

Moisture and Shear Madness

IASD and Shear Pressure Injury

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Moisture Associated Skin Damage

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Effects of Moisture+

- Macerated/overhydrated skin has decreased strength of outermost skin layer
  - Reduced cohesion of skin cells & collagen cross-linking
- Moisture increases the coefficient of friction between surfaces
- Components of fluids cause local inflammation, ↑ permeability of barrier
  - (e.g., substances in feces)

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Incontinence Associated Dermatitis or Incontinence Associated Skin Damage (IASD)

- Local inflammatory damage to superficial skin layers from contact with moisture+
  - Urine/wetness
  - Feces/irritants
  - Cleansing friction, etc.

IASD Occurs in All Clinical Settings

Prevalence of IASD

- 10%-35% in hospitals (Campbell et al, *Inter Wound J* 2014; Junkin et al., *JWOCN* 2007; Peterson et al., AACN NTI abstract, 2007))

- 20% in long-term acute care units (Long et al., *JWOCN* 2012)

- 3-7% of NH residents (Boronat-Garrido et al., JWOCN, 2016; Bliss et al., *OWM* 2006, Bliss et al., Nurs Res, 2006; ; Kottner et al. Int J Nurs Stud, 2014; Zehrer et al., *OWM* 2004)
- 41% community living with FI or DI (Bliss et al., JWOCN 2015)

IASD Signs and Symptoms

- Skin Color Change
  - pink → redness on light skin tones:
  - lighter or darker than normal tone on dark skin tones
- Loss of skin layers
  - Superficial
  - Shiny skin due to serous exudate
- Rash (fungal or bacterial)
  - Edges are irregular
- Other Characteristics
  - Local edema

Sxs: Discomfort → pain, itching, burning sensation

IASD Locations

NH

- 73% buttocks
- 70% anal area
- 36% genitals, scrotum, groin or perineum
- 24% thighs
- 9% sacrum

(Bliss et al., *OWM*, 2006)

LTAC

- 34% buttocks
- 32% rectal/anal area
- 28% Scrotum, perineum
- 18% thighs
- 10% abdomen

(Long et al., *JWOCN* 2012)

Community-Living

95% Around anus/between buttocks 95%
13% Outer Buttocks
10% Groin (labia, scrotum, penis)
3% Thighs (inner or outer) (Bliss et al., *JWOCN 2015)*

Empowering Evidence 2014

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IASD.D.2 Instrument

Scoring of IASD Severity

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IASD.D.2 Description of Body Areas

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Undamaged/
No IASD score = 0

Pink score = 1

Red score = 2

Rash score = 3

Skin Loss score = 4

IASD.D.2 Instrument

SKIN LOSS

Skin loss is where the upper layer of skin is not continuous and some edges are apart due to missing skin between them. Skin often appears shiny or glistening. A pink or red color which may have purple hues may seem brighter as the skin is moist and the top layer is missing (denuded).

Skin Loss **Skin Loss** **No Skin Loss** **PU – Not IASD**

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Importance of IASD Prevention

Adverse Sequelae of IASD

- Secondary Infection (fungus & bacteria)
- ↑IASD Severity
- ↑Pressure injury risk
  Demarre et al., *J Adv Nurs*, 2015
- Patient discomfort/pain
- ↑Treatment costs

Systemic Risks of IASD

Age
Health Status
Chronic or Acute illness
Nutrition
Oxygenation
Perfusion
Temperature

Tissue Tolerance

Incontinence Associated Skin Damage

Mobility
Sensory
Cognitive
Deficits

Toileting Ability

(Brown & Sears *OWM*, 1993)

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Clinical Predictors of IASD in Specific Groups

ICU Patients with FI

- Frequent loose or liquid incontinent stool
- Diminished cognitive awareness

(adjusted for APACHE II score and vasoactive drugs)
(Bliss et al *JWOCN* 2011)

NH residents

- Not receiving IASD prevention
- Presence of pressure ulcer/injury
- ADL limitations
- Perfusion problems
- Lesser cognitive deficits

(Bliss et al *JWOCN* 2017)

