Course Objectives

1. Demonstrate basic understanding of anatomy & physiology of skin and its functions
2. Define 6 stages of pressure ulcers as outlined by 2007 NPUAP guidelines
3. Differentiate between pressure ulcers, moisture associated skin damage and other wound types
4. Describe assessment tools available for prevention and monitoring
5. Demonstrate knowledge of pressure ulcer prevention techniques, treatment principles/options, moisture management and wound packing,
Anatomy & Physiology of Skin
- Largest organ of body
- Weighs 6-8 lbs.
- 20 sq. ft.
- Thickness varies 1/50 in. over eyelids to 1/3 in. on palms of the hands and soles of the feet
- Special cells harden to form nails and elongate to form hair
- Acid mantle: pH 4.5-5.5
- Lubricated
- Elastic
Functions

- Regulates body temperature
- Transmits sensations of touch, pressure and pain
- Prevents loss of body fluids
- Acts as an excretory organ
- Provides an interface between the body and the environment
- Protects the inner tissues from invasion
- Synthesizes vitamin D
Aging of the Skin

- Atrophy & thinning of all layers
- Flattening of rete pegs
- Easily traumatized
- Decrease in elasticity, immune response, sebaceous glands and thermoregulation
- Fewer sweat glands
- Sun exposure is the single most important factor in producing wrinkles.
Dermal-epidermal Junction

- Basement membrane separates and attaches the epidermis to the dermis
- Epidermis has downward finger like projections called rete ridges or pegs
- Interface with upwards projections of the papillary dermis
- When touching these two layers resemble a waffle iron or velcro
- With aging these projections flatten out and leave older adults susceptible to skin tears
Skin Tears

A traumatic wound caused by friction and/or shearing forces which separate the epidermis from the dermis.
Remove adhesive as directed
Adhesive remover may be beneficial
Secure skin and keep taut while removing to protect it
Consider shear and friction forces when repositioning patient
"I’m wonderin’ where Mr. Wilson found skin big enough to fit him."
Microflora of the Skin

* Resident Flora-microbes that normally inhabit the skin
  1. **Gram positive**- Staphylococcus Epidermis and Coryneform bacteria
  2. **Gram negative**- E-coli, Proteus and Pseudomonas

* Transient Flora-are acquired through direct contact or are airborne

Examples: Staphylococcus Aureus and Streptococci
Pressure ulcers

Definitions and stages
Definition: 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 and/or friction

Staging is a tool for describing depth of tissue damage

The 6 stages effective as of 2007 are:

* Stage I       Stage IV
* Stage II      Suspected deep tissue injury (SDTI)
* Stage III     Unstageable (UST)
**Pressure ulcer Stage I**

**Definition:** intact skin with non-blanchable redness of localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; color may differ from surrounding area.

**Description:**
1. The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue
2. Stage I may be difficult to detect in individuals with dark skin tones
3. May indicate “at risk” persons (a heralding sign of risk)
Stage I- Sacral/Coccyx
Definition: 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 blister

Description:
1. Presents as a shiny or dry shallow ulcer without slough or bruising
2. This stage should not be used to describe skin tears, tape burns, incontinence associated dermatitis (IAD), maceration or excoriation
Pressure ulcer Stage III

**Definition:** 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.

**Description:**

1. The depth of a stage III pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and stage III ulcers can be shallow. In contrast, areas of significant adiposity can develop extremely deep stage III pressure ulcers.

2. Bone/tendon is not visible or directly palpable.
Pressure ulcer Stage IV

Definition: Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling.

Description:
1. The depth of a stage IV pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and these ulcers can be shallow.
2. Stage IV ulcers can extend into muscle and/or supporting structures (e.g., fascia, tendon, or joint capsule) making osteomyelitis possible.
3. Exposed bone/tendon is visible or directly palpable.
Suspected Deep tissue injury (SDTI)

**Definition:** 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

**Description:**
1. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer, or cooler as compared to adjacent tissue.
2. Deep tissue injury may be difficult to detect in individuals with dark skin tones.
3. Evolution may include a thin blister over a dark wound bed. The wound may further evolve and become covered by thin eschar.
4. Evolution may be rapid exposing additional layers of tissue even with optimal treatment.
**Definition:** Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown, or black) in the wound bed.

**Description:**
1. Until enough slough and/or eschar is removed to expose the base of the wound, the true depth, and therefore stage, cannot be determined
2. Stable (dry, adherent, intact with erythema or fluctuance) eschar on the heels serves as “the body’s natural biological) cover” and should not be removed
Unstageable

- Note surrounding erythema which may indicate undermining after debridement
- Note marking indicating undermining
Prevention of Pressure Ulcers

* Avoid raising the head of the bed more than thirty degrees for extended periods of time.
* Most of the pressure should be on the side of the buttock, not the side of the hip.
* Place a pillow between the knees and ankles to prevent them from touching.
* Try not to “drag” the patient across sheets. Use draw sheet. This causes friction & shear and can damage the top layers of skin.
Prevention of Pressure Ulcers

- Manage moisture from incontinence of urine and stool
- Proper management of nutritionally compromised patients
- If patient not able to ambulate QID then frequent changing of position Q 1-2 hours
- Float heels using pillows to suspended off bed surface
- Use chair cushion when up in chair
Prevention tool

- What tools are you familiar with?
SKIN

Surface selection
Keep turning
Incontinence management
Nutrition
IAD & MASD
Incontinence Associated Dermatitis
Moisture Associated Skin Damage
Incontinence-Associated Dermatitis (IAD)

* Not pressure related
* Caused by irritation from stool or urine
* Protect skin
* Formerly known as excoriation
Identification Tips

