

Under Pressure

THE BASICS OF PRESSURE
INJURIES



Disclosures

PROGRAM CONTENT BASED
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EDUCATIONAL SESSIONS

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Objectives

Describe the various stages of pressure injuries as set forth by the NPIAP

Define medical device related pressure injuries

Discuss treatment strategies based on the stage /type of injury

Wound Categories

- ▶ Pressure Injuries – Staging and Etiology (Mechanical Device and Mucosal)
- ▶ Diabetic Neuropathic Ulcerations – Wagner Classification – University of Texas Diabetic Wound Classification
- ▶ Venous Stasis Ulcerations – CEAP Classification (clinical, etiology, anatomy, and pathophysiology)
- ▶ Skin Tears – Payne-Martin Classification System

Extent of the Problem of Pressure Injury

Pressure Injury Incidence

- ▶ 1– Pri = 2,500,000
- ▶ 2 – DFU = 2,700,000
- ▶ 3– VLU = 4,600,000
- ▶ 4 – SSI = 266,000
- ▶ 5 – Burns = 50,000

Cancer Incidence

- ▶ 6- Prostate CA = 241,000
- ▶ Breast CA = 229,000
- ▶ Lung CA = 244,000
- ▶ Bowel CA = 285,000

PRESSURE INJURY

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.

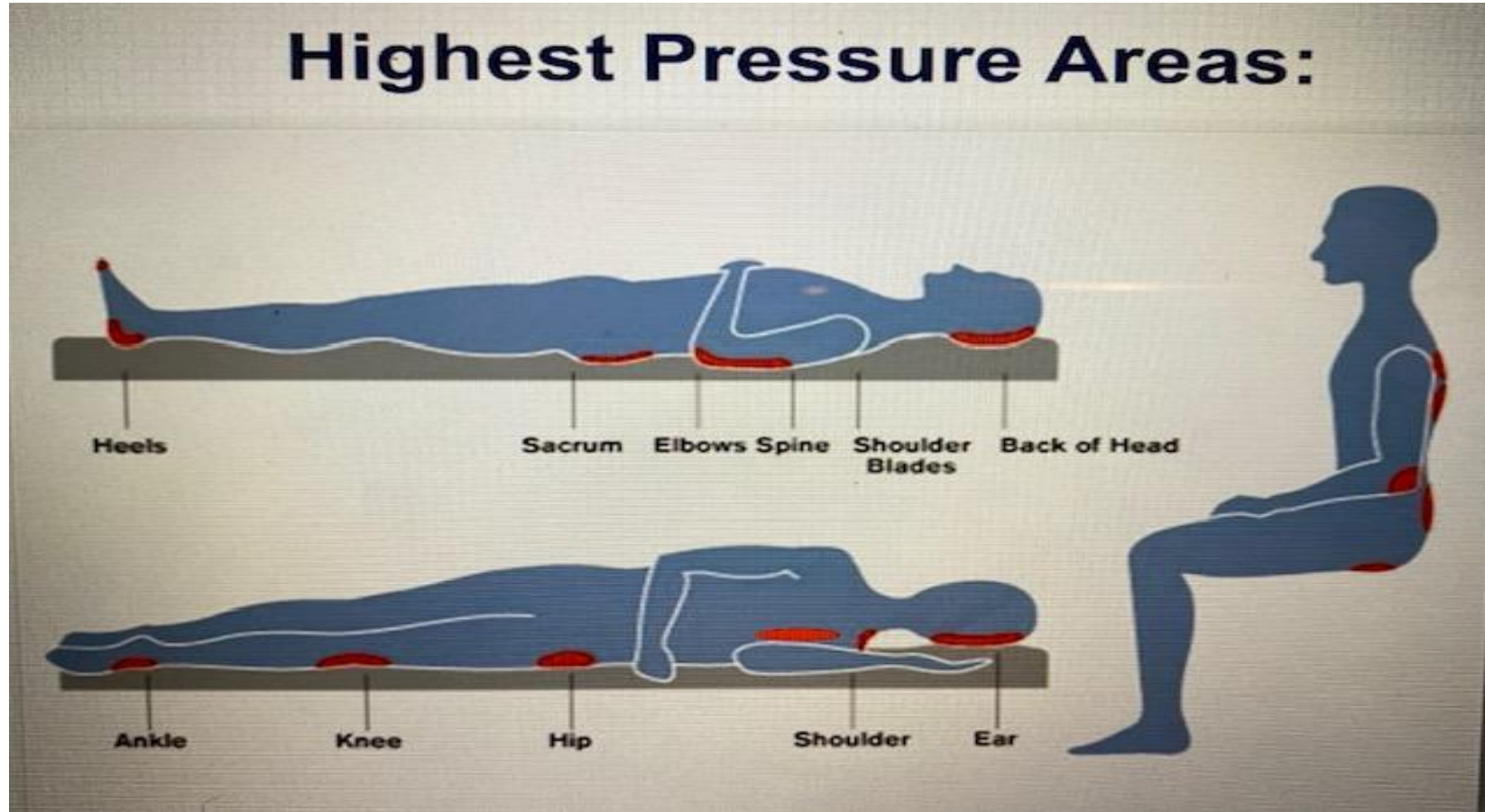
The injury can present as intact skin or an open ulcer and may be painful. The injury occurs as a result of intense pressure, prolonged pressure or pressure in combination with shear.

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

TWO MECHANISMS AT PLAY IN DEVELOPMENT OF PRESSURE INJURY

- Ischemia leads to cellular death and that injury is then exacerbated by the release of cellular waste products as tissues are offloaded and blood flow is restored. This is the ischemia-reperfusion concept.
- Previously unappreciated and now well understood is the concept of cellular death due to direct deformation damage secondary to pressure loading and shear forces. The amount of cellular death was shown to vary depending on magnitude and timing of pressure loading.

Highest Pressure Areas:

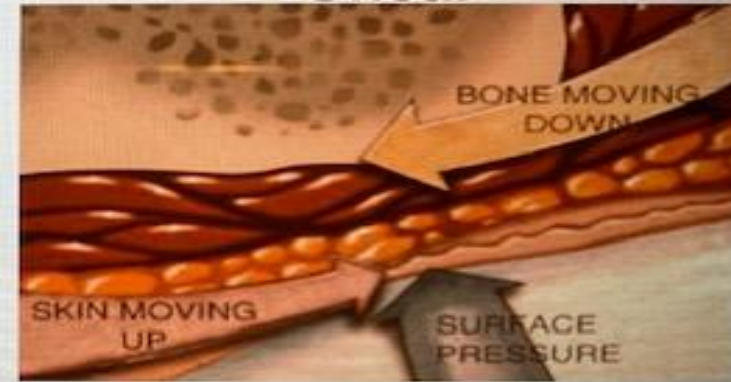


Pressure Injury Etiology: Major Contributing Factors

Pressure



Shear



- Both lead to tissue deformation and ischemia
- Can cause tissue damage within minutes at the microscopic level and prevent the removal of waste products further damaging cells
- Reperfusion that follows a period of prolonged ischemia can increase the degree of tissue damage due to release of oxygen free radicals

Determining if a Wound is a Pressure Injury

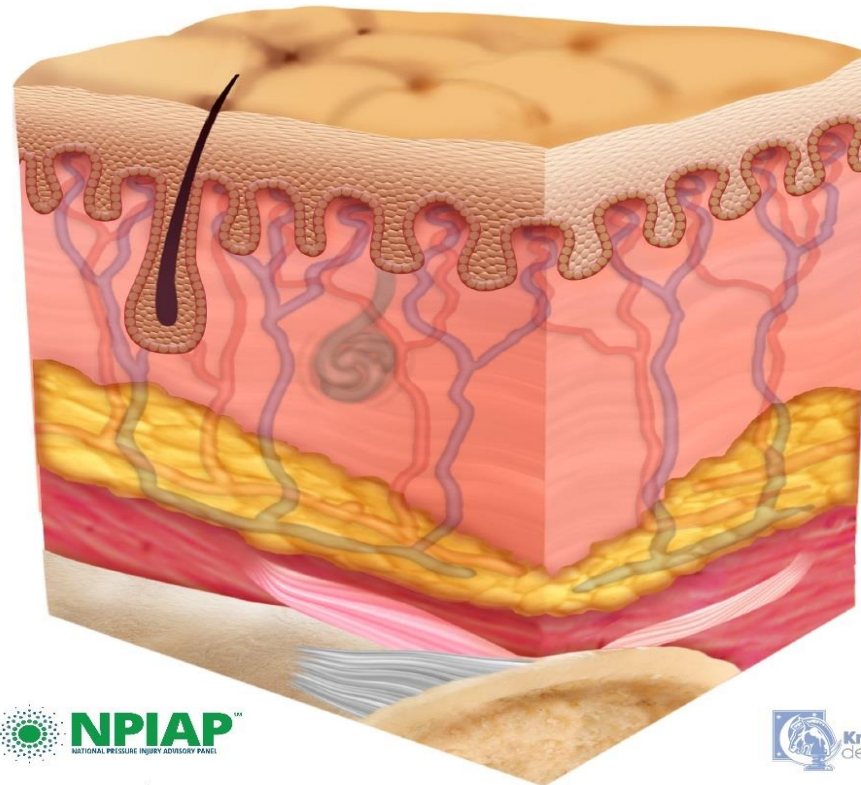
Common situations that lead to Pressure Injury

- ▶ Operations over 3 hours
- ▶ Critical care with hypotension or ventilator use
- ▶ Vasopressors • Levophed and Vasopressin
- ▶ Peripheral vascular disease
- ▶ Under medical devices
- ▶ Immobility

