Pressure WHAT?

Marta Ostler PT, CWS, CLT, DAPWCA
WHO CARES???
“One of the most costly and physically debilitating complications in the 20th century” (Burdette-Taylor 2002)
WHAT IS THIS

“Pressure Injury/Ulcer:
A pressure injury is localized damage to the skin and underlying soft tissue usually over a bony prominence or related to a medical or other device. The injury 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, co-morbidities and condition of the soft tissue.”
Stage 1 Pressure Injury: Non-blanchable erythema of intact skin

Intact skin with a localized area of non-blanchable erythema, which may appear differently in darkly pigmented skin. Presence of blanchable erythema or changes in sensation, temperature, or firmness may precede visual changes. Color changes do not include purple or maroon discoloration; these may indicate deep tissue pressure injury.
Stage 1
Stage 2 Pressure Injury: Partial-thickness skin loss with exposed dermis

Partial-thickness loss of skin with exposed dermis. The wound bed is viable, pink or red, moist, and may also present as an intact or ruptured serum-filled blister. Adipose (fat) is not visible and deeper tissues are not visible. Granulation tissue, slough and eschar are not present. These injuries commonly result from adverse microclimate and shear in the skin over the pelvis and shear in the heel. This stage should not be used to describe moisture associated skin damage (MASD) including incontinence associated dermatitis (IAD), intertriginous dermatitis (ITD), medical adhesive related skin injury (MARSI), or traumatic wounds (skin tears, burns, abrasions).
Stage II
Stage 3 Pressure Injury: Full-thickness skin loss

Full-thickness loss of skin, in which adipose (fat) is visible in the ulcer and granulation tissue and epibole (rolled wound edges) are often present. Slough and/or eschar may be visible. The depth of tissue damage varies by anatomical location; areas of significant adiposity can develop deep wounds. Undermining and tunneling may occur. Fascia, muscle, tendon, ligament, cartilage and/or bone are not exposed. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.
Stage III
Stage 4 Pressure Injury: Full-thickness skin and tissue loss

Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage or bone in the ulcer. Slough and/or eschar may be visible. Epibole (rolled edges), undermining and/or tunneling often occur. Depth varies by anatomical location. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.
Stage IV
Deep Tissue Pressure Injury: 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 skin 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.** 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.
Unstageable Pressure Injury: 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. Stable eschar (i.e. dry, adherent, intact without erythema or fluctuance) on the heel or ischemic limb should not be softened or removed.
Mater of Great Concern

Loads of RESEARCH
Advisory Panel world wide
Focused clinical work
Specific ICD-10 codes
Specific descriptions of each phase
Specific treatment pathways
Litigious Subject
Emotional
Have been around …FOREVER

2.5 Million patients develop / year
National Incidence 2.5 present in hospitals
60,000 deaths per year

However, descriptions lack the severity of the condition/pathophysiology
WHY??

“Both litigation and complaints related to pressure ulcers continue to rise in the United States”

“Has become the””Slam Dunk”” for prosecuting attorney.”

“Prosecution has 75% chance of winning a pressure ulcer case it if goes to court”……17,000 lawsuits per year
WHAT HOLDS TRUE ........

CAUSE: Pressure Ischemia: Pressure over Time

“**Immobility** is the primary risk factor for PrU” (Anders 2010)

TREATMENT: Pressure Redistribution

REDUCE QUALITY OF LIFE

HIGH MORTALITY

EXPENSIVE $$$$$$....20,900 to 151,700 per Ulcer/43,180 added to the hospital stay (AHRQ)
CAUSE:

Pressure occludes capillaries

16-33 mmHg

If pressure > 33 mmHg:
- Anoxia
- Cell Death
- Necrosis

Pressure

Time
Cause:

Extrinsic Factors:
- Pressure
- Shear
- Friction
- Moisture
- Posture
- Immobility

