# Scott Triggers<sup>©</sup>: Perioperative Skin Assessment

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#### **Objectives**

1.Review the anatomy and physiology of the skin and etiology of pressure injury (PI) development in the perioperative setting.

2.Describe and stage a pressure injury and distinguish between types of skin injuries in surgical patients.

3.Illustrate the pressure points and common location of pressure injury in the various surgical positions.

4. Identify best practices for assessment, staging, and documenting normal vs abnormal findings to improve competency and skills of the perioperative nurse.



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# **Surgical Skin Safety Statistics**

- 550-650 surgical fires annually
  - Fuel source –Oxidizer Ignition source
- 1.5 million skin tears (MARSI)
  - Acute care prevalence 3.3-22%
- Surgical irritant contact dermatitis
  - Reaction to product
    - Latex, alcohol, CHG
  - Product not permitted to dry
- Surgical pressure injuries
  - Most commonly reported positioning injury
  - Incidence 0.3% to 57.4%



Carle et al., 2021. Allergic contact dermatitis to a dye or alcohol in a chlorhexidine-based skin preparation: A case report. Anaesthesia and Intensive Care, 9(1), 70-73.

## Components of Skin Assessment

- Skin color
- Skin temperature
- Skin turgor
- Skin moisture
- Skin integrity



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# **Skin Color**

- Normal variations in skin color may occur
   Determine baseline normal in concert with patient or caregiver
- Lightening or darkening of skin color can indicate pathology
  - Rubor
  - $\circ$  Pallor
  - $\circ$  Cyanosis
  - Necrosis



Mufti, A., Maliyar, K., Ayello, E.A. & Sibbald, R.G. (2022). Anatomy and physiology of the skin in WOCN Core Curriculum Wound Management 2nd. Ed., pp.12-38, L.L. McNichol, C.R. Ratliff & S.S. Yates, Eds.; Wolters Kluwer.

#### **Skin Color**

- Skin assessment best performed with natural or halogen lighting
  - Fluorescent lighting can create blue hue
- Assess head to toe with emphasis over bony prominences



Mufti, A., Maliyar, K., Ayello, E.A. & Sibbald, R.G. (2022). Anatomy and physiology of the skin in WOCN Core Curriculum Wound Management 2nd. Ed., pp.12-38, L.L. McNichol, C.R. Ratliff & S.S. Yates, Eds.; Wolters Kluwer.

# **Skin Temperature**

- Normal skin = warm to touch
- Ischemic skin = generally cool to touch
- Trauma, deep & surrounding infection & deep inflammation are generally warmer than adjacent skin
- Best felt with back of hand
- Can be measured with infrared thermometers
   Temperature increase of 4°F on foot indicates increased risk of DFU.



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# **Skin Turgor**

- Refers to skin resiliency
  - Ability to return to original state
- Use two fingers to lift skin over sternum
  - Altered skin turgor common among older adults
  - May be a sign of dehydration
    - Difficult to determine specificity & consistency



Mufti, A., Maliyar, K., Ayello, E.A. & Sibbald, R.G. (2022). Anatomy and physiology of the skin in WOCN Core Curriculum Wound Management 2nd. Ed., pp.12-38, L.L. McNichol, C.R. Ratliff & S.S. Yates, Eds.; Wolters Kluwer.

Goehring ,M.T., Farran, J., Ingles-Laughlin, C., Benedista-Seelman, S. & Williams, B. (2022). Measures of Skin Turgor in Humans: A Systematic Review of the Literature. Wound Management and Prevention, 68(4),14-24.

#### **Skin Moisture**

- Stratum corneum has 10-15% water content
- Xerosis
  - When TEWL >15% leads to skin dryness
- Skin that is too dry or too wet contributes to risk of skin injury from pressure, shear, friction
- Xerosis
  - Light skin tones = flaky & dull
  - Dark skin tones = ashy
- Overhydrated skin
  - Light skin tones = may appear lighter (maceration), erythematous, or irregular edges
  - Dark skin tones = ashy, variable colors, erythema may be difficult to discern



<sup>1.</sup> Mufti, A., Maliyar, K., Ayello, E.A. & Sibbald, R.G. (2022). Anatomy and physiology of the skin in WOCN Core Curriculum Wound Management 2nd. Ed., pp.12-38 L.L. McNichol, C.R. Ratliff & S.S. Yates, Eds.; Wolters Kluwer.

