Unit 3: Wound Care and Healing Process

Wound: is a disruption in the normal integrity of the skin.

Causes of Wound

1. **Intentional wounds** occur during treatment or therapy. These wounds are usually made under aseptic conditions. Examples include surgical incisions and venipuncture's.

2. **Unintentional wounds** are unanticipated and are often the result of trauma or an accident. These wounds are created in an unsterile environment and therefore pose a greater risk of infection.

Types of wound

1. **Bruise wound**: Also known as a contusion, results from damage to the soft tissues and blood vessels, which causes bleeding beneath the skin surface.

2. **Abrasion wound**: Also known as a scrape or rug burn, results when the outer layer of skin is scraped or rubbed away. Exposure of nerve endings makes this type of wound painful, and the presence of debris from the scraped surface (rug fibers, gravel, sand) makes abrasions highly susceptible to infection.

3. **Laceration wound**: Cut, or incision is caused by sharp objects such as knives or glass or from trauma due to a strike from a blunt object that opens the skin.

4. **Avulsion wound**: Results when the skin or tissue is torn away from the body, either partially or completely. The bleeding and pain will depend on the depth of tissue affected.
5. **Puncture wound:** Results when the skin is pierced by a sharp object such as a pencil, nail, or bullet. If a piece of the object remains in the skin, or if there is little bleeding due to the depth and location of the puncture, infection is likely.

**Wound healing:**

The healthy body has the ability to protect and restore itself.

**Wound healing process include:**

1. Increase blood supply to the damage area.

2. Walling and removing cellular and foreign debris.

3. Initiating cellular development.

**Types of Healing**

Tissue may heal by one of three methods, which are characterized by the degree of tissue loss.

1. **Primary intention**

   - Healing occurs in wounds that have minimal tissue loss and edges that are well approximated (closed).

   - If there are no complications, such as infection, necrosis, or abnormal scar formation, wound healing occurs with minimal granulation tissue and scarring.

2. **Secondary intention**

   - Healing is seen in wounds with extensive tissue loss and wounds in which the edges cannot be approximated.
The wound is left open, and granulation tissue gradually fills in the deficit.

Repair time is longer, tissue replacement and scarring are greater, and,

- the susceptibility to infection is increased because of the lack of an epidermal barrier to microorganisms.

3. Tertiary intention healing

- Also known as delayed or secondary closure, is indicated when primary closure of a wound is undesirable.

- Conditions in which healing by tertiary intention may occur include poor circulation or infection.

- Suturing of the wound is delayed until the problems resolve and more favorable conditions exist for wound healing.

Phases of wound healing

- Hemostasis
- Inflammation
- Proliferation or Granulation
- Remodeling or Maturation

1. Initial phase-Hemostasis (Defensive Phase):
Immediately after injury; lasts 3 to 6 days
- Hemostasis
- Phagocytosis
A. Hemostasis, or cessation of bleeding, occurs by vasoconstriction of large blood vessels in the affected area. Plug and fibrin clot formation.

B. Inflammation, is the body’s defensive adaptation to tissue injury and involves both vascular and cellular responses (phagocytosis).

2. Proliferative Phase (Proliferation, Granulation and Contraction):
- From post injury day 3 or 4 until day 21.
- Collagen synthesis.
- Granulation tissue formation.

3. Remodeling or Maturation Phase:
- From day 21 until 1 or 2 years post injury.
- Collagen organization.
- Remodeling or contraction.
- Scar stronger.
Kinds of Wound Drainage

**Exudate:** Material such as fluid and cells that have escaped from blood vessels during inflammatory process.

**Types of exudate**

1. **Serous Exudate**
   a. Mostly serum.
   b. Watery, clear of cells. E.g. Fluid in a blister.

2. **Purulent Exudate**
   a. Thicker
   b. Presence of pus
   c. Color varies with organisms.

3. **Sanguineous (hemorrhagic) Exudate**
   a. Large numbers of RBCs
   b. Indicates severe damage to capillaries

4. **Mixed Sanguineous (hemorrhagic) Exudate**
   a. **Serosanguineous Exudate:** Clear and blood-tinged drainage

   b. **Purosanguineous Exudate:** Pus and blood

**Functions of Exudate**

1. Dilution of toxins produced by bacteria and dying cells.
2. Transport of leukocytes and plasma proteins, including antibodies, to the site.
3. Transport of bacterial toxins, dead cells, debris, and other products of inflammation away from the site.

Factors affecting wound healing:

1. **Age:** Blood circulation and oxygen delivery to the wound, clotting, inflammatory response, and phagocytosis may be impaired in the very young and in older adults; thus, the risk of infection is greater. Rate of cell growth and epithelialization of open wounds is lower with advancing age, so wound healing is slowed.

2. **Nutrition:** A balanced diet with adequate amounts of protein, carbohydrates, fats, vitamins, and minerals is needed to increase the body’s resistance to pathogens and to decrease the susceptibility of skin and mucous membranes to infection and trauma.

