Chapter 21

Safety and Infection Control

Learning Objectives

- Recognize potential hazards in health care settings, such as those caused by fire, obstructions, and spills, and suggest appropriate responses
- List four complications that may arise from improper patient positioning, and state the correct position for each situation
- Demonstrate safe techniques for assisting patient to stand, sit, lie, and walk using the principles of good body mechanics

Learning Objectives (Cont'd)

- Demonstrate methods for immobilizing and restraining adult patients, and list precautions to be taken when these methods are used
- List and explain the four factors involved in the cycle of infection, and state the most direct way to intervene in this cycle
- Describe the disease processes involved in human immunodeficiency virus infection, hepatitis, and tuberculosis, and explain how to limit the transmission of these diseases

Learning Objectives (Cont'd)

- Define *medical asepsis, disinfection,* and *sterilization,* and give examples of the correct application of each
- List examples of personal hygiene practices that help prevent the spread of infection
- Demonstrate the technique for effective hand-washing

Learning Objectives (Cont'd)

- Demonstrate the correct principles of medical asepsis in linen handling, disposal of contaminated items, and disinfection of radiographic tables and equipment
- Demonstrate correct techniques for establishing a sterile field, donning sterile gloves, removing contaminated gloves, and changing dressings

Controlling Hazards

- Fire
  - Ensure fuel, oxygen, and heat do not occur in the same place at the same time
  - Be familiar with the facility fire plan and know fire alarm and extinguisher locations
  - Keep doorways and corridors clear

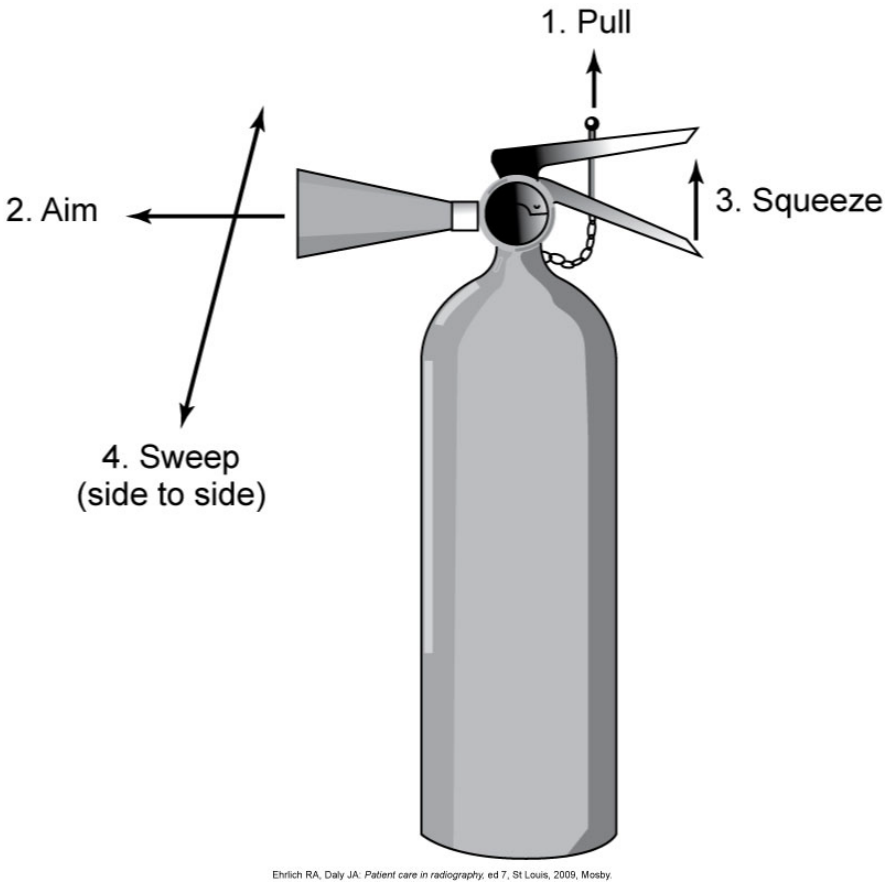
In Case of Fire

Remain calm, and remember the acronym RACE

R - Rescue -- Move patients to a safe area
A - Alarm -- Report the fire
C - Contain -- Close doors, shut off oxygen
E - Evacuate/extinguish -- If the fire is small, put it out with an extinguisher; if the fire is not small, evacuate the area

Controlling Hazards

- Fire extinguishers
  - Use an extinguisher appropriate to the type of fire
  - Use acronym PASS to correctly operate the extinguisher
    - **P**ull pin
    - **A**im nozzle
    - **S**queeze nozzle
    - **S**weep from side to side



Ehrlich RA, Daly JA: *Patient care in radiography*, ed 7, St Louis, 2009, Mosby.

