridement, including surgical debridement, conservative sharp wound debridement (CSWD), autolytic debridement, enzymatic debridement, biologic debridement (maggot therapy), and mechanical debridement (pulsatile lavage).[1][2] (See *Methods of wound debridement*.) Choice of wound debridement method depends on multiple factors, including the type of necrotic tissue, the wound location, existing comorbidities, patient preference, the care setting, and the practitioner's expertise.

METHODS OF WOUND DEBRIDEMENT

Methods of wound debridement include surgical debridement, conservative sharp wound debridement, autolytic debridement, enzymatic debridement, biologic debridement, and mechanical debridement.[1] This table explains how each method works in addition to the advantages, disadvantages, indications, and contraindications of each method.

Method	How it works	Advantages	Disadvantages	Indications	Contraindications
Surgical debridement	Necrotic and some healthy tissue are excised, converting a chronic wound into an acute wound	Immediate results; highly selective tissue removal	Requires a surgeon, an operating room, and anesthesia; postoperative pain; expense	Urgent need for wound debridement such as infected wounds and sepsis; extensive necrosis	Bleeding diatheses; anticoagulant therapy; ischemia; malignant wounds; immunosuppression

Conservative sharp wound debridement	Necrotic tissue is excised using a sharp instrument, such as sterile scissors or scalpel	Faster results than other methods of debridement; can be used with other methods	Requires a skilled practitioner; may require multiple procedures under sterile conditions; pain; patient needs to be cooperative or maintain position for procedure	Urgent need for wound debridement when surgical debridement is contraindicated or not feasible	Inability to distinguish the interface between viable and nonviable tissue; extensive undermining or tunneling; excessive or unexpected bleeding Cautions: Exposed bones, ligaments, or tendons; patients who are immunosuppressed, receive anticoagulants, or have a bleeding disorder[3]
Autolytic debridement	Endogenous enzymes and white blood cells in wound fluid dissolve and digest necrotic tissue when the wound is kept moist with moisture-retentive dressings, such as hydrogels or hydrocolloids	Safe; painless; relatively inexpensive; can be used with other methods; can be performed in various settings by nonspecialized health care providers, caregivers, and patients	Slow results; risk of maceration of surrounding tissue; odor; requires ongoing treatment and repeated dressing changes; risk of infection due to length of treatment	Uninfected wounds not requiring urgent removal of necrotic tissue	Infection; deep or extensive wounds; immunocompromised patients or patients with severe neutropenia
Enzymatic debridement	Enzymes, such as collagenases, are applied topically to the wound to dissolve and digest necrotic tissue while avoiding healthy tissue	Safe; cost-effective; can be used with other methods; can be performed in various settings by nonspecialized health care providers, caregivers, and patients	Slow results; may cause some discomfort; requires a prescription; requires ongoing treatment and repeated dressing changes; risk of infection due to	Wounds not requiring urgent removal of necrotic tissue; most effective on slough; can be used on eschar but may require cross-hatching of the eschar surface for penetration	Allergy to any component of the enzyme product; concomitant use of products that contain silver or mercury

			length of treatment		
Biologic debridement	Sterile green bottle fly (*Lucilia sericata*) larvae are applied topically to the wound to dissolve and digest necrotic tissue while avoiding healthy tissue; process uses enzymes produced by the larvae; stimulates healing chemically and mechanically	Rapid effect; safe; decreases bacteria in wound	Not readily accessible; discomfort; psychological distress	Can be used in most wounds, including infected wounds, when surgical debridement is contraindicated or not feasible	Deep or tunneling wounds; bleeding diatheses; allergies; wounds near large vessels or organs
Mechanical debridement	Physical force used such as wet-to-dry dressings, wound irrigation, pulsed lavage, hydrotherapy, noncontact low-frequency ultrasound, negative pressure wound therapy; applied directly to the wound to loosen necrotic tissue and suction to	Efficient at removing large volumes of slough; may be used with other methods of debridement; can be used for bedbound patients	May cause trauma to the wound bed or surrounding tissue; ineffective for removing eschar; pain; increased risk of infection; risk of aerosol and splash contamination; requires specialized equipment; labor-intensive	Wounds with large volumes of slough	Presence of significant granulation tissue; bleeding diatheses and anticoagulant therapy (relative contraindications) *Note:* Some mechanical debridement techniques, such as wet-to-dry dressings and hydrotherapy (whirlpool), have been used traditionally for debridement but are now considered suboptimal care.

	remove debris				

Surgical debridement generally is performed by a surgeon in an operating room; however, in some states, surgical debridement and CSWD may fall under the scope of advanced practice, and registered nurses who have been educated and demonstrate clinical competence in performing these procedures may practice them.[4][5] Nurses must know the regulations outlined by their states' nurse practice act. Autolytic and enzymatic debridement are part of routine nursing care and may be performed by a nurse, the patient, or another caregiver in any setting (acute care, long-term care, or the home) under the direction of a specially trained practitioner ordering the debridement. Biologic and mechanical debridement require special resources and aren't routinely performed in the ambulatory care setting. Therefore, this procedure focuses on CSWD, which a specially trained advanced practice nurse is likely to perform in an ambulatory care setting.

