

Pressure Ulcer Treatment

QUICK REFERENCE GUIDE



NATIONAL
PRESSURE
ULCER
ADVISORY
PANEL

DEVELOPED BY
EUROPEAN
PRESSURE ULCER
ADVISORY PANEL
(EPUAP)
AND
NATIONAL
PRESSURE ULCER
ADVISORY PANEL
(NPUAP)



Introduction

This *Quick Reference Guide* summarizes evidence-based guidelines on pressure ulcer prevention and treatment. It was developed as a 4-year collaborative effort between the European Pressure Ulcer Advisory Panel (EPUAP) and American National Pressure Ulcer Advisory Panel (NPUAP). The more comprehensive *Clinical Practice Guideline* version of the guideline provides a detailed analysis and discussion of available research, critical evaluations of the assumptions and knowledge of the field, a description of the methodology used to develop guideline, and acknowledgments of editors, authors, and other contributors. This *Quick Reference Guide* contains excerpts from the *Clinical Practice Guideline*, but users should not rely on these excerpts alone.

Printed copies of the English editions of both documents are available through the NPUAP website (www.npuap.org). The *Quick Reference Guide* has been translated into several languages; translations are available on the EPUAP website (www.epuap.org).

The goal of this international collaboration was to develop evidence-based recommendations for the prevention and treatment of pressure ulcers that could be used by health care professionals throughout the world. An explicit scientific methodology was used to identify and evaluate available research. In the absence of definitive evidence, expert opinion (often supported by indirect evidence and other guidelines) was used to make recommendations. Guideline recommendations were made available to 903 individuals and 146 societies/organizations registered as stakeholders in 63 countries on 6 continents. The final guideline is based on the available research and the accumulated wisdom of the EPUAP, NPUAP, and international stakeholders.

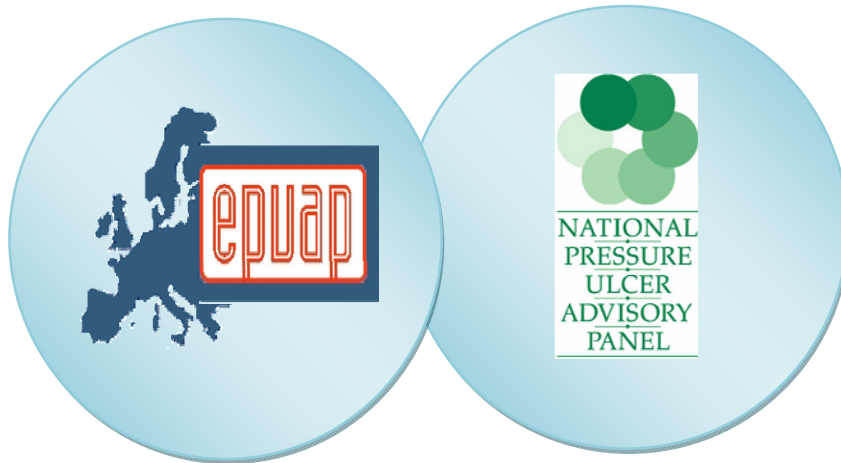
Suggested Citation

The EPUAP and NPUAP welcome the use and adaptation of the guidelines at a national and local level. However, we request citation as to the source, using the following format:

European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel. Treatment of pressure ulcers: Quick Reference Guide. Washington DC: National Pressure Ulcer Advisory Panel; 2009.

International Guideline

**Treatment of Pressure Ulcers:
Quick Reference Guide**



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Additional printed copies are available through the
National Pressure Ulcer Advisory Panel
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Limitations and Appropriate Use of This Guideline

- Guidelines are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical conditions. The recommendations may not be appropriate for use in all circumstances.
- The decision to adopt any particular recommendation must be made by the health care professional in light of available resources and circumstances presented by the individual patient. Nothing contained in this guideline is to be considered medical advice for specific cases.
- Because of the rigorous methodology used to develop this guideline, the NPUAP and EPUAP believe that the research supporting these recommendations is reliable and accurate. However, we do not guarantee the reliability and accuracy of individual studies referenced in this document.
- This guideline and any recommendations herein are intended for educational and informational purposes only.
- This guideline contains information that was accurate at the time of publication. Research and technology change rapidly and the recommendations contained in this guideline may be inconsistent with future advances. The health care professional is responsible for maintaining a working knowledge of the research and technological advances that may affect his/her practice decisions.
- Generic names of products are provided. Nothing in this guideline is intended as an endorsement of a specific product.
- Nothing in this guideline is intended as advice regarding coding standards or reimbursement regulations.

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Purpose and Scope

The overall purpose of this international collaboration was to develop evidence-based recommendations for the prevention and treatment of pressure ulcers that could be used by health care professionals throughout the world. A joint Guideline Development Group with representatives from both the NPUAP and EPUAP planned the guideline development process and reviewed all the documentation. However to simplify logistics, the EPUAP took the lead on the pressure ulcer prevention recommendations and NPUAP on the pressure ulcer treatment recommendations.

The purpose of the treatment recommendations is to guide evidence-based care for patients with existing pressure ulcers. The treatment recommendations apply to all individuals with pressure ulcers regardless of setting. The guideline is intended for the use of health care professionals who are involved in the care of patients with existing pressure ulcers. It will also guide patients and caregivers. Patients with pressure ulcers are usually at risk for additional pressure ulcers; therefore, the prevention guideline should also be followed for these individuals. Based on the results of a gap analysis of existing pressure ulcer treatment guidelines, recommendations regarding the unique needs of several special populations have been addressed where evidence exists. These include spinal cord injured individuals, infants and children, critically ill patients, bariatric patients and patients requesting palliative care.

Methods

A rigorous and explicit methodology was used in the development of these guidelines. (See the *Clinical Practice Guideline* for a more detailed description.) All evidence was reviewed for quality. Individual studies were classified by design and quality (see Table 1). The cumulative body of evidence supporting each recommendation was examined; a “Strength of Evidence” rating was assigned using the criteria in Table 2.

Table 1. Level of Evidence for Individual Studies

Level	
1	Large randomized trial(s) with clear-cut results (and low risk of error)
2	Small randomized trial(s) with uncertain results (and moderate to high risk of error)
3	Non randomized trial(s) with concurrent or contemporaneous controls
4	Non randomized trial(s) with historical controls
5	Case Series with no controls. Specify number of subjects.

Adapted from Sackett, 1989. See the *Clinical Practice Guideline* for a discussion of the guideline development methodology.

Table 2. Strength of Evidence Rating for Each Recommendation

Strength of Evidence	
A	The recommendation is supported by direct scientific evidence from properly designed and implemented controlled trials on pressure ulcers in humans (or humans at-risk for pressure ulcers), providing statistical results that consistently support the guideline statement (Level 1 studies required).
B	The recommendation is supported by direct scientific evidence from properly designed and implemented clinical series on pressure ulcers in humans (or humans at-risk for pressure ulcers), providing statistical results that consistently support the recommendation. (Level 2, 3, 4, 5 studies)
C	The recommendation is supported by indirect evidence (e.g., studies in normal human subjects, humans with other types of chronic wounds, animal models) and/or expert opinion.

This clinical practice guideline is based on the current research and will need revision in the future as new evidence is published. Future research should focus on the areas where evidence is absent or weak.

International NPUAP-EPUAP Pressure Ulcer Definition

A pressure ulcer is localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear. A number of contributing or confounding factors are also associated with pressure ulcers; the significance of these factors is yet to be elucidated.

International NPUAP / EPUAP Pressure Ulcer Classification System

Category I: Non-blanchable erythema

Intact skin with non-blanchable redness of a localized area usually over a bony prominence. . Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area. The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue. Category I may be difficult to detect in individuals with dark skin tones. May indicate “at risk” persons.

Category II: Partial thickness

Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled or sero-sanguinous filled blister.Presents as a shiny or dry shallow ulcer without slough or bruising*. This category should not be used to describe skin tears, tape burns, incontinence associated dermatitis, maceration or excoriation.

*Bruising indicates deep tissue injury.

Category III: Full thickness skin loss

Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are *not* exposed. Slough may be present but does not obscure the depth of tissue loss. *May* include undermining and tunneling.The depth of a Category/Stage III pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus

do not have (adipose) subcutaneous tissue and Category/Stage III ulcers can be shallow. In contrast, areas of significant adiposity can develop extremely deep Category/Stage III pressure ulcers. Bone/tendon is not visible or directly palpable.

Category IV: Full thickness tissue loss

Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present. Often includes undermining and tunneling. The depth of a Category/Stage IV pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have (adipose) subcutaneous tissue and these ulcers can be shallow. Category/Stage IV ulcers can extend into muscle and/or supporting structures (e.g., fascia, tendon or joint capsule) making osteomyelitis or osteitis likely to occur. Exposed bone/muscle is visible or directly palpable.

Additional Categories for the USA

Unstageable/ Unclassified: Full thickness skin or tissue loss – depth unknown

Full thickness tissue loss in which actual depth of the ulcer is completely obscured by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed. Until enough slough and/or eschar are removed to expose the base of the wound, the true depth cannot be determined; but it will be either a Category/Stage III or IV. Stable (dry, adherent, intact without erythema or fluctuance) eschar on the heels serves as “the body’s natural (biological) cover” and should not be removed.

Suspected Deep Tissue Injury – depth unknown

Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or **shear**. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue. Deep tissue injury may be difficult to detect in individuals with dark skin tones. Evolution may include a thin blister over a dark wound bed. The wound may further evolve and become covered by thin eschar. Evolution may be rapid exposing additional layers of tissue even with optimal treatment.

