NAWCO WCC - Quiz Questions with Answers

Domain 1: Assessment

1.

What is the most common cause of lower extremity arterial disease (LEAD) and arterial ulceration among older adults?

- **Atherosclerosis**
- Smoking
- Diabetes
- Dyslipidemia and hypertension

Correct answer: Atherosclerosis

*Atherosclerosis (hardening of the arteries) leads to impaired circulation in the legs and is the **most common cause** of LEAD and arterial ulceration. It is also one of the most important causes of gangrene, leading to amputation. Atherosclerotic disease can occur in any vessel.*

*Smoking, diabetes, dyslipidemia, and hypertension are **risk factors** for LEAD.*

2.

Lymphocytes are part of the immune system with three major cell types. Which of the following is not one of the three lymphocyte cell types?

Mast cells

T cells

B cells

Natural killer (NK) cells

Correct answer: Mast cells

T cells generate cytokines to orchestrate the immune response and release toxic granules to eliminate infected cells. B cells manufacture antibodies to deactivate foreign entities such as bacteria and viruses. NK cells safeguard the host against both tumors and virally infected cells.

Mast cells, while not belonging to the lymphocyte category, play a role in the skin's immune system. They are mainly found in the papillary dermis, commonly located near blood vessels and nerves.

3.

What is the main responsibility of fibroblasts?

To participate in the biosynthesis of collagen to form the extracellular matrix (ECM)

To facilitate the reepithelialization and formation of granulation tissue

To promote cell migration, proliferation, and angiogenesis

To control infection as long as the wound remains open

Correct answer: To participate in the biosynthesis of collagen to form the extracellular matrix (ECM)

Fibroblasts migrate to the wound area along fibrin strands of the wound clot and synthesize ground substance and collagen in order to form the ECM.

Integrins are cells in wounded tissues that are involved in repair; they serve a critical function in cell adhesion and signaling during wound healing and are vital for reepithelialization and the formation of granulation tissue.

Growth factors promote cell migration, proliferation, angiogenesis, and synthesis of the ECM components. Macrophages and neutrophils help control infection in an open wound.

4.

A 48-year-old male patient presents with a wound that reveals exposure of subcutaneous tissues but no visible bone, tendon, or muscle. According to the National Pressure Injury Advisory Panel (NPIAP), how is this wound classified?

Stage 3

Stage 2

Stage 1

Stage 4

Correct answer: Stage 3

A Stage 3 pressure ulcer is a severe condition characterized by full-thickness skin loss that may expose subcutaneous fat but not yet deeper structures of bone, tendon, or muscle. The ulcer appears as a deep crater, and at this stage, there may be slough and/or necrotic tissue present, which often needs to be removed to assess the depth of the injury properly and to promote healing. The base of the ulcer can be covered by yellow, tan, gray, green, or brown tissue.

Stage 1 pressure ulcers involve intact skin with non-blanchable redness. Stage 2 pressure ulcers involve partial-thickness loss of dermis presenting as a blister or shallow open ulcer. Stage 4 pressure ulcers involve full-thickness tissue loss with exposed bone, tendon, or muscle.

5.

Which of the following statements about herpes simplex virus (HSV) is false?

Erythema signifies a secondary infection.

Vesicles are uniformly shaped and grouped.

HSV infections occur in primary infection and secondary phases.

HSV-1 is associated with cold sores, while HSV-2 causes genital and perianal herpes.

Correct answer: Erythema signifies a secondary infection.

HSV infections of the epidermis are highly contagious and can be spread when a susceptible, noninfected person comes into direct contact (via broken skin or a mucous membrane) with a person shedding the virus. There are two types of HSV: HSV-1 (oral herpes) and HSV-2 (genital herpes).

*HSV infections have two phases: primary infection and secondary phase. During the **primary infection**, a significant inflammatory response extends from the base of the lesions down into the dermis, which results in the classic presentation of uniform, grouped vesicles on an erythematous base. This clinical presentation is a key indicator of HSV and can be confirmed with a Tzanck smear.*

6.

Which of the following is not a sign of zinc deficiency?

Spoon-shaped nails

Thin, sparse hair

Loss of taste

Slow wound healing

Correct answer: Spoon-shaped nails

Concave, spoon-shaped nails are an indication of insufficient iron levels in the body. Other symptoms suggest a zinc deficiency.

7.

Which of the following is not a local factor that can impact the body's healing process?

Obesity

Impaired tissue oxygenation

Repeated trauma

Wound infection

Correct answer: Obesity

Obesity is a systemic (not local) factor that can impact the healing process. Patients who are overweight are at an increased risk of pressure sores because of the compression of tissues and have slower rates of healing, as well as an increased risk of infection.

Impaired tissue oxygenation, repeated trauma, and local infection are all local factors that can impact the healing process.

8.

A patient who is at risk for a pressure ulcer should be encouraged to shift weight or change positions how often when sitting in a chair?

Every 1 hour

Every 2 hours

Every 4 hours

Every 30 minutes

Correct answer: Every 1 hour

Changing position helps decrease both the length and strength of pressure applied on areas where bones are close to the skin's surface. Patients prone to developing pressure ulcers should refrain from prolonged sitting in chairs and should ***change positions every hour****. While altering position may not lower the strength of pressure, it does decrease the duration, which is more crucial in preventing pressure ulcer formation.*

Repositioning enhances the patient's comfort, preserves their dignity, and maintains their ability to function. Sitting in a chair should be restricted to no more than 2 hours at a time.

9.

During a dressing change, a nurse notes thick yellow exudate on the dressing and the wound bed. What should the nurse document this drainage as?

Purulent

Serosanguineous

Seropurulent

Sanguineous

Correct answer: Purulent

Purulent drainage is thick, translucent to opaque in consistency and yellow, tan, or green. Purulent drainage signals infection and may have a foul odor. Do not mistake purulent with seropurulent, which is thin and watery in consistency and can be an early indicator of impending wound infection.

Sanguineous drainage is normal, signaling new blood vessel growth. It is thin and watery in consistency and red. Serosanguineous drainage is also normal during the inflammatory and proliferative phases of healing. It is thin, watery, and light pink to red.

10.

Which of the following skin lesions is an example of a papule?

- **Wart**
- Freckle
- Psoriasis
- Insect bite

Correct answer: Wart

A papule is defined as an elevated, firm, circumscribed area that is under 1 cm in diameter. Examples include warts, elevated moles, and lichen planus.

A freckle is an example of a macule. Psoriasis is classified as a type of plaque. An insect bite is a wheal.

11.

Which diabetic skin marker presents on the shin as bruising and may progress to a yellow center and dark pink border?

Necrobiosis lipoidica

Acanthosis nigricans

Bullosis diabeticorum

Dermopathy

Correct answer: Necrobiosis lipoidica

Necrobiosis lipoidica diabeticorum is a dermatologic condition that can appear on the skin (along the tibia) of diabetic patients. This condition manifests as irregular patches of degenerated collagen with reduced fibrocytes. The dry, scaly area has been infiltrated with chronic inflammatory cells.

The round, firm plaques of reddish-brown to yellow happen three times more often in women than in men. It can be confused with venous stasis disease but does not require or respond to extensive treatment. These ulcerations require only protective dressings.

12.

A wound extending through the epidermis and the uppermost layers of the dermis requires what type of healing?

Partial-thickness wound healing

Full-thickness/secondary-intention wound healing

Superficial wound healing

Primary-intention wound healing

Correct answer: Partial-thickness wound healing

The five basic wound healing models are:

- *Superficial wound healing: a wound involving only the epidermis*
- *Partial-thickness wound healing: a shallow wound involving epidermal loss and possibly partial loss of the uppermost layers of the dermis*
- *Full-thickness/secondary-intention wound healing: total loss of skin layers (epidermis and dermis), extending into subcutaneous tissues and deeper structures that heals by secondary intention*
- *Primary or first-intention wound healing: a process in which the wound is cleaned, then the edges approximated by a surgeon and then held in place with sutures or another method (approximated surgical incisions)*
- *Delayed primary-intention wound healing: a dirty wound that is left open to allow cleansing and then closed by a surgeon (healing by secondary intention)*

13.

A stage II pressure ulcer will cause which of the following signs and/or symptoms?

Superficial blistering with partial-thickness skin loss involving the epidermis and dermis

Blanchable erythema, warmth, and edema

Induration or hardness and discoloration of the skin

Full-thickness loss of skin with adipose tissue visible

Correct answer: Superficial serum-filled blistering with partial-thickness skin loss involving the epidermis and dermis

Stage II category pressure ulcers are superficial and primarily result from mechanical force or friction on the epidermis. Partial-thickness loss of the epidermis and dermis creates a shallow, open ulcer with a pink-red wound bed and without slough. Stage II ulcers can also lead to an intact or open/ruptured serum-filled blister.