Some wounds require multiple visits for serial CSWD or follow-up with adjunctive methods in the home care setting, such as autolytic or enzymatic debridement, for complete debridement and wound healing.[1] Debridement may be discontinued when necrotic tissue no longer remains in the wound and only viable granulation tissue is visible in the wound bed.

Equipment

- Facility-approved disinfectant
- Facility-approved pain assessment tool
- Fluid-impermeable pad
- Gloves
- Labels
- Light source
- Sterile dressing
- Sterile forceps
- Sterile gauze
- Sterile gloves
- Sterile normal saline solution
- Sterile scissors or sterile scalpel
- Waterproof trash container
- Optional: dressings and tape specially formulated for fragile skin, hemostatic dressing or agent such as silver nitrate, other personal protective equipment, patient gown, prescribed analgesia, sheet or blanket, tape, topical wound treatment agents (antimicrobials, enzymes, or growth factors), wound packing material

Preparation of Equipment

Inspect all equipment and supplies. If a product is expired, is defective, or has compromised integrity, remove it from patient use, label it as expired or defective, and report the expiration or defect as directed by your facility.

Implementation

- Gather and prepare the necessary equipment and supplies.
- Perform hand hygiene.[6][7][8][9][10]
- Confirm the patient's identity using at least two patient identifiers.[11]
- Provide privacy.[12][13][14]

- Explain the procedure to the patient and family (if appropriate) according to their individual communication and learning needs *to increase their understanding, allay their fears, and enhance cooperation.*[15][16][17][18]
- If required by your facility, obtain informed consent and place the signed consent form in the patient's medical record.[15][16][18]
- Review the patient's medical record for conditions that may complicate CSWD. Use caution when performing CSWD in patients who have diabetes, immunosuppression, or a bleeding disorder; are taking anticoagulants; or have exposed bones, ligaments, or tendons.[1][19]
- Conduct a preprocedure verification *to make sure that all relevant documentation, related information, and equipment are available and correctly identified to the patient's identifiers.*[20]
- Screen for and assess the patient's pain using facility-defined criteria that are consistent with the patient's age, condition, and ability to understand.[21]
- Treat the patient's pain, as needed, using nonpharmacologic, pharmacologic, or a combination of approaches. Base the treatment plan on evidence-based practices and the patient's clinical condition, past medical history, and pain management goals.[21] Administer analgesia, as needed, following safe medication administration practices at least 20 minutes before the procedure *because wound debridement can be painful.*[1][2][22][23][24][25]
- Monitor closely if the patient is at high risk for adverse outcomes related to opioid treatment, if prescribed.[21]

◆ ***Clinical alert:*** Continually monitor the patient's tolerance of the procedure. If the patient expresses pain or discomfort, stop the procedure and address the pain appropriately before continuing.[1][2][21] ◆

- Ask the patient to change into a patient gown, if needed.
- Assist the patient onto the procedure table.
- Assist the patient to a position that maximizes comfort while allowing easy access to the wound.[1]
- Cover the patient with a sheet or blanket, if needed, *to maintain warmth and modesty.*
- Ensure that lighting is adequate *to visualize the wound.*
- Place a fluid-impermeable pad under the patient *to prevent soiling.*
- Perform hand hygiene.[6][7][8][9][10]
- Put on gloves and, as needed, other personal protective equipment *to comply with standard precautions.*[26][27]
- Gently remove the existing dressing. Irrigate it with sterile normal saline solution, if needed, *to ease removal.* (See the "Wound irrigation, ambulatory care" procedure.)
- Discard the soiled dressing in a waterproof trash container.[27]
- Remove and discard your gloves.[27]
- Perform hand hygiene.[6][7][8][9][10]
- Put on clean gloves.[26][27]
- Clean the wound with sterile normal saline solution and sterile gauze.[22]
- Assess the wound and surrounding tissue *to gauge healing and evaluate for signs of infection.*[22] (See the "Wound assessment" procedure.)
- Discard the soiled gauze in a waterproof trash container.[27]
- Remove and discard your gloves.[27]
- Perform hand hygiene.[6][7][8][9][10]
- Set up a sterile field and open the packages of sterile instruments. Label all medications, medication containers, and other solutions on and off the sterile field.[28]

- Put on sterile gloves.[22][26][27]
- Conduct a time-out immediately before starting the procedure *to perform a final assessment, ensuring that the correct patient, site, positioning, and procedure are identified and, as applicable, that all relevant information and necessary equipment are available.*[29]
- Using your nondominant hand, grasp loose necrotic tissue with sterile forceps. Hold the tissue tautly so that the demarcation between viable and necrotic tissue is clearly visible.[1][2]
- Using your dominant hand, cut away the loose necrotic tissue in layers with a sterile scalpel or scissors. Take care to avoid vascular tissue and any other tissue not clearly identified as necrotic.[1] (See *Sharp debridement*.)

