

INFECTION CONTROL III: STERILE TECHNIQUE

Course

Health Science
Technology III

Unit II

Asepsis

Essential Question

How can health
care workers
keep infection
from spreading?

TEKS

121.5 1E, 6A,
6F

TAKS

ELA 1
Science 2

Prior Student Learning

Understanding
of asepsis.

Estimated time

3 hours

Rationale

To minimize nosocomial infections, health care workers must know and practice sterile technique.

Objectives

Upon completion of this lesson, the student will be able to:

- Demonstrate donning sterile gloves without contaminating the gloves;
- Create a sterile field, and add sterile items to the sterile field;
- Analyze common situations involving the use of sterile technique;
- Discuss principles that should be applied when carrying out sterile technique; and
- State corrective action to problems encountered when using sterile technique.

Engage

Read and discuss “The Case of the Unfortunate Nurse” case study which can be accessed at <http://www.sciencecases.org/dengue/dengue1.asp>.

Key Points

- I. Surgical Asepsis
 - A. Involves keeping the clinical setting and objects as free from microorganisms as possible.
 - B. Used in operating rooms and in other conditions similar to surgical procedures.
 - C. Involves the use of physical barriers
 1. Gowns
 2. Gloves
 3. Masks
 4. Drapes
 - D. Involves extraordinary control measures so contamination does not occur.
 - E. Involves use of autoclave to kill microorganisms from objects
- II. Procedures with high risk for infection.
 - A. All surgeries
 - B. Insertion of urinary and other catheters
 - C. Dressing of wounds
 - D. Giving injectable medications
 - E. Caring for patients at great risk for infection
 1. Burns
 2. Transplants

3. Newborns
 4. Those with suppressed immune systems (e.g. cancer victims, elderly, patient's with some autoimmune diseases, transplant patients, victims of AIDS, etc.).
- III. Process of sterilization
 - A. Steam under pressure
 - B. Gas autoclave for heat sensitive items
 - C. Includes the use of special tape that changes color when sterilization is complete.
 - IV. Sterile Field
 - A. Any area that is used when doing a sterile procedure.
 - B. Materials used in the procedure are placed within the sterile field.
 - C. Area where the sterile field is placed must be clean and dry.
 - D. The area of sterility is covered by a sterile drape.
 - V. Rules when dealing with a sterile field
 - A. All sterile equipment is double wrapped.
 - B. If tape used to close the sterile package has not changed color after autoclaving, it should be considered contaminated.
 - C. All sterile packages must bear an expiration date.
 - D. When opening a sterile package, only clean hands can touch the outside of the package.
 - E. The inside of sterile packages can be touched only with sterile gloves. Only sterile surfaces may contact sterile surfaces.
 - F. Commercially prepared sterile packages will be sealed. If the package is in poor condition, consider the items to be nonsterile.
 - G. When opening a sterile package, never reach across the sterile area. Open by walking around the sterile area.
 - H. Barriers must be used to keep field sterile once opened, i.e. sterile gloves, gowns, drapes, and masks.
 - I. Your hands must be always kept in front and above the waist. Below the waist is considered contaminated.
 - J. Do not cough or sneeze over sterile field.
 - K. Sterile fields must remain dry, if wet it is no longer sterile.
 - L. Never leave the sterile field unless it is first covered with a sterile drape.
 - M. Consider 1-½ inches around the edge of a sterile field to be contaminated. **DO NOT PLACE ANYTHING STERILE IN THAT AREA.**
 - N. Special rooms might be used to reduce contamination.
 - O. Transfer forceps are like sterile fingers. Do not tilt tip upward, keep downward and touch sterile items only with the tip.
 - P. Never turn your back on a sterile field.
 - VI. Preparing a patient
 - A. Sterile drapes may be used, depending on the procedure.
 - B. Antiseptic agents might be used to prepare the patient's skin.
 - C. Removal of hair might also be done.

- VI. Basic concepts to keep in mind when determining the correct procedures to follow
 - A. Sterile to Sterile = Sterile
 - B. Sterile to Unsterile = Unsterile
 - C. Sterile to Unsure = Contaminated
 - D. If during a procedure, sterile technique is breached by breaking one of the rules, tell the person(s) involved. A patient's health and well being is at stake.
 - E. The health care provider must be aware of all needles and sharps during procedure. Account for them at the finish.
 - F. Wear gloves when cleaning after procedure; dispose of needles and sharp items in proper containers.

Activity

- I. Complete **Case Studies**
- II. Apply sterile gloves. **Gloving Procedure**

Teacher Note: *Alternative if sterile gloves are not available: The students are given one large sheet of white paper and a pair of clean latex gloves. Have each student fold the paper towel in the manner of the paper for sterile gloves – fold the middle and making “grab edges” on the sides of the piece of paper. Then have the students fold the edges of the latex gloves and place inside the paper towel like sterile gloves. Then demonstrate the application of sterile gloves and have the students return the demonstration.*

- III. Create a sterile field and correctly add a variety of items to the field.