Stage I involves nonblanchable erythema, a temperature increase or decrease at the wound site, and discoloration of the skin. In addition, skin texture changes in stage I pressure ulcers; the skin may feel hard and indurated, and observation may reveal heightened skin features or an orange-peel appearance. This stage of tissue destruction is reversible, although tissues may take 1 to 3 weeks to return to normal.

Stage III pressure ulcers involve full-thickness loss of skin with visible adipose tissue (i.e., the wound has not extended to bone, tendon, muscle, or cartilage). Stage III can involve undermining and tunneling.

14.

For what condition is staging used?

Pressure ulcers

Deep vein thrombosis

Edema

Burn injuries

Correct answer: Pressure ulcers

There are several staging models used for pressure ulcers, but the National Pressure Ulcer Advisory Panel Pressure Ulcer Staging System (NPUAP) is probably the most widely known wound classification system. Its items consist of stages I, II, III, IV, unstageable, and suspected deep tissue injury (sDTI).

15.

Arterial occlusion can be assessed by measuring capillary refill and is indicated if the refill time is greater than what value?

3 seconds

10 seconds

20 seconds

15 seconds

Correct answer: 3 seconds

*Capillary refill is performed by pressing the soft pad of the finger or toe until it turns white, then releasing pressure and noting the time it takes for color to return. A normal capillary refill time is under 3 seconds. Poor circulation is evidenced by increased or delayed capillary refill times (**over 3 seconds**) and may indicate lower extremity arterial disease (LEAD).*

16.

Signs of wound infection, such as pain, warmth, pus, odor, or streaking erythema, should prompt a nurse to check the patient's vital signs for indications of sepsis.

Of the following vital signs, which would **not** be indicative of sepsis?

Hypertension with increasing blood pressure

Temperature >38 degrees C (100.4 degrees F)

Increased heart rate >90/min

Increased respiratory rate >20/min

Correct answer: Hypertension with increasing blood pressure

Vital indications of systemic infection leading to sepsis include:

- *temperature >38 degrees or <35 degrees C*
- *heart rate >90/min*
- *respiratory rate >20/min*
- *temperature changes with chills*
- ***hypotension** with falling blood pressure and <90 mm Hg systolic or >40 mm Hg decrease from normal reading*
- *leukocytes >12,000, <4,000 mm^3, or more than 10% immature forms*

Two or more of the above criteria must be present to diagnose SIRS (systemic inflammatory response syndrome), sepsis, MODS (multiorgan dysfunction syndrome), or CARS (compensatory antiinflammatory response syndrome).

17.

As part of a physical assessment for a patient with peripheral artery occlusive disease (PAOD), a nurse should check for the "5 Ps" in a patient's lower extremities and report all findings to the physician. Which of the following is not one of these "5 Ps"?

Poor circulation

Pulselessness

Pallor

Pain/numbness

Correct answer: Poor circulation

When assessing for PAOD in patients, a nurse should check for the "5 Ps," which are pulselessness, pain/numbness, poikilothermia (coolness), pallor, and paresthesia. Any of these findings should be reported to the physician.

Poor circulation is part of the pathophysiology of this disease but not one of the signs included in the "5 Ps."

18.

Which of the following laboratory values best reflects acute changes in nutritional status?

Prealbumin

Albumin

Transferrin

C-reactive protein

Correct answer: Prealbumin

Because of the short half-life of prealbumin (2 days), this protein is decreased quickly when nutrition is inadequate and responds quickly when external nutrients are provided. Because of this, it is most commonly monitored for acute changes in nutritional status.

Normal values of prealbumin are 14 mg/dL or greater. If levels fall below 11 mg/dL, the patient should be evaluated further for malnutrition.

19.

A 68-year-old diabetic female presents to the ED with a diabetic foot wound that is penetrating to the tendon with active infection noted. According to the University of Texas Health Science Center San Antonio (UTSA), what is the grade of this wound?

Grade 2B

Grade 3A

Grade 1C

Grade 0D

Correct answer: Grade 2B

The University of Texas system utilizes a matrix structure with four grades of wound depth and four associated stages to specify ischemia, infection, both ischemia and infection, or neither. The UTSA classification system has been judged superior to the original Wagner system as a predictor of patient outcomes.

- *grade 0: no open lesions, may have deformity*
- *grade 1: superficial wound not involving the tendon, capsule, or bone*
- *grade 2: wound penetrating to tendon or capsule*
- *grade 3: wound penetrating to bone or joint*

Following each grade are four stages. Stage A is without infection or ischemia (neither), stage B is with infection, stage C is with ischemia, and stage D is with infection and ischemia (both).

Therefore, a diabetic foot ulcer/wound that is penetrating to the tendon with an infection will receive UTSA grade 2B.

20.

In which of the following patient scenarios is the Numeric Pain Rating Scale best used?

A verbally communicative adult complaining of post-surgical wound pain

A toddler with a wound after an accidental fall from their high chair

An adult patient under sedation

A nonverbal adult with advanced dementia

Correct answer: A verbally communicative adult complaining of post-surgical wound pain

The Numeric Pain Rating Scale asks patients to rate their pain on a scale from 0 (no pain) to 10 (worst possible pain). It is ideal for adults who can understand and communicate their pain levels effectively. Toddlers, sedated patients, and nonverbal adults with dementia cannot effectively use or understand the Numeric Pain Rating Scale due to communication barriers or cognitive limitations and should be given a different pain assessment tool to utilize.

21.

What is phagocytosis?

Ingestion, destruction, and digestion of cellular particulate matter

Attraction of a cell in response to a chemical signal

Development of new blood vessels in injured tissues

Attraction to a cell in response to an electrical signal

Correct answer: Ingestion, destruction, and digestion of cellular particulate matter

Phagocytosis is the ingestion of bacteria or other material by phagocytes (white blood cells that engulf and destroy pathogens). Neutrophils are the most common type of phagocyte, making up 50% to 70% of the white blood cells in the body.

Chemotaxis is the attraction of a cell in response to a chemical signal.

Angiogenesis or neovascularization is the development of new blood vessels in injured tissues.

Galvanotaxis is the attraction of a cell in response to an electrical signal.

22.

Which of the following is not a skin change observed in the elderly?

Decreased time for epidermal regeneration

Decreased dermal thickness

Decreased collagen and elastin fibers

Increased damage from the sun

Correct answer: Decreased time for epidermal regeneration

As a person grows older, the time taken for epidermal regeneration lengthens, and the skin sustains more damage from sun exposure. Various changes occur in the skin, including reductions in dermal thickness, fatty layers, collagen and elastin levels, size of rete ridges, sensation, metabolism, sweat gland activity, subcutaneous tissue, and circulation.

23.

A patient presents to the ER after spilling scalding coffee on herself with painful, blanching, unblistered redness to approximately 30% of her body. What type of burn injury does she have?

Superficial-thickness burn

Partial-thickness burn

Full-thickness burn

Subdermal burn

Correct answer: Superficial-thickness burn

Blanching redness without blisters indicates a superficial-thickness burn (first-degree). With first-degree burns, the epidermis remains intact and without blisters. The skin is erythematous and blanches with pressure.

24.

Osteomyelitis has been diagnosed in a patient's diabetic foot ulcer. What Wagner grade is this classified as?

Grade 3

Grade 4

Grade 5

Grade 2

Correct answer: Grade 3

The Wagner Ulcer Grade Classification system is used to establish the presence of depth and infection in a wound, and it is commonly used as an assessment instrument in the evaluation of diabetic foot ulcers. There are six grades, progressing from 0 to 5 in the order of severity of breakdown in the diabetic, neuropathic foot.

Grade 3 is a deep, infected wound with an abscess or tendon or bone involvement (osteomyelitis).

25.

Slough can be best described as which of the following?

Necrotic tissue

Viable tissue

Granulation tissue

Collagen

Correct answer: Necrotic tissue

Slough is an avascular (nonviable) tissue (necrotic/devitalized) that is typically moist and soft. It may be tan, yellow, green, or white, and firmly or loosely adherent to the wound bed. It has a moderate to high water content, and is made up of fibrin debris.

Granulation tissue is moist tissue that is pink or red; it is composed of new blood vessels, connective tissue, fibroblasts, and inflammatory cells that fill an open wound when it starts to heal. It has a granular surface that is berry-like or cobblestone.

26.

To assess pain in pediatric patients and patients with limited understanding, which pain scale is recommended?

