# Chapter 38

## Providing Wound Care and Treating Pressure Injuries

# Lesson 38.1
# Overview of Wound Healing

**Theory**

1) Describe the physiologic processes by which wounds heal.
2) Discuss factors that affect wound healing.
3) Describe four signs and symptoms of wound infection.
4) Discuss correct nursing actions to be taken if wound dehiscence or evisceration occurs.

# Wounds

- Occur in a variety of ways:
  - Trauma
  - Surgery
  - Pressure
  - Burns
- May be open or closed
- All bring the risk of infection or permanent damage

# Types of Wounds
(Slide 1 of 2)

- Closed
  - Contusion (bruise)
  - Hematoma
  - Sprain
- Open
  - Incision
  - Laceration
  - Abrasion
  - Puncture
  - Penetrating
  - Avulsion
  - Ulceration

# Types of Wounds
(Slide 2 of 2)

- Partial-thickness wounds
  - Superficial wounds
  - Heal more quickly by producing new skin cells
  - Fibrin clot forms framework for growing new cells
- Full-thickness wounds
  - No dermal layer present except at margins of wounds
  - All necrotic tissue must be removed
  - Wound heals by contraction

# Phases of Wound Healing

- Regardless of the cause, there are three distinct phases of wound healing
  - Inflammatory phase
  - Proliferation or reconstruction phase
  - Maturation or remodeling phase

# Inflammation Phase of Wound Healing

- Begins immediately and lasts 1 to 4 days
  - Swelling or edema of the injured part
  - Erythema (redness) resulting from the increased blood supply
  - Heat or increased temperature at the site
  - Pain stemming from pressure on nerve receptors
  - A possible loss of function resulting from all these changes

# Proliferation Stage of Wound Healing

- Begins on third or fourth day; lasts 2 to 3 weeks
  - Macrophages continue to clear the wound of debris, stimulating fibroblasts, which synthesize collagen
  - New capillary networks formed to provide oxygen and nutrients to support the collagen and for further synthesis of granulation tissue
  - Tissue is deep pink
  - A full-thickness wound begins to close by contraction as new tissue is grown
  - Scarring influenced by degree of stress on the wound

# Maturation Phase of Wound Healing

- Final phase begins about 3 weeks after injury
  - May take up to 2 years
  - Collagen is lysed (broken down) and resynthesized by the macrophages, producing strong scar tissue
  - Scar maturation, or remodeling
  - Scar tissue slowly thins and becomes paler

# Types of Wound Healing

- First intention
  - A wound with little tissue loss
  - Edges of the wound approximate, and only a slight chance of infection
- Second intention
  - A wound with tissue loss
  - Edges of wound do not approximate; wound is left open and fills with scar tissue
- Third intention
  - Occurs when there is delayed suturing of a wound
  - Wounds sutured after granulation tissue begins to form

# Factors Affecting Wound Healing
(Slide 1 of 3)

- Age
  - Children and adults heal more quickly than the elderly
  - Peripheral vascular disease (PVD)
    - Impaired blood flow
  - Decreased immune system function
    - Antibodies and monocytes necessary for wound healing
  - Reduced liver function
    - Impairs the synthesis of blood factors
  - Decreased lung function
    - Reduces oxygen needed to synthesize collagen and new epithelium

# Factors Affecting Wound Healing
(Slide 2 of 3)

- Nutrition
  - Proteins, carbohydrates, lipids, vitamins, and minerals needed for proper wound healing
- Lifestyle
  - The person who does not smoke and who exercises regularly will heal more quickly
- Medications
  - Steroids and other anti-inflammatories, heparin, and antineoplastic agents interfere with the healing process

# Factors Affecting Wound Healing
## (Slide 3 of 3)

- Infection
  - Wound infections slow the healing process
  - Bacterial infections often cause wound drainage and should be assessed for color, consistency, and odor
- Chronic illnesses
  - Diabetes, cardiovascular disease, or immune system disorders may slow wound healing

# Wound Complications
(Slide 1 of 4)

- Hemorrhage
  - All patients with fresh surgical wounds should be monitored for signs of hemorrhage
  - If hemorrhage is internal, hypovolemic shock may occur
  - Signs and symptoms of hemorrhage
    - Decreased BP; increased pulse rate; increased respirations; restlessness; diaphoresis; cold, clammy skin