Classification of Pressure Ulcers

1. Use a validated pressure ulcer classification system to document the level of tissue loss. (Strength of Evidence = C)
2. Do not use a pressure ulcer classification system to describe tissue loss in wounds other than pressure ulcers. (Strength of Evidence = C)
3. Educate the professional about special assessment techniques to be used in darkly pigmented individuals. (Strength of Evidence = B)
 - 3.1. Intact Skin: Category/Stage I pressure ulcers and suspected deep-tissue injury may be difficult to detect with visual inspection alone in dark-skinned individuals. Assess differences in skin temperature, skin color, tissue consistency (i.e., boggy or firm) and pain between affected areas and normal tissue when skin is intact. (Strength of Evidence = B)
 - 3.2. Open Pressure Ulcers: Inflammatory redness from cellulitis and deeper tissue damage may be difficult to detect in dark-skinned individuals. Assess the skin for heat, tenderness, pain or change in tissue consistency to identify the extent of inflammation and possible cellulitis and/or undermining in pressure ulcers presenting as open pressure ulcers (i.e. Category/Stage II, III, IV and unstageable ulcers). (Strength of Evidence = C)
4. Educate the professional on differentiating pressure ulcers from other types of wounds (e.g., venous ulcers, arterial ulcers, neuropathic ulcers, incontinence-associated dermatitis, skin tears, and intertrigo). (Strength of Evidence = C)
5. Educate the professional about the appropriate use of the classification system and the appearance of different tissue types at common pressure ulcer sites. (Strength of Evidence = B)
6. Confirm the reliability of classifications among the professionals responsible for classifying pressure ulcers. (Strength of Evidence = B)
7. Do not classify pressure ulcers on mucous membranes. (Strength of Evidence = C)

Assessment and Monitoring of Healing

Assessment of the Individual with a Pressure Ulcer

1. Complete an initial assessment of the individual with a pressure ulcer, to include:
 - The individual's and family's goals of care. If the individual is unable to participate, consult with family and/or significant others.
 - A complete health/medical and social history.
 - A focused physical examination that includes:
 - Factors that may affect healing (e.g., impaired perfusion, impaired sensation, systemic infection)
 - Vascular assessment in the case of extremity ulcers (e.g., physical examination, history of claudication, and ankle-brachial index or toe pressure)
 - Laboratory tests and x-rays as needed
 - Nutritional assessment (see Nutrition section of this guideline).
 - Pain related to pressure ulcers (see Pain section of this guideline).
 - Risk for developing additional pressure ulcers (see Prevention section of this guideline).
 - Psychological health, behavior and cognition.
 - Social and financial support systems.
 - Functional capacity, particularly in regard to positioning, posture, and the need for assistive equipment and personnel.
 - The employment of pressure-relieving maneuvers.
 - Adherence to pressure-relieving maneuvers.
 - Integrity of seating and bed surfaces (wear and tear).
 - The individual's/family member's knowledge and belief about developing and healing pressure ulcers. (Strength of Evidence = C)
2. Reassess the individual if the ulcer does not show signs of healing as expected despite adequate local wound care, pressure redistribution, and nutrition. (Strength of Evidence = C)
 - 2.1. Expect some signs of healing in most individuals within 2 weeks. (Strength of Evidence = B)
 - 2.2. Adjust expectations in the presence of multiple factors (particularly unmodifiable factors) that impair wound healing (e.g., persistent undernutrition, poor perfusion, and co-morbidities known to impair wound healing). (Strength of Evidence = B)
 - 2.3. Teach the individual and his/her family about the normal healing process and keep them informed about progress (or lack of progress) toward healing, including signs and symptoms that should be brought to the professional's attention. (Strength of Evidence = C)

Pressure Ulcer Assessment

- 1. Assess the pressure ulcer initially and re-assess it at least weekly, documenting findings. (Strength of Evidence = C)**

A 2-week period is recommended for evaluating progress toward healing. However, weekly assessments provide an opportunity for the health care professional to detect early complications and the need for changes in the treatment plan.

- 2. With each dressing change, observe the pressure ulcer for developments that may indicate the need for a change in treatment (e.g., wound improvement, wound deterioration, more or less exudate, signs of infection, or other complications). (Strength of Evidence = C)**

- 3. Assess and accurately document physical characteristics such as location, Category/Stage, size, tissue type(s), wound bed and periwound condition, wound edges, sinus tracts, undermining, tunneling, exudate, necrotic tissue, odor, presence/absence of granulation tissue, and epithelialization. (Strength of Evidence = C)**

3.1. Position the individual in a consistent neutral position for wound measurement. (Strength of Evidence = C)

3.2. Length and width: Select a uniform, consistent method for measuring wound length and width to facilitate meaningful comparisons of wound measurements across time. (Strength of Evidence = B)

3.3. Wound depth, tunneling, and undermining: Select a consistent, uniform method for measuring depth. Care should be taken to avoid causing injury when probing the depth of a wound bed or determining the extent of undermining or tunneling. (Strength of Evidence = C)

3.4. Use pressure ulcer assessment findings to plan interventions that will best promote healing. (Strength of Evidence = C)

The treatment needs of a pressure ulcer change over time, in terms of both healing and deterioration. Treatment strategies should be continuously re-evaluated based on the current status of the ulcer.

Methods for Monitoring Healing

- 1. Assess progress toward healing using one or more of the following methods:**

1.1. Use a validated tool such as the Pressure Ulcer Scale for Healing (PUSH[®]) Tool or the Bates-Jensen Wound Assessment Tool (BWAT), formerly known as the Pressure Sore Status Tool (PSST). (Strength of Evidence = B)

- 1.2. Use clinical judgment to assess signs of healing such as decreasing amount of exudate, decreasing wound size, and improvement in wound bed tissue. (Strength of Evidence = C)
- 1.3. Consider using baseline and serial photographs (when equipment is available) to monitor pressure ulcer healing over time. Use standard photographic techniques. (Strength of Evidence = C)
- 1.4. Consider the use of reliable and valid electronically assisted data-collection devices. (Strength of Evidence = C)
2. Re-evaluate the pressure ulcer, the plan of care, and the individual if the pressure ulcer does not show progress toward healing within 2 weeks (or as expected given the individual's overall condition and ability to heal). (Strength of Evidence = C)
 - 2.1. This recommendation applies to situations where the goal is healing (i.e., intent to heal). (Strength of Evidence = C)
 - 2.2. Signs of deterioration should be addressed immediately. (Strength of Evidence = C)

Role of Nutrition in Pressure Ulcer Healing

1. Screen and assess nutritional status for each individual with a pressure ulcer at admission and with each condition change — and/or when progress toward pressure ulcer closure is not observed. (Strength of Evidence = C)
 - 1.1. Refer all individuals with a pressure ulcer to the dietitian for early assessment of and intervention for nutritional problems. (Strength of Evidence = C)
 - 1.2. Assess weight status for each individual to determine weight history and significant weight loss from usual body weight ($\geq 5\%$ change in 30 days or $\geq 10\%$ in 180 days). (Strength of Evidence = C)
 - 1.3. Assess the individual's ability to eat independently. (Strength of Evidence = C)
 - 1.4. Assess the adequacy of total nutrient intake (food, fluid, oral supplements, enteral/parenteral feedings). (Strength of Evidence = C)
2. Provide sufficient calories. (Strength of Evidence = B)

- 2.1. Provide 30-35 kcalories/kg body weight for individuals under stress with a pressure ulcer. Adjust formula based on weight loss, weight gain, or level of obesity. Individuals who are underweight or who have had significant unintentional weight loss may need additional kcalories to cease weight loss and/or regain lost weight. (Strength of Evidence = C)
- 2.2. Revise and modify (liberalize) dietary restrictions when limitations result in decreased food and fluid intake. These adjustments are to be managed by a dietitian or medical professional. (Strength of Evidence = C)
- 2.3. Provide enhanced foods and/or oral supplements between meals if needed. (Strength of Evidence = B)
- 2.4. Consider nutritional support (enteral or parenteral nutrition) when oral intake is inadequate. This must be consistent with the individual's goals. (Strength of Evidence = C)
3. Provide adequate protein for positive nitrogen balance for an individual with a pressure ulcer. (Strength of Evidence = B)
 - 3.1. Offer 1.25 to 1.5 grams protein/kg body weight daily for an individual with a pressure ulcer when compatible with goals of care, and reassess as condition changes. (Strength of Evidence = C)
 - 3.2. Assess renal function to ensure that high levels of protein are appropriate for the individual. (Strength of Evidence = C)
4. Provide and encourage adequate daily fluid intake for hydration. (Strength of Evidence = C)
 - 4.1. Monitor individuals for signs and symptoms of dehydration: changes in weight, skin turgor, urine output, elevated serum sodium, or calculated serum osmolality. (Strength of Evidence = C)
 - 4.2. Provide additional fluid for individuals with dehydration, elevated temperature, vomiting, profuse sweating, diarrhea, or heavily draining wounds. (Strength of Evidence = C)
5. Provide adequate vitamins and minerals. (Strength of Evidence = B)
 - 5.1. Encourage consumption of a balanced diet that includes good sources of vitamins and minerals. (Strength of Evidence = B)
 - 5.2. Offer vitamin and mineral supplements when dietary intake is poor or deficiencies are confirmed or suspected. (Strength of Evidence = B)

Pain Assessment and Management

Assess for Pain

1. **Assess all individuals for pain related to a pressure ulcer or its treatment. (Strength of Evidence = B)**
2. **Assess for pressure-ulcer-related pain in adults using a validated scale. (Strength of Evidence = B)**
3. **Assess for pain in neonates and children using a validated scale. (Strength of Evidence = C)**
 - 3.1. **Use the FLACC (Face, Leg, Activity, Cry, and Consolability) tool for children 2 months to 7 years of age. (Strength of Evidence = C)**
 - 3.2. **Use the CRIES (Crying; Requires O₂ for Saturation >95%; Increasing vital signs; Expression; Sleepless) Scale for neonates up to 6 months. (Strength of Evidence = C)**
4. **An assessment of pain should include an assessment of body language and nonverbal cues (e.g., change in activity, loss of appetite, guarding, grimacing, and moaning). (Strength of Evidence = C)**