Wong-Baker FACES Pain rating scale

Numeric pain intensity scale

Visual analog scale (VAS)

Verbal descriptor scale (VDS)

Correct answer: Wong-Baker FACES Pain rating scale

The Wong-Baker FACES Pain rating scale consists of six cartoon faces ordered from smiling to crying. The FACES scale has been used extensively with pediatric populations. A version for use with adults and patients who are cognitively impaired or non-English-speaking uses oval-shaped faces, without tears, that are more adult-like in appearance. The FACES pain scale offers easy and quick administration, simplicity, correlation with VAS, and little mental effort required by the patient to respond appropriately.

27.

Which of the following is not a high-pressure area for the patient lying in a supine position?

Ischial tuberosities

Occiput

Sacrum

Heels

Correct answer: Ischial tuberosities

Bony locations are most susceptible to pressure ulcer formation because a person's body weight is concentrated on these areas when resting on an unyielding surface.

High-pressure areas in the supine position include the occiput, sacrum, and heels. In the sitting position, the ischial tuberosities exert the highest pressure, and the trochanters are most affected in the side-lying position.

28.

What is the process that describes the spread of particles from regions of higher concentration to regions of lower concentration?

Diffusion

Osmosis

Permeability

Osmotic pressure

Correct answer: Diffusion

Diffusion is simply the movement of anything from an area of high concentration to an area of low concentration.

Permeability is the ease with which substances can cross a cell membrane.

Osmosis is the diffusion of water across a membrane in response to differences in solute concentration. The pressure that must be applied to a solution to prevent the inward flow of water across a semipermeable membrane is known as osmotic pressure.

29.

What is a superficial, elevated, solid skin lesion that is under 1 cm and can vary in color?

Papule

Pustule

Vesicle

Nodule

Correct answer: Papule

A papule is a superficial, circumscribed dome-shaped or flat-topped palpable lesion elevated above the skin surface and under 10 mm (1 cm) in diameter. It can vary in color.

A pustule is an elevated lesion that contains pus. A vesicle is an elevated lesion that contains clear fluid and is also under 10 mm in diameter. A nodule is a firm lesion that is thicker or deeper than the average plaque or papule.

30.

Of the following medical conditions, which poses the highest risk of developing a pressure ulcer?

Paraplegia

Extremity cast

Short stature

Obesity

Correct answer: Paraplegia

Paraplegia (paralysis) and spinal cord injury place a hospitalized patient at high risk of developing a pressure ulcer due to their inability to feel susceptible areas that may be causing skin breakdown. Those with the greatest level of disability and mobility impairment have the highest pressure ulcer risk.

31.

What is the most superficial (i.e., outermost) layer of the epidermis?

Stratum corneum

Stratum lucidum

Stratum granulosum

Stratum spinosum

Correct answer: Stratum corneum

Healthy skin is characterized by its resilience, flexibility, elasticity, slight moisture, and good hydration. It comprises two main layers: the outermost layer, known as the epidermis, and the innermost layer, called the dermis. These layers are separated by a structure called the basement membrane. Below the dermis lies a layer of loose connective tissue known as the hypodermis or subcutis.

The epidermis lacks its own blood supply and is predominantly made up of keratinocytes, which account for around 90% of its composition. Keratinocytes are responsible for producing keratin, a fibrous protein. The epidermal keratinocytes are organized into five layers: the outermost layer is the stratum corneum, followed by the stratum lucidum, stratum granulosum, stratum spinosum, and finally, the deepest layer known as the stratum basale or germinativum, which rests upon the basement membrane.

32.

Which vitamin is essential for epithelial cell structure and function, protein synthesis, and the inflammatory response?

Vitamin A

Vitamin C

Vitamin E

Vitamin K

Correct answer: Vitamin A

Vitamin A is required for the inflammatory response and plays an important role in immune function; it is essential for epithelial cell structure and function and influences the synthesis or activation of many proteins, hormones, and insulin.

Deficiencies of vitamin A have been associated with delayed reepithelialization, collagen synthesis, and cellular cohesion. Vitamin A is also depleted during malnutrition, infection, and injury. Fortunately, because vitamin A is a fat-soluble vitamin and not excreted from the body, deficiencies are rare.

33.

Screening for neuropathy by testing protective sensation can be done using which of the following tests?

Semmes-Weinstein 5.07 Monofilament Examination (SWME)

Catheter-based angiography

Doppler ultrasound

Ankle-brachial index

Correct answer: Semmes-Weinstein 5.07 Monofilament Examination (SWME)

A swift and dependable method for neuropathy screening involves the SWME test. This test evaluates the loss of protective sensation by applying a 5.07 monofilament at five specific locations on each foot. Typically, the monofilament is affixed to a sturdy paper holder. The standardization ensures that when pressed against a foot area, the monofilament exerts a force of 10 grams.

The other choices are common tests and procedures for confirming peripheral arterial disease (PAD).

34.

A pressure ulcer is assessed on a patient's coccyx as full-thickness tissue loss with visible subcutaneous fat. The wound has not reached bone, tendon, muscle, or cartilage, and there is undermining in the wound. What stage ulcer is this, based on the NPUAP classification system?

Stage III

Stage II

Stage IV

Unstageable/unclassified

Correct answer: Stage III

This is a stage III pressure ulcer based upon the International NPUAP pressure ulcer staging system.

- *Stage I: Intact skin with non-blanchable erythema that is not blue or purple located in an area usually over a bony prominence; darkly pigmented skin may not have visible blanching, but the color may differ from the surrounding area*
- *Stage II: Partial thickness damage with dermis exposed presenting as a shallow open ulcer with a red-pink wound bed, without slough, granulation, or eschar. The area can manifest as an intact or open/ruptured serous fluid blister or as a shiny or dry shallow ulcer without slough or bruising. This stage should not be used to describe skin tears, tape burns, perineal dermatitis, maceration, or excoriation. Bruising indicates a suspected deep tissue injury (sDTI).*
- ***Stage III**: Full-thickness loss of skin with adipose tissue visible; granulation or epibole can be present. Depth of wound does not extend to bone, tendon, muscle, or cartilage. The wound can have undermining and/or tunneling. Slough can appear but does not obscure the depth of tissue loss. If slough/eschar is present and obscures the extent of tissue loss, then the wound is termed an "unstageable pressure injury."*
- *Stage IV: Full-thickness skin and tissue loss with palpable fascia, muscle, tendon, ligament, cartilage, or bone. Slough or eschar can be present on some parts of the wound bed; if slough/eschar is present and obscures the extent of tissue loss, then the wound is termed an "unstageable pressure injury."*
- *Unstageable pressure injury: Full-thickness skin/tissue loss; the extent of tissue damage cannot be confirmed due to obscuring slough/eschar (the base of the ulcer is covered by slough and/or eschar in the wound bed). This injury cannot*

be staged until the slough and/or eschar is removed to expose the base of the wound and its true depth.

35.

Viable muscle can be recognized by the 4 Cs. Which of the following is not included in the 4 Cs of healthy muscle tissue?

Compressible

Color

Consistency

Capacity to bleed

Correct answer: Compressible

Characteristics of healthy, viable muscle tissue include the following:

- *red color*
- *contraction upon stimulation with forceps or electrocautery*
- *strong consistency*
- *capacity to bleed*

Compressibility is a characteristic of healthy skin (not muscle).

36.

During a routine examination, you observe that an elderly patient has thin, papery skin, particularly on the backs of their hands. The patient is concerned about frequent bruising and tearing.

Which explanation best describes why these skin changes occur in the elderly?

Reduction in collagen and elastin in the dermis leads to thinner, less elastic skin that is more prone to damage

Hyperplasia of the stratum corneum leads to thicker, more fragile skin

Increased melanin production in the elderly results in thinner skin and increased fragility

Insufficient hydration over the years thins the skin and reduces its protective barrier function

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Correct answer: Reduction in collagen and elastin in the dermis leads to thinner, less elastic skin that is more prone to damage

As skin ages, it undergoes intrinsic changes, such as a decrease in collagen and elastin fibers in the dermis, leading to thinner, less elastic skin that is more susceptible to bruising and tearing. This issue is related to the dermal layer, not the epidermal layer. Hyperplasia of the stratum corneum would lead to a thickening of the outermost layer of the skin, not to the thinning and fragility observed in elderly skin. Melanin production affects skin pigmentation and has no direct correlation with the thickness or fragility of the skin. The changes seen in elderly skin are due to structural protein degradation, not melanin production. Hydration of the skin generally improves its barrier function and does not lead to thinning. However, the thinning observed in elderly skin is primarily due to reduced collagen and elastin, not low hydration levels.

