Chapter 13

Surgical Wound Care
Wounds Classified According to

- Cause
  - Incision or puncture
- Severity of injury
- Amount of contamination
  - Clean, clean-contaminated, contaminated, and dirty or infected
- Skin integrity
Phases of Wound Healing

- Hemostasis
  - Termination of bleeding
  - Begins as soon as the injury occurs

- Inflammatory phase
  - An initial increase in blood elements and water flow out of the blood vessel into the vascular space
  - Causes cardinal signs and symptoms of inflammation: erythema, heat, edema, pain, and tissue dysfunction
Wound Healing

Phases of Wound Healing

Reconstruction phase

- Collagen formation occurs—a glue-like protein substance that adds tensile strength to the wound and tissue.
- Appearance changes to an irregular, raised, purplish, immature scar.
- Wound dehiscence most frequently occurs during this phase.
Phases of Wound Healing

- Maturation phase
  - Fibroblasts begin to exit the wound.
  - The wound continues to gain strength, although healed wounds rarely return to the strength the tissue had before surgery.
  - Keloids may form during this phase.
Process of Wound Healing

- Primary intention
  - Wound is made surgically with little tissue loss.
  - Skin edges are close together.
  - Minimal scarring results.
  - It begins during the inflammatory phase of healing.

Process of Wound Healing

- Secondary intention
  - Healing occurs when skin edges are not close together or when pus has formed.
  - If wound has purulent exudates, the surgeon provides a means for its release via drainage system or by packing the wound.
  - The necrotized tissue decomposes and escapes.
  - The cavity begins to fill with granulation tissue.
  - The amount of granulation tissue required depends on the size of the wound; scarring is greater in a larger wound.
Tertiary Intention

- Occurs with delayed suturing of a wound in which two layers of granulation tissue are sutured together.
- Occurs when a contaminated wound is left open and sutured closed after the infection is controlled or a primary wound becomes infected, is opened, allowed to granulate, and then sutured.
Factors That Affect Healing

Nutritional needs

If the patient cannot tolerate food or fluids, total parenteral nutrition or nasogastric feedings can be provided.

Because patients may not be able to tolerate large meals or solid foods, dietary services can provide small frequent feedings.

Fluids

Offer hourly; encourage 2000 to 2400 mL in 24 hours.
Factors That Affect Healing

Rest and activity

The nurse assists the patient to achieve a balance between time to rest to facilitate healing and activity to decrease venous stasis.

When the patient is confined to bed, moving one body section at a time should be encouraged.
Selection of the site for the surgical wound is based on:

- Tissue or organ involved
- Nature of injury or disease process
- Process of inflammation or infection
- Strength of the site
- If a drainage system is required, the position of the drain may also influence the placement of the incision.
The nurse should inspect dressings every 2 to 4 hours for the first 24 hours.

On the day of surgery, most wounds will have sanguineous or serosanguineous exudates.

As the exudate subsides, it becomes serous.

Because pressure to the surgical wound retards bleeding, wounds are usually covered by a gauze dressing.

The nurse should inspect both the dressing or incisional area and the area under the patient; exudate follows the flow of gravity.
Types of dressings.

Surgical Wound

- Fluid from the cells clusters with leukocytes along the vessel walls so that fibrin walls off the injury and begins to build a new cell.

- The inflammatory response depends on the level of injury inflicted, size of the area involved, and physical condition of the patient.

- Phagocytosis occurs when exudate from the injured cell is surrounded, engulfed, and digested by leukocytes.

- An infectious process would be evidenced by an elevated WBC count.
Surgical wounds, because they are aseptically created, generally heal well and quickly.

Incision Coverings

- Gauze
  - Permits air to reach the wound
- Semiocclusive
  - Permits oxygen but not air impurities to pass
- Occlusive
  - Permits neither air nor oxygen to pass
Removing Dressings

- Care is taken to avoid accidental removal or displacement of underlying drains.
- An analgesic may need to be given at least 30 minutes before exposing a wound.

Sutured, clean wounds may not be dressed after surgery, or dressing may be removed within 24 hours postoperatively to allow air circulation.

Sterile technique is followed whenever the wound or dressing is handled.

A gown, mask, and protective goggles are worn if soiling or splashing of wound exudate is expected.
Skill 13 - 1: Steps 9 & 11

Changing a sterile dry dressing.

SKILL 13-1: Step 14

Changing a sterile dry dressing.

Dry Dressings

- May be chosen for management of a wound with little exudate/drainage
- Protects the wound from injury, prevents introduction of bacteria, reduces discomfort, and speeds healing
- Most commonly used for abrasions and nondraining postoperative incisions
Care of the Incision

Â· Wet-to-Dry Dressing
  - Primary purpose is to mechanically debride a wound.
  - The moistened contact layer of the dressing increases the absorptive ability of the dressing to collect exudate and wound debris.
  - As the dressing dries, it adheres to the wound and debrides it when the dressing is removed.
  - Commonly used wetting agents are normal saline and lactated Ringer's solution, acetic acid, sodium hypochlorite solution, povidone-iodine, and antibiotic solutions.
Skill 2: Step 13

Applying a wet-to-dry dressing.