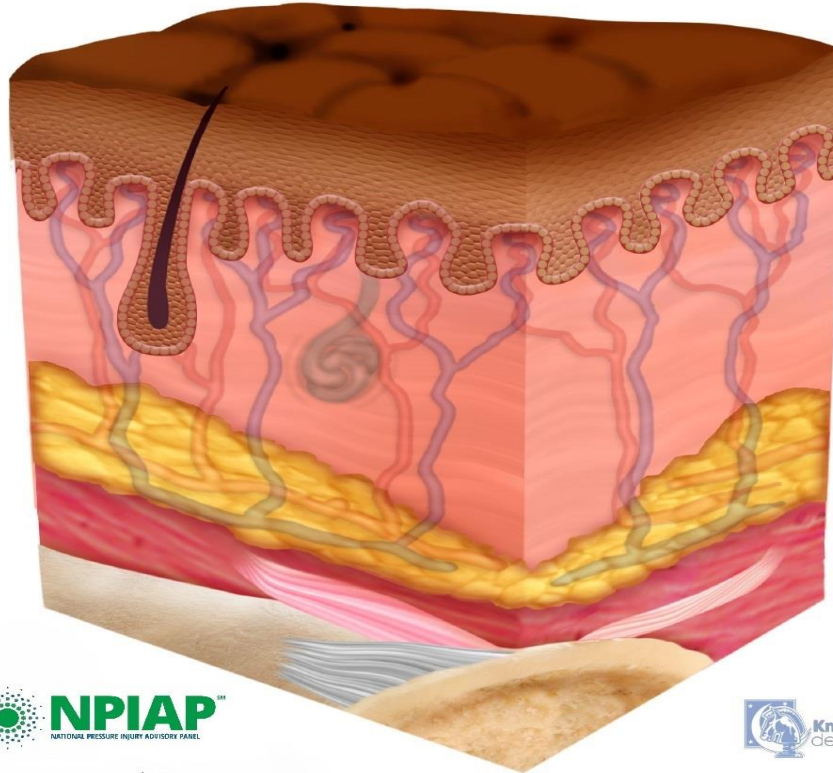
Exposure to pressure

- ▶ Intense pressure leading to direct cell death (DTPI)
- ▶ Prolonged pressure leading to ischemia (traditional pressure injury)
- ▶ High shear forces on tissue (sacrum when in bed)
- ▶ **Poor Tolerance for Pressure**
 - Malnutrition – Incontinence – Ischemia
 - Neuropathy

Healthy Skin – Lightly Pigmented



Healthy Skin – Darkly Pigmented



STAGE 1 PRESSURE INJURY

NON BLANCHABLE ERYTHEMA OF INTACT SKIN

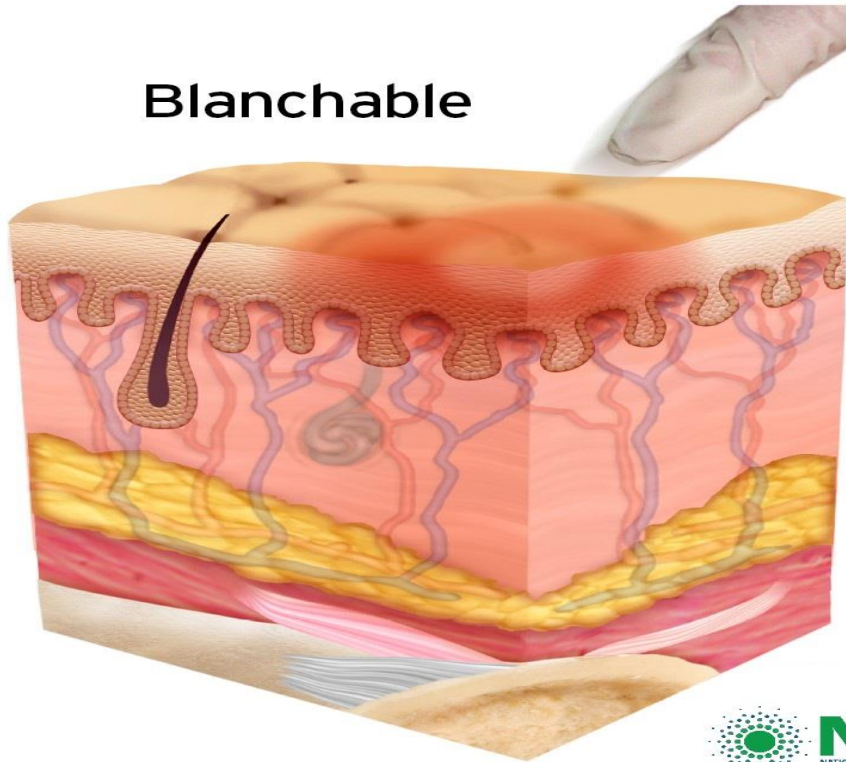
Intact skin with a localized area of non blanchable erythema, which may appear differently in darkly pigmented skin.

Presence of blanchable erythema or changes in sensation, temperature, or firmness may precede visual changes.

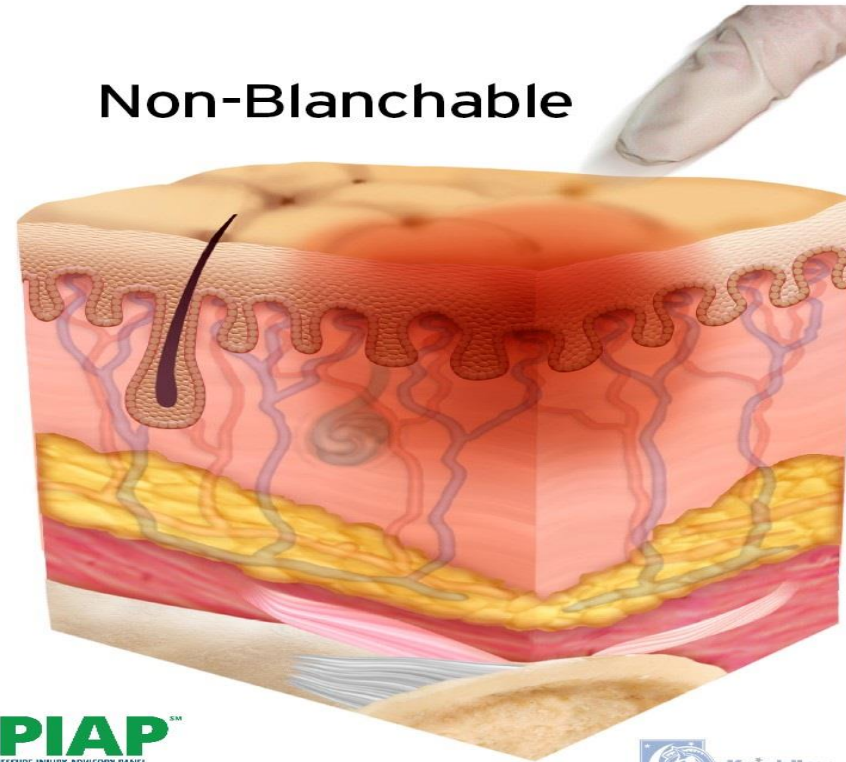
Color changes do not include purple or maroon discoloration; these may indicate deep tissue injury

Blanchable vs Non-Blanchable

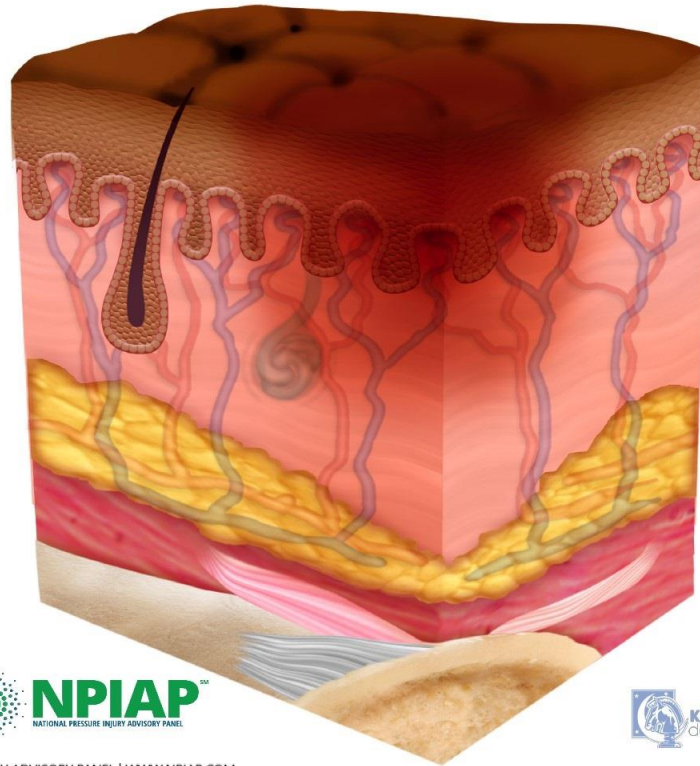
Blanchable



Non-Blanchable



Stage 1 Pressure Injury – Darkly Pigmented

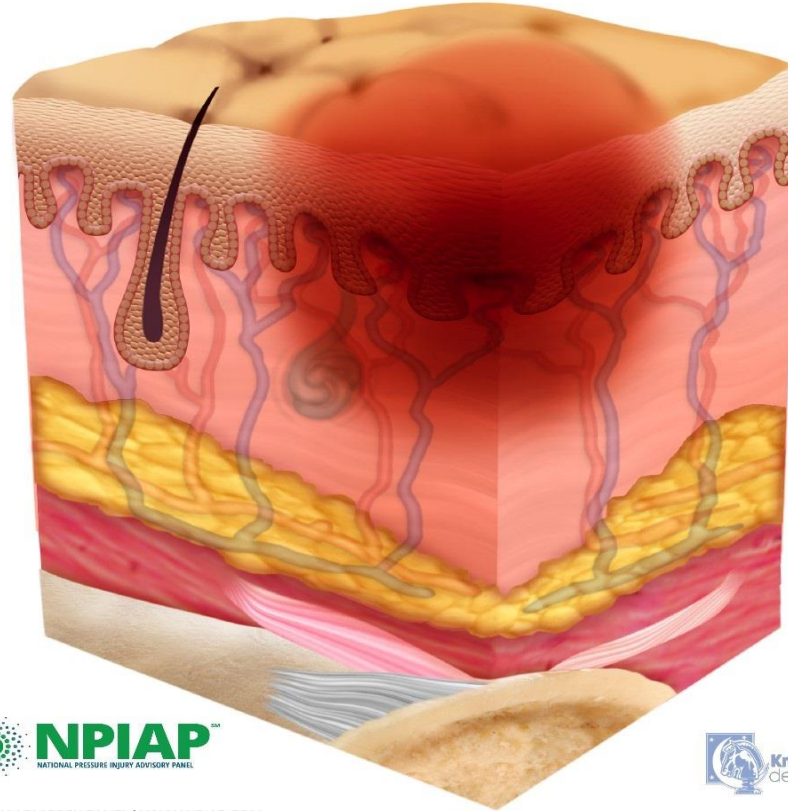


How can I accurately assess pressure injuries in dark-skinned individuals?