37.

What is the outer avascular layer of skin?

Epidermis

Keratinocytes

Dermis

Hypodermis

Correct answer: Epidermis

The epidermis is the outermost skin layer, which is avascular and derived from embryonic ectoderm. The epidermis consists almost entirely of keratinocytes, which are cells that produce keratin, a fibrous protein.

The epidermal keratinocytes are arranged into five layers. Below the epidermis is the dermis (the vascular structure that supports and nourishes the epidermis). The basement membrane is the structure that separates the epidermis and dermis. The hypodermis (superficial fascia) lies below the dermis and is a layer of loose connective tissue.

38.

Which laboratory value is not indicative of dehydration?

Decreased urine specific gravity

Hypernatremia

Increased BUN-creatinine ratio

Increased albumin

Correct answer: Decreased urine specific gravity

Patients who are dehydrated can be evaluated by several laboratory tests. Generally, in a dehydrated patient, serum sodium is elevated (hypernatremia), albumin is higher than normal, the BUN-creatinine ratio is increased, and urine specific gravity is ***increased****.*

A decreased urine-specific gravity is not indicative of dehydration.

39.

A 68-year-old male with a history of Type 2 Diabetes Mellitus (T2DM) presents to the emergency department with a new foot wound. Upon assessment, you note a deep laceration with bone exposure, fever of 101.8°F (38.8°C), and WBC of 21,000.

Which condition should you most suspect?

Osteomyelitis

Venous ulcer

Cellulitis

Thrombophlebitis

Correct answer: Osteomyelitis

Osteomyelitis is an infection in the bone. It can be caused by a bloodstream infection spreading to the bone or by exposure of the bone through a break in the skin. It can be acute or chronic, and symptoms may vary for each type. In the acute setting, osteomyelitis should be considered when the following symptoms are present: fever, high WBC, high Erythrosedimentation Rate (ESR), and an ulcer to the bone or bony exposure. Patients with T2DM are at high risk of developing osteomyelitis.

The other answer choices do not fit this patient's presentation.

40.

A 49-year-old male patient with a chronic venous ulcer to the left lower extremity has a serum prealbumin level of 15 mg/dL. How should this value be interpreted in the context of wound healing?

It may indicate a mild nutritional deficiency

It is within normal limits and should not contribute to impaired wound healing

It is reflective of significant malnutrition

It is unrelated to nutritional status

Correct answer: It may indicate a mild nutritional deficiency

Prealbumin, also known as thyroxine-binding prealbumin or transthyretin, is commonly used as a marker of nutritional status in hospitalized patients. It is sensitive to protein intake and nutritional changes and responds more rapidly than other proteins, such as albumin.

A serum level of 15 mg/dL is slightly below normal values (18–45 mg/dL) but not extremely low, suggesting a mild nutritional deficiency that could compromise optimal wound healing. While the level is low, it does not typically signify significant malnutrition unless accompanied by other indicators.

41.

Which of the following wounds should not be debrided?

Arterial and ischemic ulcers

Pressure and venous ulcers

Diabetic and arterial ulcers

Vasculitic and pressure ulcers

Correct answer: Arterial/ischemic ulcers

Debridement is necessary for any type of wound, whether it's acute or chronic, when there is dead tissue (such as slough or eschar) or foreign objects present. It's also necessary if the wound is infected. Once the wound has been cleaned and viable tissue is visible, debridement is not needed (unless there's a biofilm present).

However, debridement is not recommended for arterial/ischemic ulcers. Before performing debridement, it's important to conduct arterial testing (such as ankle-brachial index or vascular studies) to assess the circulation. Additionally, stable eschar (which is firmly attached, not infected, and dry) on a poorly perfused limb or on a pressure ulcer on the heel should not be debrided.

42.

A third-degree burn is now universally classified as which of the following?

Full-thickness burn

Superficial-thickness burn

Partial-thickness burn

Subdermal burn

Correct answer: Full-thickness burn

Burn injuries have historically been classified as first-, second-, third-, or fourth-degree. Today, they are more universally classified as superficial-thickness (first-degree), partial-thickness (second-degree), full-thickness (third-degree), and subdermal (fourth-degree).

A patient can often have burns at multiple depths.

43.

A diabetic foot ulcer that has penetrated the subcutaneous tissue with exposed bone, tendon, ligament, or joint capsule is classified as which Wagner grade?

Grade 2

Grade 3

Grade 4

Grade 5

Correct answer: Grade 2

The widely used Wagner foot wound classification system is an assessment tool that divides diabetic foot ulcers into six grades based on the depth of the lesion and the presence of osteomyelitis or gangrene. The grades progress from 0 to 5 in the order of breakdown severity for a diabetic, neuropathic foot.

Grade 2 indicates a deep penetration through the subcutaneous tissue with possible exposure of bone, tendon, ligament, or joint capsule. No abscess or osteomyelitis is noted in this grade.

44.

Which of the following best describes the appearance of granulation tissue within a wound bed?

Red, firm, and pebbled

Yellow and firm

Yellow to gray-green and loose

Black and soft and wet or hard and dry

Correct answer: Red, firm, and pebbled

Granulation tissue constitutes a combination of small blood vessels and connective tissue within the wound's base. This base creates a nourishing matrix capable of facilitating the migration of epidermal cells over the wound bed. A well-granulated wound offers an ideal environment for epidermal migration and the application of a skin graft, given that the newly formed capillaries aid in limiting or diffusing exudates through the host bed. A defining characteristic of the proliferative phase is the emergence of granulation tissue, which typically initiates as the inflammatory phase diminishes, typically occurring 3 to 4 days post-injury.

A transition from healthy red granulation tissue to a darker red or dusky pink hue warrants further assessment and potential intervention. Changes in the color and quantity of wound fluid may also occur. Additionally, heightened pain levels may signify the presence of an infection.

45.

Pathergy is a phenomenon that is often manifested in what clinical condition?

Pyoderma gangrenosum (PG)

Diabetic foot ulcers

Pressure ulcers

Factitious disorder

Correct answer: Pyoderma gangrenosum (PG)

A common and notable characteristic of PG is a phenomenon known as pathergy, which is the abnormal and exaggerated inflammatory response to noxious stimuli. Patients often report the lesion developing after minor trauma, such as a bump against a piece of furniture. Minor trauma preceding the development of the ulcer is an important piece of information to obtain during history-taking.

46.

What common foot lesion is caused by an infection with human papillomavirus?

Plantar warts

Tinea pedis

Callus

Hard and/or soft corn

Correct answer: Plantar warts

*A plantar wart (verruca plantaris) is caused by a contagious viral infection (**human papillomavirus**) and involves an overproliferation of skin and mucosa growing downward (iceberg effect). It can create a single lesion or clustered lesions that have a yellow, brown, gray, or black appearance. Vesicular inclusion from dried capillary ends leads to a black/red appearance.*

47.

Which of the following is the loss of full-thickness tissue that prevents wound-edge approximation?

Avulsion

Laceration

Abrasion

Puncture wound

Correct answer: Avulsion

An avulsion is a type of injury in which a portion of the skin and sometimes the underlying tissue is partially or completely torn away. This can occur secondary to accidents, animal bites, or trauma, resulting in skin that is not just cut but forcefully removed from the body. Avulsion wounds involve peeling of the skin from underlying tissue, which compromises the blood supply and can lead to tissue necrosis.

Lacerations are open skin wounds caused by blunt or penetrating trauma. Abrasions are the partial-thickness denudation of a portion of skin, and puncture wounds are caused by an object that punctures the skin.

48.

A pedal pulse that is graded as 3+ on a 4-point scale of intensity would merit which description?

Full, increased

Bounding

Diminished, barely palpable

Normal, as expected

Correct answer: Full, increased

Pedal pulses can normally be palpated at both the dorsalis pedis and the posterior tibialis. The presence or absence of palpable pulses is not diagnostic of lower extremity arterial disease (LEAD). A patient with palpable pulses may still have LEAD; if pulses are absent, a handheld Doppler probe must be used to determine the presence or absence of pulses.

The best way to document pulses in clinical practice is to utilize a 4-point scale (see below) and to specify the type of scale used (e.g., 3+ pedal pulse on a 4-point scale).

- *4+ = bounding, aneurysmal*
- ***3+ = full, increased***
- *2+ = expected, normal*
- *1+ = diminished, barely palpable*
- *0 = absent, not palpable (obtain dopplers)*

49.

A fistula is classified as "low-output" if the drainage amount is below what value?

200 mL per 24 hours

125 mL per 24 hours

400 mL per 24 hours

500 mL per 24 hours

Correct answer: 200 mL per 24 hours

Fistulas can be classified according to output. A low-output fistula is characterized by <200 mL per 24 hours.