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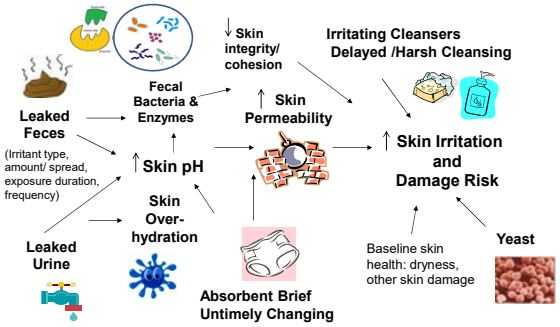
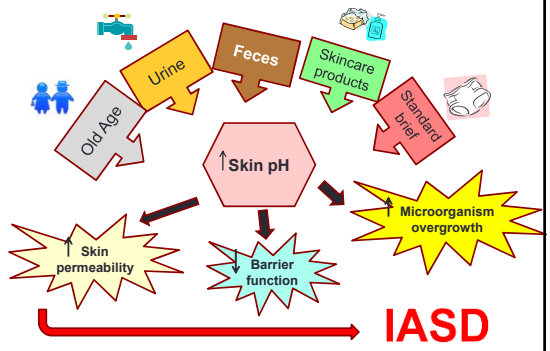
Local IASD Risk Factors



(Bliss & Powers, *WCET J* 2011; Gray et al. *JWOCN*, 2012; Berg *Pediatriacs*, 1986; Faria et al. *OWM*, 1996 Yosipovitch & Maibach *Cosmetics Toiletries*, 1996)

Alkaline Skin pH and IASD



IASD Treatment and Prevention

- Use defined skin care regimen routinely
- Timely cleansing of soiling
  - Gentle cleansing, soft cloth
- Apply moisturizer (emollient +/-humectant) esp. on dry skin
- Apply protectant/moisture barrier to skin
  - e.g., petrolatum, silicone-based dimethicone, zinc oxide, acrylate films, cyanoacrylates
- Topical anti-fungal as needed
- Incontinence reduction, containment
  - Absorbent products, anal plugs, pouches, catheters
- Possible new focus – maintain acidic skin pH

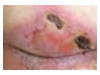
"Skin pH Friendly" Product Research

Absorbent briefs + Curly fiber

- Lower (acidify) pH of pad/brief and skin when wet with alkaline solution similar to urine or feces (skin pH = 5.7)
  - (Beguin et al. *BMC Geriatrics* 2010; Bliss et al. *JWOCN 2017*)
- vs various controls (standard brief, normal skin, etc) (skin pH = 6.4-6.6, p<.001))
  (Bliss et al. JWOCN 2017)

Skin care products

- **Protectant/barrier cream** with emollient + acrylate terpolymer + dimethicone
  - skin pH = 6.8 vs. no protectant skin pH = 6.6 p =.09
  - Association with pH after adjusting for FI frequency, age & contractures & (β = −.439, p=.020) (Kon et al. *JWOCN* 2017)
- Acidic (5.5) **skin cleanser** for ICU patients (Duncan et al. Intensive Crit Care Nurs, 2013)



Pressure Injury

Definition

- Localized damage to skin & underlying soft tissue due to intense and/or prolonged pressure with or without shear
  - usually over a bony prominence
  - Can be related to a medical/other device

Pressure

- Pressure is a force;
- it is exerted perpendicular to a surface

http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/

Possible Ways Pressure Injury Occurs

- Ischemia
- Decreased transport of nutrients and waste to cells
- Reperfusion of metabolic wastes & toxins
- Deformation/damage of muscle, tissue, blood vessels
- Cell death and tissue necrosis

(2011 National Pressure Ulcer Advisory Panel www.npuap.org; Brienza et al. *JWOCN* 2015; Lachenbruch et al. *OWM* 2013)

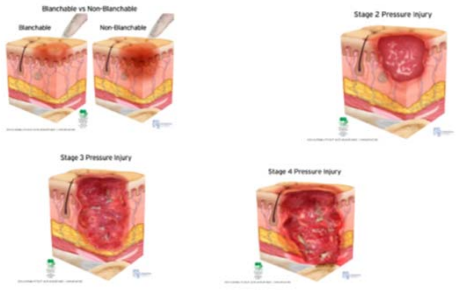
Signs & Symptoms Pressure Injury

- Currently Staged 1-4, partial vs full thickness
- nonstageable (if base not visible), DTI
- Range of signs depending on stage:
  - Nonblanchable erythema (redness), local swelling, firmness → open ulcer with definite edges, varying depth, eschar/slough
- pain/discomfort

- **Stage 1 Pressure Injury: Non-blanchable erythema of intact skin**
  Intact skin with a localized area of non-blanchable erythema, Color changes do not include purple or maroon discoloration; these may indicate DT pressure injury.
- **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.
- **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. Undermining and tunneling may occur. Fascia, muscle, tendon, ligament, cartilage and/or bone are not exposed.
- **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, undermining and/or tunneling often occur.

