

Is It Pressure?

Wound Care Education Institute

I. Differential Identification

- A. A differential diagnosis is a systematic diagnostic method used to identify the presence of an entity where multiple alternatives are possible.
 1. Systematic comparison and contrasting of the clinical findings.
 2. This method is essentially a process of elimination
- B. Gather the Facts – Perform a Complete Wound Assessment
 1. Collection of data that characterizes the status of a wound and the surrounding periwound skin.
 2. Performed by inspection (looking), palpation (touching), listening, and smell.
 3. A holistic wound assessment should include a full review of systemic, psychosocial, and local factors that affect wound healing.
- C. Different etiologies may present with similar characteristics
 1. First important to understand the characteristics of different types of ulcers.

II. Pressure Ulcers

A. Definition

1. 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. A number of contributing or confounding factors are also associated with pressure ulcers; the significance of these factors is yet to be elucidated.¹
2. Although other forces can play a role, PRESSURE must play a role to be a pressure ulcer.

B. Cause

1. Pressure is the compression or squeezing together of soft tissue (especially over bony prominences), caused by weight or tension. These forces cause blood vessels to collapse resulting in an ischemic response and, potentially, tissue necrosis.
2. Friction
 - a. The force of rubbing two surfaces against each other.
 - b. Friction without pressure causes damage to the epidermis and upper dermal layers only. (Partial thickness) AKA sheet burn.
 - c. Friction accompanied with gravity causes shear.²
3. Shear
 - a. An internal, opposing motion of tissue layers and bone.
 - b. Shear is caused by gravity pushing down on the body and resistance (friction) between the patient and a surface, such as the bed or chair. E.g. elevation of head of bed, and sliding down in chair.²
 - c. Shearing forces stretch or even tear the blood vessels, thereby reducing the amount of pressure needed to occlude them.²
 - d. Shearing causes undermining and tunneling.

C. Characteristics

1. Location - At any site, most frequently over bony prominences
2. Distribution - Isolated individual lesions
3. Shape - Rounded, crater-like shape, can resemble shape of object that caused the pressure
4. Depth – Varies; partial or full thickness
5. Wound Bed – Varies; Erythema, Slough, Eschar, Granulation tissue, Epithelial tissue, Bone, ligaments, tendons
6. Margins – Smooth, regular edge; demarcated
7. Surrounding Skin - Varies; often the periwound has non-blanchable erythema or, in dark-skinned clients, a deepening of natural color.
8. Associated Findings
 - a. Pressure and/or shear must be present.

D. Staging

1. Assessment system that classifies pressure ulcers based on anatomic depth of soft tissue damage.
2. Developed by the National Pressure Ulcer Advisory Panel (NPUAP) as method of communication between health care providers. Updated in February 2007.

3. Based upon the deepest tissue injury/destruction through the layers of the skin
4. The deepest a pressure ulcer will be is when there is visible: bone, tendon/ligament or muscle.
5. Cannot be accurately staged until the deepest viable tissue layer is visible.
6. Un-stageable¹
 - a. 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.
 - b. Unable to visualize true depth of tissue destruction.
 - c. Until enough slough and/or eschar is removed to expose the base of the wound, the true depth, and therefore stage, cannot be determined.
 - d. Stable (dry, adherent, intact without erythema or fluctuance) eschar on the heels serves as the body's natural (biological) cover and should not be removed.
7. Stage I¹
 - a. Intact skin with non-blanchable redness of a localized area usually over a bony prominence.
 - b. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area.
 - c. The area may be painful, firm, soft, warmer, or cooler as compared to adjacent tissue.
 - d. Stage I may be difficult to detect in individuals with dark skin tones.
 - e. May indicate "at risk" persons (a heralding sign of risk)
8. Stage II¹
 - a. Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough.
 - b. Slough is made up of dead collagen matrix from the subcutaneous tissue.
 - c. The presence of slough indicates full thickness tissue damage.
 - d. Three P's: pink, partial, painful.
 - e. May also present as an intact or open/ruptured serum-filled blister.
 - f. Presents as a shiny or dry shallow ulcer without slough or bruising.
 - g. This stage should not be used to describe skin tears, tape burns, perineal dermatitis, maceration, or excoriation.
9. Stage III¹
 - a. Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon, or muscle is not exposed.
 - b. Slough may be present but does not obscure the depth of tissue loss.
 - c. May include undermining and tunneling.
 - d. 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. Bone/tendon is not visible or directly palpable.
10. Stage IV¹
 - a. Full thickness tissue loss with exposed bone, tendon, or muscle.
 - b. Slough or eschar may be present on some parts of the wound bed.
 - c. Often include undermining and tunneling.
 - d. 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.
 - e. Stage IV ulcers can extend into muscle and/or supporting structures (e.g., fascia, tendon or joint capsule) making osteomyelitis possible. Exposed bone/tendon is visible or directly palpable.
11. Suspected Deep Tissue Injury:¹
 - a. 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.
 - b. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer, or cooler as compared to adjacent tissue.
 - c. Mushy - having the consistency of mush soft - yielding readily to pressure or weight
 - d. Boggy - wet, spongy, soft
 - e. Deep tissue injury may be difficult to detect in individuals with dark skin tones.