2. LeBlanc, K., Baranoski, S., Christensen, D., Langemo, D., Edwards, K., Holloway, S.... Regan, M. (2013). International Skin Tear Advisory Panel: A Tool Kit to Aid in the Prevention, Assessment, and Treatment of Skin Tears Using a Simplified Classification System©. Advances in Skin & Wound Care, 26(10), 459-476.

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# **Skin Integrity**

- Intact skin = normal finding
  - Intact epidermis protects against micro-organisms
- Any breaks in integrity should be identified, type of damage determined & treatment of causative factors initiated
- Correct tool should be used to classify injury
  - Pressure injury = NPIAP pressure injury staging guide
  - Skin tear = ISTAP skin tear classification system
  - Incontinence associated dermatitis (IAD)
    - GLOBIAD
  - Mufti et al., 2022, Beeckman, 2018; Bliss et al., 2014





- Epidermis
  - 5 layers
  - Basement Membrane
- Dermis
  - Collagen, Elastin (proteins)
- Hypodermis
  - Fat
  - Muscle



# **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 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 & condition of the soft tissue.



#### **Etiology of Pressure Injury**<sup>1-3</sup>







1.. Gefen A, Creehan S, Black J. Critical biomechanical and clinical insights concerning tissue protection when positioning patients in the operating room: A scoping review. Int Wound J. 2020;1-19.

2. European Pressure Ulcer Advisory Panel National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. in Haesler E, ed. Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline. Westford, MA, USA: EPUAP-NPIAP-PPPIA; 2019.

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#### **Top-Down vs Bottom-Up Tissue Damage**





Bottom-Up

- Stage 3, 4,

Unstageable, DTI

Top-Down

• Stage 1, 2



Wound Ostomy and Continence Nurses Society. (2016) Bottom-Up (Pressure Shear) Injuries. In D. Doughty, and L. McNichol (Ed). *Core Curriculum Wound Management*. (pp. 313-332). Philadelphia, Wolters Kluwer.

#### **Stages of Pressure Injury**





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#### **Stage 1 Pressure Injury**

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.







National Pressure Ulcer Advisory Panel. Pressure Injury Stages. http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/ Image Credit(s): Adobe Stock Images, M. Arnold Long

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#### **Stage 1 Pressure Injury**

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





National Pressure Ulcer Advisory Panel. Pressure Injury Stages. <u>http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/</u>. Image Credit(s): Adobe Stock Images, M. Arnold Long Scott Triggers PLLC

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#### **Stage 2 Pressure Injury**

The wound bed is viable, pink or red, moist, and may also present as an intact or ruptured serumfilled 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.





9. National Pressure Ulcer Advisory Panel. Pressure Injury Stages. <u>http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/</u>. Image Credit(s): Adobe Stock Images, M. Arnold Long

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#### **Stage 2 Pressure Injury**

• Granulation tissue, slough, and eschar are not present.





National Pressure Injury Advisory Panel (2016). NPUAP Pressure Injury Stages. https://cdn.ymaws.com/npuap.sitevm.com/resource/resmar/npuap pressure injury stages.pdf

Images credit: Scotttriggers.com

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# What Stage 2 Pressure Injury is NOT...

 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).

9. National Pressure Ulcer Advisory Panel. Pressure Injury Stages. <u>http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/</u>. Image Credit(s): Wiki Commons & , M. Arnold Long



### **Stage 3 Pressure Injury**

- 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 3 Pressure Injury**



CABG Sacral



AVR Occipital - Reoperation

National Pressure Ulcer Advisory Panel. Pressure Injury Stages. <u>http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/</u>. Image Credit(s): M. Arnold Long, ScottTriggers.com

# **Stage 4 - Pressure Injury**

- 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.

National Pressure Ulcer Advisory Panel. Pressure Injury Stages. <u>http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/</u>. Image Credit(s): Adobe Stock Images, M. Arnold Long



#### **Pressure Injury Unstageable**

 Full-thickness skin & tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar.