Controlling Hazards (Cont'd)

- Electric Shock
  - Make sure equipment is grounded
  - Follow manufacturer instructions for use
  - Do not overload circuits and avoid using extension cords
- Falls and Collisions
  - Keep walkways clear
  - Store items properly and use a step stool or ladder to reach high items

Controlling Hazards (Cont'd)

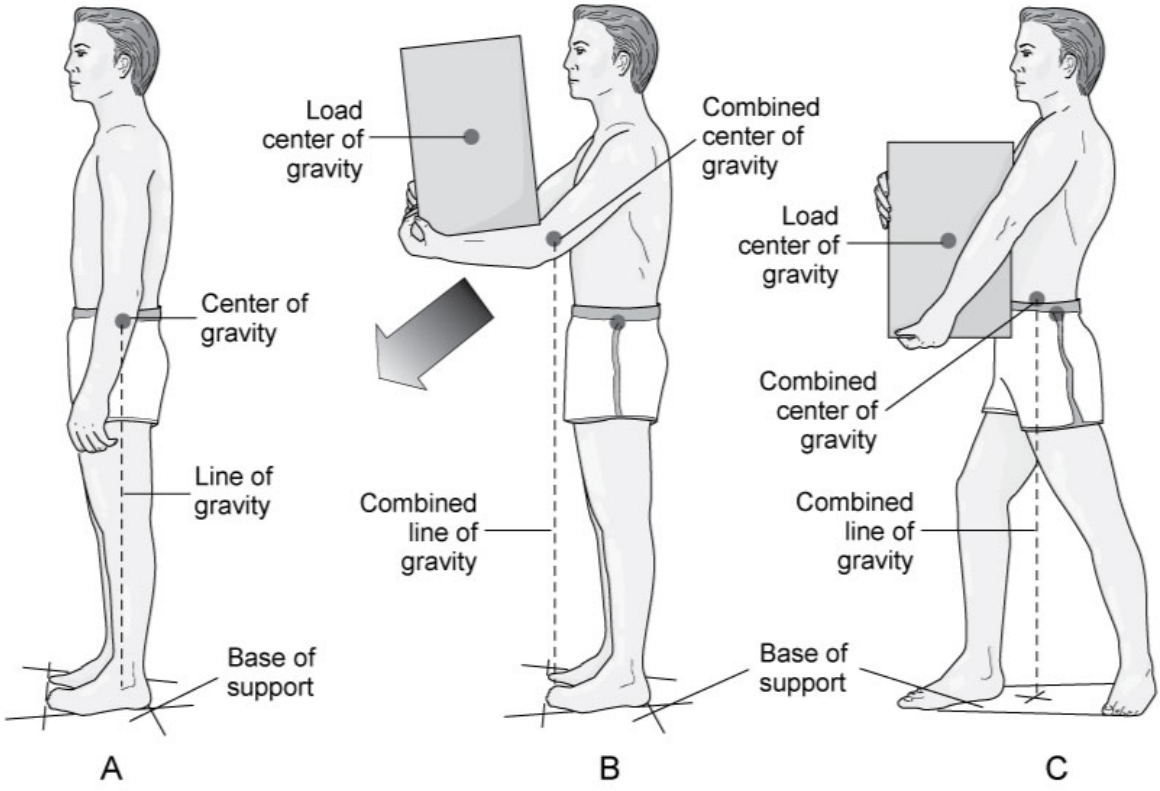
- Spills
  - Clean up non-hazardous spills immediately
  - For hazardous spills:
    - Limit access to area
    - Evaluate risks
    - Use appropriate equipment for the spill
    - Clean up spill

Body Mechanics

- Use proper body mechanics when lifting objects and transferring patients to avoid:
  - Back strain
  - Shoulder strain
  - Rotator cuff tears
  - Neck injury

Body Mechanics (Cont'd)

- Proper technique includes a:
  - Wide base of support
  - Center of gravity close to the base of support
  - Line of gravity that bisects the center of gravity



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Assisting Patients

- To stand:
  - Face seated patient
  - Place hands on patient's scapulae
  - Place patient's hands on your shoulders
  - Bend knees slightly and help patient stand

Ehrlich RA, Daly JA: *Patient care in radiography,* ed 7, St Louis, 2009, Mosby.