50.

Which of the following types of collagen is most prevalent in the skin?

Type I

Type II

Type III

Type IV

Correct answer: Type I

The primary proteins present in the dermis include collagen and elastin. Collagen accounts for approximately 30% of the dermis's volume or 70% of its dry weight. Among the 19 known types of collagen, four are particularly abundant.

Type I collagen is predominantly found in tendons, ligaments, bones, and skin, constituting around 90% of skin collagen. Type II is a major component of cartilage. Type III collagen is prevalent in arteries, the intestine, and the uterus. Type IV collagen is located within the basement membrane of the epidermis. The remaining 15 types are present in significantly lower quantities.

51.

Donor sites, venous ulcers, and surgical wounds are examples of which type of wound?

Full-thickness skin loss wound

Superficial wound

Partial-thickness skin loss wound

Subcutaneous tissue wound

Correct answer: Full-thickness skin loss wound

There are four categories of wounds categorized by the depth of tissue damage: superficial, partial-thickness, full-thickness, and subcutaneous. Full-thickness skin loss wounds penetrate through the epidermis and dermis into subcutaneous fat and deeper tissues. Examples of such wounds include donor sites, venous ulcers, and surgical wounds.

Healing of full-thickness skin loss wounds involves the formation of granulation tissue and contraction.

52.

The Rule of Nines is a method for estimating surface area. This method divides the body into how many areas?

Eleven

Ten

Nine

Eight

Correct answer: Eleven

The Rule of Nines allows for a quick estimate of body surface area and is often used in triage situations. This method for estimating surface area divides the body into 11 different areas equal to 9% each, with the final 1% for the genitalia.

53.

Which of the following signs and/or symptoms is most commonly the first indication of lower extremity arterial disease (LEAD)?

Lower extremity pain worsened by activity and relieved by rest

Rest pain in the lower extremity

Thin, shiny skin

Prolonged venous filling time

Correct answer: Lower extremity pain worsened by activity and relieved by rest

Pain in the lower extremity is often the first indication of LEAD and worsens as the disease process advances; the patient typically reports pain that is worsened by activity or elevation and relieved by rest and dependency. The location of the pain may suggest the level of occlusion.

Advanced LEAD is typically evidenced by rest pain. Assessment findings in a patient with chronic tissue ischemia include thin, shiny skin and prolonged venous filling time (>20 seconds).

54.

An adult patient has sustained burns to the back of their left arm, posterior head and neck, anterior trunk, perineum, and front of the right leg.

Using the Rule of Nines, what percentage of their total body surface area (TBSA) has been burned?

37%

45%

28%

54%

Correct answer: 37%

According to the Rule of Nines, to estimate the TBSA of a burn injury, add the following: the back of the left arm (4.5%), anterior trunk (18%), front of the right leg (9%), posterior head and neck (4.5%), and perineum (1%). This equals 37%.

55.

What are the initial indicators of a possible fistula?

Fevers and abdominal pain

Passage of GI secretions or urine through an unintentional opening onto the skin

Surgical site infection

Dehisced wound

Correct answer: Fevers and abdominal pain

Fevers and abdominal pain are the initial indicators of a possible fistula. The passage of GI secretions or urine through an unintentional opening onto the skin heralds the development of a cutaneous fistula. Surgical incisions, associated surgical site infections, and dehisced wounds are common locations of fistula development (not early indicators of a fistula).

56.

A burn that extends through the dermis with obvious blistering is which type?

Second-degree burn

First-degree burn

Third-degree burn

Fourth-degree burn

Correct answer: Second-degree burn

A second-degree burn presents with a moist, glossy, exuding surface accompanied by noticeable blister formation. The affected area becomes pale under pressure (blanches) and is highly sensitive to touch due to nerve involvement. This type of burn, also referred to as a superficial-partial thickness burn, affects the epidermis and causes damage to the papillary layer of the dermis.

57.

What is the Wagner grade of a foot wound in which there is localized gangrene of the heel?

Grade 4

Grade 3

Grade 2

Grade 5

Correct answer: Grade 4

A Wagner grade 4 diabetic foot ulcer is characterized by localized wet or dry gangrene of the toes, forefoot, or heel.

58.

When assessing the onset of pain related to a new wound, for which patient population is the Wong-Baker FACES Pain Scale most appropriate?

Children who may have difficulty describing their pain

Elderly patients with cognitive impairment

Adults who prefer not to use numeric scales

Patients with chronic pain across all ages

Correct answer: Children who may have difficulty describing their pain

The Wong-Baker FACES Pain Scale is a widely used tool to help patients communicate the severity of their pain using visual representations. It is particularly effective in situations when verbal communication about pain is challenging. Since it uses facial expressions, it is most widely used to help children articulate their pain levels and is ideal for younger patients who cannot express their pain verbally as effectively.

Elderly patients with cognitive impairments, adults who prefer not to use numeric scales, and patients with chronic pain might use this scale, but it is not specifically designed for them. It is most appropriate for pediatric patients.

59.

Factors that affect the severity of a burn include all the following, except:

The patient's location when the burn occurred

Depth and size of the burn

Anatomic location of the burn

Cause of the burn

Correct answer: The patient's location when the burn occurred

A burn injury is generally described or classified by the etiology (cause), depth, and size of the burn.

The damage sustained in a burn injury depends on the properties of the injurious agent and the intensity and duration of the exposure. Causes of burns include heat, chemicals, radiation, friction, and electricity. The anatomic location also influences each injury's severity and ability to heal.

The patient's location when the burn occurred is important to note, but the other factors are much more critical to burn severity.

60.

What is excessively dry, flaky skin that can be particularly severe on the heels and bottoms of the feet?

Anhidrosis

Bromhidrosis

Maceration

Hyperkeratosis

Correct answer: Anhidrosis

Anhidrosis (an inability to produce sweat) leads to excessively dry, flaky skin that can be particularly severe on the heels and bottoms of the feet; it is often related to autonomic dysfunction caused by endocrine or neurologic disorders, which results in loss of moisture production in the skin and severe flaking.

Bromhidrosis (or foot odor) is caused by excessive perspiration from over 250,000 sweat glands in the foot.

Maceration occurs when the skin softens and subsequently breaks down from excessive exposure to moisture.

Hyperkeratosis refers to the thickening of the skin's outer layer due to an overproduction of the protein keratin.

61.

What is the turnover rate for epithelial cells?

1 month

1 week

1 day

1 year

Correct answer: 1 month

Epithelialization stands as a crucial element of wound healing physiology, involving the regeneration of a wound's surface through the emergence of new epithelial cells, which typically regenerate at a rate of about one month.

Primarily comprised of keratinocytes, these epithelial cells originate from the wound edges and dermal appendages, such as sebaceous glands, sweat glands, and hair follicles. They serve to furnish a reservoir of intact epithelial cells, aiding in the wound resurfacing process through lateral migration.

62.

What is the most common precipitating factor for the development of erythema multiforme?

Herpes simplex virus (HSV)

Fever

Exposure to an allergen

Medication reaction

Correct answer: Herpes simplex virus (HSV)

Erythema multiforme (EM) is clinically characterized by an abrupt onset of popular target lesions. The vast majority appear within 24 hours of a preceding HSV infection.

Treatment options include topical and systemic therapy for the acute eruption with antiseptic/antiviral agents, as well as prophylactic treatment of recurrent disease.

63.

Hyperbaric oxygen therapy (HBOT) is indicated for patients with which classification of diabetic foot ulcer (DFU)?

Wagner grade 3 or higher

Wagner grade 4 or higher

Pressure ulcer stage 3 or higher

UTSA grade 2 or higher

Correct answer: Wagner grade 3 or higher

HBOT is appropriate and indicated for the management of DFUs, as local-tissue hypoxia and infection are two of the primary defects underlying compromised healing in a DFU. HBOT specifically treats both of these underlying factors.

*The patient must have diabetes (type I or type II) and a lower extremity wound due to diabetic disease (**Wagner grade 3 or higher**). The wound must have failed standard wound care and must be re-evaluated every 30 days during HBOT.*

64.

Lymphatic vessels are contained in what layers of tissue?

Dermis and subcutaneous layers

Epidermis

Hypodermis

Hypodermis and subcutaneous layers

Correct answer: Dermis and subcutaneous layers

The lymphatic system comprises lymphatic vessels and lymphatic tissue, forming a network responsible for drainage and transportation. Lymphatic vessels are present in the dermis and subcutaneous tissue.