- ▶ Tangential lighting
- ▶ Avoid bright, direct light
- ▶ Moistening skin may help
- ▶ Palpate bony prominences and surrounding tissue for differences in: – Temperature – Tissue consistency (firm, boggy) – Pain with palpation
- ▶ New Technologies: (e.g. thermography, ultrasound, SEM, bio-impedance)



Stage 1 Pressure Injury - Lightly Pigmented



Clinical Photos – Stage 1



Initial Treatment – Stage 1

- Appropriate pressure redistribution surface – Group 1
- Frequent turning and repositioning
- Foam dressing/ protective skin barrier
- Float heels off bed with foam, pillows or heel suspension device
- Nutritional assessment

Stage 2 Pressure Injury:

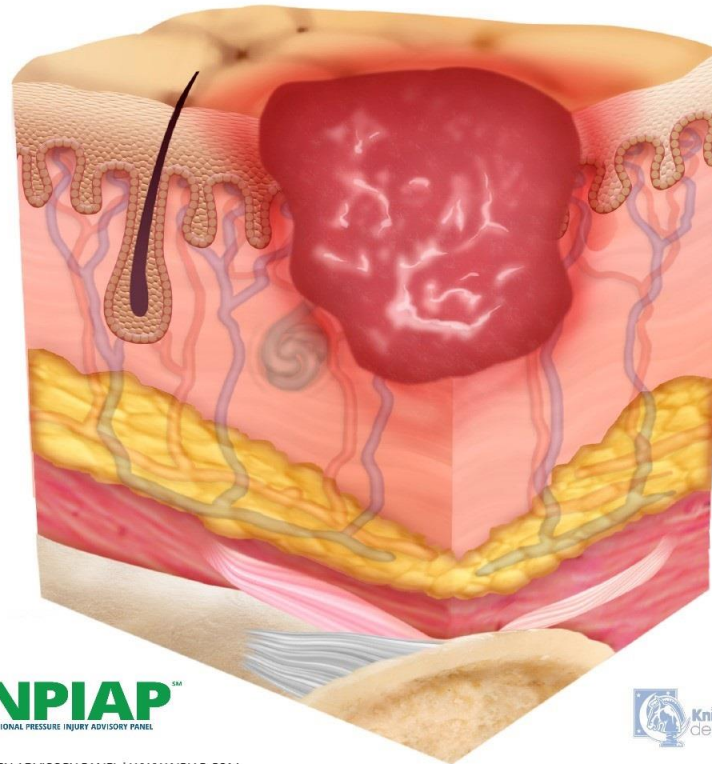
Partial-thickness skin loss with exposed dermis

- Partial-thickness skin loss 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 heel.

Stage 2 Pressure Injury

This stage should not be used to describe moisture associated skin damage (MASD) including associated dermatitis (IAD), intertriginous dermatitis (ITD), medical adhesive related skin injury (MARSI), or traumatic wounds (skin tears, burns, abrasions)

Stage 2 Pressure Injury



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Clinical Photos – Stage 2



When yellow tissue or material is in wound bed



Is that slough? Or Reticular dermis?

Slough is moveable and does not have capillary buds



When the Wound is Shallow and Open

- ▶ Many, many conditions can lead to open skin wounds
- ▶ Carefully consider history of the problem and location of the wounds
- ▶ Label open wounds as stage 2 pressure injury only when you are confident that pressure was the cause of the wound – Just because it is open does not make the wound a stage 2



Additional Considerations

- ▶ Appearance of Partial Thickness Wounds
- ▶ Visible bright red tissue
- ▶ Bleeding
- ▶ Edge is not distinct, often beveled
- ▶ Do not label as “excoriation” – Word means to “scratch”



Initial Treatment – Stage 2

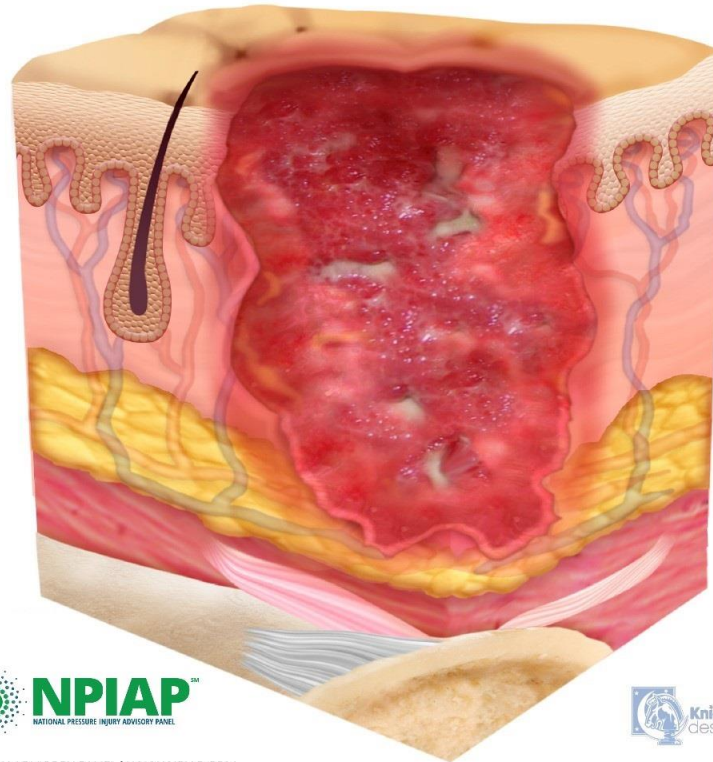
- Appropriate pressure redistribution – Group 1
- Frequent turning and repositioning
- Float heels with pillows, foam or heel suspension device
- Foam dressing/hydrocolloid - to be changed based on drainage, soiling, dislodgement
- Nutritional assessment

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 or bone is not exposed. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.

Stage 3 Pressure Injury



Eschar

Necrotic (dead) tissue.

You may see eschar in a full – thickness wound after an injury, gangrenous ulcer, infection, cancer, infarction, poison and inflammation.

Presents as dry, thick, leathery tissue that is often tan, brown or black. Black tissue is formed when healthy tissue dies and becomes dehydrated.

Wound source.com



This Photo by Unknown Author is licensed under [CC BY](#)

Slough

- ▶ Is necrotic (dead) tissue
- ▶ Is characterized as being yellow, tan, green or brown in color and may be moist, loose and stringy in appearance
- ▶ Slough returns after debridement, eschar usually does not
- ▶ Percentage of slough is not an indicator of the stage of the Pressure Injury



Scab vs Eschar

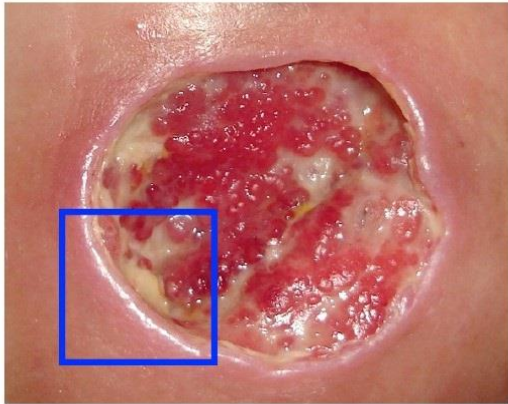
- ▶ The term “eschar” is NOT interchangeable with “scab”.
- ▶ Eschar is found in a full thickness wound.
- ▶ The term “scab” is used when a crust has formed by coagulation of blood or exudate.
- ▶ Scabs are found on superficial or partial – thickness wounds.
- ▶ Scab is rusty brown, dry crust that forms over injured surface of skin , within 24 hours of injury.
- ▶ Knowing the difference may not seem like a big deal until being audited, or facility is in survey.

Clinical Photos

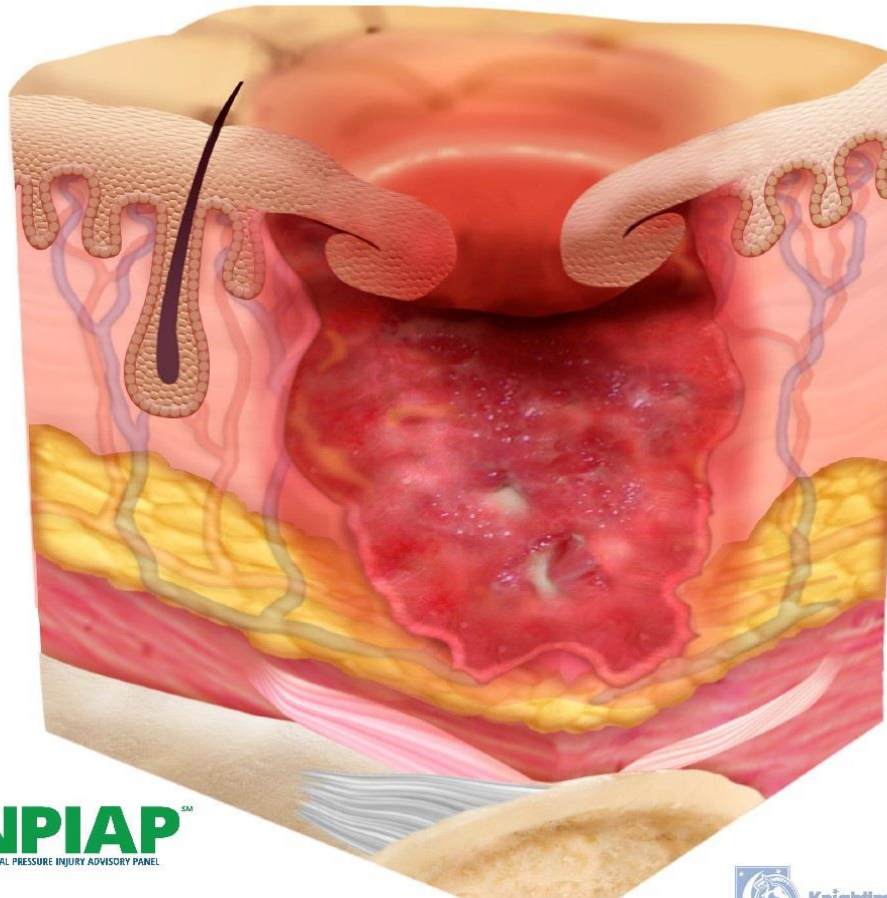


Stage 3 Pressure Injury with Epibole

Stage 3 Pressure Injury with Epibole



Area of Focus



- ▶ **Epibole**(ee-PIB-oh-lee)
- ▶ Due to lack of tissue in the wound bed to support the epidermal cells to cross the wound bed
- ▶ Needs to be removed

