



# **PRESSURE ULCERS AND WOUND CARE**

Know and understand:

- The morbidity and mortality associated with pressure ulcers for older adults
- The common risk factors for pressure ulcer development
- Techniques for preventing pressure ulcers
- The pressure ulcer staging system and treatment strategies for each stage

- Chronic Wound Healing
- Pressure Ulcer Definition and Classification
- Pressure Ulcer Assessment and Documentation
- Pressure Ulcer Prevention
- Principles of Pressure Ulcer Treatment
- Infectious Aspects of Pressure Ulcers
- Palliative Care for Chronic Wounds

- Associated with
  - Decreased quality of life
  - Longer hospital stays
  - Increased chance of 30-day readmission
  - Increased chance of admission to a long-term care facility
  - Increased risk of death
- Estimated cost of \$3,500 to >\$60,000 per patient
- Affect 1.3-3 million adults in the U.S.
- Are a designated quality measure and major risk management issue

- One that develops despite the provider having
  - 1) evaluated the individual's clinical condition and pressure ulcer risk factors
  - 2) defined and implemented interventions consistent with individual needs, goals, and recognized standards of practice, and
  - 3) monitored and evaluated the impact of the interventions, revising the approaches as appropriate
- Patients at high risk are those with immobility and multiple chronic conditions
- These pressure ulcers may be a marker for disease severity or impending death

# THE SPECTRUM OF CHRONIC WOUNDS

- Pressure ulcers
- Arterial ulcers, or wounds from PAD
- Venous insufficiency ulcers
- Diabetic or neuropathic ulcers
- Nonhealing surgical wounds
- Wounds from malignancy
- Wounds from autoimmune source or vasculitis
- Wounds from trauma and burns (including skin tears, lacerations, and self-induced)

- Normal wound healing includes a complex but orderly sequence of:
  - Hemostasis
  - Inflammation
  - Proliferation
  - Remodeling

- A localized injury to the skin and/or underlying tissue, usually over a bony prominence that results from pressure, or pressure in combination with shear.



# STAGING OF PRESSURE ULCERS (1 of 7)

Stage	Definition
<p>Stage 1 Nonblanchable erythema</p>	<ul style="list-style-type: none"> <li>• Intact skin with nonblanchable redness of a localized area, usually over a bony prominence.</li> <li>• Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area.</li> <li>• The area may be painful, firm, soft, or warmer or cooler than adjacent tissue.</li> <li>• May be difficult to detect in those with dark skin tones.</li> <li>• May indicate “at risk” patients.</li> </ul>
<p>Stage 2 Partial thickness</p>	<ul style="list-style-type: none"> <li>• Partial-thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough.</li> <li>• May also present as an intact or open/ruptured blister filled with serum or serosanguinous fluid.</li> <li>• Presents as a shiny or dry shallow ulcer without slough or bruising .</li> </ul>

Staging according to the National Pressure Ulcer Advisory Panel

# STAGING OF PRESSURE ULCERS (2 of 7)



Buttocks, Stage 1



Buttocks, Stage 2

# STAGING OF PRESSURE ULCERS

## (3 of 7)

Stage	Definition
Stage 3 Full-thickness tissue loss	<ul style="list-style-type: none"><li>• Full-thickness tissue loss</li><li>• Subcutaneous fat can be visible but bone, tendon, or muscle are not exposed</li><li>• Slough may be present but does not obscure the depth of tissue loss</li><li>• May include undermining and tunneling</li><li>• Depth varies by anatomical location</li></ul>
Stage 4 Full-thickness tissue loss	<ul style="list-style-type: none"><li>• Full-thickness tissue loss with exposed bone, tendon, or muscle</li><li>• Slough or eschar may be present</li><li>• Often includes undermining and tunneling</li><li>• Depth varies by anatomic location</li></ul>