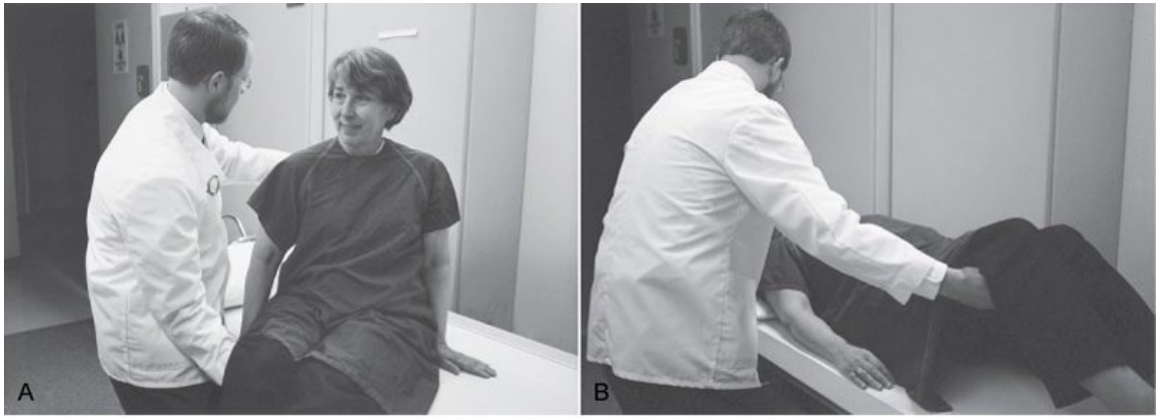
Assisting Patients (Cont’ d)

- To get a patient onto a radiographic table:
  - If table height is adjustable, pivot so patient’s back is against table
  - If table height is not adjustable, assist patient onto step stool and then pivot so that patient’s back is against table
  - Ease patient into sitting position

Ehrlich RA, Daly JA: *Patient care in radiography,* ed 7, St Louis, 2009, Mosby.

Assisting Patients (Cont’d)

- To lie down
  - Place one arm under patient’s knees and other arm under patient’s shoulders
  - Lift legs and pivot patient
  - Ease legs and shoulders onto table

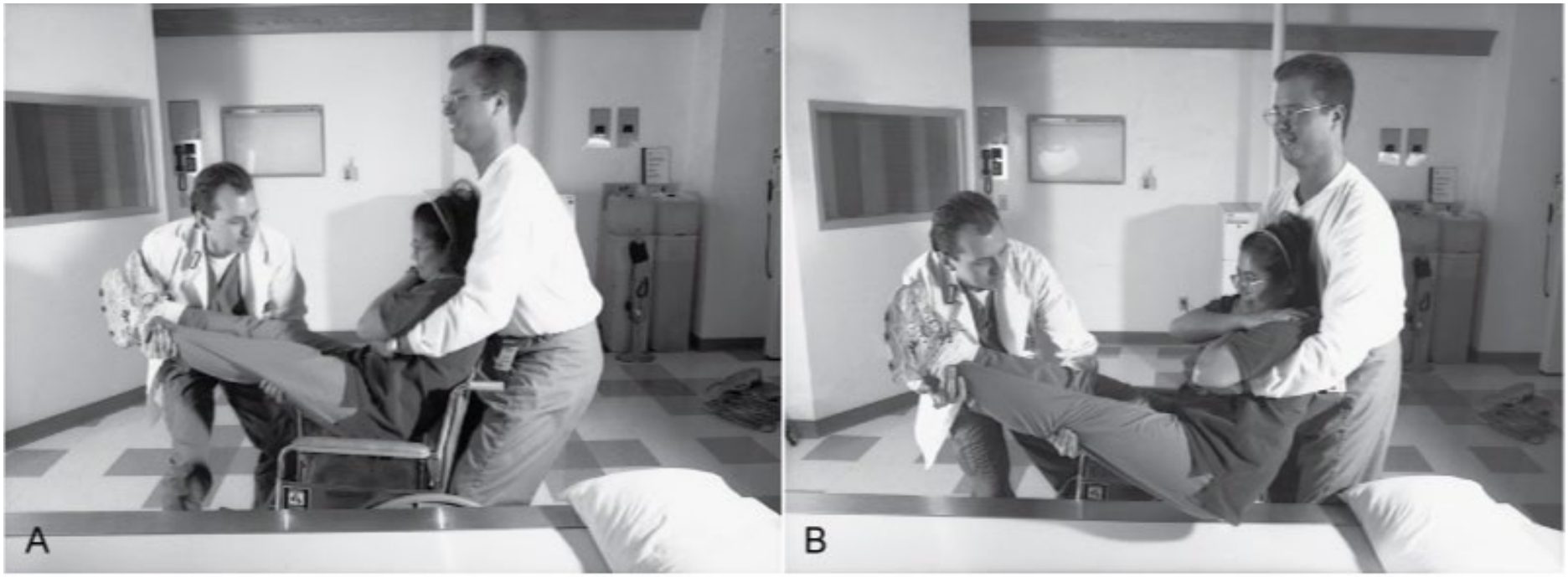


Assisting Patients (Cont’d)

- To walk with assistive equipment:
  - Make sure pathway is clear
  - Remain alongside patient
- To walk without assistive equipment:
  - Grasp patient around waist
  - Have patient lean against your shoulder for support

Lifting Patients

- Using a two-person lift



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Lifting Patients (Cont'd)

- Using a three-person lift

Ehrlich RA, Daly JA: *Patient care in radiography*, ed 7, St Louis, 2009, Mosby.