# Wound Complications
(Slide 2 of 4)

- Infection
  - Wound may be infected during surgery or postoperatively. Traumatic wounds are more likely to become infected
  - Localized infection is an abscess, an accumulation of pus from debris as a result of phagocytosis
  - Primary organisms responsible—*S. aureus, E. coli, S. pyogenes, Proteus vulgaris,* and *P. aeruginosa*

# Wound Complications
(Slide 3 of 4)

- Cellulitis
  - Inflammation of tissue surrounding the wound, characterized by redness and induration
- Fistula
  - An abnormal passage between two organs or an internal organ and the body surface
- Sinus
  - A canal or passageway leading to an abscess

# Wound Complications
(Slide 4 of 4)

- Dehiscence
  - The spontaneous opening of an incision
    - A sign of impending dehiscence may be an increased flow of serosanguineous drainage
- Evisceration
  - Protrusion of an internal organ through an incision

# Evisceration

- If evisceration occurs
  - Place the patient in supine position
  - Place large sterile dressings over the viscera
  - Soak the dressings in sterile normal saline
  - Notify the surgeon immediately
  - Prepare the patient for return to surgery
    - Keep NPO

# Question 1

Which phase of healing begins on the third or fourth day after an injury and lasts 2 to 3 weeks?

1) First
2) Inflammatory
3) Proliferation
4) Maturation

# Question 2

Which of the following is *not* a factor in wound healing?

1) Age
2) Medications
3) Lifestyle
4) Type of wound

# Lesson 38.2
# Overview of Wound Care
(Slide 1 of 2)

**Theory**

5) Explain the major purpose of a wound drain.
6) Identify the advantages of negative pressure wound therapy.
7) Compare and contrast the therapeutic effects of heat and cold.

# Lesson 38.2
# Overview of Wound Care
(Slide 2 of 2)

**Clinical Practice**

1) Perform wound care, including emptying a drainage device and applying a sterile dressing.
2) Provide appropriate care for a pressure ulcer.
3) Perform wound irrigation.
4) Remove sutures or staples from a wound and apply thin adhesive strips (Steri-Strips).
5) Give a heat or cold treatment to a patient.

# Wound Closures

- Sutures and staples hold edges of a surgical wound together until wound can heal
- Silver wire clips also sometimes used
- Large retention sutures may be used
- Steri-Strips can be used if the wound is small
- Topical skin adhesive is a synthetic, noninvasive glue