Primarily, the lymphatic system functions to transport fluid and protein from interstitial spaces back to the vascular system. Due to their characteristics such as the absence of a basement membrane and thinner vessel walls, lymphatic vessels are capable of reabsorbing molecules too large for the venous system.

65.

What are the first inflammatory cells to respond to a wound site?

Neutrophils

Macrophages

Mast cells

Lymphocytes

Correct answer: Neutrophils

The first leukocytes to arrive in a wound space are neutrophils, responding to the soluble mediators released by platelets and the coagulation cascade. They migrate into the wound space within minutes after the injury and dominate the scene for the first 2 to 3 days.

The neutrophil is the primary cell responsible for cleansing wounds of microorganisms and phagocytosis of bacteria and foreign debris; therefore, inadequate numbers of neutrophils will slow healing in infected wounds.

66.

A palpable pulse in the foot indicates what blood supply?

- **80 mm Hg**
- 100 mm Hg
- 60 mm Hg
- 120 mm Hg

Correct answer: 80 mm Hg

A palpable pulse indicates a blood supply of 80 mm Hg in the foot. If a regional pulse is not palpable, Doppler or other vascular assessments are necessary to determine healing ability.

67.

Most clinicians agree that a wound is clinically infected when the colony count is greater than what value?

10^5 organisms per gram of tissue

10^4 organisms per gram of tissue

10^3 organisms per gram of tissue

50,000 organisms per gram of tissue

Correct answer: 10^5 organisms per gram of tissue

In general, a wound infection is present when the culture results show a colony count above 10^5 (100,000) organisms/mL or the presence of any beta-hemolytic streptococci.

Three techniques are used in the clinical arena to obtain a wound culture: biopsy, needle aspiration culture, and swab culture.

68.

Where are paraplegic patients most likely to develop pressure wounds?

Ischial tuberosity

Coccyx

Heels

Sacrum

Correct answer: Ischial tuberosity

Paraplegic patients sitting in wheelchairs are most likely to develop ischial pressure wounds. This results from permanent capillary occlusion in tissue compressed between the ischial bony prominence and a chair's hard surface.

69.

What is the thickest tissue layer of the skin?

Dermis

Epidermis

Hypodermis

Basement membrane

Correct answer: Dermis

The dermis, also known as the true skin, is a richly vascularized structure responsible for supporting and nourishing the epidermis, the outer layer of the skin. It constitutes the thickest layer of tissue in the skin. In contrast to the densely packed cellular epidermal layer, the dermis is relatively less populated, mainly by fibroblast cells, and it is both vascularized and innervated.

At the junction between the dermis and the epidermis lies a thin layer of protein known as the basement membrane. This membrane serves to both separate and connect the epidermis and dermis. The epidermis forms the outermost layer of the skin, while the hypodermis, also called subcutaneous tissue, is situated beneath the dermis.

70.

Neuropathy is a frequent risk factor for diabetic foot ulcers and can include sensory, motor, and autonomic nerves. Which of the following symptoms is least likely to be the result of autonomic neuropathy?

Muscle atrophy

Abnormal blood flow in the soles of the feet

Decreased sweating and oil production

Loss of skin temperature regulation

Correct answer: Muscle atrophy

The lower extremities of individuals with diabetes commonly experience complications such as sensory, motor, and autonomic neuropathies. Autonomic neuropathy, which involves the involuntary nervous system, can have widespread effects on various organ systems in the body. It frequently coincides with other peripheral neuropathies and diabetic issues. Symptoms of autonomic neuropathy include reduced sweating and oil production, disrupted skin temperature regulation, and abnormal blood flow in the feet, leading to dry skin (xerosis) and the development of fissures, cracks, calluses, and eventually ulcers.

Meanwhile, motor neuropathy affects the muscles essential for normal foot movement and can lead to muscle wasting.

71.

Clinicians often use the mnemonic STONEEES to help identify deep tissue infections. Which of the following signs and/or symptoms is not included in the three "Es" of this mnemonic?

Exotoxin production

Exudate

Erythema

Edema

Correct answer: Exotoxin production

In an effort to help clinicians identify wounds that are critically colonized with deep tissue infection present, STONEEES is often used. It represents:

- *size is bigger*
- *temperature increase*
- *os (probe to or exposed bone)*
- *new or satellite areas of breakdown*
- *exudate, erythema, edema*
- *smell*

72.

A photoplethysmograph (PPG) essentially measures venous refill times and assesses the overall severity of chronic venous insufficiency. What does a refill time of greater than 24 seconds mean?

Normal finding

Mild venous insufficiency

Moderate venous insufficiency

Severe venous insufficiency

Correct answer: Normal finding

A PPG measures venous refill times, which is the time it takes for the vein to refill through the normal arterial capillary system. In a situation of reflux, refill time ***decreases****, reflecting the backward flow of blood through the veins.*

Refill times greater than 24 seconds are considered normal. *Rapid refill times can be quantified by the overall severity of chronic venous insufficiency. Mild disease would be reflected if the refill time is 20-24 seconds. Moderate disease would be indicated with a refill time of 10-19 seconds. A refill time at or below 10 seconds would be interpreted as severe venous insufficiency.*

73.

A 68-year-old diabetic female patient presents with a wound on the lower extremity. The wound has a punched-out appearance, with a smooth edge and a black necrotic base. What type of wound is this most likely to be?

Arterial ulcer

Venous ulcer

Diabetic ulcer

Pressure ulcer

Correct answer: Arterial ulcer

An arterial ulcer, also known as an ischemic or arterial insufficiency ulcer, is a type of wound resulting from inadequate blood flow to a particular area, typically due to arterial disease. These ulcers are most often found on the feet and lower extremities. Arterial ulcers commonly present with a "punched-out" appearance and smooth edges and can have a black necrotic base due to poor blood supply.

Venous ulcers typically have irregular edges and are located around the ankles with more granulation tissue and less necrosis. Diabetic ulcers are commonly located on the foot and may have callused edges but do not typically present with a smooth and necrotic appearance. Pressure ulcers occur over bony prominences due to pressure, not typically on the lower extremities in a diabetic patient, unless they are related to immobility.

74.

The dermis is made up of collagen and elastin (proteins). What are their functions?

Providing elasticity, strength, and bulk support

Producing melanin and acting as touch receptors

Performing phagocytosis

Recruiting and activating fibroblasts

Correct answer: Providing elasticity, strength, and bulk support

The major proteins found in the dermis are collagen and elastin. These proteins give skin tensile strength and provide elastic recoil.

Melanocytes, a key cell found in the epidermis, produce melanin (variations in skin color are related to the amount and distribution of melanin synthesized and stored in keratinocytes).

Merkel cells (another key cell in the epidermis) are thought to function as touch receptors.

Phagocytosis is a function of macrophages (a cell abundantly found in the dermis); macrophages also recruit and activate fibroblasts.

75.

Using the University of Texas–San Antonio (UTSA) wound classification system, how would an infected, superficial wound not involving a tendon, capsule, or bone be graded?

Grade 1B

Grade 0B

Grade 2B

Grade 3B

Correct answer: Grade 1B

A popular diabetic foot ulcer classification system, the UTSA protocol utilizes a matrix structure with four grades of wound depth and four associated stages to specify infection, ischemia, neither infection nor ischemia, or both infection and ischemia. This classification system has been judged superior to the Wagner system as a predictor of patient outcomes.

- *Grade 0 - no open lesions, may have deformity*
- *Grade 1 - superficial wound not involving a tendon, capsule, or bone*
- *Grade 2 - wound penetrating to tendon or capsule*
- *Grade 3 - wound penetrating to bone or joint*

Stage A indicates no infection or ischemia, stage B indicates infection only, stage C indicates ischemia only, and stage D indicates infection and ischemia. Thus, ***Grade 1B would reflect a superficial wound that is infected.***

76.

What does hypoalbuminemia indicate?

Kwashiorkor (protein-energy malnutrition)

Marasmus (chronic wasting of body tissues)

Vegan diet

Chronic obstructive pulmonary disease (COPD)

Correct answer: Kwashiorkor (protein-energy malnutrition)

Hypoalbuminemia causes poor wound healing and is an indication of protein malnutrition produced by severe protein deficiency (Kwashiorkor).

Marasmus is a condition that involves chronic wasting of body tissues, commonly due to prolonged dietary deficiency of protein and calories. Cancer and COPD are common causes of this disorder.

A vegan diet can certainly provide adequate nutrition and would not contribute to hypoalbuminemia.

77.

Which of the following would most likely cause calluses to form on a person's foot?