Stage 3 Pressure Injury with Epibole



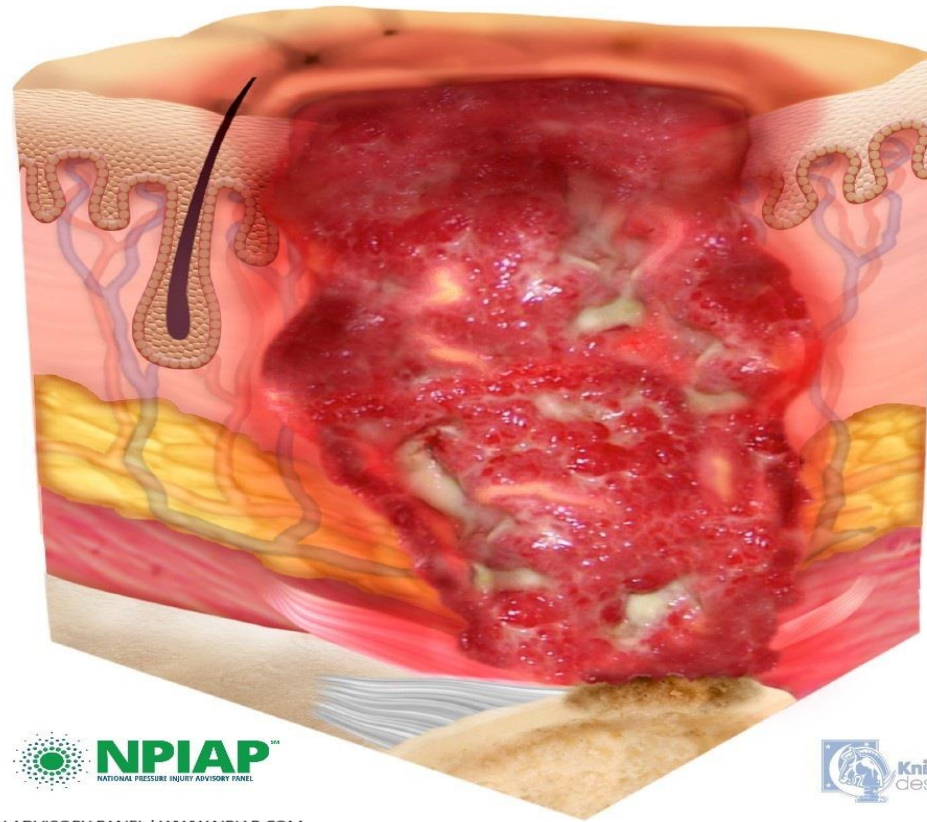
Initial Treatment Stage 3

- ▶ Appropriate pressure redistribution surface; Group 1 if stable, Group 2 if progressing or high risk patient
- ▶ Frequent turning and repositioning
- ▶ Offload heels with heel suspension device
- ▶ Appropriate primary dressing based on wound bed characteristics and drainage
- ▶ Debridement based on extent of non-viable tissue
- ▶ Nutritional assessment

Stage 4 Pressure Injury: Full-thickness loss of skin and tissue

- ▶ 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 4 Pressure Injury



Clinical Photos – Stage 4



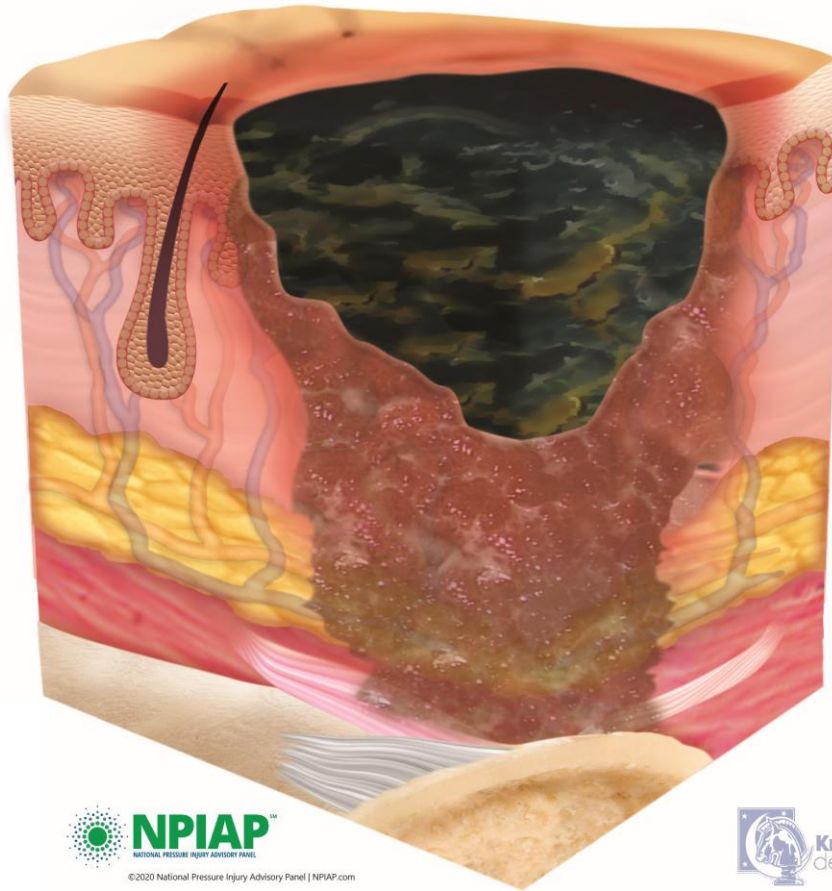
Initial Treatment – Stage 4

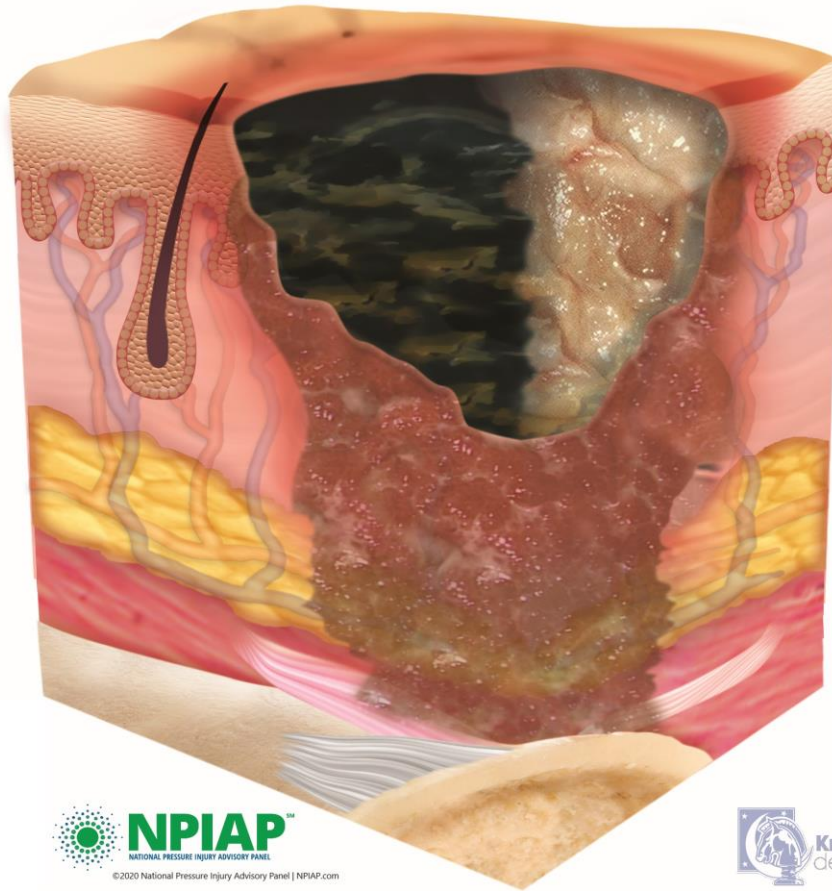
- ▶ Appropriate pressure redistribution – Group 2 or 3 (air fluidized) based on progression and risk
- ▶ Frequent turning and repositioning
- ▶ Offload heels with heel suspension device
- ▶ Appropriate primary dressing based on wound bed characteristics, depth, drainage
- ▶ Surgical consult may be appropriate regarding debridement/flap closure
- ▶ Nutritional assessment

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 an ischemic limb or the heel(s) should not be softened or removed





Clinical Photos - Unstageable



Eschar



Slough



Initial Treatment - Unstageable

- ▶ Appropriate pressure redistribution surface – Group 2 or Group 3 – depending on location and progress
- ▶ Frequent turning and repositioning
- ▶ Offload heels with heel suspension device
- ▶ Primary dressing based on wound bed; eschar, fibrin, slough etc.
- ▶ Debridement usually appropriate except with dry stable heel eschar
- ▶ Nutritional assessment

Deep Tissue Pressure Injury:

Persistent non-blanchable deep red, maroon or purple discoloration

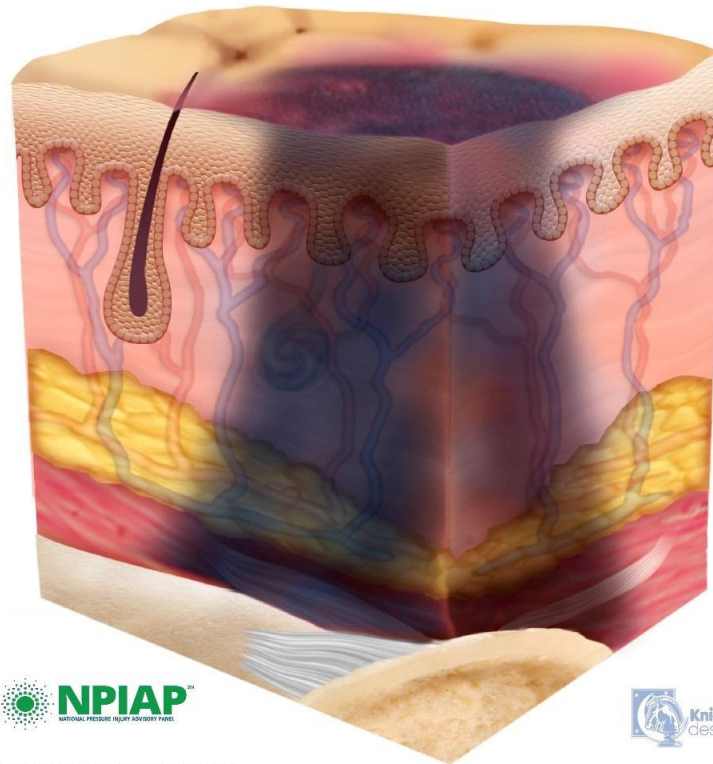
- ▶ Intact or non-intact skin with localized area of persistent non-blanchable deep red, maroon, purple discoloration or epidermal separation revealing a dark wound bed or blood-filled blister.
- ▶ Pain and temperature change often precede skin color changes. Discoloration may appear differently in darkly pigmented skin.
- ▶ This injury results from intense and/or prolonged pressure and shear forces at the bone-muscle interface.

Deep Tissue Pressure Injury:

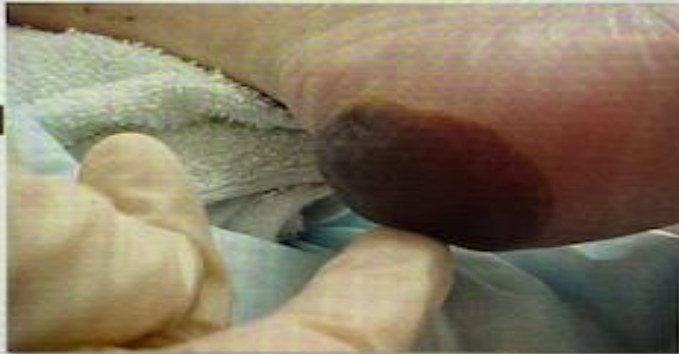
Persistent non-blanchable deep red, maroon or purple discoloration

- ▶ 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.

Deep Tissue Pressure Injury



Clinical Photos - DTPI



DTPI with Skin Slippage



Initial Treatment - DTPI

- ▶ Appropriate pressure redistribution surface – Group 3/Air Fluidized if on trunk.
- ▶ Frequent turning and repositioning
- ▶ Offload heels with heel suspension device
- ▶ Primary dressing based on whether skin closed or open, as well as wound bed and drainage
- ▶ Likely evolution to Stage 3 or 4
- ▶ Nutritional assessment

Day 1 - DTPI



Day 3 - DTPI



Day 10 - Unstageable



Evolution of Deep Tissue Pressure Injury

- ▶ Day 1 - Classify intact, discolored skin this pressure as a Deep Tissue Pressure Injury
- ▶ Day 3 - Classify discolored skin with epidermal blistering as a Deep Tissue Pressure Injury
- ▶ Day 10 - If the Deep Tissue Pressure Injury becomes necrotic, classify it as an Unstageable Pressure Injury

NPIAP Pressure Injury Stages Additional Considerations

- ▶ Describes anatomic depth that is visible or palpable.
- ▶ Deeper damage possible
- ▶ Does not heal 4-1. Do NOT Downstage.
- ▶ Note if caused by a medical device
- ▶ Pressure injuries on mucous membranes should not be staged.
- ▶ Injury does not imply fault. Numerically stage if depth visible/palpable: • Stage 1 • Stage 2 • Stage 3 • Stage 4
- ▶ Depth not visible: • Unstageable • Deep Tissue Pressure injury

Additional Considerations

▶ Partial Vs Full Thickness

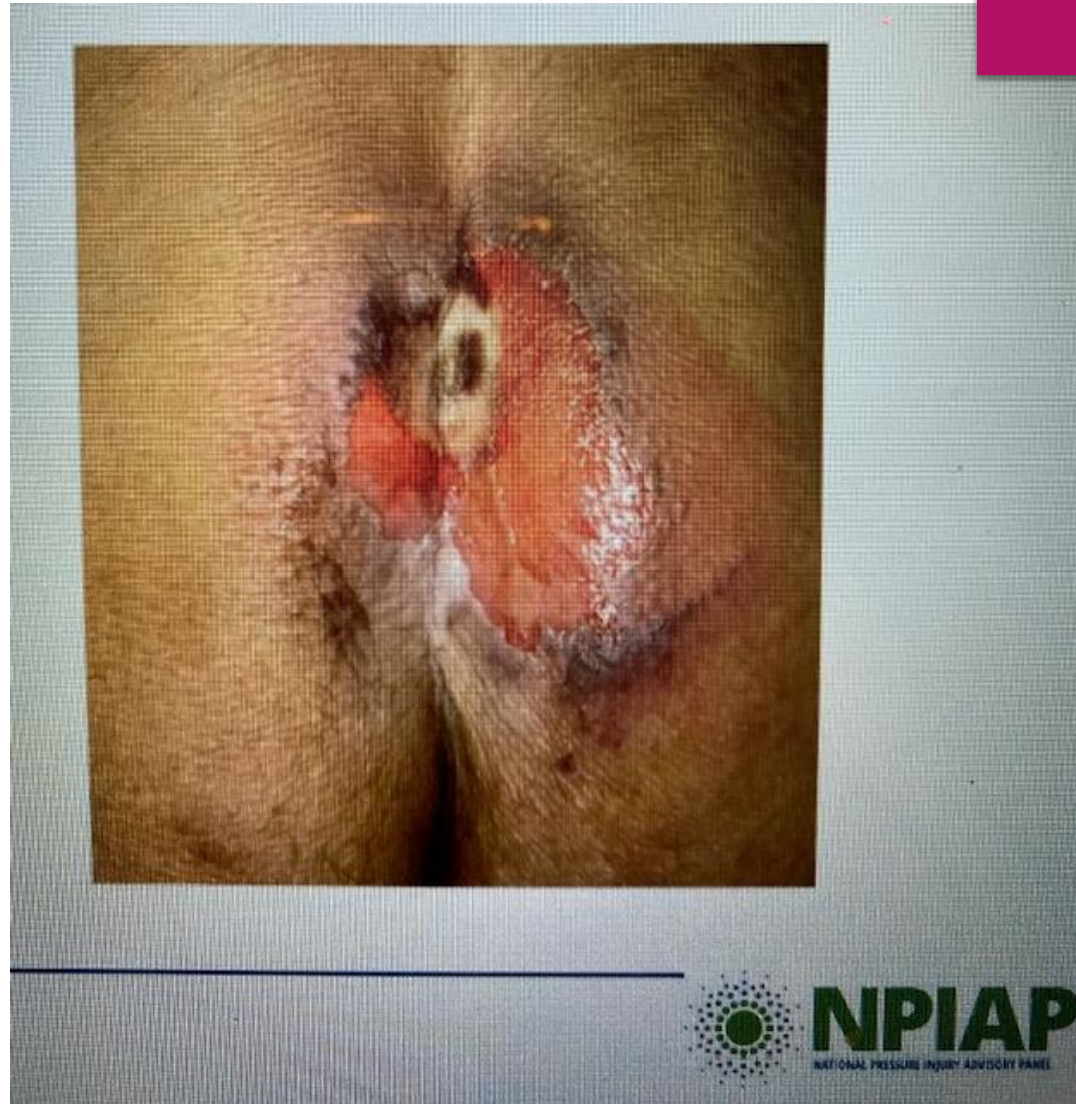
- ▶ Loss of both epidermis and dermis leads to a full thickness wound – Thickness of epidermis varies – Simple measurement of depth is not usable to determine PT vs FT
- ▶ Bony prominences lack much adipose (hence the risk) – Stage 3 may be uncommon as the initial stage of an ulcer, except in the buttocks
- ▶ Full thickness wounds expose structures below the skin – Exposed orthopedic hardware is also a stage 4