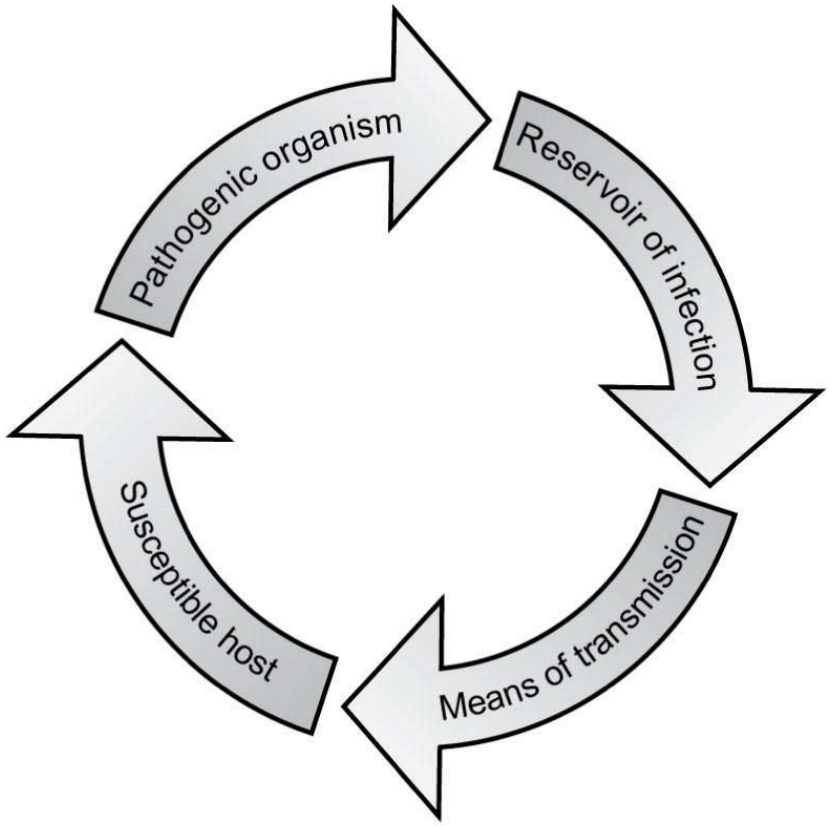
Patient Safety

- To immobilize a patient, use:
  - Sandbags
  - Safety straps
  - Compression bands
  - Tape
- Report and complete an incident report for any occurrence resulting in patient injury

Adler AM, Carlton RR: *Introduction to radiography and patient care*, ed 4, Philadelphia, 2007, Saunders.

Infection Control

- The cycle of infection requires:
  - An infectious organism
  - An environment in which the organism can live
  - A susceptible host in which the organism can reside
  - A means of transferring the organism from the reservoir to the host



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Infection Control (Cont'd)

- Prevention of disease transmission is the best way to interrupt the cycle of infection
- Transmission methods include:
  - Direct contact – direct contact with microorganism (i.e. HIV)
  - Fomites – object that's been in contact with pathogen (i.e. table, sponges)
  - Vectors – an arthropod (insect) that carries infectious organism (i.e. mosquitos, fleas, ticks)
  - Vehicles – any medium that transports pathogen (i.e. contaminated food, water, blood)
  - Airborne contamination – particles dispersed by air currents (i.e. TB, measles)
  - Droplet contamination – involves mucous membranes; cough, sneezing; travel 3 feet or less (i.e. Flu, meningitis, strep)

Infectious Diseases

- Human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS)
  - Routes of transmission include:
    - Sexual contact
    - Contaminated blood or needles
    - Fluids containing contaminated blood
    - Mother to fetus via the placenta
    - Contaminated breast milk

Infectious Diseases (Cont'd)

- Hepatitis C
  - Routes of transmission include:
    - Contact with blood or blood products
- Hepatitis A and E
  - Routes of transmission include:
    - Food and water contaminated with feces
- Hepatitis B
  - Routes of transmission include:
    - Contaminated blood, blood products, or needles
    - Body fluids such as saliva, semen, and vaginal secretions