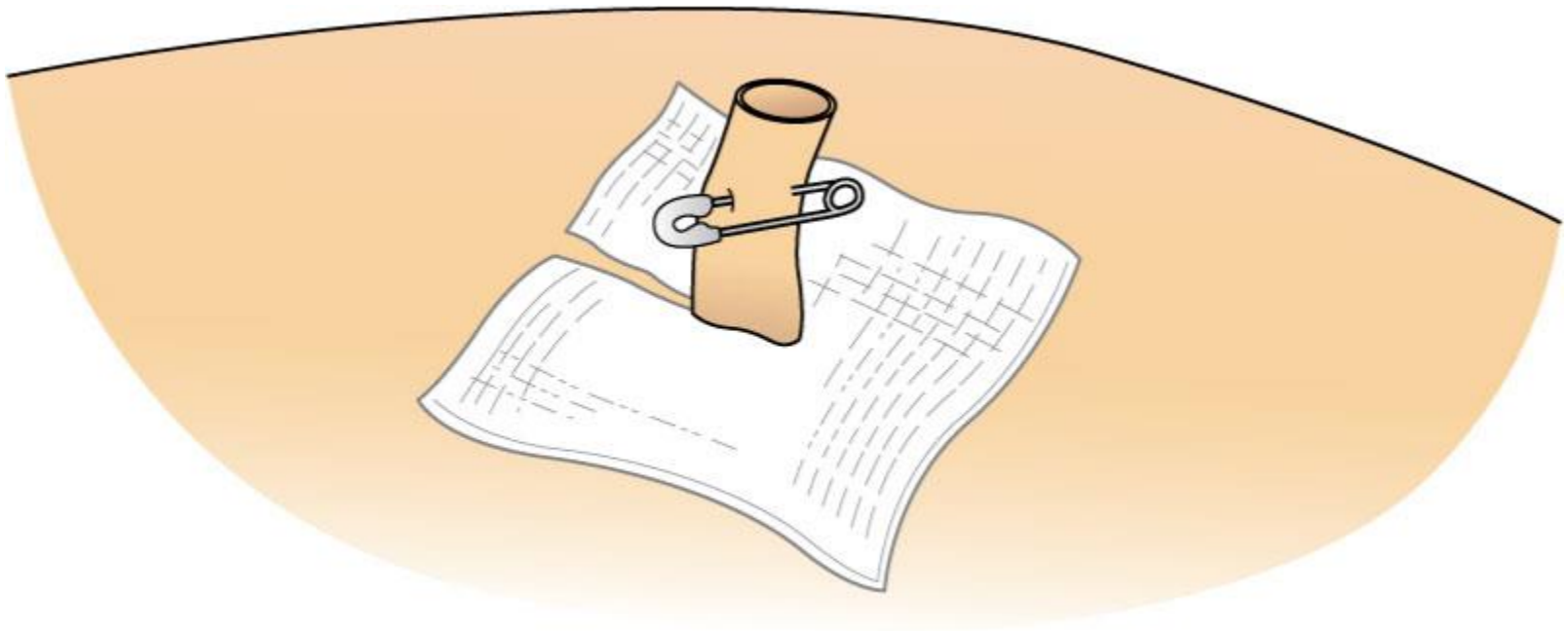
# Open Wound Classifications

- Red wounds
  - Clean and ready to heal; protective dressing should be used
- Yellow wounds
  - Have a layer of yellow fibrous debris and sloughing; need to be continually cleansed and have an absorbent dressing
- Black wounds
  - Need débridement of dead tissue, usually caused by thermal injury or gangrene

# Drains and Drainage Devices

- Provide an exit for blood and fluids that accumulate during the inflammatory process
- May be active or passive
- Penrose drain is a flat rubber tube
- Plastic drainage tubes can be connected to a closed drainage system
  - Hemovac and Jackson-Pratt

# Figure 38.6: Penrose drain in a “stab wound” close to an abdominal incision



Redrawn from Potter, P.A., & Perry, G.A. (2005). *Fundamentals of Nursing* (6th ed.). St. Louis: Mosby.

# Figure 38.7: Hemovac-type drainage system

# Figure 38.8: Jackson-Pratt–type drainage device

# Dressings
(Slide 1 of 2)

- Protective coverings placed over wounds
  - Prevent microorganisms from entering the wound
  - Absorb drainage
  - Control bleeding
  - Support and stabilize tissues
  - Reduce discomfort

# Dressings
(Slide 2 of 2)

- A wide variety of dressing materials are available
  - Dry sterile gauze
  - Telfa and other nonadherent dressings
  - Surgi-Pads or abdominal pads
  - Foam dressings
  - Transparent film dressings
  - Hydrocolloid dressing

# Figure 38.9: Various types of dressings

# Treatment of Wounds

- Wound cleansing should be performed with warmed isotonic saline. Grossly contaminated wounds are cleaned at each dressing change
- Antibiotic solutions may be ordered for wound irrigation
- Surgical wounds and open wound dressing require sterile technique
- May require hydrocolloid or wet-to-dry dressings