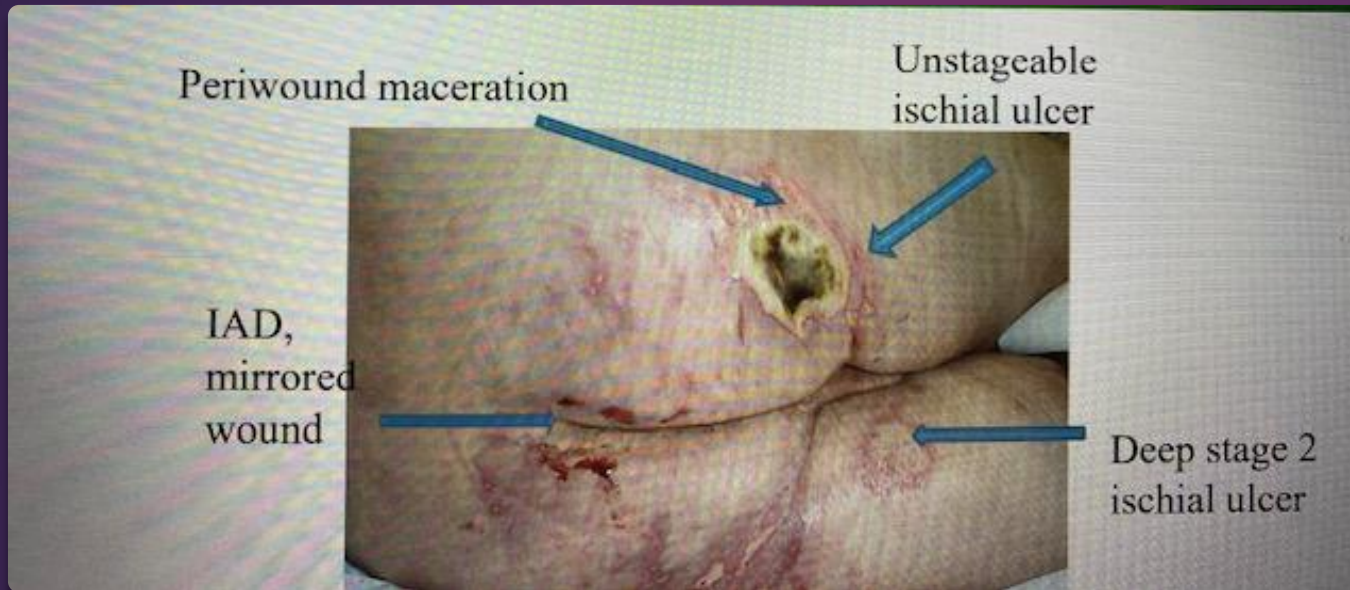
Granulation Tissue and Slough

- ▶ Granulation tissue – Small blood vessels and inflammatory cells within new connective tissue
- ▶ Created by fibroblasts, contains Type-III collagen – Present in wound below the superficial (papillary dermis) – Begins at day 5-7 post injury
- ▶ Slough – Inflammatory fluids dried on wound – Stimulated by biofilm, ischemia, infection

When more than one stage is present

- ▶ When more than one stage is present, label the Pressure Injury to its worst level of damage
- ▶ This level will be the level treated
- ▶ This photo is an unstageable pressure injury





When multiple wounds exist in one patient – label all of them

Skin Failure in Wound Care

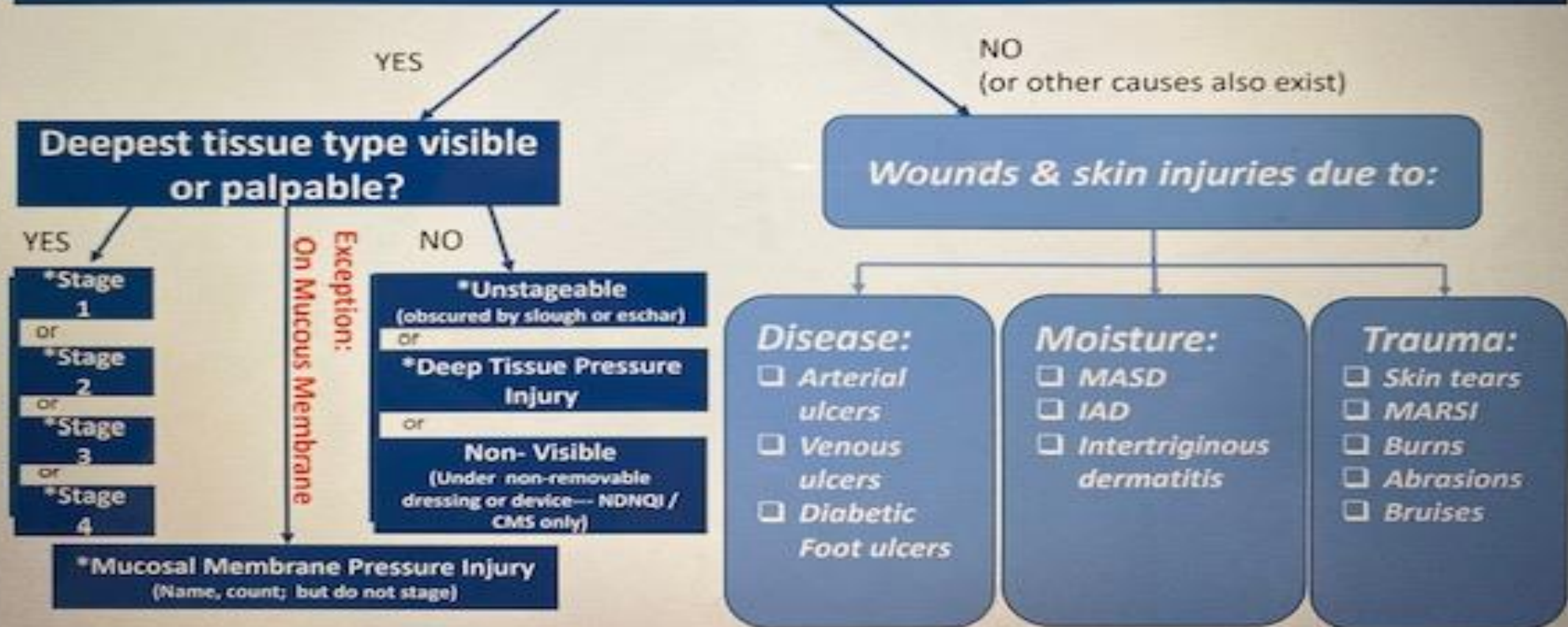
- **An event in which the skin and underlying tissue die due to hypoperfusion that occurs concurrent with severe dysfunction or failure of other organ systems**
 - Hypoperfusion leads to systemic failure and local failure
- **Component of Multi-organ failure causes tissue to lose its ability to resist pressure and trauma and cannot repair itself**
- **Stages**
 - Acute failure seen in ICU and hypoperfusion (sepsis)
 - Chronic failure seen over time with multiple comorbidities
 - End stage seen at end of life - mortality 21% in 30 days



Septic patient with full thickness ulcer

Langemo and Brown. Skin fails too: Acute, chronic and end-stage skin failure. *ASWC*, 19 (4) 2006, 206-211.

Pressure/Shear at Injury Site?



*See NPUAP staging definitions.

Classify/stage first. THEN determine if etiology is related to a medical device.

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What do we **NOT** stage?

VLU



Skin Tears



Burns



Arterial Ulcers



Medical Device Related Pressure Injuries (MDR PI)

- ▶ Medical device related pressure injuries result from the use of devices designed and applied for diagnostic or therapeutic purposes.
- ▶ The resultant pressure injury generally conforms to the pattern or shape of the device.
- ▶ The injury should be staged using the staging system.
- ▶ This describes an etiology. It is not a stage.
- ▶ Use the staging system to stage.
- ▶ Then note whether the injury is known to be related to a medical device.
- ▶ When assessing medical device related pressure injuries, remove only those devices that can be safely removed.
- ▶ Prevention requires unique

Medical Device Pressure Injuries

- ▶ Every patient with a medical device is at risk for pressure injuries due to impaired sensation, poor perfusion, altered tissue sensation, poor nutrition, edema, and the tendency for moisture to develop under device.
- ▶ Medical related pressure injuries account for 30% of all hospital- acquired pressure injuries
- ▶ Up to 70% of MDR pressure injuries occur on the head, neck, face and ear
- ▶ Common devices:(Arnold-Long, 2017) – Respiratory devices (10-71%) – Splints/braces (7-36%) – Tubes/drains (5-17%)

MDRPI

- ▶ Nasal/face- – 4-23%(Ambutas, 2014)
- ▶ 17%, 19.9% ear(Vangilder et al., 2012)
- ▶ 13% O2, 8% NG(Apold, 2012)
- ▶ 10-71% O2 tubing/CPAP/BiPAP(Arnold-Long et al., 2017)
- ▶ Cervical Collar- – 6.8-22%(Apold, 2012)
- ▶ Tracheostomy- – 8.1%- 11.8%(Davies, 2016) – 1.9-12.5%(O'Toole et al., 2016)
- ▶ Splints/Braces – 17-36%(Arnold-Long, 2017) -3.6- 42.9%(Forni, et al., 2011)
17% immobilizers;12% stockings/boots(Apold, 2012)
- ▶ Tubes/drains – 5-17%(Arnold-Long, 2017)
24.1- 67.3% urinary meatus(Rassin et al., 2013)
- ▶ 8% NG(Apold et al., 2012)

Other factors that put patients at risk for MDRPI

- Rigidity of devices
- Not easy to secure or adjust the device to the body
- Difficult to safely remove or lift the device to inspect the skin underneath
- Poor positioning or fixation of the device
- Inappropriate size of the device
- Limited knowledge of the impact of edema
- Failure to check tubing
- Lack of awareness of the need to remove, reposition and provide basic skin care underneath devices
- Limited best practice guidelines
- Lack of standardized practice

Other devices that cause injury

- ▶ Personal items – Cell Phones – Pens/pencils – Toothbrush – Comb/brushes
- ▶ Bathing items – Bedpans – Basins
- ▶ Care items – Needle caps – Syringes OR items - Positioners - Pads Call light
- ▶ Electrical cords
- ▶ Razors
- ▶ Cutlery
- ▶ Glasses
- ▶ Hearing aids

Clinical Photos - MDRPI

Oxygen Tubing



Oxygen Mask



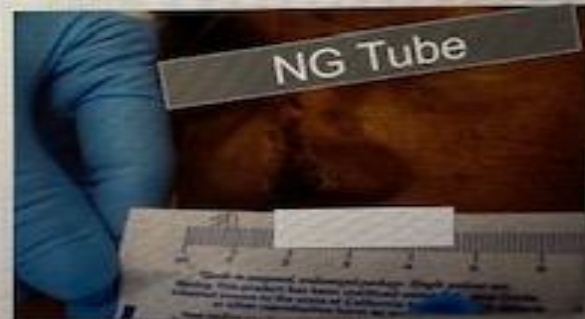
Pulse Oximeter Clip



Bedpan



NG Tube







More...