• Pt is incontinent of stool, urine or both
• Diffuse
• Itchy
Intertrigo/Candidiasis

Treat with antifungal or silver impregnated cloth
Check skin folds

Intertrigo
Moisture associated skin damage (MASD) aka Moisture related skin damage (MRSD)
## Moisture Damage Reference Sheet

<table>
<thead>
<tr>
<th>Type of MASD</th>
<th>Moisture Source</th>
<th>Brief Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incontinence Associated Dermatitis</td>
<td>Urine, Liquid stool</td>
<td>Erythema and inflammation of the skin, sometimes accompanied by erosion or denudation caused by exposure to urine or stool</td>
<td><img src="image1" alt="Example Image" /> <img src="image2" alt="Example Image" /></td>
</tr>
<tr>
<td>Intertriginous Dermatitis</td>
<td>Perspiration</td>
<td>Erythema and inflammation of the skin inside and adjacent to skin folds, sometimes accompanied by erosion or denudation, caused by exposure to chronic perspiration</td>
<td><img src="image3" alt="Example Image" /> <img src="image4" alt="Example Image" /></td>
</tr>
<tr>
<td>Periwound moisture associated dermatitis</td>
<td>Exudate</td>
<td>Erythema and inflammation of the skin within 4 centimeters of the wound edge, sometimes accompanied by erosion or denudation caused by exposure to wound exudate, infection, and/or traumatic removal from adhesive materials.</td>
<td><img src="image5" alt="Example Image" /> <img src="image6" alt="Example Image" /></td>
</tr>
<tr>
<td>Peristomal moisture associated dermatitis</td>
<td>Urinary or fecal effluent</td>
<td>Erythema and inflammation of the skin around a stoma, at times accompanied by denudation caused by exposure to stool or urine occluded under the skin barrier of the pouching system</td>
<td><img src="image7" alt="Example Image" /> <img src="image8" alt="Example Image" /></td>
</tr>
</tbody>
</table>
Treatment Principles & Options
TIME Principles

- Tissue Non-viable or deficient
- Infection or Inflammation
- Moisture Imbalance
- Edge of wound non-advancing or undermining or rolled
Types of Debridement

- Autolytic
- Enzymatic/Chemical
- Mechanical
- Sharp
## Enzymatic debriding agents

<table>
<thead>
<tr>
<th>Agent</th>
<th>Enzyme source</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Precautions</th>
</tr>
</thead>
</table>
| Collagenase | Strain of Clostridium histolyticum | • Approved by the United States FDA for the debridement of chronic wounds and burns  
• Selective for collagen  
• Generally pain-free delivery  
• May be combined with a variety of other topical dressings | • Effectiveness compared with other forms of debridement may be questionable  
• Prescription based upon wound area  
• High cost  
• Relatively slow-acting | • Moist wound environment required for activation  
• Topical silver dressings significantly inhibit collagenase activity |
| Papain | Papaya            | • Provides relatively “aggressive” enzymatic debridement  
• Generally pain-free delivery  
• May be combined with a variety of other topical dressings | • Not readily available in the United States  
• Nonspecific (i.e., will cleave any protein containing cysteine)  
• Relatively slow-acting | • Agent is often combined with a chlorophyll-complex that causes green wound discoloration following application  
• Need to avoid adjacent healthy tissues |
| Bromolain | Pineapple         | • Relatively rapid-acting  
• Selective for non-viable tissue | • Removal from base of wound required after several hours  
• Inhibits platelet function but is reversible | • Evidence of efficacy is based on acute wounds or burns, not chronic wounds |

FDA: Food and Drug Administration.
Data from:
Managing moisture balance

Principles of Dressing selection
The ideal healing environment for wound treatment is moist wound healing

- Too moist = absorptive dressing
- Too dry = add moisture
Wound Packing
Wound Packing Tips

- Pack firmly using one piece of roll gauze or packing gauze—depending on wound size
- Use cotton tipped applicator or tongue depressor if needed
- If wound is large enough to have multiple pieces tie together so it is one continuous piece
- Make sure to place date, time and initials on outer dressing
Bates-Jensen wound assessment tool

- 4 pages long
- Mostly used in skilled nursing facilities
- Covers many attributes seen in many wound types
How do we cleanse wound?

Dressing choice based on treatment goal

Acute versus chronic wound

Resources

Pain
Summary

* Wound Infection - use antimicrobial dressing
* Maceration of wound edges - Protect peri-wound skin - Avoid having moist gauze in contact with skin
* Cavity/Dead space - pack firmly to fill
* Necrotic tissue - Debride
* Rolled wound edges must be treated
Other Wound Types
Other Wound Types

* Arterial
* Venous
* Neuropathic/Diabetic
* Skin Tears
Arterial Ulcer

Characteristics

- Absent or diminished pulses
- Pain on elevation
- Taut, shiny skin
- Thickened toenails
- Absence of hair
- Small, dry lesions with well-defined borders (punched out)
- Located distally
Venous Ulcer

Characteristics

- Leg hyperpigmentation - hemosideron staining
- Gaiter distribution
- Edema
- Weeping lesions
- Irregular wound edges
- Shallow
- Palpable pulses
Characteristics
Neuropathic/Diabetic Ulcer

Characteristics

- Below the ankle: often plantar aspect of foot
- Neuropathy: sensory, motor, autonomic
- Secondary to pressure or foreign body
- Wound edges: thick callus
- Wound bed usually appears dry, unless infected
How would treatment differ?
How would you describe?
What is this?
Thank You

Any questions?????
References


Lymphedema
Squamos Cell Carcinoma