Teacher Note: *Initially, tell the students that you will be violating sterile technique three times during the exercise. They are to watch carefully and will be asked at the end to give the three violations. Then, give each student one item to add to the sterile field. Some can add gauze; some an instrument, both by dropping on to the field and by using the wrapping as a glove and handing to the instructor; some can drop a syringe on the field; pour liquid into a cup on the sterile field without spilling; draw up solution from an ampoule; and finally draw a solution from a vial. The instructor should open the sterile field according to accepted technique. Then the instructor should don sterile gloves. Next, the instructor should ask that the students add different supplies and equipment to the sterile field. Finally the instructor will ask for the student(s) with the ampoules and vials to assist with drawing the solution into a syringe. While conducting the exercise, the instructor will violate sterile technique three times. After the completion of the exercise, the instructor will ask the class to identify the violations and discuss them.*

- IV. Complete the full case study “The Case of the Unfortunate Nurse”

found at http://www.sciencecases.org/dengue/dengue_notes.asp.

Assessment

Successful completion of Quiz: Infection Control/Sterile Technique

Materials

Key Quiz: Infection Control/Sterile Technique

www.accessexcellence.com/AE/AEC/CC/hand_background.html Excellent ideas for handwashing activities.

<http://www.engenderhealth.org/ip/index.html> An online course designed to help health care providers, supervisors of health care facilities, medical students, and nursing students strengthen infection prevention practices in low-resource settings.

Large double-wrapped (tray to be used to establish sterile field, containing a small cup for liquids)

Individually wrapped items, i.e. forceps and scissors

Sterile gauze in unopened paper

Unopened, paper wrapped syringes

An ampule with liquid

A vial with liquid

Alcohol or Hydrogen peroxide (or similar liquid)

Sterile forceps in a container

1 package Sterile gloves

Paper towels

Latex gloves

Table to place the sterile field

Accommodations for Learning Differences

For reinforcement: The student will divide into groups of four, set up their own sterile fields, and add items to the field using the rules of sterile technique. They will use the rules for sterile technique to evaluate themselves and each other.

For enrichment: The student will research Joseph Lister and Dr. Ignaz Semmelweis, focusing on their contribution to the advancement of sterile procedures and cross-contamination. Write and present a skit. See Project Rubric for evaluation tool.

National and State Education Standards

National Health Science Cluster Standards

HLC06.01

Health care workers will understand the existing and potential hazards to

clients, co-workers, and self. They will prevent injury or illness through safe work practices and follow health and safety policies and procedures.

HLC06.02

Health care workers will understand the fundamentals of wellness and the prevention of disease processes. They will practice preventive health behaviors among their clients.

TEKS

121.5 (c) 10B The student is expected to identify guidelines or standards precautions.

121.5 (c)10 C The student is expected to demonstrate skills related to infection control.

121.5 (c) 11G The student is expected to practice personal and client safety.

Texas College Readiness Standards

English Language Arts

II. B. Understand new vocabulary and concepts and use them accurately in reading writing and speaking.

III. B. Develop effective speaking styles for both group and one on one situations.

IV. A. Apply listening skills as an individual and as a member of a group in a variety of settings.

Science

I. A. 1. Utilize skepticism, logic and professional ethics in science.

Procedure VI Put on Sterile Gloves	Possible	Allocated
1. Removed rings, used alcohol-based handrub for hand hygiene.	2	
2. Opened sterile glove package.	2	
3. Grasped glove for dominant hand by fold of cuff with finger and thumb of non-dominant hand.	3	
4. Inserted dominant hand, pulling glove on with other hand, keeping cuff turned back.	3	
5. Placed gloved fingers under cuff of other glove.	2	
6. Inserted non-dominant hand.	2	
7. Eased glove on by pushing on inside fold of cuff.	2	
8. Smoothed gloves over wrists and fingers for better fit.	2	
9. Kept hands above waist level.	2	
10. Maintained sterile technique throughout procedure.	3	
TOTAL POINTS -- PROCEDURE VI	23	

***If a competitor jeopardizes the patient's or his/her own safety or fails to perform a critical step and does not take immediate action to correct the error, the total points for the procedure or specific subpart(s) of the procedure will be deducted by the judge(s).*

<http://www.hosa.org>

Removal of Gloves	Possible	Allocated
1. Insert fingers of one gloved hand under the cuff of the other glove and roll glove off the hand (glove to glove technique).	2	
2. Insert fingers of the bare hand between the cuff of the glove and the wrist to roll glove off hand (skin to skin technique).	2	
3. Hold gloves only by inside surface after removal then dispose of gloves.	2	
TOTAL POINTS	6	

QUIZ: INFECTION CONTROL/STERILE TECHNIQUE

NAME: _____

For each of the following questions, write the word(s) that best answers the questions in the space provided.