Wearing shoes that do not properly fit

Warts

Viral infections

Bacterial infections

Correct answer: Wearing shoes that do not properly fit

Callus formation is a natural protective response to repetitive stress. It is characterized by thickened hyperkeratotic skin. The problem with this buildup is that accumulation of callus can increase pressure by 25% to 30%, resulting in an ulcer below the callused area that is not visible to the examiner and/or is not palpable. Callus buildup is the result of a biomechanical problem (wearing poorly fitting shoes). Unless the underlying cause is eliminated, a callus will continue to occur. Based on the duration and amount of pressure applied, the skin may eventually break down, and an ulcer will develop.

Evaluation of a patient's shoes (footwear assessment) is as important as taking a good history or examining the patient's feet.

78.

Peripheral neuropathy is the primary cause of which condition?

Diabetic foot ulcers

Systemic infection

Peripheral arterial disease (PAD)

Charcot arthropathy

Correct answer: Diabetic foot ulcers

Peripheral neuropathy is involved in 78% of diabetic foot ulcers. The incidence of neuropathy in patients with diabetes appears to be linked to the duration of diabetes and, to some extent, glycemic control.

79.

According to the CDC guidelines, an individual is considered obese with a body mass index (BMI) greater than what value?

30

25

35

27

Correct answer: 30

BMI is determined by measuring an individual's height and weight, calculated as the person's weight in kilograms divided by the square of their height in meters, representing a weight-to-height ratio. An individual with a BMI of 30 or higher is classified as obese, indicating a significant risk associated with excess weight. Likewise, a BMI exceeding 27 suggests a major risk for obesity.

Being overweight is defined by a BMI of 25 or greater, while a BMI falling between 18.5 and 24.9 is considered within the range of normal weight. Furthermore, a BMI equal to or below 21 coupled with involuntary weight loss puts a patient at risk of developing pressure ulcers.

80.

Which of the following most indicates that surgical exploration is necessary after a laceration has been sustained?

There may be damage to underlying structures

A foreign body is present in the wound

Uncontrolled bleeding is present

The epidermis and dermis are both involved

Correct answer: There may be damage to underlying structures

Possible damage to underlying structures indicates that surgical exploration is likely necessary, as damage to these structures must be assessed. The presence of a foreign body in the wound may require surgical exploration but may also be treatable solely with irrigation, depending on the situation. Uncontrolled bleeding should be controlled; however, surgical exploration is likely to be necessary only if the bleeding is due to damage of an underlying structure. Involvement of just the epidermis and dermis indicates the laceration is superficial, and surgical exploration will not be necessary.

81.

Which of the following statements about neutrophils is false?

They are specialized secretory cells, playing an important role in vascular dilation and permeability, including temporary mild edema.

They are proteins produced by white blood cells (WBCs) that give red blood cells (RBCs) the ability to transport oxygen.

Their primary function is to phagocytose bacteria and foreign debris.

They are the first inflammatory cells to respond to a wound space.

Correct answer: They are specialized secretory cells, playing an important role in vascular dilation and permeability, including temporary mild edema.

Mast cells are specialized secretory cells. In their resting state, mast cells contain granules, which serve as histamine-binding sites. Histamine, a vasoactive amine, is initially released from the mast cells after injury. Histamine plays an important role in vascular dilation and permeability, including temporary mild edema. At low doses, histamine can stimulate collagen formation and healing.

The other choices are accurate statements regarding neutrophils.

82.

The most commonly seen fistulas involve which areas?

Skin and GI tract

Skin and bladder

Intestine and colon

Intestine and wound bed (or wound surface)

Correct answer: Skin and GI tract

A fistula is an abnormal passage or opening between one or more body organs or spaces. Fistulas with openings from one internal body organ or another (e.g., from the small bowel to the bladder or from the bladder to the vagina) are internal fistulas, whereas those with cutaneous involvement (such as from the small bowel to the skin) are termed external fistulas.

The most commonly seen fistulas involve the skin and GI tract and are called ***enterocutaneous fistulas*** *(connecting the intestine to the surface of the skin).*

83.

Nationwide, what is the prevalence of malnutrition in hospitals?

Between 30% and 50%

Between 10% and 20%

Below 10%

Over 60%

Correct answer: Between 30% and 50%

Nationwide, an estimated 30% to 50% of all adult patients hospitalized are at risk for malnutrition or are already malnourished. This is particularly alarming because malnutrition is associated with increased morbidity and mortality in patients with acute and chronic disease, as well as longer hospitalization stays and higher treatment costs, compared with patients without malnutrition.

84.

Which of the following factors would least likely contribute to fistula formation?

Obesity

Steroid therapy

Diabetes mellitus

Infection

Correct answer: Obesity

A fistula represents an atypical channel or an irregular tract that originates either from a cavity filled with pus or a hollow organ, extending to the body's surface, or connecting one cavity or organ to another. Factors that might increase the risk of developing a fistula encompass the use of steroids, the presence of inflammatory bowel syndrome (IBS), exposure to radiation treatment, the creation of an enterostomy, inadequate nutrition, reduced oxygen supply, the existence of diabetes, liver cirrhosis, undergoing chemotherapy, the consumption of anti-inflammatory medications, the occurrence of sepsis, and gastrointestinal (GI) surgery that is conducted without prior bowel preparation.

However, it's important to note that obesity alone is not considered a contributing factor to the development of fistulas.

85.

Exposed muscle describes which classification of pressure ulcer?

Stage IV

Stage III

Unstageable

Stage II

Correct answer: Stage IV

This is a stage IV pressure ulcer based on the International NPUAP pressure ulcer staging system.

- *Stage I: Intact skin with non-blanchable erythema that is not blue or purple located in an area usually over a bony prominence; darkly pigmented skin may not have visible blanching but may differ in color from the surrounding area*
- *Stage II: Partial-thickness damage with dermis exposed presenting as a shallow open ulcer with a red-pink wound bed, without slough, granulation, or eschar. The area may also present as an intact or open/ruptured serous fluid blister or as a shiny or dry shallow ulcer without slough or bruising. This stage should not be used to describe skin tears, tape burns, perineal dermatitis, maceration, or excoriation. Bruising indicates a suspected deep tissue injury (sDTI).*
- *Stage III: Full-thickness loss of skin with adipose tissue visible; granulation or epibole may be present. The depth of the wound does not extend to bone, tendon, muscle, or cartilage. The wound can have undermining and/or tunneling. Slough can manifest but does not obscure the depth of tissue loss. If slough/eschar is present and obscures the extent of tissue loss, then the wound is termed an "unstageable pressure injury."*
- ***Stage IV**: Full-thickness skin and tissue loss with palpable/exposed fascia, muscle, tendon, ligament, cartilage, or bone. Slough or eschar can be present on some parts of the wound bed; if slough/eschar obscures the extent of tissue loss, then the wound is termed an "unstageable pressure injury."*
- *Unstageable pressure injury: Full-thickness skin/tissue loss; the extent of tissue damage cannot be confirmed due to obscuring slough/eschar (the base of the ulcer is covered by slough and/or eschar in the wound bed). It cannot be staged until the slough and/or eschar is removed to expose the base of the wound and its true depth.*

86.

Which of the following statements regarding the NPUAP classification system for staging pressure ulcers is false?

When documenting a healing pressure ulcer, reverse staging is appropriate.

There are six stages or categories involved.

Staging should be based on the type of tissue visualized or palpated.

Stages I and II involve partial-thickness loss.

Correct answer: When documenting a healing pressure ulcer, reverse staging is appropriate.

The six stages of pressure ulcer staging are stage I, stage II, stage III, stage IV, unstageable, and suspected deep tissue injury (sDTI). Staging should be based on the type of tissue that is visualized or felt. Stages I and II involve partial thickness loss, and stages III and IV involve full-thickness loss.

***Do not** reverse-stage when documenting a healing pressure ulcer.*

87.

What is a major symptom of plantar fascitis?

Foot pain when standing after periods of rest

Foot pain in the afternoon

Foot pain in the middle of the night

Foot pain with exercise

Correct answer: Foot pain when standing after periods of rest

The clinical features of plantar fascitis include subjective symptoms of pain and discomfort. The pain can be described as a slow, dull ache; intense achiness; or a burning sensation. The pain can be sharp, pinpoint, or knife-like.

Patients will often complain of pain in the heel when standing after periods of rest, especially on their first step in the morning. This pain diminishes with each successive step but can return late in the afternoon (after prolonged weight-bearing). It is usually described as non-radiating and localized to the medial aspect of the heel pad. The symptoms are predominantly unilateral, but bilateral involvement occurs in 10% of cases.

88.

Bacterial skin damage can be caused by several sources and irritants. Which of the following is not a source of bacterial skin damage?