Intrinsic Factors:
- Medications
- Sensation
- Nutrition
- Edema
- Co-morbidities
- Emotion/Cognition
- Illness
- Ischemia
- Hypertension

...etc

Usually worse than they appear (Kosaik 1954)
# Braden Risk Assessment Scale

(abridged version)

<table>
<thead>
<tr>
<th>Sensory Perception</th>
<th>1: Completely limited</th>
<th>2: Very limited</th>
<th>3: Slightly limited</th>
<th>4: No impairment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td></td>
<td></td>
<td></td>
<td>4: No impairment</td>
</tr>
<tr>
<td>Activity</td>
<td>1: Bedfast</td>
<td>2: Chairfast</td>
<td>3: Walks Occasionally</td>
<td>4: Walks frequently</td>
</tr>
<tr>
<td>Mobility</td>
<td>1: Completely immobile</td>
<td>2: Very limited</td>
<td>3: Slightly limited</td>
<td>4: No limitation</td>
</tr>
<tr>
<td>Nutrition</td>
<td>1: Very poor</td>
<td>2: Probably inadequate</td>
<td>3: Adequate</td>
<td>4: Excellent</td>
</tr>
<tr>
<td>Friction &amp; Shear</td>
<td>1: Problem</td>
<td>2: Potential problem</td>
<td>3: No apparent problem</td>
<td>4: Excellent</td>
</tr>
</tbody>
</table>

Copyright Barbara Braden and Nancy Bergstrom, 1988, reprinted with permission
Pressure Ulcer Risk Factors

- **Age** greater than 65 years old
- Terminal illness
- Dialysis
- Radiation and oxygen therapy
- History of pressure ulcer
- **Functional impairment**
- Incontinence
- Length of stay at a facility
- Malnutrition
- Stroke
- Renal Failure
- **Friction/shear**
- Decreased sensation
- **Sedation**

Berlowitz, 1997; Ferrell, 2000; Kwong, 2009; Cox, 2011; Nonnemacher, 2008; Lahmann, 2012; & Cacon, 2010).
MANAGEMENT PRINCIPLES

Pressure avoidance
- Frequent repositioning: **PASSIVE MOBILITY**
- Avoid bed rest: **ACTIVE MOBILITY**
- Pressure reducing surface

Nutrition: ensure proper intake and monitor
Continence and moisture control (when possible)

Wound care
Debridement
Dressing selection
Pressure Redistribution
Novel Dressings and therapies have NOT shown increased benefit specific to Pressure Ulcers (Boyko 2018)

With all this talk of function, mobility….why aren’t patients being referred to Physical Therapy??
Physical Therapists…”are healthcare professionals who maintain, restore, and improve movement, activity and health, enabling individuals of all ages to have optimal functioning and quality of life. “

AVILES, Frank Jr.; Examining the Increased Role of the Physical Therapist Within the Wound Care Industry; Today’s Wound Clinic, May 2014, Vol 8 issue 4.
<table>
<thead>
<tr>
<th>INTERVENTIONS IN WOUND HEALING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAIT</strong></td>
</tr>
<tr>
<td><strong>BALANCE</strong></td>
</tr>
<tr>
<td><strong>THERAPEUTIC EXERCISE</strong></td>
</tr>
<tr>
<td><strong>DRESSING MANAGEMENT</strong></td>
</tr>
<tr>
<td><strong>ORTHOOTICS</strong></td>
</tr>
<tr>
<td><strong>ASSISTIVE DEVICES</strong></td>
</tr>
<tr>
<td><strong>SCAR MANAGEMENT/MASSAGE</strong></td>
</tr>
<tr>
<td><strong>MOBILITY: FUNCTIONAL TRAINING</strong></td>
</tr>
</tbody>
</table>
WOUND HEALING BENEFITS OF EXERCISE