Prevent Pain

1. **Use a lift or transfer sheet to minimize friction and/or shear when repositioning an individual, keeping bed linens smooth and unwrinkled. (Strength of Evidence = C)**
2. **Position the individual off of the pressure ulcer whenever possible (see Support Surface and Repositioning section). (Strength of Evidence = C)**
3. **Avoid postures that increase pressure, such as Fowler's position greater than 30 degree or 90 degree side-lying position, or the semi-recumbent position. (Strength of Evidence = C)**
4. **Minimize pressure ulcer pain by handling all wounds gently; flushing and not rubbing unnecessarily during cleansing; and protecting the periwound skin. (Strength of Evidence = C)**

Manage General Pain

1. **Organize care delivery to ensure that it is coordinated with pain medication administration and that minimal interruptions follow. Set priorities for treatment. (Strength of Evidence = C)**
2. **Encourage individuals to request a "time out" during any procedure that causes pain. (Strength of Evidence = C)**

3. Reduce pressure ulcer pain by keeping the wound bed covered and moist, and using a non-adherent dressing. (Note: Stable dry eschar is usually not moistened.) (Strength of Evidence = B)
4. Use dressings less likely to cause pain and/or those likely to require less frequent dressing changes (e.g., hydrocolloids, hydrogels, alginates, polymeric membrane foams, foam, soft silicone dressings, and ibuprofen-impregnated dressings [not available in the U.S.]). Note: Gauze dressings are more likely to cause pain. See Dressings section for further information. (Strength of Evidence = C)
5. For an individual with pain from a pressure ulcer, music, meditation, distraction, conversations, and guided imagery are sometimes beneficial. (Strength of Evidence = C)
6. Administer pain medication regularly, in the appropriate dose, to control chronic pain following the World Health Organization Dosing Ladder. (Strength of Evidence = C)
7. Encourage repositioning as a means to reduce pain, if consistent with the individual's wishes. (Strength of Evidence = C)

Reduce Debridement Pain

1. Use adequate pain-control measures, including additional dosing at times of wound manipulation, wound cleansing, dressing change, debridement, etc. (See sections on cleansing, dressings, debridement, etc. for additional specific recommendations). (Strength of Evidence = C)
2. Consider topical opioids (diamorphine or benzydamine 3%) to reduce or eliminate pressure ulcer pain. (Strength of Evidence = B)
3. Apply topical medications according to manufacturer's directions to allow adequate time for action prior to wound treatments. (Strength of Evidence = C)

Manage Chronic Pain

1. Manage persistent pressure ulcer pain (neuropathic) with a local anesthetic or an adjuvant (antidepressant or antiepileptic), as well as with transcutaneous nerve stimulation, warm applications, or tricyclic antidepressants. (Strength of Evidence = C)
2. Refer the individual with chronic pain related to pressure ulceration to the appropriate pain and/or wound clinic resources. (Strength of Evidence = C)

Educate Individuals, Family and Health Care Providers

1. Educate the individuals, caregivers, and health care providers about causes, assessment and management of pressure ulcer pain. (Strength of Evidence = C)

Support Surfaces for Treatment of Pressure Ulcers

This section addresses support surface **recommendations for individuals with existing pressure ulcers**. Refer to the Support Surfaces section in the Prevention Guideline for information on prevention of additional pressure ulcers and general guidance on positioning. Refer to the Glossary in the Clinical Practice Guideline for selected terms and definitions associated with support surfaces.

Support surfaces alone neither prevent nor heal pressure ulcers. They are to be used as part of a total program of prevention and treatment. When pressure ulcers deteriorate or fail to heal, the professional should consider replacing the existing support surface with one that will improve pressure redistribution and microclimate (heat and moisture control) for the individual. Changing the support surface is only one of several strategies to consider. The individual and his/her pressure ulcer should be re-evaluated. Preventive interventions and local wound care should also be intensified as needed. A significant increase in risk status may also prompt such re-evaluation of the individual and the support surface.

General Recommendations

Support Surfaces

1. Provide a support surface that is properly matched to the individual's needs for pressure redistribution, shear reduction, and microclimate control. (Strength of Evidence = C)
2. Replace the existing mattress with a support surface that provides better pressure redistribution, shear reduction, and microclimate control for the individual if she or he:
 - Cannot be positioned off of the ulcer
 - Has pressure ulcers on two or more turning surfaces (e.g., the sacrum and trochanter), limiting turning options
 - Fails to heal or demonstrates ulcer deterioration despite appropriate comprehensive care
 - Is at high risk for additional ulcers
 - "Bottoms out" on the existing support surface(Strength of Evidence = C)
3. If pressure ulcers are not healing:
 - 3.1. Re-evaluate the individual and his/her pressure ulcer(s).

- 3.2. Intensify prevention strategies as indicated.**
- 3.3. Consider changing the support surface to improve pressure redistribution, shear reduction, and microclimate control matched to the individual's needs. (Strength of Evidence = C)**
- 4. Before replacing the existing mattress:**
 - 4.1. Evaluate the effectiveness of previous and current prevention and treatment plans.**
 - 4.2. Set treatment goals consistent with the individual's goals, values, and lifestyle. (Strength of Evidence = C)**
- 5. Select a support surface that meets the individual's needs. Consider the following factors:**
 - **Number, severity, and location of the pressure ulcer(s);**
 - **Risk for additional pressure ulcers;**
 - **Need for additional features, such as ability to control moisture, temperature, and friction/shear. (Strength of Evidence = C)**
- 6. Choose a support surface that is compatible with the care setting. (Strength of Evidence = C)**
- 7. Evaluate the appropriateness and functionality of the support surfaces on every encounter. (Strength of Evidence = C)**
- 8. Verify that the support surface is still functioning to its original intended specifications before using it for an individual with an existing pressure ulcer. (Strength of Evidence = C)**
- 9. Identify and prevent potential complications of support surface use. Refer to the Clinical Practice Guideline for details. (Strength of Evidence = C)**
- 10. Choose positioning devices and incontinence pads that are compatible with the support surface. Limit the amount of linen and pads placed on the bed. (Strength of Evidence = C)**

Positioning

- 1. Do not position an individual directly on a pressure ulcer. (Strength of Evidence = C)**
- 2. Continue to turn and reposition the individual regardless of the support surface in use. Establish turning frequency based on the characteristics of the support surface and the individual's response. (Strength of Evidence = C)**

3. **Inspect the skin for additional damage each time the individual is turned or repositioned while in bed. Do not turn the individual onto a body surface that is damaged or still reddened from a previous episode of pressure loading, especially if the area of redness does not blanch (i.e., Category/Stage I pressure ulcer). (Strength of Evidence = C)**
4. **Limit head-of-bed elevation to 30 degrees for an individual on bedrest, unless contraindicated by medical condition. Encourage individuals to sleep in a 30- to 40-degree side-lying position or flat in bed if not contraindicated. (Strength of Evidence = C)**
5. **Use transfer aids to reduce friction and shear. Lift — don't drag — the individual while repositioning. Do not leave moving and handling equipment under the individual after use. (Strength of Evidence = C)**
6. **Increase activity as rapidly as is tolerated. (Strength of Evidence = C)**
7. **Do not leave the individual on a bedpan longer than necessary. (Strength of Evidence = C)**
8. **Do not use ring- or donut-shaped devices. (Strength of Evidence = C)**
9. **Do not apply heating devices (e.g., hot water bottles, heating pads, built-in bed warmers) directly on pressure ulcers. (Strength of Evidence = C)**

Heat increases the metabolic rate, induces sweating, and decreases the tolerance of the tissue for pressure. When the body heat cannot dissipate, it will increase the risk of skin maceration and may impede healing.

Category/Stage I and II Pressure Ulcers

Note: Selection of support surfaces is complex and cannot be determined solely on the basis of the category/stage of the ulcer.

While in Bed

1. **Consider higher-specification foam or similar nonpowered pressure-redistribution support surfaces for Category/Stage I and II pressure ulcers. (Strength of Evidence = C)**
2. **Avoid prolonged head-of-bed elevation and a slouched position that places pressure and shear on the sacrum and coccyx. (Strength of Evidence = C)**

While in a Chair

1. **Use a pressure-redistribution cushion in the chair for individuals with Category/Stage I or II pressure ulcers. (Strength of Evidence = C)**

2. **Minimize seating time and consult a seating specialist if pressure ulcers worsen on the seating surface selected. (Strength of Evidence = C)**
3. **Ensure that the feet are properly supported either directly on the floor, on a footstool, or on footrests when sitting (upright) in a bedside chair or wheelchair. (Strength of Evidence = C)**
4. **If sitting in a chair is necessary for individuals with pressure ulcers on the sacrum/coccyx or ischia, limit sitting to three times a day in periods of 60 minutes or less. Consult a seating specialist to prescribe an appropriate seating surface and/or positioning techniques to avoid or minimize pressure on the ulcer. (Strength of Evidence = C)**
5. **Avoid seating an individual with an ischial ulcer in a fully erect posture (in chair or bed). (Strength of Evidence = C)**
6. **Modify sitting-time schedules and re-evaluate the seating surface and the individual's posture if the ulcer worsens or fails to improve. (Strength of Evidence = C)**

Category/Stage I and II Pressure Ulcers of the Heel

Note: Selection of support surfaces is complex and cannot be determined solely on the basis of the category/stage of the ulcer.

Relieve pressure under the heel(s) with Category/Stage I or II pressure ulcers by placing legs on a pillow to “float the heels” off the bed or by using pressure-reducing devices with heel suspension. (Strength of Evidence = B)

Deep Tissue Injury

Note: Selection of support surfaces is complex and cannot be determined solely on the basis of the category/stage of the ulcer.