- f. Evolution may include a thin blister over a dark wound bed. The wound may further evolve and become covered by thin eschar. Evolution may be rapid exposing additional layers of tissue even with optimal treatment.

E. Staging of pressure ulcers on Mucous Membranes³

1. Definition: Mucosal Pressure Ulcers (MPRU) are pressure ulcers found on mucous membranes with a history of a medical device in use at the location of the ulcer, however ulcers on mucosal surfaces are not to be staged using the pressure ulcer staging system.³
2. Where are mucous membranes
 - a. Mucous membrane is the moist lining (inner tissue) of body cavities that communicate with the exterior (open to the outside).
 - b. Mucous membrane tissues line the tongue, gastrointestinal (GI) tract, nasal passages, urinary tract and vaginal canal.
 - c. Body cavities featuring mucous membrane include most of the respiratory system.
 - d. The glans penis (head of the penis) and glans clitoris, urethra, and the inside of the prepuce (foreskin) and clitoral hood are mucous membranes, not skin.
3. Injury of mucous membrane³
 - a. Injury to mucous membrane can occur from direct trauma (burns, bites, pinching, radiation, pressure or infection).
 - b. Pressure applied to this tissue can render it ischemic and lead to ulceration.
 - c. Vulnerable to pressure from medical devices, such as oxygen tubing, endotracheal tubes, bite blocks, orogastric and nasogastric tubes, urinary catheters and fecal containment devices.
 - d. Examples: A pressure ulcer that develops on nasal mucosa from pressure exerted by oxygen/CPAP nasal prongs; A pressure ulcer that develops on the inside of the lip from pressure exerted by an endotracheal tube
 - e. Anatomy of injury
 - 1) The injured tissue bleeds and forms a clot within minutes. However, because of the moist environment and mucus, the clot does not resemble the hard, dry clots seen on the skin. The clot on mucous membrane is soft and then becomes coagulum.
 - 2) Coagulum remains flat and loosely attached to the wounded area. This coagulum is not to be classified as slough, even though both tissues can appear yellow and shiny.
4. Why not stage - The staging system for pressure ulcers of the skin cannot be used to stage mucosal pressure ulcers because the histology of mucous membrane tissue is different than skin.³
 - a. Nonblanchable erythema cannot be seen in mucous membranes
 - b. It is difficult to distinguish between partial thickness and full thickness tissue loss as tissue layers are thin
 - c. Exposed muscle would seldom be seen
 - d. Bone is not present in mucous membrane tissue
5. The position of the National Pressure Ulcer Advisory Panel (NPUAP) is that pressure ulcers on mucosal surfaces are not to be staged using the pressure ulcer staging system.³
 - a. It is understood that these ulcers may indeed be due to pressure, however anatomically analogous tissue comparisons cannot be made.³
 - b. Further, it is NPUAP's position that mucosal pressure ulcers not be classified as partial or full thickness, because the clinical assessment of the tissue does not allow the distinction.³
 - c. Therefore, the position of NPUAP is that pressure ulcers on mucous membranes be labeled as mucosal pressure ulcers without a stage identified.³