Dermatophyte (tinea)

Cellulitis

Erysipelas

Folliculitis

Correct answer: Dermatophyte (tinea)

Common types of skin damage include irritants and sources of mechanical, moisture, chemical, vascular/neuropathic damage; infections (fungal, bacterial, viral); and allergic reactions. Bacterial skin damage is most commonly caused by the following: cellulitis, erysipelas (bacterial infection of the upper layer of the skin and superficial lymphatics), erythrasma (a superficial bacterial infection that causes brown, scaly skin patches in skin folds), folliculitis, and impetigo (bullous and nonbullous).

Dermatophyte (or tinea) is a fungal infection that causes skin damage (e.g., ringworm and related diseases).

89.

Which diabetic skin condition is characterized by spontaneous blistering, usually on the feet/toes?

Bullosis dibeticorum

Dermopathy

Necrobiosis lipoidica

Acanthosis nigricans

Correct answer: Bullosis dibeticorum

Also referred to as diabetic bullae, these are blister-like lesions on the feet, toes, and hands of diabetic patients that occur spontaneously. This condition is a distinct skin marker for diabetes (though rare).

Dermopathy is a diabetic skin condition characterized by dull, red papules (skin spots).

Necrobiosis lipoidica is the breakdown of collagen and vascular thickening due to diabetes. This condition starts as a bruised appearance and may progress to a yellow center with a dark pink appearance around the circle.

Acanthosis nigricans is a diabetic skin condition characterized by velvety hyperpigmentation (brown to black, poorly defined edges).

90.

Which of the following conditions is not an acute complication of major burns?

Acute renal failure (ARF)

Pneumonia

Cellulitis

Wound infection

Correct answer: Acute renal failure (ARF)

The top five acute complications of major burns are:

- *pneumonia*
- *cellulitis*
- *urinary tract infection*
- *respiratory failure*
- *wound infection*

91.

Using the Fontaine classification system for peripheral artery occlusive disease (PAOD), rest pain is indicative of which stage?

Stage 3

Stage 1

Stage 2b

Stage 4

Correct answer: Stage 3

The Fontaine classification system includes five stages for PAOD. This system allows accurate reporting of a patient's status and offers standard communication with other clinicians.

- *Fontaine stage 1: asymptomatic*
- *Fontaine stage 2a: mild or intermittent claudication (appearing with moderate-to-heavy activity and is relieved by approximately 10 minutes of rest), typically occurs when **the** involved vessel is approximately 50% occluded*
- *Fontaine stage 2b: moderate to severe claudication*
- ***Fontaine stage 3**: ischemic rest pain (occurring in the absence of activity and with the legs in a dependent position, usually nocturnal), rest pain signals advanced occlusive disease (typically >90% occlusion).*
- *Fontaine stage 4: ulcer/gangrene (due to total occlusion of below-knee vessels)*

92.

Documentation of wound care should always contain the three C's. Which of the following items is not one of the three Cs?

Clinical findings

Clarity of plan of care

Conciseness

Consistency

Correct answer: Clinical findings

Documentation should always contain the three Cs:

- *clarity of plan of care*
- *conciseness or focus of topic*
- *consistency in documentation*

The documentation should include an accurate, legible course of treatment. It should include clinical findings (i.e., clarity of the plan of care).

93.

For a patient with a pressure wound that is draining moderate to heavy amounts of exudate, which category of dressings should be used?

Alginates

Gauze

Hydrogels

Transparent film

Correct answer: Alginates

Alginates are highly absorptive gelling dressings made of spun fibers of brown seaweed. When applied to a wound, sodium ions present in the wound exchange for the calcium ions in the dressing, producing a hydrophilic gel and providing calcium ions to the wound. Since calcium acts as a clotting factor, this mechanism enables some alginates to act as a hemostat.

Alginates absorb serous fluid or exudate in wet wounds with moderate to heavy drainage (such as leg ulcers, cavity wounds, and pressure wounds, as well as at donor sites and other bleeding sites), forming a nonadhesive, nonocclusive hydrophilic gel that conforms to the shape of the wound. In addition, they protect against microbial contamination and do not adhere to the wound.

94.

Which of the following descriptions best characterizes pyoderma gangrenosum?

Ragged, elevated borders that are dusky red or purple with a halo

Palpable, nonblanchable purpura that may be associated with petechia, nodules, and vesicles

Pustular or macular-papular rash with erythematous satellite lesions

Dusky, purple, and palpable nodules progressing to necrosis and ulceration

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Correct answer: Ragged, elevated borders that are dusky red or purple with a halo

Pyoderma gangrenosum is a painful autoimmune skin blister that starts small, is necrotic, and involves crops of lesions at different stages of healing or development. It has ragged, elevated borders and is dusky red or purple. It is often associated with ulcerative colitis (UC) and Crohn's disease, worsens with debridement, and should be treated with steroid therapy.

95.

You are assessing an 82-year-old male patient with type 2 diabetes and peripheral neuropathy for skin integrity. He spends most of his time seated or in bed. What preventive measure should be prioritized to prevent skin breakdown and injury?

Use a pressure-relieving cushion when seated

Implement a high-protein diet

Encourage 60 minutes of daily exercise

Apply heat packs to enhance circulation

Correct answer: Use a pressure-relieving cushion when seated

In geriatric patients, particularly those with limited mobility and with sensitivity due to conditions like diabetes and neuropathy, using pressure-relieving devices is critical to prevent pressure ulcers. A high-protein diet is supportive but does not directly prevent pressure injuries. Vigorous daily exercise might help increase circulation and overall health, but it does not address the direct problem. Applying heat packs could risk burns due to reduced sensation.

96.

Which of the following signs is characteristic of a Kennedy ulcer?

Asymmetrical shape

Intact skin

Development over weeks

Appearing on the heel

Correct answer: Asymmetrical shape

A Kennedy ulcer (also known as a Kennedy terminal ulcer), is a pressure ulcer that develops rapidly in some individuals as they are dying, usually within the last 8-12 hours of life. These ulcers develop on the sacrum as the skin breaks down (as part of the dying process). They start as a pear- or butterfly-shaped bruise and grow rapidly.

The edges of a Kennedy ulcer are often irregular, and the shape is asymmetrical.

97.

Which of the following should not be included in weekly assessments and documentation of pressure ulcers?

Drainage only if purulent

Stage of ulcer, including size (length, width, depth)

Location of ulcer

Description of tissue

Correct answer: Drainage only if purulent

Odor and drainage, including color and amount, should be included in daily and weekly assessments of pressure ulcers (regardless of whether the drainage is purulent).

Staging, location, and a description of the tissue should be included in pressure ulcer documentation.

98.

Which of the following statements about necrobiosis lipoidica diabeticorum is true?

It is a dermatologic condition that can affect the shins of diabetic patients.

It is usually called pyoderma gangrenosum.

It usually occurs because of subclinical community-acquired MRSA infection.

It usually presents as bilateral and symmetrical lesions.

Correct answer: It is a dermatologic condition that can affect the shins of diabetic patients.

Necrobiosis lipoidica diabeticorum is a dermatologic skin condition that can appear along the tibia in diabetic patients (often morbidly obese female diabetic patients). It is characterized by irregular patches of degenerated collagen with reduced fibrocytes. These dry, scaly areas of skin have been infiltrated with chronic inflammatory cells. The result is bilateral and asymmetric round, firm plaques that are reddish-brown to yellow.

Community-acquired MRSA infections do cause necrotic abscesses, but not necrobiosis lipoidica diabeticorum. This condition is different from pyoderma gangrenosum.

99.

Compared to the Wagner Scale, what additional factor does the Texas University Diabetic Foot Scale evaluate?

Infection status and ischemia

Presence of calluses and corns

Location and size of the ulcer

Serum glucose levels

Correct answer: Infection status and ischemia

The Texas University Diabetic Foot Scale includes an assessment of wound infection and ischemia, providing a comprehensive evaluation of diabetic foot ulcers, which helps determine appropriate interventions and predict outcomes more effectively than the Wagner Scale alone.

The Wagner Ulcer Grade Classification System is used primarily to classify diabetic foot ulcers based on their depth and the presence of osteomyelitis or gangrene. This helps in determining the severity and guiding treatment options.

Calluses and corns are common diabetic foot conditions but are not specifically addressed in the Texas Scale's grading; it focuses more on infection and ischemia. Although location and size of the ulcer are important in the overall assessment, the Texas Scale primarily differentiates from the Wagner Scale by adding infection status and ischemia evaluation. While blood sugar control is a critical component of managing diabetic foot health, it is not a measurement included in the Texas University Diabetic Foot Scale.