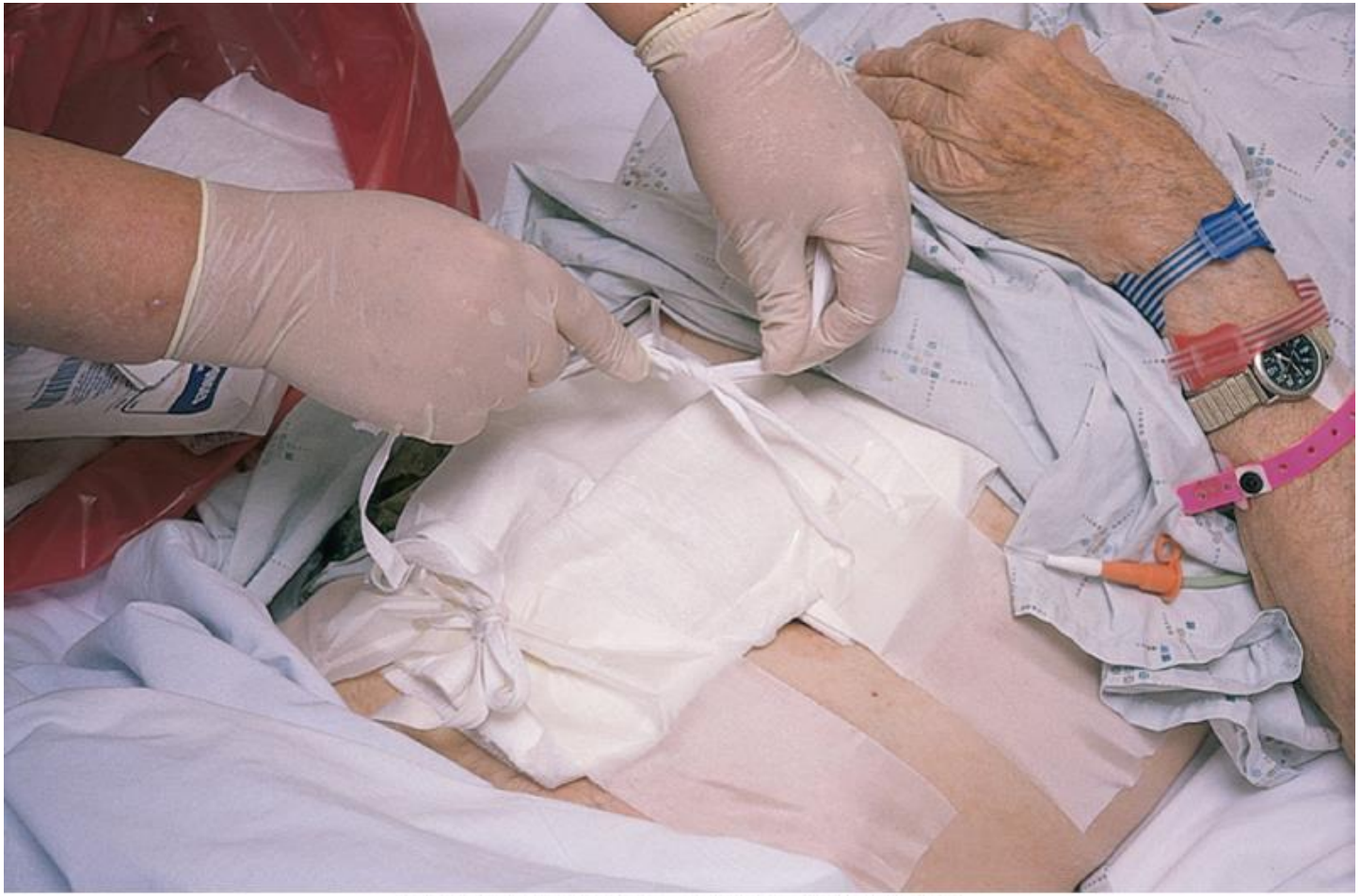
# Débridement

- Removing necrotic tissue from a wound so that healing can occur
- May be performed with scissors and forceps
- May be enzymatic, in which an enzyme is used to liquefy dead tissue
  - Mechanical débridement uses wet-to-dry dressings or whirlpool treatments