III. Types of skin breakdown related to moisture - not to be confused as a pressure ulcer

- A. Moisture lesions are the most often misclassified wounds as pressure ulcers.^{4,5,6}
- B. Incontinence associated dermatitis (IAD)
 1. Other names: Perineal Dermatitis, irritant dermatitis, and diaper rash when noted in children.
 2. Causes:
 - a. Inflammation of the skin from prolonged exposure to urine or stool.

- b. Regular use of an absorptive containment device such as an incontinence brief or pad, which raises the pH of the underlying skin and increases production of perspiration.

3. Characteristics^{6,7,8}

- a. Location - Often occur over the fatty tissue of the buttocks, Perineum, inner thigh, groin; May occur over bony prominence.
- b. Distribution - consolidated or patchy
- c. Shape - Diffuse differential areas/spots; Kissing ulcer (a mirror-image manner on each side of the skin fold); Anal cleft-linear.
- d. Depth – Partial thickness; superficial
- e. Wound Bed - Non uniform redness; Pink/white surrounding skin (maceration); Peri-anal redness, NO NECROSIS
- f. Margins – Diffuse and irregular edges
- g. Surrounding Skin – Varies
- h. Associated Findings
 - 1) Moisture must be present.
 - 2) A full-thickness wound (tissue destruction into the subcutaneous tissue or deeper), with or without necrosis (slough or eschar), reflects ischemic tissue damage and would be classified as a pressure ulcer not as perineal dermatitis.¹⁰

C. Intertriginous Dermatitis (ITD)

- 1. Causes - skin damage caused by trapped perspiration and skin-on-skin friction and typically presents as inflammation and linear lesions occurring at the base of skin folds.^{12,13}
- 2. Characteristics
 - a. Location – Intergluteal cleft; Skin folds; beneath the pannus, underneath pendulous breasts, or in the groin crease.^{12, 13, 15}
 - b. Distribution - typically in a mirror-image manner on each side of the skin fold^{13,14}
 - c. Shape- linear^{12, 13, 15}
 - d. Depth – Partial thickness^{12, 13, 15}
 - e. Wound Bed - Initially mild erythema and may progress to more intense inflammation with erosion, oozing, exudation, maceration, and crusting.^{12, 13, 15}
 - f. Surrounding Skin - Frequently macerated, secondary bacterial and fungal infections¹⁷; candidiasis
 - g. Associated Findings^{12, 13, 15}
 - 1) Pain, itching, burning, and odor.
 - 2) Perspiration with or without friction.¹⁵
 - 3) ITD can coexist with IAD.^{12, 13}

D. Candidiasis - Candida Albicans

- 1. Normal flora in intestines, overgrowth related to stress, antibiotics, starts as yeast and changes to fungal, thrives in warm moist environment.
- 2. Characteristics
 - a. Location - most commonly in intertriginous areas such as the axillae, groin, body folds, gluteal folds, in digital web spaces, in the glans penis, and beneath the breasts.
 - b. Distribution - consolidated or patchy
 - c. Shape - Diffuse differential areas; small round erythematous papules and pustules, plaques, and/or satellite lesions
 - d. Depth – Partial thickness; superficial
 - e. Wound Bed - Pink/Beefy Red; associated crusting or scaling with cheesy white exudate.
 - f. Margins – Diffuse and irregular edges, satellite lesions (outside the advancing edge of candidiasis) most important diagnostic feature⁹
 - g. Surrounding Skin – Varies; may be white (maceration)
 - h. Associated Findings

- 1) Key indicator is Itching and/or burning⁹
- 2) White skin - presents as bright to dull red central area with peripheral red vesicles (satellite lesions)
- 3) Dark skin - presents as a darker skin tone, may develop into dark red or purple hue