Position the individual off of the area(s) of suspected deep tissue injury with intact skin. If pressure over the area cannot be relieved by repositioning, evaluate the individual and provide a support surface properly matched to his/her needs, considering pressure redistribution, shear reduction, and microclimate control. Keep the individual off of the area as much as possible. (Strength of Evidence = C)

Category/Stage III, IV, and Unstageable Pressure Ulcers

Note: Selection of support surfaces is complex and cannot be determined solely on the basis of the category/stage of the ulcer.

Position the individual off of the area(s) of Category/Stage III, IV, and unstageable pressure ulcers. If pressure over the area cannot be relieved by repositioning or if there are pressure ulcers on multiple turning surfaces, evaluate the individual

and provide a support surface properly matched to his/her needs, considering pressure redistribution, shear reduction, and microclimate control. Keep the individual off of the area as much as possible. (Strength of Evidence = B)

Refer to the Clinical Practice Guideline for a summary of research investigating the use of various support surfaces to create an environment conducive to healing for Category/Stage III, IV, and unstageable pressure ulcers. It is the responsibility of the professional to provide the most appropriate support surface to meet the individual's needs for pressure redistribution, microclimate control, and comfort.

Category/Stage III, IV, and Unstageable Pressure Ulcers of the Heel

Note: Selection of support surfaces is complex and cannot be determined solely on the basis of the category/stage of the ulcer.

- 1. Place the leg in a device that elevates the heel from the surface of the bed, completely offloading the pressure ulcer. (Strength of Evidence = C)**
- 2. Apply the device according to the manufacturer's instructions. (Strength of Evidence = C)**
- 3. Ensure that the device is not too tight and does not create additional pressure damage. Check device placement more frequently in individuals with neuropathy, peripheral arterial disease, lower-extremity edema; or who are likely to develop edema. (Strength of Evidence = C)**
- 4. Remove the device periodically to assess skin integrity. (Strength of Evidence = C)**

Special Populations

Most previous guidelines have provided general recommendations that did not address the special needs of critically ill, spinal-cord-injured, and bariatric individuals. These recommendations address the unique needs of these special populations in relation to pressure redistribution, shear reduction, and microclimate control.

Critically Ill Individuals

- 1. Consider the need to change support surfaces for individuals with poor local and systemic oxygenation and perfusion to improve pressure redistribution, shear reduction, and microclimate control and utilize additional features (e.g., turn assistance, percussion) as needed. (Strength of Evidence = C)**
- 2. Consider the need to change support surfaces for individuals who cannot be turned for medical reasons such as spinal instability and hemodynamic instability. Resume routine repositioning as soon as these conditions stabilize. (Strength of Evidence = C)**

- 3. Consider slow, gradual turns allowing sufficient time for stabilization of hemodynamic and oxygenation status. (Strength of Evidence = C)**

Some individuals are truly too unstable to turn. However, turning the individual more slowly or in small increments that allow adequate time for stabilization of vital signs should be considered when possible.

- 4. Consider more frequent small shifts in position to allow some reperfusion in individuals who cannot tolerate frequent major shifts in body position. Small shifts do not replace support-surface changes when needed or turning (major shifts in body position) when possible. (Strength of Evidence = C)**
- 5. Prevent shear injury when lateral-rotation features are used. Assess skin frequently for shear injury. (Strength of Evidence = C)**

Lateral Rotation in Individuals without Pressure Ulcers

- 6. Secure the individual with bolster pads (provided by the manufacturer) to prevent sacral shearing when lateral-rotation features are selected for individuals without pressure ulcers. The individual should be aligned properly in the center of the surface. (Strength of Evidence = C)**
- 7. Continue to turn the individual and assess skin for pressure and shear damage. Discontinue lateral rotation at the first sign of tissue damage, and re-evaluate the individual and the support surface. (Strength of Evidence = C)**
- 8. Change lateral-rotation support surface to a support system with improved pressure redistribution, shear reduction, and microclimate control and without rotation when there is evidence of shear injury. Position the individual off of the area of injury as much as possible. (Strength of Evidence = C)**

Lateral Rotation in Individuals with Pressure Ulcers

- 9. Consider alternative methods of pressure redistribution (or avoid lateral-rotation beds) in individuals with sacral or buttock pressure ulcers. (Strength of Evidence = C)**
- 10. Offload the pressure ulcer(s) in individuals undergoing lateral-rotation therapy. (Strength of Evidence = C)**
- 11. Inspect the pressure ulcer and the periulcer skin for shear injury with every dressing change. Shear injury may appear as deterioration of the ulcer edge, undermining, and/or as increasing inflammation of periulcer skin or the ulcer. (Strength of Evidence = C)**

Continued use of lateral rotation may be necessary for individuals in respiratory distress. In all cases, the risks and benefits of continued lateral rotation should be weighed in individuals with existing pressure ulcers.

Spinal-Cord-Injured Individuals

Ideally, ischial ulcers should heal in an environment where the ulcers are free of pressure and other mechanical stress. Total bedrest may be prescribed to create a pressure-free wound environment. However, this approach comes with potential physical complications (e.g., muscle wasting, deconditioning, respiratory complications), psychological harm, social isolation, and financial challenges for the individual and his/her family. Balancing physical, social, and psychological needs against the need for total offloading (i.e., total bedrest) creates a challenging dilemma for the individual and the professional.

Use of a wheelchair is imperative for spinal-cord-injured individuals. Sitting time may need to be restricted when ulcers are present on sitting surfaces. Seating cushions must be high-immersion, uniform-loading distribution cushions. Refer to the Consortium on Spinal Cord Injury Medicine guidelines for additional information.

Wheelchair Seating

- 1. Refer individuals to a seating professional for evaluation if sitting is unavoidable. (Strength of Evidence = C)**
- 2. Select a cushion that effectively redistributes the pressure away from the pressure ulcer. (Strength of Evidence = C)**
- 3. Individualize the prescription of a wheelchair and seating support surface and associated equipment for posture and pressure redistribution. (Strength of Evidence = C)**
 - 3.1. Consider body size and configuration for optimal selection of seating systems. (Strength of Evidence = C)**
 - 3.2. Determine the effects of posture and deformity on pressure distribution. (Strength of Evidence = C)**
 - 3.3. Consider mobility and lifestyle needs in selecting support surface(s). (Strength of Evidence = C)**
 - 3.4. Select and periodically re-evaluate wheelchair and seating systems according to individualized anthropometric, ergonomic, and functional principles. (Strength of Evidence = C)**

Wheelchair and Cushion Characteristics and Maintenance

- 1. Seat spinal-cord-injured individuals with ischial ulcers on a seating support surface that provides contour, uniform pressure distribution, and high immersion or offloading. (Strength of Evidence = B)**

- 2. Use alternating-pressure seating devices judiciously for individuals with existing pressure ulcers. Weigh the benefits of off-loading against the potential for shear based on the construction and operation of the cushion. (Strength of Evidence = C)**

Alternating-pressure seating devices have been used successfully in many clinical settings; however, individual responses to the high-pressure phase may vary. Because the potential for shear across alternating cells exists, the effect on the individual should be carefully observed.

- 3. Select a stretchable cushion cover that fits loosely on the top surface of the cushion and is capable of conforming to the body contours. (Strength of Evidence = C)**
- 4. Assess the cushion and cover for heat dissipation. Select a cushion and cover that permit air exchange to minimize temperature and moisture at the buttock interface. (Strength of Evidence = C)**
- 5. Inspect and maintain all aspects of the wheelchair seating system at appropriate regular intervals to ensure proper functioning and meeting of the individual's needs. (Strength of Evidence = C)**
- 6. Provide complete and accurate training on use and maintenance of wheelchair and cushion devices delivered to the individual. (Strength of Evidence = C)**

Activity Options for Individuals with Pressure Ulcers on Sitting Surfaces

- 1. Weigh the risks and benefits of supported sitting against benefits to both physical and emotional health. (Strength of Evidence = C)**
- 2. Consider periods of bedrest to promote ischial and sacral ulcer healing. (Strength of Evidence = C)**
- 3. Limit sitting time for spinal-cord-injured individuals with ischial ulcers according to skin tolerance and pressure ulcer response. (Strength of Evidence = C)**
- 4. Develop a schedule for progressive sitting according to the individual's tolerance and pressure ulcer response. (Strength of Evidence = C)**
- 5. Maintain proper positioning and postural control. (Strength of Evidence = C)**
 - 5.1. Provide adequate seat tilt to prevent sliding forward in the wheelchair, and adjust footrests and armrests to maintain proper posture and pressure redistribution. (Strength of Evidence = C)**

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- 5.2. Avoid the use of elevating legrests if the individual has inadequate hamstring length. (Strength of Evidence = C)
 6. Establish pressure-relief schedules that prescribe the frequency and duration of weight shifts. (Strength of Evidence = C)
 - 6.1. Teach individuals to do “pressure-relief lifts” or other pressure-relieving maneuvers as appropriate. (Strength of Evidence = C)
 - 6.2. Use variable-position seating (tilt-in-space, recline, and standing) in manual or power wheelchairs to redistribute load off of the seat surface. (Strength of Evidence = C)
 - 6.3. Identify effective pressure-relief methods and educate individuals in performance of methods consistent with the ability of the individual. (Strength of Evidence = C)
 7. Use the split-sling type of mechanical lift to transfer an individual into a wheelchair or bedside chair when the individual needs total assistance to transfer. Remove sling immediately after transfer. (Strength of Evidence = C)

Bariatric (Obese) Individuals

Bed Selection

1. Fit the individual to the bed from the time of admission. (Strength of Evidence = C)
 - 1.1. Use beds that support the weight of the individual. (Strength of Evidence = C)
 - 1.2. Check for “bottoming out” of the mattress. (Strength of Evidence = C)
 - 1.3. Ensure that the bed surface is sufficiently wide to allow turning of the individual. (Strength of Evidence = C)
 - 1.4. Confirm that the width of the bariatric individual does not reach the side rails of the bed when the individual is turned side-to-side. (Strength of Evidence = C)
2. Consider using features that provide air flow over the surface of the skin to facilitate fluid evaporation if the skin is excessively moist. (Strength of Evidence = C)