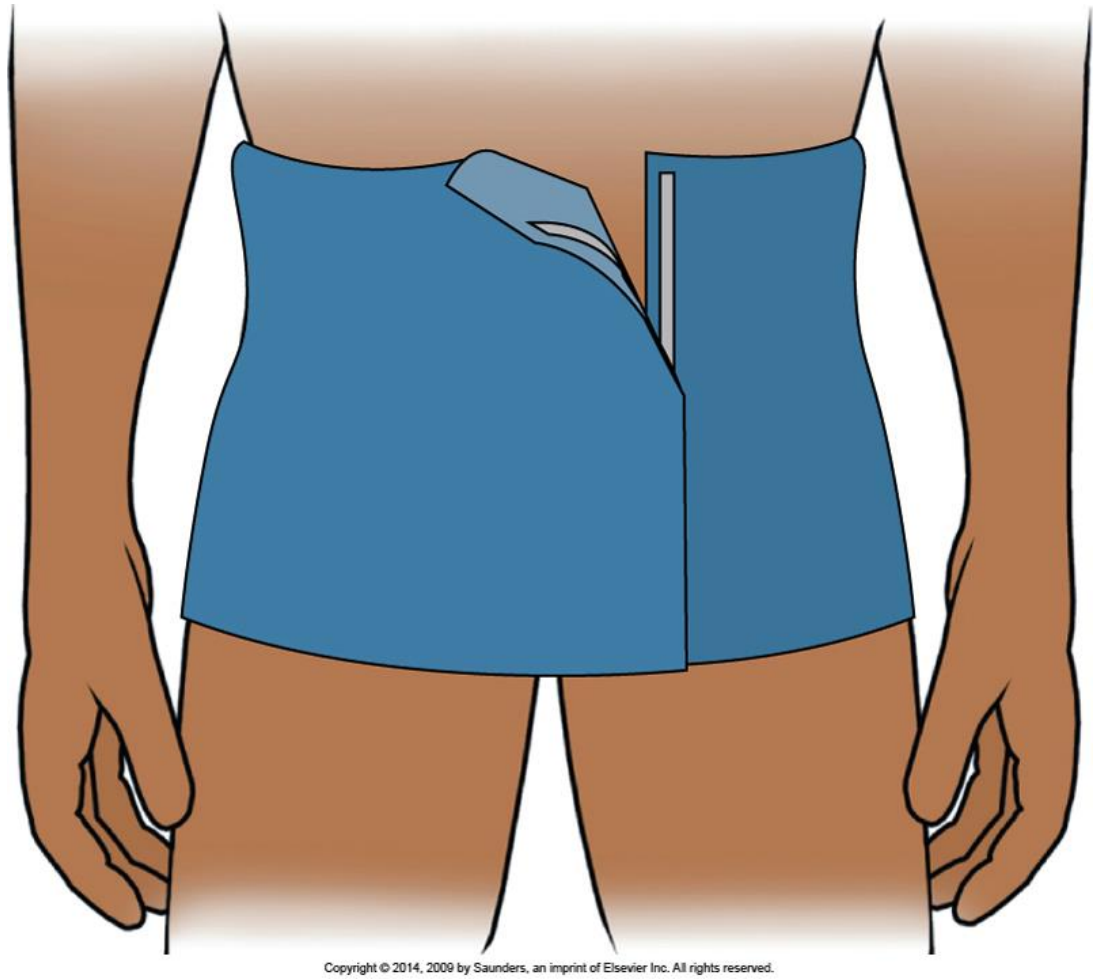
# Securing Dressings

- Dressing may be secured with:
  - Stretch gauze such as Conform, Kerlix, Kling
  - Mesh netting
  - Elastic tape or bandage
  - Montgomery straps
  - Binders
  - Tape

# Figure 38.10: Montgomery straps may be used to hold a dressing in place



# Figure 38.12: An abdominal binder after surgery with a large incision



# Negative Pressure Wound Therapy

- Also called vacuum-assisted closure (VAC)
- Good for wounds that are difficult to heal
- Involves applying a suction device to a special wound dressing to institute negative pressure at the wound site, drawing the edges together
- Negative pressure and suction remove fluid from the wound, allowing increased blood flow, and thereby oxygen and nutrients, to be delivered to the wound

# Figure 38.14: Wound VAC unit working on a chronic leg wound


Courtesy Kinetic Concepts, Inc., San Antonio, TX.

# Vascular Ulcers
(Slide 1 of 2)

- Clean ulcers at each dressing change. Use only normal saline; then cover ulcer with a dressing
  - Stage I: thin film dressings are used to protect ulcers from shear
  - Stage II (noninfected): a hydrocolloid, foam or hydrogel dressing is used
  - Stage III (draining ulcers): an absorbent dressing is used

# Vascular Ulcers
(Slide 2 of 2)

- Infected ulcers—nonocclusive dressing is always used
- Oxygen chamber treatment is used to treat nonhealing wounds occasionally
- Electrical stimulation may also be used to accelerate wound healing

# Figure 38.15: Wound irrigation

From Potter, P.A, & Perry, G.A. (2009). *Fundamentals of Nursing* (7th ed.). St. Louis: Mosby.