National Pressure Ulcer Advisory Panel. Pressure Injury Stages. <u>http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/</u>. Image Credit(s): scotttriggers.com

#### **Pressure Injury Unstageable**

- 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.





#### **Unstageable with Eschar**



Image Credit(s): M. Arnold Long, Scotttriggers.com



#### **Deep Tissue Pressure Injury**

- 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 & temperature change often precede skin color changes. Discoloration may appear differently in darkly pigmented skin.
- This injury results from intense and/or prolonged pressure & 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.



#### **Deep Tissue Pressure Injury**

 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).





National Pressure Ulcer Advisory Panel. Pressure Injury Stages. <u>http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/</u>. Image Credit(s): ScottTriggers.com

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#### **Deep Tissue Pressure Injury is NOT...**

 Do not use DTPI to describe vascular, traumatic, neuropathic, or dermatologic conditions.







National Pressure Ulcer Advisory Panel. Pressure Injury Stages. <u>http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/</u>. Image Credit(s): ScottTriggers.com



#### **Medical Device Related Pressure Injury (MDRPI)**

- This describes an etiology.
- 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.

National Pressure Ulcer Advisory Panel. Pressure Injury Stages. <u>http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/</u>. Image Credit(s): Adobe Stock Images, M. Arnold Long







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Black JM, Cuddigan JE, Walko MA, Didier LA, Lander MJ, Kelpe MR. Medical device related pressure ulcers in hospitalized patients. *Int Wound J.* 2010;7(5):358-365. doi:10.1111/j.1742-481X.2010.00699. Image credit: Illustration by Blaine Miller used with permission

# High risk medical devices

- Anesthesia devices<sup>3</sup>
- Face plates in prone position<sup>3</sup>
- External fixators
- Urinary catheters & tubing<sup>1,2</sup>
- Vacuum-packed positioning device<sup>1</sup>
- Peg Boards<sup>2</sup>
- Mayo stands on the toes<sup>3</sup>
- Safety straps<sup>3</sup>
- Compression stockings

1. Guideline for prevention of perioperative pressure injury. In: Guidelines for Perioperative Practice. Denver, CO: AORN, Inc; 2023:751-776.

2. Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline. 3<sup>rd</sup> ed. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel (NPIAP), and Pan Pacific Pressure Injury Alliance; 2019.











# **MDRPI in the OR**







# **Medical-device related PI Prevention Bundles**<sup>15,16</sup>



**Pressure Redistribution** 

Partnering with Team

# **Skin Protection**

15.Pittman J, Gillespie C. Medical Device-Related Pressure Injuries. *Crit Care Nurs Clin North Am.* 2020;32(4):533-542. doi:10.1016/j.cnc.2020.08.004 16. Stellar JJ, Hasbani NR, Kulik LA, et al. Medical Device-Related Pressure Injuries in Infants and Children. *J Wound Ostomy Continence Nurs.* 2020;47(5):459-469. doi:10.1097/WON.000000000000683



# **Pressure Injury Mucosal Membrane**

- Mucosal membrane pressure injury is found on mucous membranes with a history of a medical device in use at the location of the injury.
- Due to the anatomy of the tissue these ulcers cannot be staged.



National Pressure Ulcer Advisory Panel. Pressure Injury Stages. http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/. Image Credit(s): Adobe Stock Images, M. Arnold Long

# Medical Adhesive-Related Skin Injury (MARSI)

# **Types of MARSI**

- Erythema
- Tension injury or blister
- Skin stripping
- Irritant contact dermatitis
- Skin tear
- Maceration





#### Bulla S/P CABG

# MARSI



**Tension injury blister** 

#### Types of Medical Adhesive Product Categories

- Surgical dressing (transparent dressing, tape)
- Surgical closure (strips)
- IV dressings (transparent, bordered dressings)
- Wound dressing
- Tube securement (NG, feeding, chest, foley)
- Electrodes



# **Etiology**











# **Skin Assessment**



European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Injury Advisory Panel, 2019.