# STAGING OF PRESSURE ULCERS (4 of 7)



Hip, Stage 3



Sacrum, Stage 4

# STAGING OF PRESSURE ULCERS

## (5 of 7)

Stage	Definition
<p>Unstageable Full-thickness skin or tissue loss, depth unknown</p>	<ul style="list-style-type: none"><li>• 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</li><li>• Until enough slough and/or eschar is removed to expose the base of the wound, the true depth (and therefore stage) cannot be determined</li><li>• 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</li></ul>

# STAGING OF PRESSURE ULCERS (6 of 7)

Stage	Definition
Suspected deep tissue injury, depth unknown	<ul style="list-style-type: none"> <li>• 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</li> <li>• May be preceded by tissue that is painful, firm, mushy, boggy, warmer, or cooler than adjacent tissue</li> <li>• May be difficult to detect in individuals with dark skin tones</li> <li>• Evolution may include a thin blister over a dark wound bed</li> <li>• The wound may further evolve and become covered by thin eschar</li> <li>• Evolution may be rapid and expose additional layers of tissue, even with optimal treatment</li> </ul>

# STAGING OF PRESSURE ULCERS (7 of 7)



Heel, unstageable,  
with unstable  
eschar



Heel, deep tissue  
injury

- Diagnosis
- Stage
- Location
- Length
- Width
- Depth
- Presence of odor and/or drainage
- Presence of undermining and tunneling
- Wound bed characteristics
- Margins
- Surrounding skin



- Braden Scale
  - Most widely-used pressure ulcer risk assessment tool
  - Combines sensory perception, moisture, activity, mobility, friction, and shear
  - Validated in home, SNF, and hospital settings (but not ICUs)
- Clinical judgment should also be relied on

# RISK FACTORS FOR PRESSURE ULCERATION

Intrinsic Risk Factors	Extrinsic Risk Factors
Dermatitis	Friction
Edema	Immobility
Hypoperfusion	Medical devices
Immobility	Moisture
Long-term corticosteroid use	Pressure
Circulatory impairment	Shear forces
Nutritional compromise	

# MOISTURE-ASSOCIATED SKIN DAMAGE (MASD) (1 OF 2)

- Occurs from perspiration, urine, diarrhea, fistulas, or wound exudate
- Increases susceptibility to pressure ulcers
- Is a common occurrence in patients with constant loose stools from tube feeding or *Clostridium difficile* colitis
- Strategies to avoid or treat MASD
  - Moisture barrier creams, absorbable undergarments, continence care, and fecal and urinary diversion devices

# MOISTURE-ASSOCIATED SKIN DAMAGE (MASD) (2 OF 2)



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Sacrum, with MASD

- Strategies to minimize pressure, friction, and shear
  - Pillows and foam wedges to keep pressure off bony prominences
  - Lifting devices and draw sheets to minimize friction
- Industry standard for turning and repositioning is every 2 hours, however, individualize for each patient
- Patients who sit for long periods of time in chairs should be assessed for proper posture and alignment and provided pressure relief schedules and cushioning
- Prevent heel wounds with local skin care, cushioning, “floating the heels”

# PRESSURE REDISTRIBUTION SURFACES

- **Group 1** support surfaces are nonpowered devices made of gel, foam, or water
- **Group 2** support surfaces include alternating-pressure air mattresses and pressure-reducing air mattresses of the low air loss type.
- **Group 3** support surfaces are complete bed systems using air-fluidized technology using pressurized silicone-coated beads that promote a flotation environment

# PRINCIPLES OF PRESSURE ULCER TREATMENT (1 OF 2)

- Should be a holistic, patient-centered approach
- Assess overall health status of the patient
- Address psychosocial needs
- Treat underlying comorbidities
- Assess and correct causes of tissue damage
- Assess and monitor the wound
- Understand patient's functional and cognitive status, home environment, family support, and other factors such as presence of depression

- Elements of pressure ulcer treatment
  - Offloading and pressure redistribution strategies
  - Removing debris and necrotic tissue
  - Addressing moisture balance
- Clinicians must also:
  - Address pain
  - Acknowledge advance directives
  - Recognize wounds appropriate for a palliative approach and alter the plan accordingly