Managing Occupational Exposure to Blood-Borne Pathogens

- For all accidents:
  - Report the occurrence and complete an incident report
  - Follow facility protocol regarding baseline blood samples and follow-up
- Needle stick
  - Allow to bleed under cold water, then wash with soap
- Splashed fluid
  - Rinse with water

Infectious Diseases

- Tuberculosis (TB)
  - Routes of transmission include:
    - Airborne contamination
- Nosocomial infections
  - Acquired during a hospital stay through contact with:
    - Contaminated hands
    - Contaminated instruments
    - Urinary catheters

Preventing Transmission

- Standard Precautions involves use of barriers to prevent contact with:
  - Blood
  - Body fluids, including wound drainage
  - Secretions and excretion (except sweat)
  - Non-intact skin
  - Mucous membranes

Preventing Transmission (Cont'd)

- Standard Precautions include:
  - Hand-washing
  - Using alcohol-based hand rubs between washings
  - Wearing protective gloves and aprons
  - Using mask and eye protection
  - Proper disposal of contaminated items into designated containers

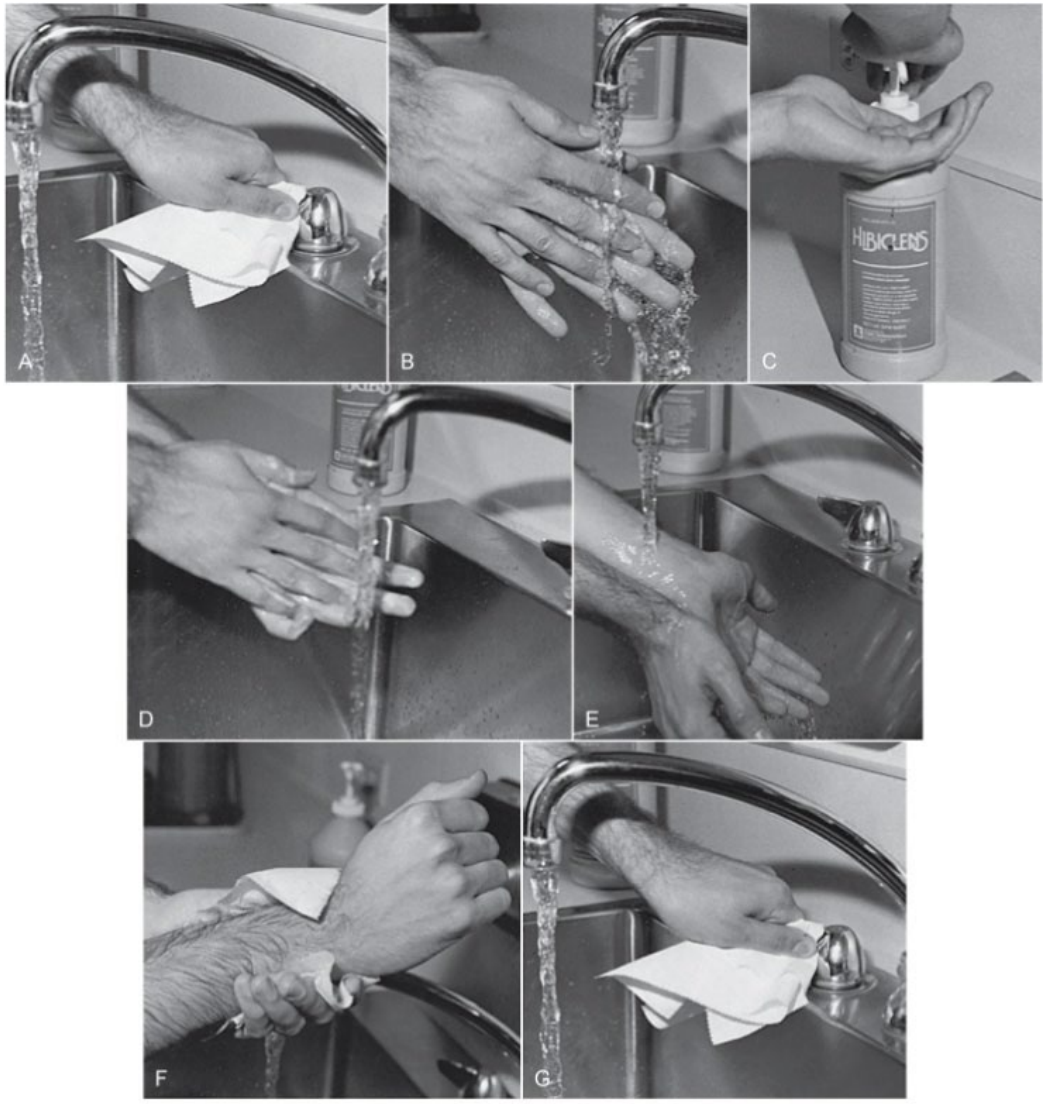
Medical Asepsis

- Asepsis is the process of reducing the probability of transmission
- Steps include:
  - Cleanliness or proper cleaning, proper linen handling, and hand-washing
  - Disinfection or destruction of pathogens by chemical agents
  - Sterilization or treating items with heat, gas, or chemicals to make them germ-free