http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/

Stages of Pressure Injuries



http://www.npuap.org/resources/educational-and-clinical-resources/

Pressure Injury Risks

- Several Risk Screening Scales
  - Common: Braden, Norton, Waterlow
- Risk Factors for **ANY** Pressure injury
  - Incontinence/moisture/microclimate (+ warm temperature)
  - Poor nutrition
  - Mobility/activity limitations/physical condition
  - Sensory problems/mental condition
  - Friction & shear – Braden (as well as load pressure)
  - Sex/age, skin condition, BMI, tissue malnutrition (e.g., MOF, PVD), surgery/trauma – Waterlow
  - Presence of IASD (Bliss, Gurvich, et al., *JWOCN* 2017)



Friction vs. Shear


Free images

Friction

- A resistant force that one surface encounters when moving over another
- **CoF** – measure of the amount of resistance that a surface exerts on things moving over it
- Friction injury increases susceptibility of skin to other damage

Shear

- Deformation or distortion of an area of skin due to 2 opposite parallel forces
  - skin pulls in 1 direction, bones/body pull in opposite direction
  - Damages tissues, blood vessels
  - Friction occurs with shear

Bergstrom et al. Clinical Practice Guideline, No. 15. AHCPR Publication No. 95-0652.; *Wounds International* 2010
www.woundsinternational.com/media/issues/300/files/content_8925.pdf

Shearing Pressure Injury

- Sheer stress - force of two parallel surfaces moving in opposite directions
- Examples: Dragging patient up in bed, sliding down in wheel chair
- Damage is often elongated, can be unilateral
- Moisture increases risk

Areas susceptible to shear: ischial tuberosities, heels, shoulder blades, and elbows

Bhattacharya & Mishra *Indian Journal of Plastic Surgery 2015*

Prevention and Management
Shear Pressure Injury

- Avoid tissue deformation/distortion
  - No sliding, dragging; use lifts
- Reduce pressure load
  - Reposition and proper position (HOB ≤ 30°, avoid slouching), raising knee area of bed
  - Pressure redistributing mattresses/cushions

- Manage friction and interface pressure
  - Increase contact area with surfaces
    - Cushions that conform to body, allow immersion
  - Absorbent products, gentle cleansing with soft materials; silk-like textile for bedding = fewer Stage 1s

(Wounds Internaional ww.woundsinternational.com/media/issues/300/files/content_8925.pdf; Mimura, M. et al. *Wound Rep Reg* 2009; https://www.woundscanada.ca/docman/public/170-bpr-prevention-and-management-of-pressure-injuries/file; 2016 NPUAP www.npuap.org); Twersky J OWM 2012)

Prevention and Management
Shear Pressure Injury

- Promote good skin condition
  - Prevent skin over-hydration/maceration
  - Manage microclimate and acidic pH
    - Incontinence reduction/management; dry skin thoroughly after cleansing, high absorbency briefs/pads; moisture wicking fabrics
  - Topical products & dressings for standard wound care

Wounds Internaional www.woundsinternational.com/media/issues/300/files/content_8925.pdf; https://www.woundscanada.ca/docman/public/170-bpr-prevention-and-management-of-pressure-injuries/file; 2016 NPUAP www.npuap.org; Singh JWOCN

State of the Science IASD Care

- "There is no evidence that one barrier/protectant in the market is better than any other"
  (Woo et al. *ADV SKIN WOUND CARE* 2017)
- "A wide variety of products…with both moisturizing and barrier capacity exists…There is inadequate evidence to rank these products based on their barrier function while preventing maceration…Evidence on the effectiveness alone of skin care regimens to prevent or treat IAD are yet insufficient for policy making."
  (Beeckman ,J Tissue Viability 2017)

State of the Science -- Shear Injury

- It is not known how shear forces cause tissue injury, who is at greatest risk, relation between internal and external forces, what the relation is between posture change and shear injury

(http://www.npuap.org/wp-content/uploads/2012/02/ Shear_slides.pdf)

Clinical Reality

Small Group Activity

1. How do you prevent and treat IASD or shear pressure injury in your facility?
2. What do you find is most effective?
3. Compare with others to identify common products or approaches
4. What do you still want/need to know to improve your practice and patient outcomes?
5. Select a reporter to report back to the large group