All from anti-embolism stockings



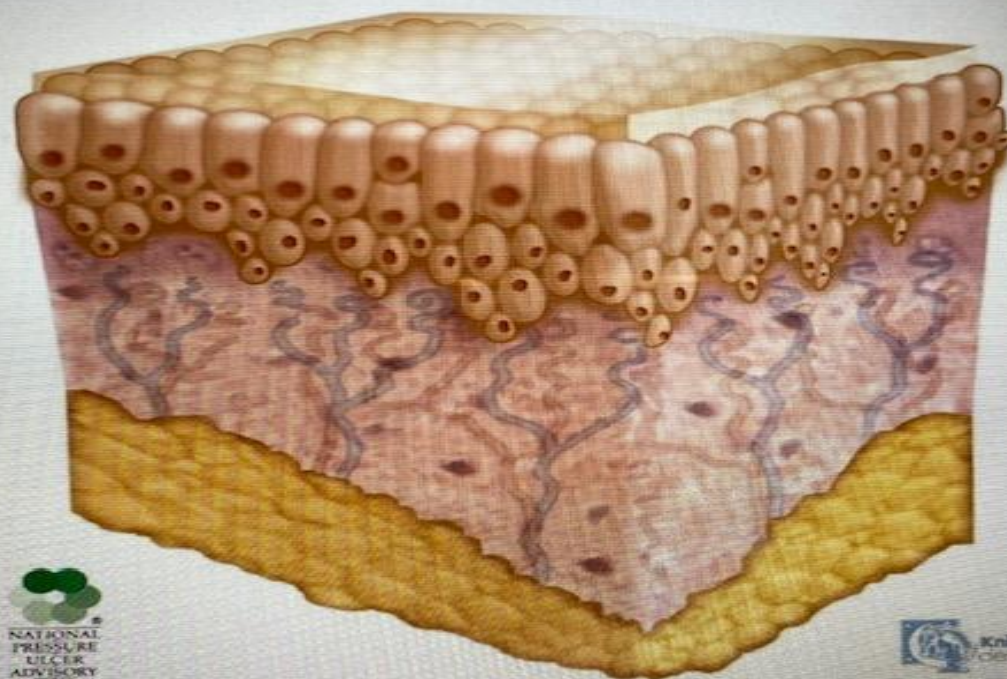
Initial Treatment - MDRPI

- ▶ Prevention, as always, is most important!
- ▶ Move and/or stabilize tubes and devices whenever possible – ET Tubes
- ▶ Properly applied tube holders
- ▶ Foam where applicable – O2 Canulas
- ▶ Avoid pressure over and around ears – NG Tubes
- ▶ Never allow traction on the nares or lips – CPAP/BIPAP Masks
- ▶ Rotate styles of masks whenever possible
- ▶ Foam where applicable – Foley Catheters
- ▶ Avoid traction on meatus and labia
- ▶ Avoid lying on them

Mucosal Membrane Pressure Injury

- ▶ Mucosal membrane pressure injury is found on mucus membranes with history of a medical device in use at the location of the injury.
- ▶ Unlike skin, many of the mucosal surfaces do not contain keratinized epithelium.
- ▶ Epidermis, dermis, subcutaneous, fat and deeper structures in normal tissue – Stratified squamous or columnar epithelium over loose connective tissue in mucous membranes
- ▶ The layers of tissue are so thin and so similar difficult to tell by visual inspection which layer is exposed.
- ▶ Oral, nasal, rectal, urethral
- ▶ Structures such as muscle or bone would not be present in an injury to localized to the mucosa.
- ▶ Due to the anatomy of the tissue these ulcers cannot be staged

Mucous Membrane



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Knightline
DESIGNS



Devices	Issues leading to ulceration	Suggested methods to reduce risk
Arterial line	Often placed prior to fluid resuscitation or edema	Loosen and retape tubing after 24–48 hours
Cervical collars	Need to stabilize cervical spine until ligamentous damage can be ruled out	Change to softer collar, ^{22,29} pad collar at occiput, ^{22,29} remove collar daily to inspect, change pads to keep face/neck dry
Ear	Tubing can be tightened to hold on the face. Ears are thinly covered cartilage, so development of full thickness wounds occurs rapidly	Pad areas of the face in contact with the tubing, use silicone oxygen tubing
EEG leads	Secured with glue for long-term reading of EEG to diagnose epilepsy	Use of EEG cap has reduced ulcerations
Elastic stockings	Often placed prior to fluid resuscitation or postoperative edema, used on patients with peripheral vascular disease	Measure to determine size, do not guess; remove twice daily to inspect skin on heels
Fecal containment device	Tubing too short to reach the side of the bed; ports of tube hidden in abdominal/perineal folds or under scrotum	Check location of tubing with each reposition, especially in the perineum, secure tubing to the bed leaving slack in the tubing
Nasal cannula	Device slips from the nares leading to tighter securement	Pad the oxygen tubing or behind the ears, use silicone oxygen tubing
NT/ET tube	Need to secure device to prevent migration and accidental extubation	Secure tube with device that allows tube to move (avoid tape), ²⁷ move ET tube often, for example, with each turn in bed, cushioning the nasal ala with a hydrocolloid dressing reduced alar PrUs by 40% ²⁴ and severity of wounds ²⁸
Nasogastric tubes	Secured to cheek which puts tension on the tube in the nares	Secure with device that “floats” the tube in the nares, move the tube when the patient’s head is turned, change to soft feeding tubes when able
Noninvasive positive pressure masks (CPAP/BiPAP)	Urgency to place and secure tightly to prevent leaks, thin skin over bridge of nose	Pad the bridge of the nose and cheeks before placing, apply silicone dressings to the nares for infants in nasal CPAP, ²⁷ alternate between full face mask and smaller masks, ²⁸ rotate sites of CPAP, ^{20,24} use face mask with silicone pads
PEG tubes	Stoma can enlarge and leak HCl acid on to abdomen	HCl acid blockers for short-term use, skin protection with cyanoacrylate rather than dressings (dressings hold HCl acid on to the skin), rotate tube daily ²⁹
Pulse oximetry	Oximetry clip used in hypoxic patients’ ears to obtain reading; metal clip form of oximetry probe can exert high amounts of pressure on a small area of soft tissue	Move device from ear to ear with each movement of the patient’s head or body
Splints (wrist, leg)	Often secured with wraps; doctors’ orders may be unclear about removal of splint for skin assessment and care	Rewrap device if edema develops, clarify orders to remove splint, observe for any signs of pressure and pad as needed
Tracheostomy	Sutured tightly to secure airway; difficult to place dressings for padding under edematous tissue; ulcers develop in posterior neck folds	Work with doctors who place the tracheostomy to determine if suture can be removed at day 5, work with RTs to change ties with trach care, determine if RT or nurses will change securement straps, use thicker, wider foam collar straps to pad skin, ²⁸ pad skin around stoma with thin, breathable dressings, check for ulcers beneath straps on each shift, look closely at securements in neck folds, find ties and move them daily, line entire neck with dressings, silver dressings reduced ulcers and peristomal skin injury ¹⁸
Urinary catheter	Tubing too short to reach the side of the bed; ports of tube hidden in abdominal/perineal folds or under scrotum	Check location of tubing with each reposition, pad tubing ports, secure tubing to leg or lower abdomen (males) and leave slack in tubing



Best Practices for Prevention of Medical Device-Related Pressure Injuries in Critical Care

- Choose the correct size of medical device(s) to fit the individual
- Cushion and protect the skin with dressings in high-risk areas (e.g., nasal bridge)
- Inspect the skin in contact with device at least daily (if not medically contraindicated)
- Avoid placement of device(s) over sites of prior or existing pressure injury
- Educate staff on correct use of devices and prevention of skin breakdown
- Be aware of edema under device(s) and potential for skin breakdown
- Confirm that devices are not placed directly under an individual who is bedridden or immobile



ET Tube

Mucosal Membrane Pressure Injury



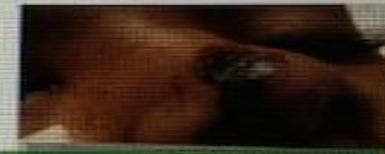
Trach Ties

Unstageable



Retention Sutures

Stage 3



NG Tube

Unstageable



Oxygen Tubing

Stage 2



CPAP Mask

Unstageable



O₂ Saturation Probe

Stage 2



Arterial Line Tubing

Stage 2



NATIONAL
PRESSURE
ULCER
ADVISORY
PANEL

Best Practices for Prevention of Medical Device-Related Pressure Ulcers in Long Term Care

- Choose the correct size of medical device(s) to fit the individual
- Cushion and protect the skin with dressings in high-risk areas (e.g., nasal bridge)
- Inspect the skin in contact with device at least daily (if not medically contraindicated)
- Avoid placement of device(s) over sites of prior or existing pressure ulcer
- Educate staff on correct use of devices and prevention of skin breakdown
- Be aware of edema under device(s) and potential for skin breakdown
- Confirm that devices are not placed directly under an individual who is bedridden or immobile



Elastic Wrap

Suspected Deep Tissue Injury



Trach Ties

Untaggable



Splint

Suspected Deep Tissue Injury



Oxygen Tubing

Stage II



CPAP Mask

Untaggable



Bedpan

Stage III

Recurrent Pressure Injuries

Tew, C., et al., Recurring pressure ulcers: Identifying the definitions. A National Pressure Ulcer Advisory Panel white paper.