Hand Hygiene

- Hand decontamination using soap and water, antiseptic hand-wash, or alcohol-based hand rub
- Clean hands before and after:
  - Work
  - Meals
  - Patient contact
  - Donning and removing gloves

Hand-Washing



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[Proper Hand Hygiene]

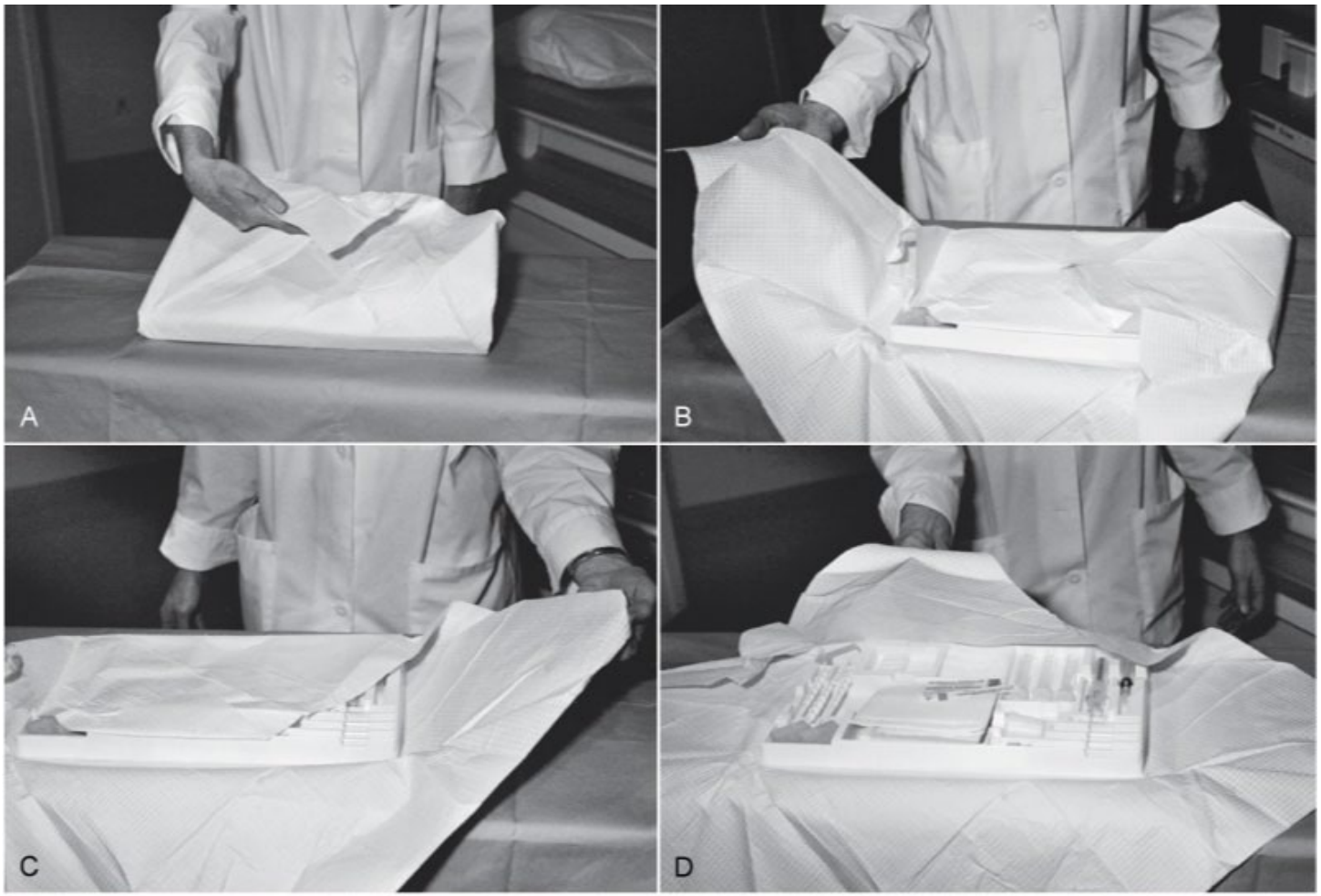
Handling Contaminated Items

- Linens
  - Fold edges toward the middle and place in designated container
- Disposable items
  - Use once only
  - Follow facility protocol for disposal
- Waste
  - Place objects contaminated by blood or body fluid in a biohazard container

