Skin damage associated with moisture and pressure

Tips for how to differentiate and goals for protection and management
Our faculty

MODERATOR
Cynthia Saver, MS, RN

FEATURED SPEAKER
Linda Moore, BSN, RN, CWON
Program Objectives

- Identify how wounds are classified according to wound depth and etiology.

- Describe the etiology of a pressure injury (PI) and incontinence-associated skin damage (IAD).

- Discuss evidenced-based protocols of care for prevention and management of IAD and PIs.

- Describe the NPUAP-EPUAP Pressure Injury Classification System.

- Identify appropriate products that can be used for prevention and treatment of IAD and PIs.
Pressure Injury

What are pressure injuries and their contributing factors?
Layers of the Skin

Wound Classification by Depth
Partial Thickness

Friction Injury
Skin Tear
Stage 2 Pressure Injury
Partial-Thickness Burn

Wound Classification by Depth
Full Thickness

Pressure Injury Definition

- A pressure injury (PI) is localized damage to the skin and/or underlying soft tissue usually over a bony prominence or related to a medical or other device.
- A PI can present as intact skin or an open ulcer and may be painful.
- The injury occurs as a result of intense and/or prolonged pressure or pressure in combination with shear.
- The tolerance of soft tissue for pressure and shear may also be affected by microclimate, nutrition, perfusion, comorbidities and condition of the soft tissue.

National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel Press Release – NPUAP Announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. April 13, 2016
Prolonged duration and intensity of pressure can cause tissue intolerance due to extrinsic and intrinsic factors. Pressure compresses tissue and blood vessels, hindering oxygen and nutrient delivery, leading to tissue death.

**Shear Forces**

**Shear:** Force per unit magnitude of the area acting parallel (tangential) to the surface of the body. This parameter is affected by pressure, the coefficient of friction between the materials contacting each other, and how much the body adheres to the support surface.

Illustration from Ohura, Sapporo, Japan, 2007 – Shear Force Initiative


Shear Forces

- Shear forces affect the deep blood vessels and deeper tissue, which may result in ulcers with large areas of internal tissue damage and less damage at the skin surface.

- Moisture damage occurs from the outside; the term microclimate describes moisture in contact with the skin.

Effects of Moisture on the Skin

Moisture and temperature changes the stratum corneum (SC)

- Strain at which the SC breaks down at 100% humidity is 4 times greater than dry skin.
- Moisture increases the coefficient of friction between the skin and the underlying surface, increasing the risk of shear damage.

National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel Press Release – NPUAP Announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. April 13, 2016.
Unstageable Pressure Injury (UPI): Obscured full-thickness skin and tissue loss

- Full-thickness skin and tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar.
- If slough or eschar is removed, a Stage 3 or Stage 4 pressure injury will be revealed.

National Pressure Ulcer Advisory Panel - NPUAP Announces a Change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. April 13, 2016
Stable eschar (i.e., dry, adherent, intact without erythema or fluctuance) on an ischemic limb or the heel(s) should not be removed.

Loose, soft or spongy — Should be removed

Stable (dry, adherent) — Do not remove
Deep Tissue Pressure Injury (DTPI):
Persistent non-blanchable deep red, maroon, or purple discoloration

• Intact or non-intact skin with localized area of persistent non-blanchable deep red, maroon, purple discoloration or epidermal separation revealing a dark wound bed or blood filled blister. Pain and temperature change often precede color changes.

• Discoloration may appear differently in darkly pigmented skin. This injury results from intense and/or prolonged pressure and shear forces at the bone-muscle interface.

National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel Press Release – NPUAP Announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. April 13, 2016
DTPI: Further definition

- The wound may evolve rapidly to reveal the actual extent of tissue injury, or may resolve without tissue loss.
- If necrotic tissue, subcutaneous tissue, granulation tissue, fascia, muscle or other underlying structures are visible, this indicates a full thickness pressure injury (Unstageable, Stage 3 or Stage 4).
- Do not use DTPI to describe vascular, traumatic, neuropathic, or dermatologic conditions.