IV. Bruise or Suspected Deep Tissue Injury (sDTI)

A. Bruise

1. AKA contusion, results from leakage of blood from vessels into the tissues after sufficient blunt force has been applied to distort the soft tissues and tear one or more vessels.
2. Usually resolves on its own in a matter of 2 weeks.²²
3. Color
 - a. Starts reddish color of oxygenated blood, may have blue appearance as blue light bounces and red penetrates more deeply, then becomes Purplish.¹⁷
 - b. As blood pigments break down, the sequence of colors passes through those of a ripening banana, through greens, yellow and browns and the coloration fades.¹⁷
4. Skin is intact
5. Damage may be both superficial and deep
6. Tissue may be swollen or painful

B. Purpura

1. Red-purple lesions that result from the extravasation of blood into the skin or mucous membranes.
2. May be palpable or non-palpable (flat/macular)
3. Macular purpura is divided into two morphologies based on size:
 - a. Petechiae: small lesions (< 3 mm)
 - 1) Numerous tiny purple or red spots appearing on the skin as a result of tiny hemorrhages within the dermal or submucosal layers.
 - 2) Petechiae range from pinpoint to pinhead size and are flush with the surface.
 - 3) Small, nonblanching, non-palpable, erythematous macules.
 - 4) Causes: Thrombocytopenia, Abnormal platelet function, increased intravascular venous pressures, and some inflammatory skin diseases.
 - b. Ecchymoses: larger lesions (>5mm)
 - 1) Often misused by clinicians, Ecchymosis is not a synonym for bruise or contusion.^{17,18,19,20}
 - 2) Caused spontaneously by hematological complications, such as thrombocytopenia. NOT trauma.^{17,18,19,20}
Elderly patients frequently have areas of ecchymosis that are not trauma-related.
 - 3) Small non-elevated painless hemorrhagic spots.
 - 4) Irregular shape, and appear as blue or purplish patches.
 - 5) Found in skin and mucous membranes.
 - 6) Causes: Disseminated intravascular coagulation, Coagulation defects, Skin weakness/fragility and Waldenstrom Hypergammaglobulinemic Purpura
4. The type of lesion present is usually indicative of the underlying pathogenesis:
 - a. Macular purpura is typically non-inflammatory
 - b. Palpable purpura is a sign of vascular inflammation (vasculitis)

C. Hematoma:

1. A localized collection of blood from a broken blood vessel (s); extravasated blood trapped in the tissues of the skin, usually clotted.
2. Hematoma is not a synonym for a bruise or a contusion.^{19,20}
3. Hematoma may be imbedded within a bruise as a palpable mass; hematomas can be caused by non-traumatic means i.e., a spontaneous blood clot to the brain.

D. sDTI

1. In most cases, DTIs occur over bony prominences.
2. Patients have history of immobility in one position.
3. Deteriorate rapidly
4. The skin over and around a DTI site may be cooler than the surrounding skin and tissue. The usual assessment includes boggy, nonblanchable tissue that is deep purple in color, may be painful, has a blistered

top layer, and may present with a mirror image bilaterally.²²

5. Seven day Principle²¹

- a. For the purposes of deep pressure injuries that present as a demarcated red/purple area, clinicians can count back 7 days to pinpoint when the actual pressure damage occurred.²¹
- b. Deep pressure injuries take 7 days from the early signs of redness to demarcate; by day 9 to 11 spontaneous “skin slippage” occurs and 14 to 15 days are required to form a mature brown/black eschar to form.²¹