- Pre-operatively
  - Complete assessment
  - Visual and tactile
  - Don't just ask!
  - Consider positioning in OR
  - Report to OR nurse
  - Document





#### Intraoperative

- Get hand-off report from previous nurse
- Double check skin areas of concern
- Implement prevention
  - Consider prophylactic dressings for high risk bony prominences
  - Support surface
  - Appropriate positioning devices
  - Off loading heels
  - Any surgical breaks for repositioning, micro-shift?
- Document





#### PACU

- Hand-off report from OR nurse
- Position patient in different position than OR
- Complete skin assessment when stable
- Hand-off report to receiving nurse if inpatient
- Document



# Hints for Assessing Darkly Toned Skin

- Establish baseline skin tone
  - In area not exposed to UV
- Use adequate lighting
  - Avoid fluorescent lighting
  - Use halogen light or flashlight/headlamp
- Thoroughly cleanse area before assessment
- Compare area being assessed to unaffected areas
- Moisten areas to rehydrate epidermis

- Compare moist areas being assessed to dry skin
- Implement a skin tone classification system intended for skin pigmentation
- Use more than visual assessment
  - Include palpation to assess temperature, erythema, blanching, or pain
  - Include technology, when possible
    - SEM, ultrasound, thermography



# **Skin Tone Classification**

# 

#### • The Monk Skin Tone Scale

- Open-source, 10-shade scale describing human skin color, developed by Ellis Monk in partnership with Google.
- To replace the Fitzpatrick scale in fields such as computer vision research, after an IEEE study found the Fitzpatrick scale to be "poorly predictive of skin tone" and advised it "not be used as such in evaluations of computer vision applications."
- The Fitzpatrick scale was found to under-represent darker shades of skin relative to the global human population.



# **Assessing Skin of Color Recommendations**

Condition	Findings
Cyanosis	Lips & tongue will be gray or white; palms, soles, conjunctiva, & nail beds will have bluish tinge. Utilize other assessment (O2 saturation, ABGs) to determine level of hypoxia.
Stage 1 PI	No visible blanching response; erythema might not be visible or detectable. Inspect & palpate for additional skin tissue changes.
DTPI	Might not be easily visible. Assess for preceding changes (pain & temperature change) in the affected area.
Inflammation	Can be subtle or unnoticeable to naked eye. Areas with recently resolved inflammation appear darker than the patient's normal skin tone. The following techniques can be used: compare & contrast an affected & nonaffected area for increased warmth, skin color changes, & texture; examine the affected area for shine, tautness, & pitting edema with pressure; palpate for differences in texture.

# **Assessing Skin of Color Recommendations**

Condition	Findings
Petechiae	On darkly pigmented skin rarely visible. May be visible in oral mucosa or conjunctiva.
Skin irritation & erythema	May present as inflammatory or post-inflammatory hyperpigmentation (affected area darker than surrounding skin tone).
Ecchymoses	Areas appear darker than person's usual skin tone; may be tender & easily palpable, depending on whether a hematoma is present.
Pallor	Inspect mucous membranes for an ash gray color, using ambient lighting or a halogen lamp. Because of decreased blood flow to the skin, brown skin appears yellow-brown, & very dark brown or black skin appears ash gray.

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# **Assessing Skin of Color Recommendations**

Condition	Findings
Jaundice	Inspect oral mucosa, especially the hard palate, for yellow discoloration. For a more accurate determination of jaundice, examine the sclera closest to the cornea. If the palms and soles have callouses, they may appear yellow even when jaundice is not present.
Nails	Melanonychia, dyschromia, or chromonychia (discoloration or hyperpigmentation of the distal matrix of the nail bed) present in 75% of people with dark skin tone. When assessing for abnormalities, ask the patient if they have had rapid hyperpigmented changes or new onset hyperpigmentation, widening hyperpigmented stripe, triangular pigmented shape, & dystrophy of nails.