Example of the progression of a DTPI from an area of maroon discoloration to an eschar covered full-thickness pressure injury.
# Location of Deep Tissue Injuries

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heels</td>
<td>41.4%</td>
</tr>
<tr>
<td>Sacrum</td>
<td>19.1%</td>
</tr>
<tr>
<td>Buttocks</td>
<td>12.9%</td>
</tr>
<tr>
<td>Ankles and Foot</td>
<td>9.9%</td>
</tr>
<tr>
<td>Elbow</td>
<td>2.5%</td>
</tr>
</tbody>
</table>


Photos courtesy of Ann Durnal RN, BSN, NP.
Keys to Maintaining Healthy Skin and Preventing PI

- Support adequate nutrition
- Eliminate sources of friction
- Reposition patients who cannot move
- Keep skin clean and dry but hydrated
- Reduce pressure and shear


## Moisture-Related Damage Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaper dermatitis/Rash</td>
<td>Dermatitis of thighs and buttocks resulting from exposure to urine and feces in diapers</td>
</tr>
<tr>
<td>Perineal dermatitis</td>
<td>Skin inflammation limited to the perineum</td>
</tr>
<tr>
<td>Moisture-associated skin damage (MASD)</td>
<td>Injury to the skin caused by repeated or sustained exposure to moisture (e.g., perspiration, urine, stool, wound exudate)</td>
</tr>
<tr>
<td>Maceration</td>
<td>Skin damage caused by super-saturation of the skin that is associated with pigmentation changes, even in people of color, but no erosion of the epidermis</td>
</tr>
<tr>
<td>Erosion</td>
<td>Denudation; epidermal and dermal loss resulting in a partial-thickness wound</td>
</tr>
<tr>
<td>Intertrigo <em>Intertriginous dermatitis</em></td>
<td>Dermatitis associated with perspiration in skin folds/creases accompanied by friction</td>
</tr>
</tbody>
</table>


Intertriginous Dermatitis

- Can occur anywhere on the body where there are folds of skin against skin and moisture is present
- May appear as a linear break in the skin
- Occurs in creases such as the intergluteal cleft or groin creases when associated with IAD
- Bacteria or fungal overgrowth is a risk in these areas
- Patients may complain of itching which can lead to scratching and excoriation of the area

With incontinent patients, timely skin checks to maintain dry skin is a key goal to prevent this condition – keep the area dry and protected.

Photo courtesy of Dot Weir RN, CWS, CWON

Incontinence: Scope of the Problem

• Study of 152 acute and critical care patients—33% of patients had fecal incontinence

• Study of 608 patients in acute and critical care areas:
  • 19.75% prevalence of incontinence
  • 107 (17.6%) had fecal incontinence
  • 120 (42.5%) of the incontinent patients demonstrated some type of skin injury

Risk Assessment – Braden Scale
Moisture Subscale

1. **CONSTANTLY MOIST**
   - Skin is kept moist almost constantly by perspiration, urine, etc.
   - Dampness is detected every time patient is moved or turned

2. **VERY MOIST**
   - Skin is often, but not always moist
   - Linen must be changed at least once a shift

3. **OCCASIONALLY MOIST**
   - Skin is occasionally moist
   - Requires an extra linen change approximately once a day

4. **RARELY MOIST**
   - Skin is usually dry
   - Linen only requires changing at routine intervals

Braden B. Braden Scale For Predicting Pressure Sore Risk. [www.bradenscale.com](http://www.bradenscale.com) Used with permission. October 29, 2015
Braden Scale is copyrighted by Barbara Braden and Nancy Bergstrom 1987
Incontinence-Associated Skin Damage (IAD)

Characterized by:

• Inflammation of the skin that occurs when urine or stool comes into contact with perineal or peri-genital skin