SHARP DEBRIDEMENT

Sharp debridement can be performed in an ambulatory care setting. During the procedure, loose necrotic tissue is cut away in layers using a scalpel or scissors (as shown below).

◆ ***Clinical alert:*** If bleeding occurs during CSWD, apply direct pressure with sterile gauze and, if feasible, elevate the area. If bleeding continues despite direct pressure, apply a hemostatic dressing or agent such as silver nitrate.[1] Stop the procedure if bleeding becomes severe or remains uncontrolled despite intervention.◆

- After debridement is complete, clean the wound with sterile normal saline solution.[1]
- Dry the surrounding healthy tissue with a sterile gauze pad.
- If needed, apply topical wound treatment agents and packing material.[2]
- Apply a sterile dressing as appropriate for the wound, location, and patient's clinical condition. If the skin surrounding the wound is fragile, use dressings and tape specially formulated for fragile skin *to prevent skin stripping and tearing during removal.*[30]
- Discard used supplies in appropriate receptacles.[27]

- Clean and disinfect other reusable equipment according to the manufacturer's instructions *to prevent the spread of infection*.[31] Prepare them for sterilization.[27]
- Remove and discard your gloves and, if worn, other personal protective equipment.[27]
- Perform hand hygiene.[6] [7] [8] [9] [10]
- Assist the patient to a comfortable position and help the patient off the procedure table, if appropriate.
- Reassess and respond to the patient's pain by evaluating the response to treatment and progress toward pain management goals. Assess for adverse reactions and risk factors for adverse events that may result from treatment.[21]
- Perform hand hygiene.[6] [7] [8] [9] [10]
- Document the procedure.[32] [33] [34]

Special Considerations

- A comprehensive wound assessment should be performed before initiating CSWD. This assessment should include a holistic patient assessment *to determine the etiology of the wound and factors inhibiting healing as well as a focused wound assessment.* The information gathered from this assessment should be used to address the underlying cause of the wound, develop treatment goals, create a management plan for wound healing, and prevent subsequent wounds.

Patient Teaching

In the home setting, the patient or family (if appropriate) may perform some types of wound debridement, such as autolytic or enzymatic debridement using dressing changes and creams or ointments.[1] If the wound must be debrided at home by the patient or family, teach the patient or family how to perform the procedure. Ask for a return demonstration of the proper technique. Provide written instructions. Arrange for home health supplies and nursing visits, as appropriate. Urge the patient or family member to contact the office if the patient experiences bleeding or detects signs of infection, such as increasing wound size or exudate, erythema, edema, odor, or increasing pain.

Teach the patient and family (if appropriate) about pain management strategies during discharge planning. Include information about the patient's pain management plan and adverse effects of pain management treatment. Discuss activities of daily living and items in the home environment that might exacerbate pain or reduce the effectiveness of the pain management plan, and include strategies to address these issues. Teach the patient and family about safe use, storage, and disposal of opioids, if prescribed.[21]

Complications

Complications associated with wound debridement may include:

- deterioration of the wound
- infection
- delayed healing
- pain
- bleeding
- destruction of healthy granulation tissue.[2]

Documentation

Documentation associated with wound debridement includes:

- date and time of the procedure
- wound assessment before the procedure
- postdebridement documentation
  - debridement technique used
  - instruments used
  - tissue removed
  - wound bed appearance and size of the wound (including depth)
  - type of dressing applied
- medications administered
  - medication name
  - medication strength
  - dose
  - route of administration
  - date and time of administration
  - access site used (if applicable)
  - administration device used
  - rate of administration (if applicable)
- unexpected outcomes (such as bleeding or pain)
  - interventions taken
  - response to those interventions
- tolerance of the procedure
- teaching provided to the patient and family (if appropriate)
  - understanding of that teaching
  - follow-up teaching needed.

Related Procedures

- Sharp debridement

Related UpToDate Patient Teaching Handouts

- Debridement of a wound or burn – Discharge instructions
- Wound care – ED discharge instructions

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(Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions)

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Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions

The following leveling system is adapted from *Evidence-Based practice in nursing & healthcare: A guide to best practice,* Fifth edition, by Bernadette Mazurek Melnyk and Ellen Fineout-Overholt (2023).

Level I	Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs)
Level II	Evidence from well-designed single RCTs (experimental)
Level III	Evidence from well-designed nonrandomized controlled trials (quasi-experimental), systematic reviews of a complete body of evidence, and intervention studies using mixed methods
Level IV	Evidence from well-designed case-control and cohort studies (observational)
Level V	Evidence from systematic reviews of qualitative and descriptive studies
Level VI	Evidence from single descriptive and qualitative studies, evidence-based practice implementation, and quality improvement projects
Level VII	Evidence from expert opinion, expert committee reports, and literature reviews

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