# **Bariatric Skin Considerations**

- Skin on skin environment
  - Lack of airflow to tissue
  - Increased effect of moisture
  - Poor tissue perfusion
  - Weight of pannus
- PI may not be over bony prominence
- Use mobility equipment
- Use of tape





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Image Credit: <u>https://www.shutterstock.com/catalog/collections/2773448902110611311</u> Skin Integrity, Immobility, and Pressure Ulcers in Class III Obese Patients. Pa Patient Saf Advisory 2013 Jun;10(2):50-4. <u>http://patientsafety.pa.gov/ADVISORIES/Pages/201306\_50.aspx#</u>

Surgical Procedural Positioning and High-Risk Pressure Points



Image Credit: Blaine Miller used with permission

# **PI Location in Studies**



Occiput 4% Elbow 5% Sacral 22% - 41% Buttocks 11% - 47% Heels 14% - 52%



Chen H, Chen X, Wu J. The incidence of pressure ulcers in surgical patients of the last 5 years: a systematic review. Wounds. 2012;24(9):234–241. Image Credit: Blaine Miller used with permission

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# **Supine position**

- Occiput
- Scapulae (shoulder blades)
- •Arms
- Elbows
- Thoracic vertebrae
- Lumbar area and spine
- Sacrum/coccyx
- Buttocks
- •Heels



#### Illustration by Rex Neal, Scott Triggers©



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# **Prone position**

- Forehead, eyes, ears, and chin
- Chest/breasts, ports, implants
- Lower costal margins
- Iliac crest
- Genitalia
- Knees
- Shins
- Dorsum of the feet
- •Toes





# **Prone position risks**

- Pressure injury
- Increased intraocular pressure - Blindness
- Increased intra-abdominal pressure
- Cardiovascular changes
- Venous air embolism
- Respiratory changes
- Injury to the caregiver

- Do not use Wilson Frame
- Face, chin and forehead highest risk





# **Trendelenburg and Reverse Trendelenburg position**

- Occiput
- Scapulae
- Elbows
- •Arms
- Thoracic vertebrae
- Lumbar spine
- Buttocks
- Sacrum/coccyx
- •Heels





# **Trendelenburg position – risks**

- Pressure Injury
- Brachial Plexus Nerve Injury
- Cephalad sliding "toward the head"
- Hemodynamic changes
- Altered pulmonary function
- Retinal detachment Blindness



- Patient Falls
  - Patient harm, brain damage, paralysis and death
  - Malpractice claims
  - CMS lost reimbursement
  - Reasonably preventable!



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# Lithotomy position

- Occiput
- Shoulders
- Scapulae
- •Elbows
- •Arms
- Thoracic vertebrae
- Lumbar spine
- Buttocks
- •Sacrum/coccyx
- Lateral aspect of thighs
- •Heels



Illustration by Rex Neal, Scott Triggers©



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# Lateral position

- Side of face and ear
- Shoulder
- Arms
- Dependent axilla
- Dependent hip
- Dependent knee
- Ankles
- Feet





# **Sitting position**

- Back of head
  - Positioner specific
- Scapula
- Ischial Tuberosities
- Back of knees
- Heels











Pre-op

#### Intra-op





1. Guideline for prevention of perioperative pressure injury. In: Guidelines for Perioperative Practice. Denver, CO: AORN, Inc; 2023:751-776. 2. Guideline for positioning the patient. In: Guidelines for Perioperative Practice. Denver, CO: AORN, Inc; 2023:701-750.

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# **OR/Procedure to PeriAnesthesia**

Communication<sup>1</sup>

- Postoperative Assessment<sup>1,2</sup>
- Does the RN circulator complete a postoperative assessment to identify positioning and pressure injuries?
- 4-eyes Skin Assessment<sup>3</sup>

Quality Improvement<sup>4</sup>

- Does the health care organization's QM program evaluate the Perioperative PI Protocols and outcomes?
- Real-time RCA and Action<sup>3,5</sup>









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<sup>1.</sup> Guideline for prevention of perioperative pressure injury. In: Guidelines for Perioperative Practice. Denver, CO: AORN, Inc; 2023:751-776.

<sup>2.</sup> Guideline for positioning the patient. In: Guidelines for Perioperative Practice. Denver, CO: AORN, Inc; 2023:701-750.

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<sup>4.</sup> AORN Position Statement on Prevention of Perioperative Pressure Injury. AORN J, 2022;115(5):458-461.

<sup>5.</sup> Scott SM, Bennett J. Avoiding pressure injuries with root cause analysis and action. AORN J. 2018:108(5):15-16.

# Thank you very much!



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# **Post-Test**



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