Equipment Selection

1. Use a wheelchair and chair wide enough to accommodate the individual’s girth. (Strength of Evidence = C)

2. **Provide bariatric walkers, overhead trapezes on beds, and other devices to support continued mobility and independence. (Strength of Evidence = C)**

Assessment and Positioning

1. **Get adequate assistance to fully inspect all skin folds. (Strength of Evidence = C)**
 - Pressure ulcers may develop in unique locations, such as beneath folds of skin and in locations where tubes and other devices have been compressed between skin folds.
 - Pressure ulcers develop over bony prominences, but may also result from tissue pressure across the buttocks and other areas of high adipose tissue concentration.
2. **Avoid pressure on skin from tubes and other medical devices. (Strength of Evidence = C)**
3. **Use pillows or other positioning devices to offload pannus or other large skin folds and prevent skin-on-skin pressure. (Strength of Evidence = C)**

Pressure Ulcer Care

1. **Assess pressure ulcers carefully for signs of infection and delays in healing, which are more common in bariatric individuals. (Strength of Evidence = C)**
2. **Fill open wounds with dressing materials carefully to reduce risk of losing dressings in the wound. Document the number of dressings that are used to fill large wounds and ensure that all dressings are removed at the next dressing change. (Strength of Evidence = C)**
3. **Provide adequate nutrition to support healing. (Strength of Evidence = C)**

Obese individuals, despite their size, may lack adequate nutrients to support healing of pressure ulcers. Goals of weight loss may need to be postponed or modified to ensure that adequate nutrients are provided for healing (see Nutrition section).

Cleansing

1. **Cleanse the pressure ulcer and surrounding skin at the time of each dressing change. (Strength of Evidence = C)**
 - 1.1. **Cleanse healing, clean pressure ulcers with normal saline or potable water (i.e., water suitable for drinking). (Strength of Evidence = C)**

1.2. Consider using cleansing solutions with surfactants and/or antimicrobials to clean pressure ulcers with debris, confirmed infection, suspected infection, or suspected high levels of bacterial colonization. (Strength of Evidence = C)

1.3. Cleanse surrounding skin. (Strength of Evidence = B)

2. Cleanse the pressure ulcer using an irrigation solution, and apply sufficient pressure to cleanse the wound without damaging tissue or driving bacteria into the wound. (Strength of Evidence = C)

Generally, irrigation pressure between 4 and 15 pounds per square inch (PSI) should be adequate to clean the surface of the pressure ulcer without causing trauma to the wound bed.

3. Contain and properly dispose of used irrigation solution to reduce cross-contamination. (Strength of Evidence = C)

Debridement

1. Debride devitalized tissue within the wound bed or edge of pressure ulcers when appropriate to the individual's condition and consistent with overall goals of care. (Strength of Evidence = C)

2. Select the debridement method(s) most appropriate to: the individual's condition; goals of care; ulcer/per ulcer status; type, quantity, and location of necrotic tissue; care setting; and professional accessibility/capability. (Strength of Evidence = C)

Potential methods include sharp/surgical techniques, autolysis, enzymatic debridement, mechanical debridement, and biosurgical debridement (maggot therapy). Refer to the Clinical Practice Guideline for a description of each technique as well as indications and contraindications.

3. Use mechanical, autolytic, enzymatic, and/or biosurgical methods of debridement when there is no urgent clinical need for drainage or removal of necrotic tissue. (Strength of Evidence = C)

4. Perform surgical debridement in the presence of advancing cellulitis, crepitus, fluctuance, and/or sepsis secondary to ulcer-related infection. (Strength of Evidence = C)

5. **Sharp/surgical debridement must be performed by specially trained, competent, qualified, and licensed healthcare professionals consistent with local legal and regulatory statutes. (Strength of Evidence = C)**
6. **Use sterile instruments to sharply/surgically debride. (Strength of Evidence = C)**
7. **Use sharp debridement with caution in the presence of: immune incompetence, compromised vascular supply to the limb, or lack of antibacterial coverage in systemic sepsis. Relative contraindications include anticoagulant therapy and bleeding disorders. (Strength of Evidence = C)**
8. **Refer individuals with Category/Stage III or IV pressure ulcers with undermining, tunneling, sinus tracts, and/or extensive necrotic tissue that cannot be easily removed by other debridement methods for surgical evaluation as is appropriate with the individual's condition and goals of care. (Strength of Evidence = C)**
9. **Manage pain associated with debridement. (Strength of Evidence = C)**
10. **Perform a thorough vascular assessment prior to debridement of lower extremity pressure ulcers (e.g., rule out arterial insufficiency). (Strength of Evidence = C)**
11. **Do not debride stable, hard, dry eschar in ischemic limbs. (Strength of Evidence = C)**
 - 11.1. **Assess wound daily for signs of erythema, tenderness, edema, purulence, fluctuance, crepitance, and/or malodor (i.e., signs of infection). (Strength of Evidence = C)**
 - 11.2. **Consult a vascular surgeon urgently in the presence of the above symptoms. (Strength of Evidence = C)**
 - 11.3. **Debride urgently in the presence of the above symptoms if consistent with the individual's wishes and overall goals of care. (Strength of Evidence = C)**
12. **Perform maintenance debridement on a chronic pressure ulcer until the wound bed is covered with granulation tissue and free of necrotic tissue. (Strength of Evidence = C)**

Dressings

Wound dressings are a central component of pressure ulcer care. The selection of the dressing should be based on the tissue in the ulcer bed, the condition of the skin around the ulcer bed, and the goals of the person with the ulcer. Generally maintaining a moist ulcer bed is the ideal when the ulcer bed is clean and granulating to promote healing or closure. Several moisture-retentive dressings are available. However, the type of dressing may change over time as the ulcer heals or deteriorates. Refer to the Clinical Practice Guideline for a more complete description of all dressing types as well as a discussion of indications and contraindications for their use.

General Recommendations

1. **Assess pressure ulcers at every dressing change and confirm the appropriateness of the current dressing regimen. (Strength of Evidence = C)**
2. **Follow manufacturer recommendations, especially related to frequency of dressing change. (Strength of Evidence = C)**
3. **The plan of care should guide usual dressing wear times and contain provisional plans for dressing changes as needed (for family, the individual, and staff) due to soilage, loosening, etc. (Strength of Evidence = C)**
4. **Choose a dressing to keep the wound bed moist. (Strength of Evidence = C)**
5. **Choose a dressing that remains in contact with the wound bed or skin barrier product to keep the periwound dry and prevent maceration. (Strength of Evidence = C)**

Hydrocolloid Dressings

1. **Use hydrocolloid dressings for clean Category/Stage II pressure ulcers in body areas where they will not roll or melt. (Strength of Evidence = B)**
2. **Consider using hydrocolloid dressing on noninfected, shallow Stage III pressure ulcers. (Strength of Evidence = B)**
3. **Change the hydrocolloid dressing if feces seep beneath the dressing. (Strength of Evidence = C)**
4. **Consider using filler dressings beneath hydrocolloid dressings in deep ulcers to fill in dead space. (Strength of Evidence = B)**
5. **Consider using hydrocolloid dressings to protect body areas at risk for friction injury or risk of injury from tape. (Strength of Evidence = C)**

6. Carefully remove hydrocolloid dressings on fragile skin to reduce skin trauma. (Strength of Evidence = B)

Transparent Film Dressings

1. Consider using film dressings to protect body areas at risk for friction injury or risk of injury from tape. (Strength of Evidence = C)
2. Consider using film dressings for autolytic debridement when the individual is not immunocompromised. (Strength of Evidence = C)
3. Consider using film dressings as a secondary dressing for ulcers treated with alginates or other wound filler that will likely remain in the ulcer bed for an extended period of time (e.g., 3-5 days). (Strength of Evidence = C)
4. Carefully remove film dressings on fragile skin to reduce skin trauma. (Strength of Evidence = C)
5. Do not use film dressings as the tissue interface layer over moderately to heavily exudating ulcers. (Strength of Evidence = C)
6. Do not use film dressings as the cover dressing over enzymatic debriding agents, gels, or ointments. (Strength of Evidence = C)

Hydrogel Dressings

1. Consider the use of hydrogel dressings on shallow, minimally exudating pressure ulcers. (Strength of Evidence = B)
2. Consider the use of hydrogel dressings for treatment of dry ulcer beds so that the gel can moisten the ulcer bed. (Strength of Evidence = C)
3. Consider the use of hydrogel dressings for painful pressure ulcers. (Strength of Evidence = C)
4. Consider the use of hydrogel sheet dressings for pressure ulcers without depth and contours and/or on body areas that are at risk for dressing migration. (Strength of Evidence = C)
5. Consider the use of amorphous hydrogel for pressure ulcers with depth and contours and/or on body areas that are at risk for dressing migration. (Strength of Evidence = C)
6. Consider the use of amorphous hydrogel for pressure ulcers that are not infected and are granulating. (Strength of Evidence = B)

Alginate Dressings

1. Consider alginate dressings for the treatment of moderately and heavily exudating ulcers. (Strength of Evidence = B)
2. Consider alginate dressings in infected pressure ulcers when there is proper concurrent treatment of infection. (Strength of Evidence = C)
3. Gently remove the alginate dressing, irrigating it first to ease removal if necessary. (Strength of Evidence = C)
4. Consider lengthening the dressing-change interval or changing the type of dressing if the alginate dressing is still dry at the scheduled time for dressing change. (Strength of Evidence = C)

Foam Dressings

1. Consider using foam dressings on exudative Category/Stage II and shallow Category/Stage III pressure ulcers. (Strength of Evidence = B)
2. Avoid using single small pieces of foam in exudating cavity ulcers. (Strength of Evidence = C)
3. Consider using foam dressings on painful pressure ulcers. (Strength of Evidence = C)
4. Consider placing foam dressings on body areas and pressure ulcers at risk for shear injury. (Strength of Evidence = B)