➢ GAIT TRAINING
- SHORTEN STRIDE LENGTH
- SLOW CADANCE

➢ STRENGTHENING

➢ STRETCHING
- IMPROVE HIP STRENGTH
- IMPROVE ANKLE RANGE OF MOTION AND STRENGTH

WOUND HEALING BENEFITS OF EXERCISE

➢ PATIENTS GENERAL PHYSICAL CONDITION IS THE BASIS FOR AN EFFECTIVE PROGRAM

➢ EXERCISE EFFECTS THE INFLAMMATORY PHASE
  - inhibits the expression of pro-inflammatory factors and increases the expression of anti-inflammatory factors

➢ EXERCISE IMPROVES TISSUE OXYGENATION

Mahoney, E: Incorporating Exercise as an Integral Part of Wound Management; Todays wound Clinic; Volume 8 Issue 5 - June/July 2014
1. Pressure Redistribution/Schedule
2. Seating System
3. Mobility: Transfers, Sit to stand, Squat pivot
4. Equipment /Management
5. Patient Education
6. Assistive Devices (OT)
7. Skin Checks/Skin management
8. Collaboration with DME

ITS ALL ABOUT MOBILITY

PRESSURE REDISTRIBUTION
PRESSURE REDISTRIBUTION AND REDUCTION
FUNCTIONAL PRESSURE POINTS
Collaborating nurse/PT/OT: UC Davis: Hospital acquired
- 0°
- 30°
- 45°
Low Airloss Bed
comparative mapping on transport gurney with and without EHOB overlay

STRAPPED IN AND NOT STRAPPED IN
**Team of the Future Performs Research**

**Problem: Surface Selection**

<table>
<thead>
<tr>
<th>Surface type</th>
<th>Average pressure mmHg</th>
<th>Peak Pressure mmHg</th>
<th>Surface area in²</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iso mattress (G) flat</td>
<td>21.5</td>
<td>39.9</td>
<td>778.13</td>
<td><img src="image1.jpg" alt="Image" /></td>
</tr>
<tr>
<td>Dolphin (G) flat</td>
<td>22.3</td>
<td>37.8</td>
<td>864.06</td>
<td><img src="image2.jpg" alt="Image" /></td>
</tr>
<tr>
<td>Dolphin (G) 30°</td>
<td>23.3</td>
<td>42.0</td>
<td>892.19</td>
<td><img src="image3.jpg" alt="Image" /></td>
</tr>
<tr>
<td>Dolphin (G) flat with EHOB bariatric seat cushion</td>
<td>21.8</td>
<td>38.1</td>
<td>934.38</td>
<td><img src="image4.jpg" alt="Image" /></td>
</tr>
</tbody>
</table>
Wheel Chair Seating

<table>
<thead>
<tr>
<th>Sensor/Group</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVG Pos.</td>
<td>32.4</td>
</tr>
<tr>
<td>Peak Press.</td>
<td>123.5</td>
</tr>
<tr>
<td>Area (in²)</td>
<td>129.25</td>
</tr>
</tbody>
</table>

The diagram illustrates pressure distribution across different areas, with the values indicating varying pressures.
Use Silicone dressing & Waffle cushion for patients with:

- BP Below 100/55
- HCT below 30
- Shock: Sepsis, Neurogenic, Cardiac
- Dialysis
- Spinal Cord Injury/Spina Bifida
- Stroke
- Projected multiple surgeries

Document:

- Skin assessment
- Interventions:
  - Surface
  - Dressings
  - Moisture management

Stage PU with MD for coding
Remind floor RN to complete IR
Take Home Pearls:

1. Pressure Ulcers will not close/heal without pressure redistribution 

2. Pressure Mapping is an often missed opportunity: cost $22,000

3. Consider referral to physical therapy/DME

4. Consider underlying co-morbidities
don’t stop your curiosity,
Bibliography:


Sprigle, Stephen PhD, PT, Measure It: Proper Wheelchair Fit Is Key to Ensuring Function While Protecting Skin Integrity, Advances in Skin & Wound Care: December 2014 - Volume 27 - Issue 12 - p 561–572.