• Irritation and inflammation of the skin from prolonged exposure to urine or stool

IAD Pathophysiology

Incontinence

Inflammation

Inflammatory cytokines released

Increased TEWL

pH - acid mantle compromised

Decrease in skin’s protective barrier

Skin breakdown

Increased risk for invasion of microorganisms

IAD: Skin Damage Progression

Redness

Edema/Swelling

Vesicles/Blisters

Erosion

Epidermal Loss

Invasion of bacteria/fungus
IAD Pathophysiology

<table>
<thead>
<tr>
<th>Urine</th>
<th>Feces</th>
</tr>
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<tbody>
<tr>
<td>• Over-hydrated skin</td>
<td>Fecal Enzymes</td>
</tr>
<tr>
<td>• Maceration</td>
<td>– ↑ microbes/bacteria</td>
</tr>
<tr>
<td>• ↑ pH (alkaline pH)</td>
<td>– ↑ protease activity</td>
</tr>
<tr>
<td>• ↓ Protective barrier</td>
<td>– ↑ pH (alkaline pH)</td>
</tr>
<tr>
<td>• Urine interacts with feces to activate fecal enzymes</td>
<td>– Feces interacts with urine to activate fecal enzymes</td>
</tr>
<tr>
<td>• Urine incontinence alone – not as significant a factor in developing IAD</td>
<td>Double incontinence – significant factor developing IAD</td>
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IAD Intervention Tool

**Moderate IAD** — “Affected skin is bright or angry red - in darker skin tones, it may appear white, yellow, or very dark red/purple. Skin usually appears shiny and moist with weeping or pinpoint areas of bleeding. Raised areas or small blisters may be noted. Small areas of skin loss (dime size) if any. This is painful whether or not the person can communicate the pain.”

IAD Intervention Tool

- **Severe IAD** — “Affected skin is red with areas of denudement (partial-thickness skin loss) and oozing/bleeding. In dark-skinned persons, the skin tones may be white, yellow, or very dark red/purple. Skin layers may be stripped off as the oozing protein is sticky and adheres to any dry surface.”

Examples of IAD

Moderate

Severe


Photos used with permission from MedBio Publishing LLC.
What IAD Looks Like

Note scaling of the skin, papule, vesicle formation, and tissue weeping

Photo used with permission from MedBio Publishing LLC.
IAD vs. Stage 1 and 2 PIs


Photos used with permission from MedBio Publishing LLC
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<th>PI</th>
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<td><strong>Etiology</strong>: ischemia from pressure - shear</td>
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<td><strong>Location</strong>: buttocks, perineum upper thighs, skin folds – diffuse area</td>
<td><strong>Location</strong>: circumscribed and usually over bony prominences or device related</td>
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<td><strong>Color</strong>: red or bright red</td>
<td><strong>Color</strong>: red to bluish/purple</td>
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<td><strong>Depth</strong>: partial-thickness (limited to epidermis and/or dermis)</td>
<td><strong>Depth</strong>: partial or full-thickness deep tissue injury</td>
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<td><strong>Necrosis</strong>: none</td>
<td><strong>Necrosis</strong>: slough or eschar</td>
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<tr>
<td><strong>Symptoms</strong>: may be painful and cause itching</td>
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What Is Your Assessment?
What Is Your Assessment?

**Assessment:** Tissue injury changes associated with pressure/shear

Diffuse erythema and bluish discoloration of the skin over a large area superior to the rectal area – sacral/coccyx area

No erythema or skin changes close to the rectal area

Shallow wound covered with yellow debris-slough

Note: Brighter red area of inflamed skin around the area containing slough


Use of Underpads or Diapers

• Avoid occlusive products that may cause chafing of compromised skin (e.g., diapers, briefs, pads).

• Use absorptive products that wick moisture away from skin.

• Consider scheduled toileting when appropriate.