Polymeric Membrane Dressings

5. Consider using polymeric membrane dressings for Category/Stage II and shallow Category/Stage III pressure ulcers. (Strength of Evidence = C)

Silver-Impregnated Dressings

1. Consider use of silver dressings for pressure ulcers that are infected or heavily colonized. (Strength of Evidence = B)
2. Consider use of silver dressings for ulcers at high risk of infection. (Strength of Evidence = B)
3. Avoid prolonged use of silver dressings; discontinue when the infection is controlled. (Strength of Evidence = C)
4. Consider use of silver sulfadiazine (Silvadene®) in heavily contaminated or infected pressure ulcers until definitive debridement is accomplished. (Strength of Evidence = C)

Honey-Impregnated Dressings

Consider use of dressings impregnated with medical-grade honey for the treatment of Category/Stage II and III pressure ulcers. (Strength of Evidence = C)

Cadexomer Iodine Dressings

1. Consider use of cadexomer iodine dressings in moderately to highly exudating pressure ulcers. (Strength of Evidence = C)
2. Avoid use of cadexomer iodine in individuals with iodine sensitivity and in those with thyroid disease. (Strength of Evidence = C)
3. Avoid use of cadexomer iodine in large-cavity ulcers that require frequent (daily) dressing changes. (Strength of Evidence = C)

Gauze Dressings

1. Avoid use of gauze dressings for clean, open pressure ulcers because they are labor-intensive to use, cause pain when removed if dry, and lead to desiccation of viable tissue if they dry. (Strength of Evidence = C)
2. When other forms of moisture-retentive dressing are not available, continually moist gauze is preferable to dry gauze. (Strength of Evidence = C)
3. Use gauze dressings as the cover dressing to reduce evaporation when the tissue interface layer is moist. (Strength of Evidence = C)
4. Use loosely woven gauze for highly exudative ulcers; use tightly woven gauze for minimally exudative ulcers. (Strength of Evidence = C)
5. When other forms of moisture-retentive dressing are not available, ulcers with large tissue defects and dead space should be loosely filled with saline-moistened gauze, rather than tightly packed, to avoid creating pressure on the wound bed. (Strength of Evidence = C)
6. Change gauze packing frequently to promote absorption of exudate. (Strength of Evidence = C)
7. Use a single gauze strip/roll to fill deep ulcers; do not use multiple single gauze dressings, because retained gauze in the ulcer bed can serve as a source of infection. (Strength of Evidence = C)
8. Consider using impregnated forms of gauze to prevent evaporation of moisture from continuously moist gauze dressings. (Strength of Evidence = C)

Practice varies widely in relation to gauze dressings. Increased infection rates, retained dressing particles, and pain have led professionals in some regions of the world to avoid the use of gauze dressings for open chronic wounds, such as

pressure ulcers, in favor of advanced wound dressings. Gauze dressings today are fairly limited and primarily used as surgical dressings. Due to the need for frequent changes, they have been shown to be costly in professional time. However, the other available topical dressings are expensive and not always in the formulary; therefore, the use of saline-impregnated or moistened gauze to protect the wound is preferable to allowing the ulcer to dry out.

Silicone Dressings

- 1. Consider using silicone dressings as a wound contact layer to promote atraumatic dressing changes. (Strength of Evidence = B)**
- 2. Consider using silicone dressings to prevent tissue injury when the ulcer or periwound tissue is fragile or friable. (Strength of Evidence = B)**

Collagen Matrix Dressings

Consider the use of collagen matrix dressings for nonhealing Category/Stage III and IV pressure ulcers. (Strength of Evidence = C)

Composite Dressings

Many of the dressing types listed here are manufactured in combinations. Please refer to the statements about the individual components when considering the use of composites.

Assessment and Treatment of Infection

Bacteria are present on all skin surfaces. When the primary defense provided by intact skin is lost, bacteria reside on the wound surface also. When the bacteria (by numbers or virulence) cause damage to the body, infection is present. An impaired host has a reduced ability to combat bacteria. The number of bacteria and their effect on the host can be categorized as contamination, colonization, critical colonization, or infection. Infection is not common in Category/Stage I or II ulcers, and assessment of infection should focus on Category/Stage III and IV ulcers. Infection may spread beyond the pressure ulcer, resulting in serious systemic infections such as cellulitis, fasciitis, osteomyelitis, systemic inflammatory response syndrome (SIRS), or sepsis. To avoid these serious consequences, the professional should focus on identification of high-risk individuals, prevention, early detection, and prompt, effective treatment of pressure ulcer infection.

System Consideration

Follow local infection-control policies to prevent self-contamination and cross-contamination in individuals with pressure ulcers. (Strength of Evidence = C)

Assessment of High-Risk Individuals and Pressure Ulcers

1. Have a high index of suspicion for the likelihood of infection in pressure ulcers that have necrotic tissue or a foreign body present; have been present for a long period of time; are large in size or deep; and/or are likely to be repetitively contaminated (e.g., near the anus). (Strength of Evidence = C)
2. Have a high index of suspicion for local wound infection in individuals with diabetes mellitus, protein-calorie undernutrition, hypoxia or poor tissue perfusion, autoimmune disease, or immunosuppression. (Strength of Evidence = B)
3. Have a high index of suspicion for local infection in pressure ulcers when there are no signs of healing for 2 weeks, or when friable granulation tissue, foul odor, increased pain in the ulcer, increased heat in the tissue around the ulcer, increased drainage from the wound, an ominous change in the nature of the wound drainage (e.g., new onset of bloody drainage, purulent drainage), increased necrotic tissue in the wound bed, pocketing, or bridging is present. (Strength of Evidence = B)

Diagnosis

1. Consider a diagnosis of spreading acute infection if the pressure ulcer has signs of acute infection, such as erythema extending from the ulcer edge, induration, new or increasing pain, warmth, or purulent drainage. The acutely infected ulcer may also be increasing in size or have crepitus, fluctuance, or discoloration in the surrounding skin. The individual may also have systemic signs of infection such as fever, malaise, and lymph node enlargement. Elderly individuals may develop confusion/delirium and anorexia. (Strength of Evidence = C)
2. Determine the bacterial bioburden of the pressure ulcer by tissue biopsy or quantitative swab technique. (Strength of Evidence = B)

The gold standard method for examining microbial load is quantitative culture of viable wound tissue. Surface swabs will only reveal the colonizing organism, and may not reflect deeper tissue infection. An acceptable alternative to quantitative tissue culture is the Levine quantitative swab technique:

- Cleanse wound with normal saline. Blot dry with sterile gauze.
- Culture the healthiest-looking tissue in the wound bed.
- Do not culture exudate, pus, eschar, or heavily fibrous tissue.
- Rotate the end of a sterile alginate-tipped applicator over a 1 cm x 1 cm area for 5 seconds.
- Apply sufficient pressure to swab to cause tissue fluid to be expressed.
- Use sterile technique to break tip of swab into a collection device designed for quantitative cultures.

3. **Consider a diagnosis of pressure ulcer infection if the culture results indicate bacterial bioburden of $\geq 10^5$ CFU/g of tissue and/or the presence of beta hemolytic streptococci. (Strength of Evidence = B)**

Management

1. **Optimize the host response. (Strength of Evidence = C)**
2. **Prevent contamination of the pressure ulcer. (Strength of Evidence = C)**
3. **Reduce the bacterial load in the pressure ulcer (see recommendations on cleansing and debridement). (Strength of Evidence = C)**

Necrotic tissue and slough promote bacterial growth (see sections on debridement, cleansing, and surgical management). Cleansing removes loose debris and planktonic (free-floating) bacteria. Debridement is often required to remove adherent slough and eschar, as well as biofilms.). Once removed, biofilms tend to redevelop. Antimicrobials may help slow the rate of biofilm redevelopment. Additional research is required to elucidate best practice for diagnosing and managing biofilms in pressure ulcers and other chronic wounds.

4. **Consider the use of topical antiseptics that are properly diluted and appropriate for pressure ulcers. Antiseptics should be used for a limited time period to control the bacterial bioburden, clean the ulcer, and reduce surrounding inflammation. The professional should be knowledgeable about proper dilutions, as well as risks of toxicity and adverse reactions. (Strength of Evidence = C)** See Clinical Practice Guideline for additional details.
5. **Consider the use of topical antiseptics for pressure ulcers that are not expected to heal and are critically colonized. (Strength of Evidence = C)**
6. **Consider the use of topical antimicrobial silver or medical-grade honey dressings for pressure ulcers infected with multiple organisms, because these dressings offer broad antimicrobial coverage. However, before applying a honey dressing, make sure that the individual is not allergic to honey, bee products, or bee stings. (Strength of Evidence = C)**
7. **Limit the use of topical antibiotics on infected pressure ulcers, except in special situations. (Strength of Evidence = C)**

In general, topical antibiotics are not recommended for pressure ulcers. Reasons for this include inadequate penetration for deep skin infections, development of antibiotic resistance, hypersensitivity reactions, systemic absorption when applied to large wounds, and local irritant effects, all of which can lead to further delay in wound healing. However, short courses of silver sulfadiazine, topical antibiotic solutions, or topical metronidazole can be useful in certain circumstances — for example, on wounds that have been debrided and cleansed, yet still have a bacterial

bioburden of $\geq 10^5$ CFU/g of tissue and/or the presence of beta hemolytic streptococci. Topical metronidazole might be used for the treatment of malodor in fungating wounds or wounds with anaerobic infection.