Sterile Field

- Germ-free area containing sterile supplies and equipment
- To maintain the sterile field:
  - Never reach across the field or pass between it and the physician
  - Never leave the sterile field unattended
  - Discard any items suspected of contamination
  - Remember: Touching anything in the sterile field will contaminate it

Opening a Sterile Package



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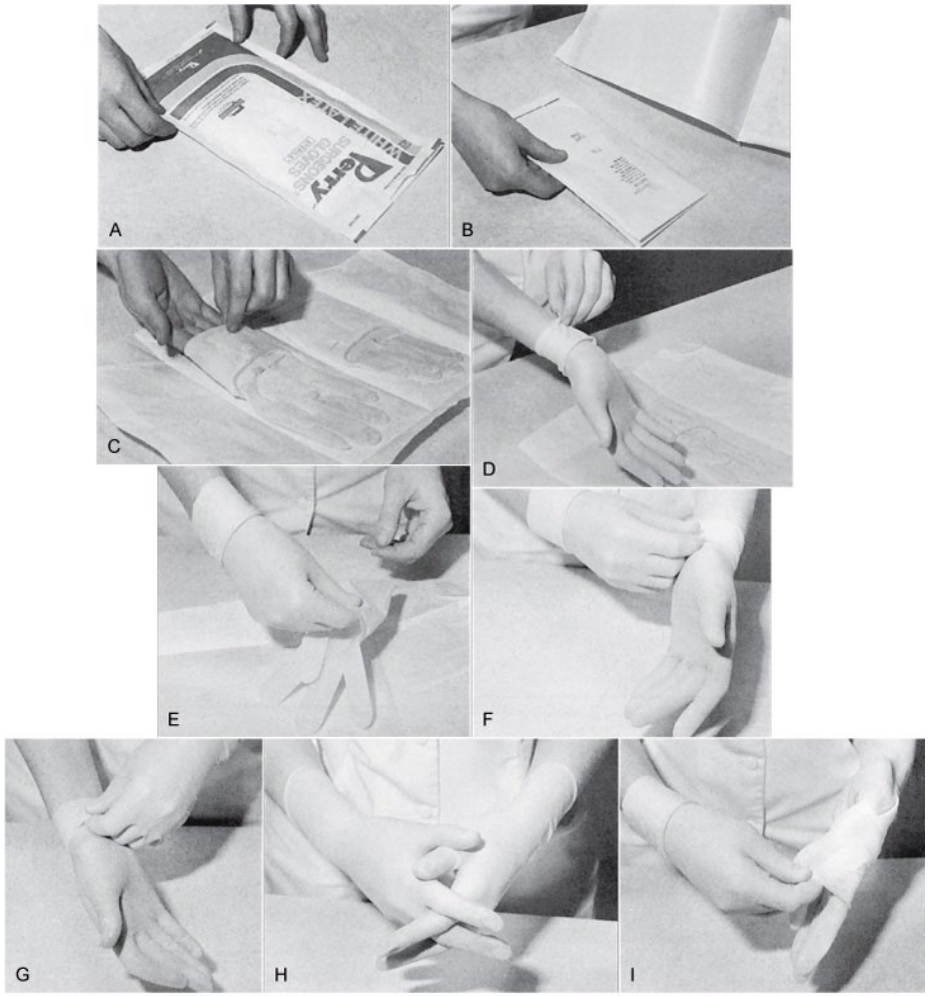
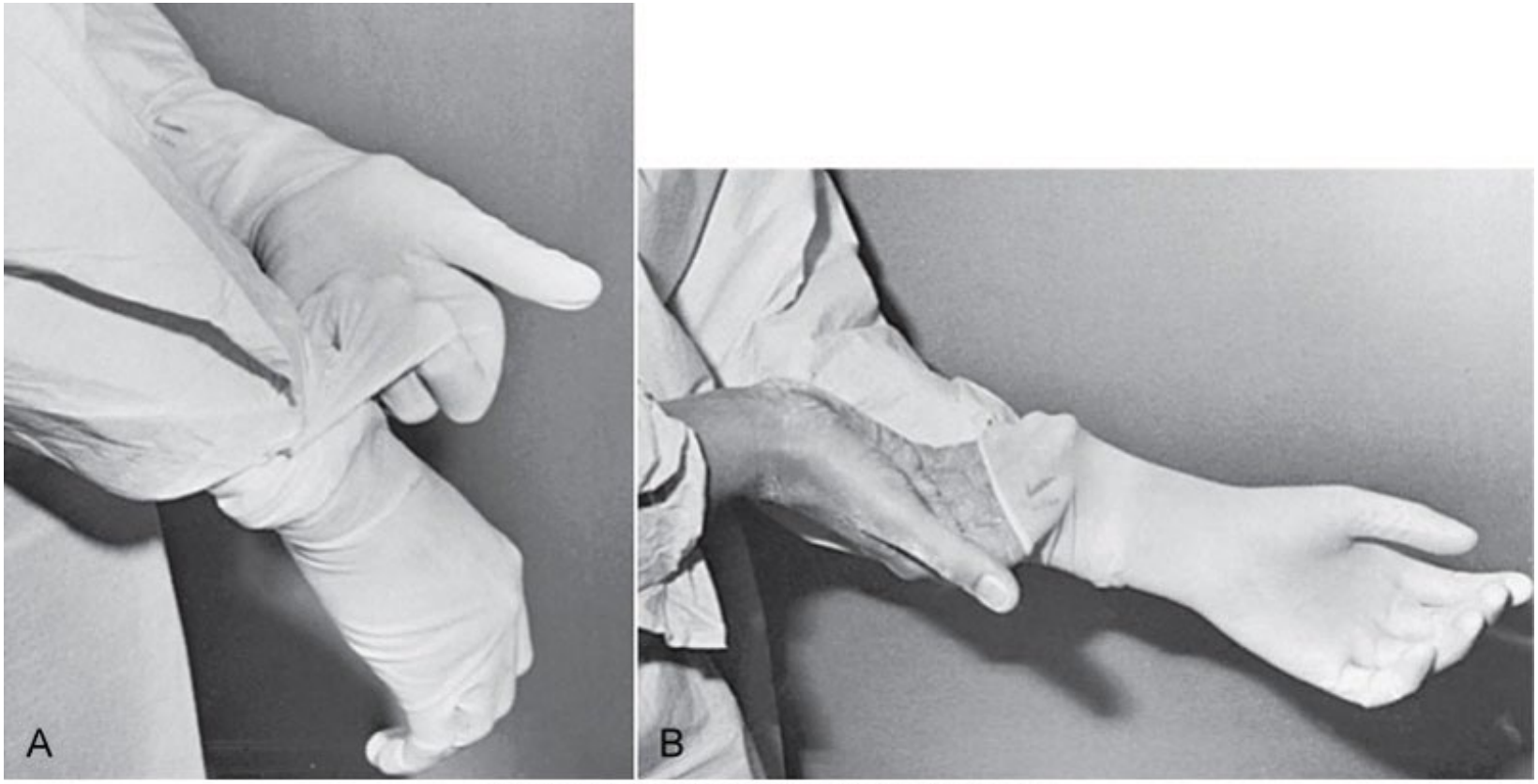
Sterile Field Preparation