Containment of Fecal Incontinence

- Document skin condition per facility policy/protocol.
- Follow manufacturer’s instructions for application and management of containment devices used.

Skin and Wound Care Products for Protection and Management of Open Skin Areas

Skin Care

Skin Injury – Examples of dressings for Skin Protection and wound management

Skin Protection

ALOE VESTA, SENSI-CARE, DuoDERM, AQUACEL, FoamLite are registered trademarks of ConvaTec Inc
Refer to product label for complete information on indications and use of each product
Sensi-Care® Skin Protectant Incontinence Wipes

- 3-in-1 Wipe: Cleans, Moisturizes, Protects
- Large 8”x10”, dual texture cloth design makes cleansing efficient
- Skin-friendly pH
- Fragrance-free
- Protects fragile skin with 3% dimethicone
- Helps treat and prevent incontinence-associated dermatitis

In vitro testing of AQUACEL® foam and Competitor Dressings Fluid Handling Capacity Testing, WHRI3533 MS067. Data on file, ConvaTec Inc.

Jones S, Bowler PG, Walker M. Antimicrobial activity of silver-containing dressings is influenced by dressing conformability with a wound surface. WOUNDS. 2005;17(9):263-270.


AQUACEL® Foam Dressing

• Helps Promote a Healthy Skin Environment

• Multi-layer dressing design helps keep moisture, such as perspiration or incontinence episodes from breaking down skin and provides a controlled Moisture Vapor Transmission Rate (MVTR)*

• Lets You Take a Peek at Intact Skin

• Skin-friendly silicone adhesive allows you to lift the border to inspect skin and reapply**

• Smooth outer surface allows for easy cleaning, which may help reduce dressing changes

* In vitro testing of AQUACEL® foam and Competitor Dressings Fluid Handling Capacity Testing, WHRI3533 MS067. Data on file, ConvaTec Inc.

** In vitro testing of AQUACEL® foam Adhesion Characteristics. WHRI 3539 MS070. Data on File. ConvaTec Inc.
Lower Shear Force with AQUACEL® Foam *

Shear injury is predominantly localized at the sacrum or coccyx**

Waterproof smooth surface slides easily and helps to reduce friction and shear force*

* Comparative Assessment of in vitro Shear Force Reduction through AQUACEL® Foam and Mepilex® Border Dressings. WHRI3783 TA290. Data on File ConvaTec Inc.
For Skin Protection in the Sacrum: AQUACEL® Foam Pro

AQUACEL® Foam Pro includes a perforated silicone adhesive wound contact layer. Designed to protect skin from breaking down in the sacral area.

- Smooth, breathable, waterproof film helps minimize shear and friction,†*3 e.g., between bed linens and dressing
- Enables easy cleaning of the dressing
- Multilayered silicone foam powered by Hydrofiber® Technology helps provide a healthy skin microclimate by absorbing and locking away excess moisture from the skin†*2,3
- Perforated gentle silicone adhesive layer allows easy application and removal*3
- Adhesive does not stick to itself*3

†When used as part of a protocol of care.
*As demonstrated in-vitro.

1. AQUACEL® Foam Pro package insert
IAD or PI?

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“Outside in” Tissue Damage
• Friction and microclimate changes
• Examples: Skin tears, IAD, intertrigo abrasions, blisters, fungal rashes

“Inside Out” Tissue Damage
• Pressure and Shear Forces causing ischemia and ultimately tissue necrosis – full thickness PI

QUESTIONS?

Thank you for attending today’s webinar


This is the first in a series of four wound care webinars in 2017. Our next webinar is scheduled for April 25th with guest speaker Kimberly LeBlanc, MN, RN, CETN(C), nationally recognized expert on the subject of skin tears.

For additional information on ConvaTec, visit convatec.com. Additional educational courses can be found at convatecacademy.com

Have a question? Please contact sgoller@healthcommedia.com