8. **Use systemic antibiotics for individuals with clinical evidence of systemic infection, such as positive blood cultures, cellulitis, fasciitis, osteomyelitis, systemic inflammatory response syndrome (SIRS), or sepsis, if consistent with the individual's goals. (Strength of Evidence = C)**
9. **Drain local abscesses. (Strength of Evidence = C)**
10. **Evaluate the individual for osteomyelitis if exposed bone is present, the bone feels rough or soft, or the ulcer has failed to heal with prior therapy. (Strength of Evidence = C)**

Biophysical Agents in Pressure Ulcer Management

Several forms of energy have been studied in the management of pressure ulcers. These include acoustic, mechanical, and kinetic energy as well as energy from the electromagnetic spectrum (EMS). Infrared (thermal) radiation, ultraviolet light (invisible light), and laser (coherent and monochromatic light) are all part of the EMS, as is electrical/electromagnetic stimulation. Biophysical agents can be used to deliver specific treatment substances to the wound bed.

All of these biophysical energies should be delivered using government-agency-approved medical devices as appropriate to the individual's health and wound condition. Use of biophysical agents should be directed by and under the supervision /management of a skilled licensed professional who has been educated and trained in safe and effective methods of choosing the appropriate patient candidate and the method of application and monitoring the positive and untoward effects. Refer to the *Clinical Practice Guideline* for additional clinical guidance and a discussion of supporting research.

Electrical Stimulation

Consider the use of direct contact (capacitative) electrical stimulation (ES) in the management of recalcitrant Category/Stage II, as well as Category/Stage III and IV pressure ulcers to facilitate wound healing. (Strength of Evidence = A)

Electromagnetic Agents

Consider the use of pulsed electromagnetic field (PEMF) treatment for recalcitrant Category/Stage II, III, and IV pressure ulcers. (Strength of Evidence = C)

Phototherapy (Laser, Infrared, Ultraviolet)

Infrared Therapy

There is insufficient evidence from research on pressure ulcers and other chronic wound types to recommend the use of infrared therapy in treating pressure ulcers.

Laser

There is insufficient evidence from research on pressure ulcers and other chronic wound types to recommend the use of laser therapy in treating pressure ulcers.

Ultraviolet Light Therapy

1. **Consider a short-term application of ultraviolet light C (UVC) if traditional therapies fail. (Strength of Evidence = C)**

This recommendation is based primarily on expert opinion. Evidence is inconclusive.

2. **Consider a course of ultraviolet light as an adjunctive therapy to reduce bacterial burden in clean, but critically colonized Category/Stage III and IV pressure ulcers. (Strength of Evidence = C)**

This recommendation is based primarily on expert opinion. Evidence is inconclusive. Ultraviolet light may be considered as an adjunctive therapy; but should not be used instead of other recommended therapies to reduce bacterial burden (see Infection section).

Acoustic Energy (Ultrasound)

1. **Consider use of noncontact low-frequency (40 kHz) ultrasound spray (NC-LFUS) for treatment of clean recalcitrant Category/Stage III and IV pressure ulcers. (Strength of Evidence = C)**

This recommendation is based primarily on expert opinion. There are no studies in pressure ulcers. Studies in other types of chronic wounds report mixed results and some adverse effects.

2. **Consider use of low-frequency (22.5, 25, 35 kHz) ultrasound for debridement of necrotic soft tissue (not eschar). (Strength of Evidence = C)**

This recommendation is based on expert opinion.

3. **Consider use of high-frequency (MHz) ultrasound as an adjunct for the treatment of infected pressure ulcers. (Strength of Evidence = C)**

This recommendation is based primarily on expert opinion. Evidence is inconclusive. High frequency ultrasound may be considered as an adjunctive therapy; but should

not be used instead of other recommended therapies to reduce bacterial burden (see Infection section).

Negative Pressure Wound Therapy

1. **Consider NPWT as an early adjuvant for the treatment of deep, Category/Stage III and IV pressure ulcers. (Strength of Evidence = B)**
2. **Debride the pressure ulcer of necrotic tissue prior to the use of NPWT. (Strength of Evidence = C)**
3. **Follow a safe regimen in applying and removing the NPWT system. (Strength of Evidence = C)** Refer to the *Clinical Practice Guideline* and manufacturer instructions for further details.
4. **Evaluate the pressure ulcer with each dressing change. (Strength of Evidence = C)**
5. **If pain is anticipated or reported, consider placing a nonadherent interface dressing on the wound bed, lowering the level of pressure, and/or changing the type of pressure (continuous or intermittent). (Strength of Evidence = C)**
6. **Educate the individual and his/her family about NPWT when used in the home settings. (Strength of Evidence = C)**

Hydrotherapy: Whirlpool and Pulsatile Lavage with Suction

Whirlpool

1. **Consider a course of whirlpool as an adjunct for wound cleansing and facilitating healing. (Strength of Evidence = C)**
2. **Consider a course of whirlpool for reducing wound bioburden and infection. (Strength of Evidence = C)**

Pulsatile Lavage with Suction

Consider a course of pulsatile lavage with suction for wound cleansing and debridement. (Strength of Evidence = C)

This recommendation is based primarily on expert opinion.

Oxygen for the Treatment of Chronic Wounds

Hyperbaric Oxygen Therapy

There is insufficient evidence to recommend hyperbaric oxygen therapy for the treatment of pressure ulcers.

Topical Oxygen Therapy

There is insufficient evidence to recommend topical oxygen for the treatment of pressure ulcers.

Biological Dressings for the Treatment of Pressure Ulcers

There is insufficient evidence to support the use of biological dressings in the treatment of pressure ulcers. However, there is evidence that the use of biological dressings in the treatment of diabetic (neurotrophic) foot ulcers resulted in a greater percentage of healing compared to the control group.

Growth Factors for the Treatment of Pressure Ulcers

The combined clinical evidence on platelet-derived growth factor (PDGF) suggests that PDGF-BB may improve healing of pressure ulcers. However, the evidence is not sufficient to recommend this treatment for routine use. (Strength of Evidence = B)

Surgery for Pressure Ulcers

These recommendations focus on the care of the individual preoperatively, intraoperatively, and postoperatively. They do not focus on specific surgical techniques; those decisions are better left to an experienced surgeon who has an understanding of the unique needs of the patient.

Preoperative Recommendations

1. Evaluate the need for surgical consultation for operative repair in individuals with Category/Stage III or IV pressure ulcers that are not closing with conservative treatment, or for individuals who desire more rapid closure of the ulcer. (Strength of Evidence = C)
2. Confirm the individual's end-of-life preferences if anticipating surgery. (Strength of Evidence = C)
3. Obtain a surgical consultation for possible urgent drainage and/or debridement if the pressure ulcer has advancing cellulitis or is a suspected source of sepsis. (Strength of Evidence = C)
4. Prior to surgery, optimize physical factors that may impair surgical wound healing. (Strength of Evidence = C)
5. Prior to surgery, optimize psychosocial factors that often impair surgical wound healing. (Strength of Evidence = B)
6. Assess for osteomyelitis; if present, infected bone must be resected prior to or during surgical closure. (Strength of Evidence = B)

Intraoperative Recommendations

1. Position the individual on the operating table with careful attention to protecting pressure points and the airway. (Strength of Evidence = C)
2. Excise the ulcer, including abnormal skin, granulation and necrotic tissue, sinus tracts, bursa and involved bone to the extent possible at surgical closure. (Strength of Evidence = C)
3. Design flaps with composite tissues to improve durability. When possible, chose a flap that will not violate adjacent flap territories to preserve all future options for flap coverage. (Strength of Evidence = C)
4. Use a flap that is as large as possible, placing the suture line away from an area of direct pressure. Minimize tension on the incisions at the time of closure. Consider possible functional loss and rehabilitation needs, especially in ambulatory individuals. (Strength of Evidence = C)
5. Transfer the individual from the operating table onto the bed with adequate help to avoid disruption of the flap. (Strength of Evidence = C)

Postoperative Recommendations

1. Maintain the individual on an intensive pressure-redistribution system that reduces shear and pressure on the operative site, limits tension on the incision(s), and controls microclimate. Do not elevate the head of the bed or move the person from the bed without explicit approval from the surgeon. (Strength of Evidence = C)
2. Protect the blood supply to the flap from pressure and pulling. (Strength of Evidence = C)
3. Report signs of flap failure to the surgeon immediately. (Strength of Evidence = C) See Clinical Practice Guideline for additional details.
4. Monitor drainage from wound drains and make certain that drainage tubes are not kinked or clogged. (Strength of Evidence = C)
5. Prevent hazards of immobility. (Strength of Evidence = C)
6. Turn the individual with a turning sheet to prevent new pressure ulcers. (Strength of Evidence = C)
7. Initiate a program of progressive sitting according to the surgeon's orders. (Strength of Evidence = C)

When weight bearing on the operative site is allowed, weight bearing should be graduated and progressive. Sitting should increase in time if no erythema is noted over weight-bearing areas. Skin tolerance to pressure over the wound site should be assessed after each period of sitting.

8. Position the individual only on a pressure-redistributing chair cushion when he/she is sitting in a chair. (Strength of Evidence = C)

See information in the Support Surfaces for Treatment of Pressure Ulcers section on wheelchair selection.

9. Dress the individual in appropriate clothing to prevent injury to the flap when using slide boards. (Strength of Evidence = C)

Hospital gowns that are open in the back permit the skin of the thighs and buttocks to drag on transfer devices or slide boards. Individuals should be adequately clothed to protect the skin during transfers. Clothing with zippers, buttons or snaps should not be used over the surgical site or pressure points.