Wound Repair and Regeneration, 2014. 22(3): p. 301-304 ●

If stage of healing is:

- ▶ 1. A closed pressure injury is one that has completely epithelialized.
- ▶ 2. A healed pressure injury exhibits fully restored epidermal integrity and stability.
- ▶ 3. A mature resolved pressure injury is one that has transitioned through the remodeling phase of healing

Then new injury is:

- ▶ 1. A reopened pressure injury is one where the epithelium reopens before the wound has fully matured.
- ▶ 2. A healed pressure injury that reopens before reaching the mature resolved pressure injury status should be considered a recurrent pressure injury.
- ▶ 3. The breakdown of previously unwounded tissue or breakdown at the site of a mature resolved pressure injury would be considered a new pressure injury

**Wound
Healing
Phases**

Inflammation

Proliferation

Remodeling

**Pressure
Ulcer
Progression**

Open

Closed

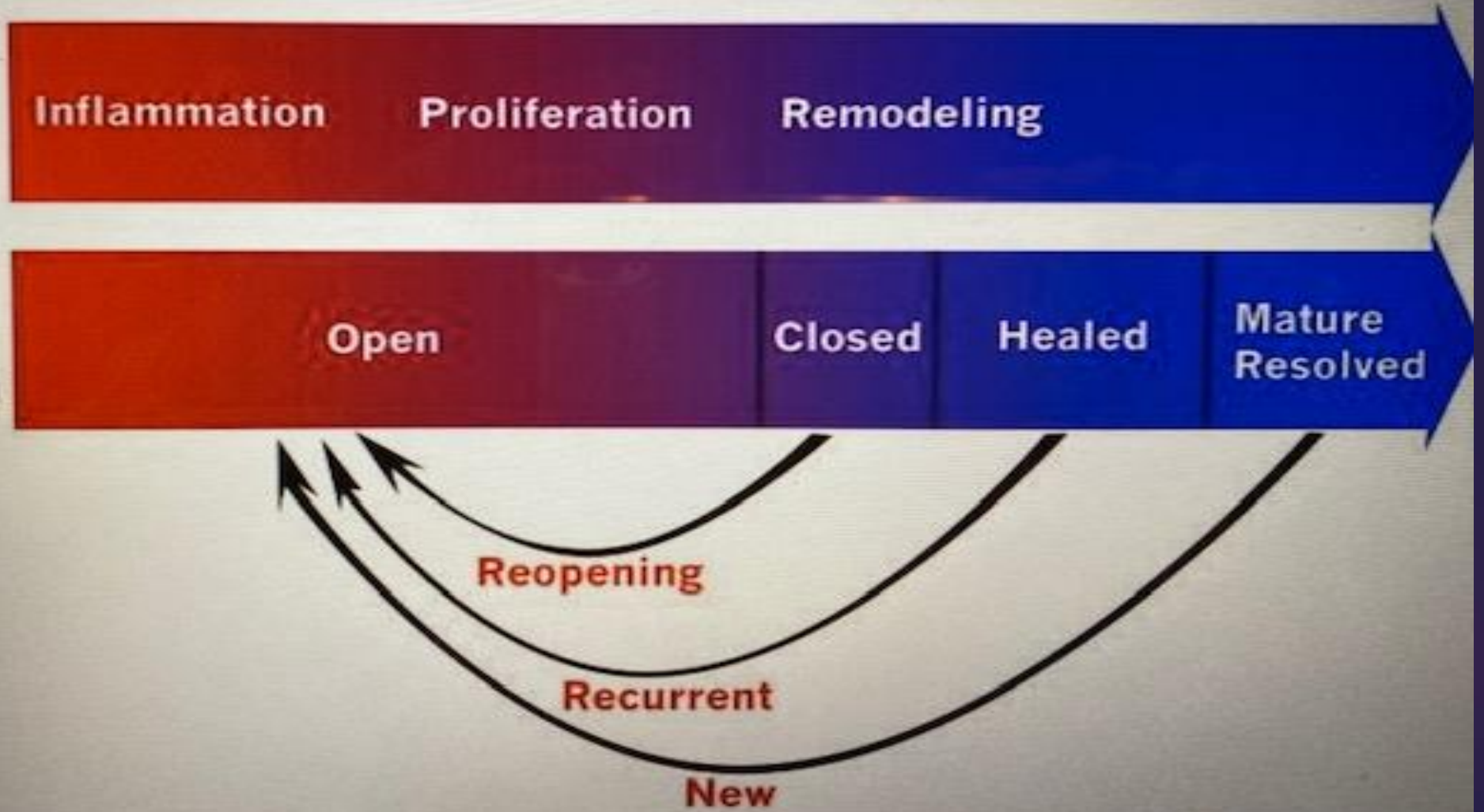
Healed

**Mature
Resolved**

Reopening

Recurrent

New





How would you stage this pressure injury?

Wound Description

- ▶ Time – Acute vs. Chronic
- ▶ Size • Depth – Partial vs. Full Thickness
- ▶ Etiology – Pressure, Diabetic Neuropathic, Arterial, Venous, Skin Tears, Lymphatic, Surgical, Traumatic, Radiation, Malignant, Thermal, Vasculitis, Thrombotic, Calciphylaxis

Determining an Etiology



- ▶ History and Examination of the Patient
- ▶ The proper and effective treatment of pressure injury is critically dependent upon an understanding of visible tissue in the wound bed
- ▶ An isolated picture of a wound -- without a measuring tape, location identification, history, pertinent history, comorbidities -- is an isolated picture of a wound!

Document

- ▶ Length, width, and depth
- ▶ Location
- ▶ Stage (if applicable)
- ▶ Exudate (amount, color, and consistency)
- ▶ Tunneling and/or undermining
 - ▶ Undermining. Bigger area of tissue destruction than can be seen (extends under the edge).
 - ▶ Tunneling. Tracts extending out from the wound.
- ▶ % of each type of tissue in wound (granulation, epithelial, eschar, slough, fibrinous)
- ▶ Wound edges (attached, not attached, rolled under, irregular, callous)



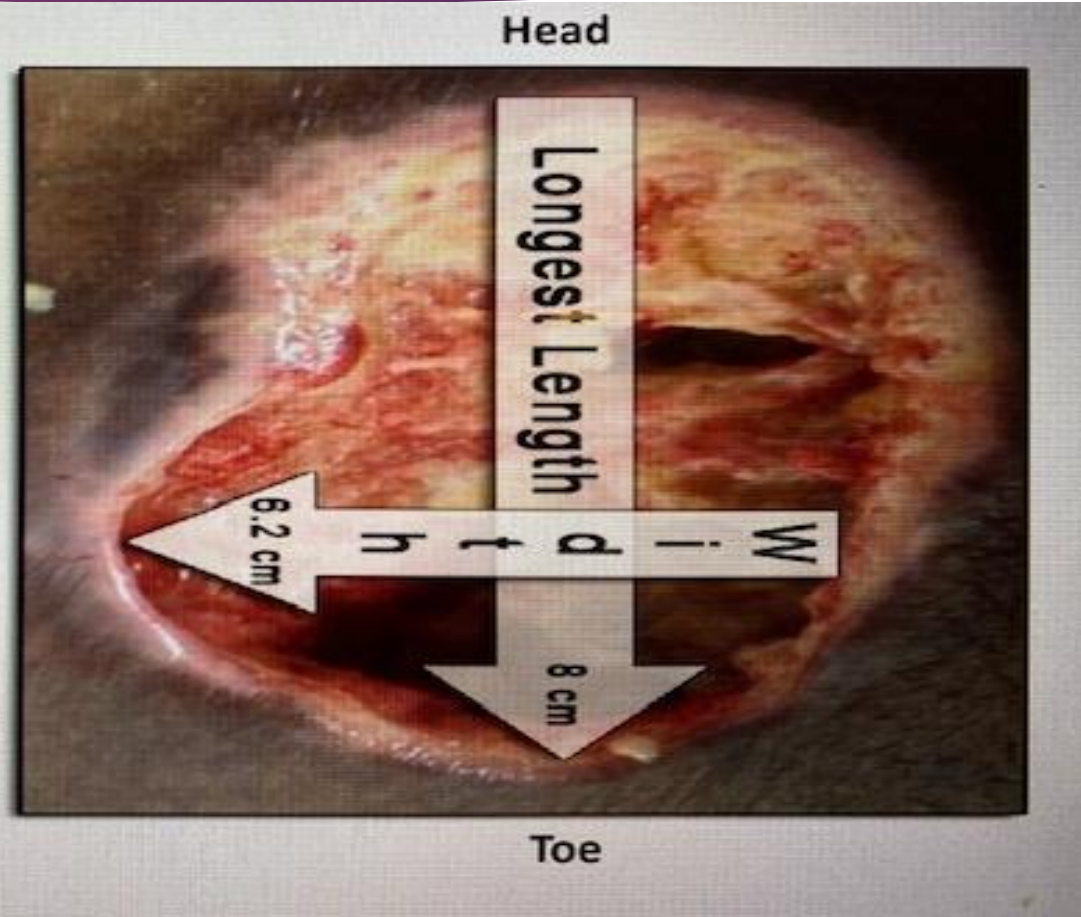
Undermining



Tunneling

How to measure a wound

Measure widest width of the pressure ulcer side to side perpendicular (90° angle) to length.



Measure Depth

- Moisten a cotton-tipped applicator with normal saline solution or sterile water.
- Place applicator tip in deepest aspect of the wound and measure distance to the skin level.



Basic Pressure Injury Dressing Categories

- ▶ Foams – Protect and mitigate pressure, shear and microclimate in Stage 1
– Absorb minimal to moderate exudate in Stage 2 and higher
- ▶ Calcium alginates – Wick and absorb moderate to large amounts of exudate while holding it in gel form, allowing moist but not wet wound bed
- ▶ Gelling Fibers – Essentially same functions as alginates
- ▶ Super-absorbents – Newer category designed to absorb and retain copious exudate

Dressing Categories

- ▶ Transparent Films – Reduce friction and shear forces in Stage 1 – Useful as secondary dressing to protect from outside moisture such as showering – No moisture absorbing capacity
- ▶ Hydrocolloids – Reduce friction and shear forces in Stage 1 and minimally exudating Stage 2, as well as superficial, minimally exudating Stage 3
Minimal moisture absorbing capacity

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Dressing Categories

- ▶ Hydrogels – Contribute and/or maintain moisture in dry to minimally exudating wounds and promote autolytic debridement – Available with antimicrobial additives such as silver
- ▶ Medicinal honey – Contribute and/or maintain moisture in dry to minimally exudating wounds and promote autolytic debridement – Reduces local wound edema and lowers wound

Conclusion

- ▶ Continuous assessment and acknowledgment of clinical status and risk factors, allowing the formulation of a constantly evolving individualized plan of care
- ▶ Document timely – chart what you see
- ▶ Prevention is the goal, although not always possible
- ▶ Treatment should be timely and appropriate, and based on accurate staging with risk factors and comorbidities taken into account
- ▶ Manage expectations. Educate patients and families. Nobody likes surprises!
- ▶ We can support good, well documented care with science... But we can't support bad care or care without adequate documentation.