3. **Oxygenation:** Decreased arterial oxygen tension alters the synthesis of collagen and the formation of epithelial cells, causing wounds to heal more slowly. Reduced hemoglobin levels (anemia) decrease oxygen delivery to the tissues and interfere with tissue repair.

4. **Smoking:** Functional hemoglobin levels decrease, impairing oxygenation to tissues.

5. **Drug therapy:**
   - **Steroids** reduce the inflammatory response and slow collagen synthesis.
   - **Anti-inflammatory** drugs suppress protein synthesis, wound contraction, epithelialization, and inflammation.
   - **Prolonged antibiotic** use, with development of resistant strains of bacteria, may increase the risk of super infection.
6. **Diabetes mellitus**: Elevated blood glucose levels impair leukocyte function and phagocytosis. The high-glucose environment is an excellent medium for the growth of bacterial, fungal, and yeast infections, which lead to delay wound healing.

**Wound complications:**
1. Infection
2. Hemorrhage
3. Pain
4. Anxiety
5. Alteration in body image (deformity).
6. Dehiscence.
7. Evisceration.

**Assessing the wound:**
1. **Appearance:**
   - wound edges must be well approximated
   - color of the surrounding tissues must be slightly redness and the wound edges should be clean
2. **wound drainage**: A normal inflammatory response is the presence of exudates, which is composed of fluids and cells that escape from blood vessels. The exudates may be:
   - **Serous**: clean and watery, from serous portion of the blood
   - **Purulent**: thick, bad odor, composed of dead tissues and live bacteria (yellow or green).
3. **Pain**: degree and severity of pain depends on such factors as wound size, wound site, and the causative agent.

4. **Related assessment:**
   - Patient general condition
   - Laboratory tests (infection or not)
   - Temperature
   - Signs and symptoms of acute hemorrhage, restlessness, thirst, drop in systolic blood pressure, increase pulse and respiration rates, decreases in urinary output.

**Pressure Ulcers (Decubitus Ulcer)**

Is any lesion caused by unrelieved pressure that results in damaging underlying tissue. It is one of the most common skin disruption. It's incidence in hospitalized patients. It can occur at any bone prominence of the body.

**Factors affecting pressure ulcer development:**

1. **Immobility**: causes prolonged pressure on body area, as unconscious and paralyzed patients.

2. **Inadequate nutritional status**: as malnutrition.

3. **Moisture of the skin**: moisture reduces the skin resistance to trauma, mainly if pressure is present.

4. **Mental status**: confused or comatose patients have diminished self-care abilities and increase the probability of skin break down.

5. **Age**: older people are greater risk for pressure ulcers because the aging skin is more susceptible to injury.
6. Friction and shearing.

7. Fecal and urinary incontinence.

8. Diminished sensation.


10. Poor lifting and transferring techniques.

11. Incorrect positioning.

12. Hard support surfaces.

13. Incorrect application of pressure-relieving devices.

Stages of Pressure Ulcer Formation

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<tr>
<th>Stage</th>
<th>Characteristics</th>
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<tr>
<td>Stage I</td>
<td>Non blanch able erythematic signals potential ulceration.</td>
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<tr>
<td>Stage II</td>
<td>Partial-thickness skin loss (abrasion, blister, or shallow crater) involves the epidermis and possibly the dermis.</td>
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| Stage III | • Full-thickness skin loss involves damage or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia.  
• The ulcer presents clinically as a deep crater with or without undermining of adjacent tissue. |
| Stage IV  | • There is full-thickness skin loss with tissue necrosis or damage to muscle, bone, or supporting structures such as tendons or joint capsules.  
• Undermining and sinus tracts may also be present. |
Nursing Diagnosis

1. **Impaired skin integrity** (altered epidermis and/or dermis) related to skeletal prominence; chemical substances; mechanical factors such as shearing forces, pressure, restraint, or physical immobilization, etc.

2. **Impaired tissue integrity** related to surgical incision; decreased blood flow; immobility; mechanical irritants, etc…

3. **Risk for infection** related to malnutrition and decreased defense mechanisms.

4. **Acute pain** related to inflammation and infection.

5. **Disturbed body image** related to changes in body appearance secondary to scars, drains, and removal of body parts.

6. **Deficient knowledge** (wound care) related to lack of exposure to information, misinterpretation, and lack of interest in learning.

Wound care

The goal of wound care is to promote tissue repair and regeneration.

A dressing is used as protective cover over the wound, it purpose to:

1. Provide physical, psychological and anesthetic comfort.

2. Remove necrotic tissues.

3. Prevent and control infection.

4. Absorb drainage.

5. Keep the wound moist and therefore enhance epithelialization.

6. Clean the wound or keep it clean.

7. Protect the wound from physical trauma or bacterial invasion.