# COMMON WOUND TREATMENT MODALITIES (1 OF 5)

Type	Content	Rationale	Best Use
Gauze	Cotton, polyester, or other fabrics	Versatile, can be absorptive or protective, primary or secondary dressing	Secondary dressing, wet to moist, or wet to dry, or as a protective to the wound and surrounding skin
Hydrocolloid	Adhesive pad with moisture-activated, gel-forming material; gelatin and pectin	Moisture retention	Superficial, clean pressure ulcers with no necrosis or infection
Semi-permeable films	Transparent polymer with acrylic adhesive	Moisture retention	Superficial, clean pressure ulcers with no necrosis or infection

# COMMON WOUND TREATMENT MODALITIES (2 OF 5)

Type	Content	Rationale	Best Use
Hydrogel	Water in a delivery vehicle such as glycerin or cross-linked polymer sheets	Promote moist wound healing and autolytic debridement	Dry wounds; wounds with some necrosis
Foam	Polyurethane with or without adhesive borders	Absorb exudate, cushioning, secondary dressing	Control exudate, protect the wound
Alginate	Seaweed derivative; can be in different forms, including sheet or rope, and combined with other materials such as silver or charcoal	Absorptive dressing	Control of exudate

# COMMON WOUND TREATMENT MODALITIES (3 OF 5)

Type	Content	Rationale	Best Use
Collagen	Animal-derived collagen formulated into gel, powder, paste, or sheet	Deactivates matrix metalloproteases that inhibit wound healing	Partial- or full-thickness wounds with minimal necrosis
Silver-containing dressings	Silver can be impregnated into multiple types of dressings	Silver has broad-spectrum antimicrobial activity	Wounds requiring control of bacterial balance
Enzymatic debriding agent	Enzyme in a petrolatum vehicle	Selected degradation of denatured collagen	Wounds with necrosis and slough
Cadexomer iodine dressing	Iodophor in a polysaccharide polymer	Absorbent, antimicrobial	Wounds with slough, infected wounds

# COMMON WOUND TREATMENT MODALITIES (4 OF 5)

Type	Content	Rationale	Best Use
Silicone dressings	Inert silicone polymer; sometimes has pores that allow passage of exudate	Contact layer that can be removed without causing trauma to wound or surrounding skin	When a nonadherent dressing is required, protects the wound and surrounding skin
Activated charcoal	Combined with silver or other vehicles	Control odor	Palliative wounds with odor
Honey	Medicinal grade honey can be used as a gel or impregnated into other dressing types	Antimicrobial properties, anti-inflammatory	Autolytic debriding agent on noninfected wounds

# COMMON WOUND TREATMENT MODALITIES (5 OF 5)

Type	Content	Rationale	Best Use
Topical antiseptics	Includes hydrogen peroxide, Dakin's solution (hypochlorite), povidone-iodine	Reduce bacterial burden of wounds	Can be cytotoxic to healing wounds; for limited use in heavily contaminated or nonhealable wounds
Petrolatum-impregnated gauze	Woven mesh; medical petrolatum and 3% bismuth tribromophenate	Bacteriostatic, nonadherent, retains moisture	Use with larger wounds with minimal necrosis and slough

- Moisture balance
- Bacterial balance
  - Facilitated by cleansing, topical antibiotics, disinfectants, and debridement
  - Methods of debridement: autolytic, enzymatic, mechanical, biologic, surgical
- Management of eschar

- Electrical stimulation
- Therapeutic ultrasound
- Light therapy
- Negative-pressure wound therapy (NPWT)
- Hyperbaric oxygen

- Important component of pressure ulcer management
- Recommendations should be individualized in response to clinical conditions and goals of care
- In general the caloric requirement for wound healing is **30-35 Kcal/kg/day**, and the recommendation for protein is **1-1.5 g/kg/day**, but more may be required
- In the absence of documented deficiencies, vitamin and mineral supplements are not useful for wound healing