Transparent Dressings

- Self-adhesive transparent film is a synthetic permeable membrane that acts as a temporary secondary skin.

Advantages

- Adheres to undamaged skin to contain exudates and minimize wound contamination
- Serves as a barrier to external fluids and bacteria yet still allows the wound to breathe
- Promotes a moist environment that speeds epithelial cell growth
- Permits visualization of the wound
Skill 13-3: Step 6

Applying a transparent dressing.

(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. Nursing interventions and clinical skills. [3rd ed.]. St. Louis: Mosby.)
Skill 13 - 3: Steps 11a & 11b

Applying a transparent dressing.

(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. Nursing interventions and clinical skills. [3rd ed.]. St. Louis: Mosby.)
Irrigations

- Wound cleansing and irrigation is accomplished using sterile or clean technique.
- Cleansing solution is introduced directly into the wound with a syringe, syringe and catheter, shower, or whirlpool.
- Fluid retention is avoided by positioning the patient on his or her side to encourage the flow of the irrigant away from the wound.
- Promote wound healing through removing debris from a wound surface, decreasing bacterial counts, and loosening and removing eschar.
Irrigations

- Solutions used for irrigations include warm water, saline, or mild detergents.
- Principles of basic wound irrigation
  - Cleanse in a direction from the least contaminated area to the most contaminated area.
  - When irrigating, all of the solution flows from the least contaminated area to the most contaminated area.
Performing sterile irrigation.

Impaired wound healing requires accurate observation and ongoing interventions.

- Situation can be life-threatening.
- Recognizing the seriousness of signs and symptoms is vital throughout the patient's recovery phase.

Wound bleeding

- Bleeding may indicate a slipped suture, dislodged clot, coagulation problem, or trauma to blood vessels or tissue.
- If internal hemorrhage occurs, the dressing may be dry while the abdominal cavity collects blood.
Complications of Wound Healing

Dehiscence

- Wound layers separate.
- Patient may say that something has given way.
- It may result after periods of sneezing, coughing, or vomiting.
- It may be preceded by serosanguineous drainage.
- Patient should remain in bed and receive nothing by mouth, be told not to cough, and be reassured.
- The nurse should place a warm, moist sterile dressing over the area until the physician evaluates the site.
Complications of Wound Healing

Evisceration

- Abdominal organs protrude through an opened incision.
- Patient is to remain in bed, and the wound and contents should be covered with warm, sterile saline dressings.
- The surgeon is notified immediately.
- This is a medical emergency, and the wound requires surgical repair.
Wound Infection

- Surgical wound becomes contaminated.
- CDC labels a wound *infected* when it contains purulent (pus) drainage.
- A patient with an infected wound displays a fever, tenderness, and pain at the wound; edema; and an elevated WBC count.
- Purulent drainage has an odor and is brown, yellow, or green, depending on the pathogen.
The surgeon’s goal is to enter the cavity involved, repair the injured or diseased area, and minimize trauma as quickly as possible.

Many options are available to the surgeon for closing the surgical incision.

- Sutures, staples, Steri-Strips, butterfly strips, and transparent sprays and films
- Binder or bandage used to support the incision of secure dressings without the use of adhesive materials

Wound closure with staples.

Steri-Strips placed over incision for closure.

• Physician’s written order is always obtained before implementing either skill.

• The time of removal is based on the stage of healing and extent of surgery.

• Sutures and staples are generally removed within 7 to 10 days after surgery, or sooner if healing is adequate.

• The physician determines and orders removal of sutures or staples one at a time or removal of every other suture or staple and replaced with a Steri-Strip as the first phase, with the remainder removed in the second phase.
Staple and Suture Removal

Sutures

- Sutures are threads of wire or other materials (silk, steel, cotton, linen, nylon, and Dacron) used to sew together body tissues.
- Sutures are placed within tissue layers in deep wounds and superficially as the final means of wound closure.
- Deeper sutures are usually made of absorbable material that disappears in several days.
- Types include interrupted or separate sutures, continuous sutures, blanket sutures, and retention sutures covered with rubber tubing for strength.
Removing sutures.