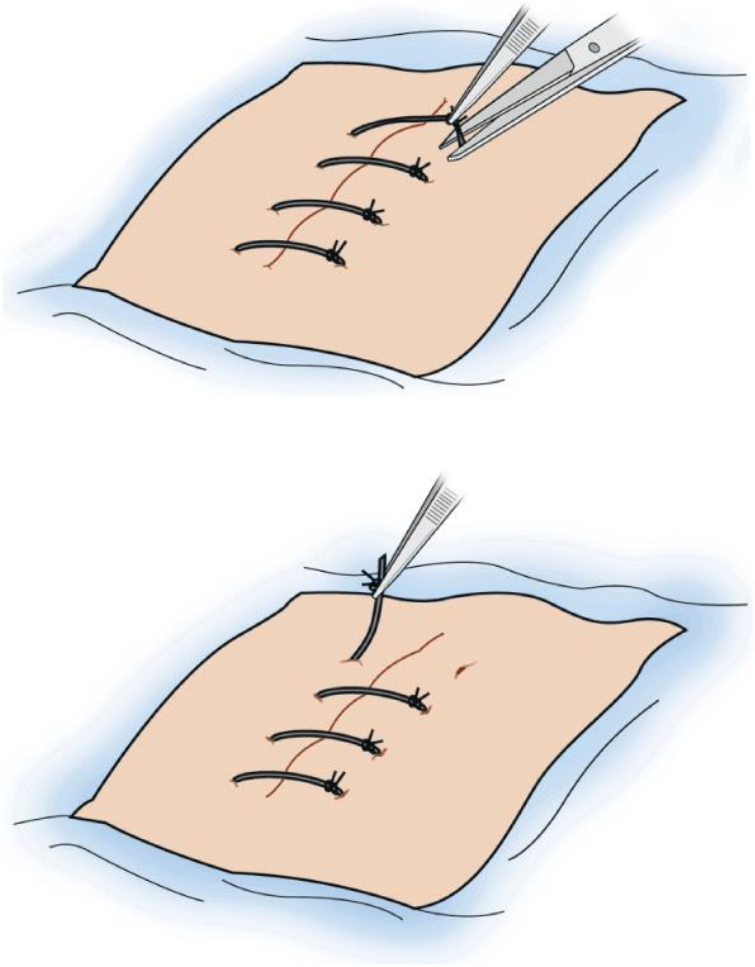
# Common Nursing Diagnoses for Patients with Wounds

- Altered skin integrity related to surgical incision (or trauma)
- Potential for infection related to nonintact skin or impaired skin integrity
- Acute pain related to infected wound
- Activity intolerance related to pain and malaise from wound infection
- Altered body image related to wound appearance
- Insufficient knowledge related to care of wound
- Anxiety related to need to perform wound care

# Suture and Staple Removal

- Sutures often removed by the physician
- Sutures cut and pulled through the skin
- Sterile technique should be used
- Staple removal requires a special instrument
- Steri-Strips applied after removal of sutures or staples
- Parts of sutures left under the skin may cause inflammation

# Figure 38.16: Clip beneath the knot with the scissors to remove the suture



# Figure 38.17: A special implement is used for staple removal

# Figure 38.18: Apply Steri-Strips to support the incision after suture removal

# Eye, Ear, and Vaginal Irrigations

- Eye irrigations
  - May be performed when injury is involved and debris or a caustic substance is present in the eye
- Ear irrigations
  - Used to remove cerumen or foreign substances
- Vaginal irrigation
  - May be ordered for infections or surgical preparation

# Heat Applications

- Can be dry or moist
- Usually requires physician's order
- Heat applied to skin provides general comfort and speeds healing process
- May be used to:
  - Relieve pain, reduce congestion, relieve muscle spasm
  - Reduce inflammation and swelling
  - Provide comfort, elevate body temperature

# Figure 38.19: An aquathermia pad is applied for a heat treatment

# Cold Applications

- Effects of cold
  - To decrease swelling
  - For joint injuries or areas requiring decreased blood flow
  - To decrease pain
  - Decreases cellular activity, leading to numbing
- Used in the form of compresses, ice bags, collars, or hypothermia blanket

# Examples of Goals for Patients with Wounds

- Wound edges well-approximated
- Wound is clean and dry without redness or swelling
- Patient states that pain is gone
- Patient states that energy has returned; is up walking in the hall
- Return demonstration of dressing change properly performed

# Question 3

Cara's patient is going home with sutures. When are sutures usually removed?

1) 3 to 5 days
2) 5 to 7 days
3) 7 to 10 days
4) 14 days

# Question 4

Eric is about to change a dressing on his patient. Which of the following is true regarding dressing changes?

1) Dressing changes may be performed as needed without a physician's order.
2) Irrigations may be done as needed without a physician's order.
3) Clean gloves and forceps are used for fresh sterile wounds that are touched.
4) Wounds should be cleaned with warm water.

# Question 5

Eric's patient has an order for cold compress therapy. How long can cold compress therapy be applied?

1) 10 minutes
2) 20 minutes
3) 30 minutes
4) 45 minutes