Donning Sterile Gloves



Donning Sterile Gloves

Removing Contaminated Gloves



Dressing Removal

- Removal
  - Perform hand hygiene
  - Don gloves
  - Inform patient of procedure
  - Carefully remove dressing
  - Place soiled dressing in proper disposal container
  - Remove gloves and repeat hand hygiene

Dressing Application

- Application
  - Prepare needed materials
  - Inform patient of procedure
  - Perform hand hygiene
  - Open dressing package and add sterile dressing
  - Don gloves
  - If appropriate, clean wound and allow to dry
  - Apply dressing and secure with tape
  - Dispose of waste properly
  - Remove gloves and repeat hand hygiene

Summary

- Workplace hazards include fire, electric shock, falls, collisions, and spills
- Use proper body mechanics when lifting objects and transferring patients to avoid injury
- Use proper technique to safely assist patients to sit, stand, walk, and lie on the table

Summary (Cont'd)

- Sandbags, safety straps, compression bands, and tape may be used to immobilize a patient
- Prevention of disease transmission is the best way to interrupt the cycle of infection
- Infectious diseases include HIV, hepatitis, and TB

Summary (Cont'd)

- To prevent transmission, follow Standard Precautions protocol
- Medical asepsis may include cleanliness, disinfection, and sterilization
- Practice hand hygiene frequently throughout the workday
- Follow facility protocol for handling contaminated linens, disposable items, and waste

Summary (Cont'd)

- A sterile field is a germ-free area containing sterile supplies and equipment
- Follow proper procedure when donning and removing sterile gloves
- Follow proper procedure when removing and applying dressings