Staples

- Staples are made of stainless steel wire, are quick to use, and provide ample strength.
- They are popular for skin closure of abdominal incisions and orthopedic surgery when the appearance of the incision is not critical.
- Leaving in a suture too long makes removal more difficult and increases the risk of infection.
- Removal of staples requires a sterile staple extractor and maintenance of aseptic technique.
Skill 13 - 5: Step 9


Removing staples.
Exudate

- Fluid, cells, or other substances that have slowly exuded from cells or blood vessels through small pores or breaks in the cell membrane

Drainage

- Removal of fluids from a body cavity, wound, or other source of discharge through one or more methods
Exudate/Drainage

- **Serous**
  - Clear, watery fluid that has been separated from its solid elements

- **Sanguineous**
  - Fluid that contains blood

- **Serosanguineous**
  - Thin and red; composed both of serum and blood

- If the tissue is infected, exudate/drainage may be brown-green purulent.

- Exudate/drainage from organs has its own particular color. (Bile from the liver and gallbladder is green-brown.)
Exudate/Drainage

- The type and amount produced depend on the tissue and organs involved.
- More than 300 mL in the first 24 hours should be treated as abnormal.
- When patients first ambulate, a slight increase may occur.
- Assess
  - Color, amount, consistency, and odor
- It may be contained either in a drainage system or on a dressing.
Drainage Systems

- They are used in procedures in which organs were removed or repaired.
- A mechanism is needed to assist gravity in removing exudates from the cavity.
- To facilitate drainage, an incision or a stab wound is made close to the incision and drains exudate away from the incision.
Jackson-Pratt drains have a wide, flat area brought through the stab wound with great force.

(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. Nursing interventions and clinical skills. [3rd ed.]. St. Louis: Mosby.)
Exudate/Drainage

Å Drainage Systems

- Closed drainage
  Å System of tubing and other apparatus attached to the body to remove fluid in airtight circuit that prevents environmental contaminants from entering the wound or cavity

- Open drainage
  Å Drainage that passes through an open-ended tube into a receptacle or out onto the dressing

- Suction drainage
  Å Use of a pump or other mechanical device to help extract a fluid

Drainage Systems

- Requires close monitoring
  - Note the color, consistency, and amount of drainage.
  - Note patency of tube; it should not be kinked or occluded. If blood clots or exudate have slowed drainage, record and report.
Exudate/Drainage

Drainage Systems

- Care of the patient with a T-tube drainage system
  - After surgical removal of the gallbladder, the bile duct is often inflamed and edematous.
  - A drainage tube is frequently inserted into the duct to maintain a free flow of bile.
  - The long end of the T-tube exits through the abdominal incision or a separate surgical wound.
  - The tube drains via gravity into a closed drainage system.
  - The collection bag is emptied and measured every shift.
(From Beare, P.G., Myers, J.L. [1998]. *Adult health nursing* [3rd ed.]. St. Louis: Mosby.)

**T-tube.**
Skill 13 - 6: Step 6

Maintaining Hemovac/Davol suction and T-tube drainage.

(Courtesy of Kinetic Concepts, Inc. [KCI], San Antonio, TX.)

Wound VAC system using negative pressure to remove fluid from area surrounding the wound.
**Skill 13 - 7: Step 2**

**Wound Vacuum-Assisted Closure.**

(Courtesy of Kinetic Concepts, Inc. [KCI], San Antonio, TX.)
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Wound Vacuum-Assisted Closure.
Skill 13-7: Step 12a, B

Wound Vacuum-Assisted Closure.

(Courtesy of Kinetic Concepts, Inc. [KCI], San Antonio, TX.)

Bandages and Binders

Bandage

- A strip or roll of cloth or other material that may be wrapped around a part of the body in a variety of ways for multiple purposes.
- Bandages are available in rolls of various widths and materials, including gauze, elasticized knit, elastic webbing, flannel, and muslin.

Binders

- A binder is a bandage that is made of large pieces of material to fit a specific body part, such as an abdominal binder or a breast binder.
Correctly applied bandages and binders do not cause injury to underlying and nearby body parts or create discomfort for the patient.

Before a bandage or binder is applied

- Inspect the skin for abrasions, edema, discoloration, or exposed wound edges.
- Cover exposed wounds or open abrasions with sterile dressings.
- Assess the condition of underlying dressings and change them if soiled.
- Assess the skin and underlying body parts and parts that will be distal to the bandage for signs of circulatory impairment.
Applying a binder, arm sling, and T-binder.

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Applying a binder, arm sling, and T-binder.

After a bandage is applied, the nurse should

- Assess, document, and immediately report changes in circulation, skin integrity, comfort level, and body function such as ventilation or movement.
- Loosen or readjust as necessary.
- Have an order to remove or loosen a dressing applied by a physician.
- Explain to the patient that any bandage or binder feels relatively firm or tight.
- Assess to be sure it is properly applied and is providing therapeutic benefit; soiled bandages should be replaced.
Process

Nursing Diagnoses

- Skin integrity, impaired
- Nutrition: more than body requirements, imbalanced
- Nutrition: less than body requirements, imbalanced
- Tissue perfusion, ineffective