_____ 1. When setting up a sterile field, the first thing the health care provider would do is:

- A. Wash hands
- B. Apply clean gloves
- C. Open sterile towel handling only 1" of the border
- D. Spply sterile gloves

_____ 2. Sterile technique would be necessary in all of the following procedures EXCEPT

- A. An injection of morphine
- B. Catheterization for urine
- C. Insertion of an IV
- D. Insertion of a feeding tube

_____ 3. When opening a sterile package, the last flap opened should be

- A. The left side flap
- B. The right side flap
- C. The top flap
- D. The innermost flap

_____ 4. When starting to put on sterile gloves, the health care provider can touch with her hands

- A. The inside cuff of the first glove to be worn
- B. The underneath part of the first glove to be worn
- C. The inside of the wrapper only
- D. The inside cuff of the second glove to be worn

_____ 5. While placing sterile dressings on a sterile field, the health care provider notes that the sterile towel is wet. The provider

- A. Knows his/her supplies would be contaminated because the towel is wet
- B. Would avoid using the dressings that touched the wet towel
- C. Would use the dressing to pack the wound since it was already wet
- D. Knows the supplies would be sterile since they were on a sterile towel

- _____ 6. True/False. If a person reaches over a sterile field, the field is considered contaminated.
- _____ 7. True/False. If a tape has not turned color during sterilization, it is safe to use the contents in a sterile procedure.
- _____ 8. True/False. One of the rules of working with a sterile field is that hands must be held above the waist and kept in front of the person.
- _____ 9. True/False. If something is spilled on a sterile field, the field is considered to be contaminated.
- _____ 10. True/False. The 3" border edge of a sterile field is considered not sterile.

KEY: QUIZ ON INFECTION CONTROL/STERILE TECHNIQUE

1. a
2. d
3. d
4. a
5. a
6. True
7. False
8. True
9. True
10. False

Case Studies

Case Study #1:

At a seaside hospital, two busy wards are located on opposite ends of the building and are connected to each other by the operating theaters and processing areas. Because it is much faster and easier to get from one ward to another by cutting through the operating theaters and processing areas, many staff do so rather than going outside and all the way around the building to get to the other ward.

Is this an appropriate practice? Why or why not?

Case Study #2:

The operating theater where Teresa works as a surgical nurse is not air-conditioned and the temperature often rises above 100 degrees F. Before surgeries start, Teresa opens the windows which are screened. The operating theater has three operating tables, and because of the way the room is set up, the only place for Teresa to put her sterile table is in front of one of the open windows.

Is this an appropriate practice? Why or why not?

Case Study #3:

Miss Pensri, a nurse in the operating theater, has prepped many surgical-incision sites over the past 10 years. She always begins by shaving the site using a razor blade. Then she wipes the site with sterile gauze and an iodophor antiseptic (Betadine) in a circular manner, working from the center out, and immediately wipes off the excess antiseptic with dry, sterile gauze.

Is this an appropriate practice? Why or why not?

Case Study #4:

At a nearby facility, used surgical instruments are processed by placing them in a metal basin filled with an antiseptic solution. They are left in the solution until they are used in another procedure.

Is this an appropriate practice? Why or why not?

<http://www.engenderhealth.org/ip/aseptic/atc1.html>

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Answers to Case Studies

Answer to Case Study #1:

No. The number of people moving through operating theaters and the surrounding processing areas should be kept to a minimum to reduce microbial contamination. Signs limiting access to these areas should be posted, and entrance to the surgical area should be restricted to authorized personnel.

Answer to Case Study #2:

No. It is not acceptable to have a sterile tray or table next to or in front of a window that is open at the top or bottom. Keeping an operating theater cool is important, not only for the comfort of the client and surgical team, but also to reduce the number of bacteria in the room; however, the integrity of the sterile field should never be compromised. In addition, the amount of airflow during surgical procedures should be minimized. If the operating theater cannot be air-conditioned, ceiling fans or open windows are acceptable only if the following conditions are met:

- Fans are kept clean and blades are wiped frequently with a damp cloth.
- Windows have intact, tight mesh screens and can be opened from the top.

If opening a window is necessary, Teresa should rearrange or remove some of the furnishings so that her sterile table is not near a window.

Answer to Case Study #3:

No. Shaving is no longer recommended for surgical/incision sites because research has shown that shaving actually *increases* the risk of postoperative infections. If hair must be removed, it is best to cut it with scissors. Also, Nurse Pensri should wait 2 minutes before wiping off the excess antiseptic solution, since iodophors require several minutes for maximum effectiveness. The incision site should first be washed with soap and water if the client has not already done this at home or in the clinic.

Answer to Case Study #4:

No. Antiseptics are for use on the skin and should not be used on inanimate objects. Instruments and other items should always be stored dry after processing and should never be stored soaking in solutions. Instead, the instruments should be sterilized or high-level disinfected and then stored dry until use.

<http://www.engenderhealth.org/ip/aseptic/atc2.html#answer6>

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