- All chronic wounds are contaminated or colonized with bacteria but may not be infected
- Infectious complications
  - Cellulitis, abscess, osteomyelitis, pyarthrosis, necrotizing fasciitis, systemic infectious
- Signs and symptoms of infection
  - Fever, increased drainage, pain, warmth, edema, erythema, slough, odor, cessation of healing, worsening of the wound

- Swab cultures are best reserved for wounds with purulent drainage in the setting of high suspicion for infection
- Treatment must involve
  - Managing underlying conditions
  - Protection from urine and feces
- Wound infections can be treated locally, systemically, or both depending on the clinical situation

# PALLIATIVE CARE FOR CHRONIC WOUNDS (1 OF 2)

- Should be considered when it becomes clear that there is little or no realistic chance of healing within the patient's lifetime, and when the burdens of operative procedures or advanced treatment options outweigh the benefits
- Factors leading to designating a wound as palliative:
  - Poor nutrition, inadequate perfusion, multisystem organ failure, immunocompromise, irreversible anasarca, or a terminal prognosis that prevents the normal healing process

# PALLIATIVE CARE FOR CHRONIC WOUNDS (2 OF 2)

THE MNEMONIC “SPECIAL”	
S	Stabilize the wound
P	Prevent new wounds
E	Eliminate odor
C	Control pain
I	Infection prophylaxis
A	Absorbent wound dressings
L	Lessen or reduce dressing changes

- Older adults are at high risk of developing pressure ulcers
- Pressure ulcers may result in serious morbidity and mortality
- Risk assessment and risk factor intervention are key to pressure ulcer prevention
- Many wounds have reduced or no chance of healing. For these wounds, palliative care principles may curtail suffering, improve quality of life, and decrease health care costs.

## CASE 1 (1 of 4)

- A 65-year-old man being admitted for rehabilitation after surgical repair of his left hip, fractured in a fall 1 week earlier
- History: type 2 diabetes mellitus, coronary heart disease, hypertension, hyperlipidemia
- 50-pack-year smoking history

- Physical examination:
  - Diminished sensation in both feet (by monofilament testing)
  - Diminished pulses in bilateral dorsalis pedis and posterior tibialis
  - Crusted skin, thick toenails
  - Nonfluctuating, dry, black eschar on lateral left heel. Surrounding skin is intact, with no evidence of cellulitis.

Which one of the following is the most appropriate initial management of the wound?

- A. Sharply debride the eschar.
- B. Leave the eschar intact and elevate both heels off the bed surface.
- C. Cover the wound with a hydrocolloid sheet; change every 3–5 days and as needed.
- D. Apply a silver alginate dressing plus a secondary dressing over the wound; change weekly.



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- An 85-year-old man with areas of redness and skin breakdown on his buttocks
- History: dementia, Parkinson disease
- Spends much time sitting in a recliner
- Wears a adult brief because of urinary and occasionally fecal incontinence
- Appetite is good, weight is stable.

- Physical examination
  - Several areas on the buttocks have partial-thickness erosions with sanguineous drainage.
    - ❖ Tender to touch
    - ❖ No induration, satellite lesion, or surrounding erythema
  - Adult brief is saturated with urine and there are traces of stool adherent to the buttocks and perirectal area.

Which one of the following is the most appropriate skin-care recommendation?

- A. Apply a petrolatum-based barrier ointment.
- B. Apply a barrier film.
- C. Discontinue use of adult briefs and put the patient on bed rest until the areas are healed.
- D. Apply a mild antifungal cream to the affected areas.

Which one of the following is the most appropriate skin-care recommendation?

- A. Apply a petrolatum-based barrier ointment.
- B. Apply a barrier film.**
- C. Discontinue use of diapers and put the patient on bed rest until the areas are healed.
- D. Apply a mild antifungal cream to the affected areas.

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