10. Confirm the presence of a positive social network at home prior to discharging the individual from a facility. (Strength of Evidence = B)

11. Confirm the individual's ability to procure needed equipment, maintain the equipment, and adhere to postoperative needs after surgery. (Strength of Evidence = C)

Pressure Ulcer Management in Individuals Receiving Palliative Care

Patient and Risk Assessment

1. Complete a comprehensive assessment of the individual. (Strength of Evidence = C)
2. Assess the risk for new pressure ulcer development on a regular basis by using a structured, consistent approach which includes a validated risk assessment tool and a comprehensive skin assessment, refined by using clinical judgment informed by knowledge of key risk factors (see Risk Assessment section). (Strength of Evidence = C)
 - 2.1. Use a general screening tool such as the Braden Scale, Norton Scale, Waterlow Scale, Braden Q (for pediatric patients), or other age-appropriate tool in conjunction with clinical judgment. (Strength of Evidence = C)

- 2.2. Use the Marie Curie Centre Hunters Hill Risk Assessment Tool, specific to individuals in palliative care, in conjunction with clinical judgment for an adult individual. (Strength of Evidence = C)**

Pressure Redistribution

- 1. Reposition and turn the individual at periodic intervals, in accordance with the individual's wishes and tolerance. (Strength of Evidence = C)**
 - 1.1. Establish a flexible repositioning schedule based on individual preferences and tolerance and the pressure-redistribution characteristics of the support surface. (Strength of Evidence = C)**
 - 1.2. Pre-medicate the individual 20 to 30 minutes prior to a scheduled position change for individuals who experience significant pain on movement. (Strength of Evidence = C)**
 - 1.3. Observe the individual's choices in turning, including whether she/he has a "position of comfort," after explaining the rationale for turning. (Strength of Evidence = C)**
 - 1.4. Comfort is of primary importance and may supersede prevention and wound care for individuals who are actively dying or have conditions causing them to have a single position of comfort. (Strength of Evidence = C)**
 - 1.5. Consider changing the support surface to improve pressure redistribution and comfort. (Strength of Evidence = C)**
 - 1.6. Strive to reposition an individual receiving palliative care at least every 4 hours on a pressure-redistributing mattress such as viscoelastic foam, or every 2 hours on a regular mattress. (Strength of Evidence = B)**
 - 1.7. Individualize the turning and repositioning schedule, ensuring that it is consistent with the individual's goals and wishes, current clinical status, and combination of co-morbid conditions, as medically feasible. (Strength of Evidence = C)**
 - 1.8. Document turning and repositioning, as well as the factors influencing these decisions (e.g., individual wishes or medical needs). (Strength of Evidence = C)**
- 2. Consider the following factors in repositioning:**
 - 2.1. Protect the sacrum, elbows, and greater trochanters, which are particularly vulnerable to pressure. (Strength of Evidence = C)**
 - 2.2. Use positioning devices such as foam or pillows, as necessary to prevent direct contact of bony prominences and to avoid having the individual lie directly on the pressure ulcer (unless this is the position of least discomfort, per individual preference). (Strength of Evidence = C)**

2.3. Use heel protectors and/or suspend the length of the leg over a pillow or folded blanket to float the heels. (Strength of Evidence = C)

2.4. Use a chair cushion that redistributes pressure on the bony prominences and increases comfort for an individual who is seated. (Strength of Evidence = C)

Nutrition and Hydration

- 1. Strive to maintain adequate nutrition and hydration compatible with the individual's condition and wishes. Adequate nutritional support is often not attainable when the individual is unable or refuses to eat, based on certain disease states. (Strength of Evidence = C)**
- 2. Allow the individual to ingest fluids and foods of choice. (Strength of Evidence = C)**
- 3. Offer several small meals per day. (Strength of Evidence = C)**
- 4. Offer nutritional protein supplements when ulcer healing is the goal. (Strength of Evidence = C)**

Skin Care

- 1. Maintain skin integrity to the extent possible. (Strength of Evidence = C)**
 - 1.1. Apply skin emollients per manufacturer's directions to maintain adequate skin moisture and prevent dryness. (Strength of Evidence = C)**
 - 1.2. Minimize the potential adverse effects of incontinence on skin. See Prevention section.**

Pressure Ulcer Care

Pain management, odor control, and exudate control are the aspects of pressure ulcer care that tend to be most closely related to supporting the individual's comfort.

- 1. Set treatment goals consistent with the values and goals of the individual, while considering family input. (Strength of Evidence = C)**
 - 1.1. Set a goal to enhance quality of life, even if the pressure ulcer cannot be healed or treatment does not lead to closure/healing. (Strength of Evidence = C)**
 - 1.2. Assess the impact of the pressure ulcer on quality of life for the individual and his/her family. (Strength of Evidence = C)**
 - 1.3. Assess the individual initially and with any significant change in condition, to re-evaluate the plan of care. (Strength of Evidence = C)**

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- 2. Assess the pressure ulcer initially and with each dressing change, but at least weekly (unless the individual is actively dying), and document findings. (Strength of Evidence = C)**
 - 2.1. See Assessment and Monitoring Healing section for general assessment information.**
 - 2.2. Monitor the ulcer in order to continue to meet the goals of comfort and reduction in wound pain, addressing wound symptoms such as odor and exudate. (Strength of Evidence = C)**
 - 3. Manage the pressure ulcer and periwound area on a regular basis as consistent with the individual's wishes. (Strength of Evidence = C)**
 - 3.1. Cleanse the wound with each dressing change using potable water (i.e., water suitable for drinking), normal saline, or a noncytotoxic cleanser to minimize trauma to the wound and help control odor. (Strength of Evidence = C)**
 - 3.2. Debride the ulcer of devitalized tissue to control infection and odor. (Strength of Evidence = C)**
 - 3.2.1. Debride devitalized tissue within the wound bed or at edges of pressure ulcers when appropriate to the individual's condition and consistent with the overall goals of care. (Strength of Evidence = C)**
 - 3.2.2. Avoid sharp debridement with fragile tissue that bleeds easily. (Strength of Evidence = C)**
 - 3.3. Choose a dressing that can absorb the amount of exudate present, control odor, keep periwound skin dry, and prevent desiccation of the ulcer. (Strength of Evidence = C)**
 - 3.3.1. Use a dressing that maintains a moist wound-healing environment and is comfortable for the individual. (Strength of Evidence = C)**
 - 3.3.2. Use dressings than can remain in place for longer periods of time to promote comfort related to the pressure ulcer care. (Strength of Evidence = C)**
 - 3.3.3. Use a dressing that meets the needs of the individual for overall comfort and pressure ulcer care. See section on Dressings. (Strength of Evidence = C)**
 - 3.3.3.1. Consider use of an antimicrobial dressing to control bioburden and odor. (Strength of Evidence = C)**
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- 3.3.3.2. Consider use of a hydrogel to soothe painful ulcers. (Strength of Evidence = C)
 - 3.3.3.3. Consider use of foam and alginate dressings to control heavy exudate and lengthen wear time. (Strength of Evidence = B)
 - 3.3.3.4. Consider use of polymeric membrane foam for exudate control and cleansing. (Strength of Evidence = C)
 - 3.3.3.5. Consider use of silicone dressings to reduce pain with dressing removal. (Strength of Evidence = B)
 - 3.3.4. Protect the periwound skin with a skin protectant/barrier or dressing. (Strength of Evidence = C)
 - 4. Control wound odor. (Strength of Evidence = C)
 - 4.1. Cleanse the ulcer and periwound tissue, using care to remove devitalized tissue. (Strength of Evidence = C)
 - 4.2. Assess the ulcer for signs of wound infection: increasing pain; friable, edematous, pale, dusky granulation tissue; foul odor and wound breakdown; pocketing at base; or delayed healing. (Strength of Evidence = B)
 - 4.3. Use antimicrobial agents as appropriate to control known infection and suspected critical colonization. See Infection section. (Strength of Evidence = C)
 - 4.3.1. Consider use of properly diluted antiseptic solutions for limited periods of time to control odor. (Strength of Evidence = C)
 - 4.3.2. Consider use of topical metronidazole to effectively control pressure ulcer odor associated with anaerobic bacteria and protozoal infections. (Strength of Evidence = C)
 - 4.3.3. Consider use of dressings impregnated with antimicrobial agents (e.g., silver, cadexomer iodine, medical-grade honey) to help control bacterial burden and odor. (Strength of Evidence = C)
 - 4.4. Consider use of charcoal or activated charcoal dressings to help control odor. (Strength of Evidence = C)
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- 4.5. Consider use of external odor absorbers for the room, (e.g., activated charcoal, kitty litter, vinegar, vanilla, coffee beans, burning candle, and potpourri). (Strength of Evidence = C)**

Pain Assessment and Management

- 1. Perform a routine pressure ulcer pain assessment every shift, with dressing changes, and periodically as consistent with the individual's condition (see Pain Management section). (Strength of Evidence = B)**
- 2. Assess pressure ulcer procedural and non-procedural pain initially, weekly, and with each dressing change. (Strength of Evidence = C)**
- 3. Provide systematic treatment for pressure ulcer pain (see Pain Management section). (Strength of Evidence = C)**
- 4. If consistent with treatment plan, provide opioids and/or non-steroidal anti-inflammatory drugs 30 minutes prior to dressing changes or procedures, and afterward. (Strength of Evidence = C)**
- 5. Provide local topical treatment for ulcer pain:**
 - Ibuprofen-impregnated dressings may help decrease pressure ulcer pain in adults; however, these are not available in all countries.**
 - Lidocaine preparations help decrease pressure ulcer pain.**
 - Diamorphine hydrogel is an effective analgesic treatment for open pressure ulcers in the palliative care setting. (Strength of Evidence = B)**
- 6. Select extended-wear-time dressings to reduce pain associated with frequent dressing changes. (Strength of Evidence = C)**
- 7. Encourage individuals to request a time out during a procedure that causes pain. (Strength of Evidence = C)**
- 8. For an individual with pressure ulcer pain, music, relaxation, position changes, meditation, guided imagery, and transcutaneous electrical nerve stimulation (TENS) are sometimes beneficial. (Strength of Evidence = C)**

Resource Assessment

- 1. Assess psychosocial resources initially and at routine periods thereafter (psychosocial consultation, social work, etc.). (Strength of Evidence = C)**
- 2. Assess environmental resources (e.g., ventilation, electronic air filters, etc.) initially and at routine periods thereafter. (Strength of Evidence = C)**

- 3. Validate that family care providers understand the goals and plan of care.
(Strength of Evidence = C)**

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