E. If unsure if it is a sDTI or a bruise..... Document sDTI, Protect yourself, Revise later.

Characteristics of Wound Types

	Pressure	IAD	ITD	Arterial	Venous	Neuropathic
Location	<ul style="list-style-type: none"> • At any site • Over bony prominences 	<ul style="list-style-type: none"> • Fatty tissue of the buttocks • Perineum • Inner thigh • Groin • May occur over bony prominence 	<ul style="list-style-type: none"> • Intergluteal cleft • Skin folds • Beneath the pannus • Underneath Breasts • Groin crease 	<ul style="list-style-type: none"> • Tips of toes • Between toes • Over phalangeal heads • Around lateral malleolus • Pressure points from foot wear 	<ul style="list-style-type: none"> • Medial lower leg and ankle, • Malleolar area • Seldom on the foot or above the knee 	<ul style="list-style-type: none"> • Plantar aspect of foot • Over metatarsal heads • Under heel • Toes • Areas of foot exposed to repetitive trauma
Distribution	<ul style="list-style-type: none"> • Isolated individual lesions 	<ul style="list-style-type: none"> • Consolidated <i>or</i> • Patchy 	<ul style="list-style-type: none"> • Mirror-image on each side of skin fold 	<ul style="list-style-type: none"> • Isolated individual lesions 	<ul style="list-style-type: none"> • Isolated individual lesions 	<ul style="list-style-type: none"> • Isolated individual lesions
Shape	<ul style="list-style-type: none"> • Rounded, crater-like shape • Shape of object that caused the pressure 	<ul style="list-style-type: none"> • Diffuse • Kissing ulcer • Anal cleft-linear 	<ul style="list-style-type: none"> • Linear 	<ul style="list-style-type: none"> • Round • Even wound margins • Punched out appearance 	<ul style="list-style-type: none"> • Irregular • Poorly defined 	<ul style="list-style-type: none"> • Well defined • Round or oblong
Depth	<ul style="list-style-type: none"> • Partial <i>or</i> • Full Thickness 	<ul style="list-style-type: none"> • Partial Thickness 	<ul style="list-style-type: none"> • Partial Thickness 	<ul style="list-style-type: none"> • Shallow to deep 	<ul style="list-style-type: none"> • Superficial • Deep with associated complications 	<ul style="list-style-type: none"> • Deep
Wound Bed	<ul style="list-style-type: none"> • Erythema • Slough • Eschar • Granulation • Epithelial • Bone • Ligaments • Tendons 	<ul style="list-style-type: none"> • Non-uniform redness • Pink/white) • Peri-anal redness • NO NECROSIS 	<ul style="list-style-type: none"> • Mild erythema • Inflammation with erosion • Oozing • Exudation • Maceration • Crusting 	<ul style="list-style-type: none"> • Pale • Slough • Eschar • Epithelial • Non-granular • Minimal exudate 	<ul style="list-style-type: none"> • Red ruddy granular • May have slough or eschar • Exudate moderate to heavy 	<ul style="list-style-type: none"> • Varies • Granular • Necrotic • Pale if co-existing arterial disease
Surrounding Skin	<ul style="list-style-type: none"> • Varies • Non-blanchable erythema 	<ul style="list-style-type: none"> • Varies 	<ul style="list-style-type: none"> • Maceration • Secondary Bacterial or Fungal infections 	<ul style="list-style-type: none"> • Pale • Hairless • Cyanosis • Cool to touch • Skin thin and shiny 	<ul style="list-style-type: none"> • Dry or wet thin scaly skin • Lipodermatosclerosis • Hemosiderin • Firm edema • Dermatitis • Evidence of healed ulcers 	<ul style="list-style-type: none"> • Callused
Associated Findings	<ul style="list-style-type: none"> • Pressure and/or shear must be present 	<ul style="list-style-type: none"> • Moisture must be present • If necrosis occurs reassess for pressure 	<ul style="list-style-type: none"> • Pain, itching, burning, and odor • Perspiration with or without friction 	<ul style="list-style-type: none"> • Absent or diminished pulses • ABI ≤ 0.9 • Intermittent claudication • Resting pain 	<ul style="list-style-type: none"> • Perfusion Diminished on with co-existing arterial disease • Dilated superficial veins • Dry, thin skin 	<ul style="list-style-type: none"> • Diminished or absent sensation in foot • Foot deformities • Palpable pulses • Warm foot • Subcutaneous fat atrophy