

MEDICAL ASEPSIS

Exercise 18

Introduction

The importance of aseptic technique has been emphasized throughout the laboratory exercises of this course. Do you remember the two major goals of aseptic technique discussed in “Exercise 6”? In scientific research proper aseptic technique is important in achieving accurate and reproducible results. In medical procedures asepsis is critical to maintaining the health and well-being of patients and medical personnel alike.

One common medical procedure involving aseptic technique is the insertion of a urinary catheter. Recent studies have shown that 50% of all nosocomial infections are urinary tract infections, and that 80% of these UTI’s are associated with catheters. Although most of these infections originate due to long-term, indwelling catheters and/or patients who are severely compromised, always following proper aseptic technique can help to improve these statistics.

An underlying purpose for many exercises in this course is to provide you with the opportunity to practice and sharpen your aseptic skills. In this lab you will test those skills in a simulated medical procedure. Today’s exercise will simulate the aseptic introduction of a catheter into a patient. As part of this procedure you will learn the proper method for donning sterile gloves. Many medical techniques, such as this catheterization, require that you use one hand for touching any non-sterile articles, while the other hand is reserved for handling only sterile objects. It is crucial that the “sterile hand” is never contaminated by touching any non-sterile surface. At the conclusion of the procedure you will test the precision of your technique and the sterility of your hands by touching them to a fresh agar plate. The non-sterile hand should produce bacterial growth but the sterile hand should not.

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Materials

Per Student

1. 1 enriched agar plate
2. 1 large test tube (simulated patient urethra)
3. 1 package of sterile gloves
4. 1 sterile package containing a glass tube (simulated catheter)

Cultures

Petri plate with a lawn of *Serratia marcescens*

Methods

Pre-procedure Setup

1. Clear off and disinfect your work area. Make sure you have plenty of uncluttered counter space to work on.
2. The empty test tube for this exercise will simulate the urethra of a patient. To make this simulation more realistic we are going to inoculate the rim of the tube (opening of the urethra) with some “normal flora”. Open the plate of *Serratia* and touch the rim of the test tube to the bacteria on the plate. Set this test tube (patient) aside in your test tube rack.
3. Divide an agar plate in half with your marker and label one side "Sterile Hand" and the other "Non-sterile Hand" along with your name.
4. Handwashing Procedure:
 - a. Go to a sink and turn on the water.
 - b. Dispense some soap onto your hands.
 - c. Wash your hands thoroughly with soap and water for a minimum of 10 seconds.
 - d. Pay particular attention to the areas that contain the most microorganisms. These areas include: between fingers, under rings, around wrists and especially under the fingernails.
 - e. Rinse the hands with running water to remove soap and loosened microbes.
 - f. Dry your hands with paper towels and use the paper towels to turn off the faucet.

(Remember that although your hands are clean now, they are not sterile. There are still resident microorganisms present that cannot be removed by even the most diligent scrubbing.)
5. Open the sterile “catheter” package, being careful not to touch any of the contents or the inside of the package itself.

Donning Sterile Gloves

1. The sterile gloves may be packaged singly or in pairs. You will need two gloves. Arrange the glove package(s) on your clean work space.
2. Open the outer packaging by peeling apart the sides from the top of the package.
3. Remove the inner package and lay it on your work area. Carefully open the package without touching the gloves or the inside of the package.
4. If your gloves came packaged as a pair, identify the right and left glove. Gloves that are packaged singly are designed to fit either hand. Note that each glove has a cuff approximately 5 cm (2 inches) wide.

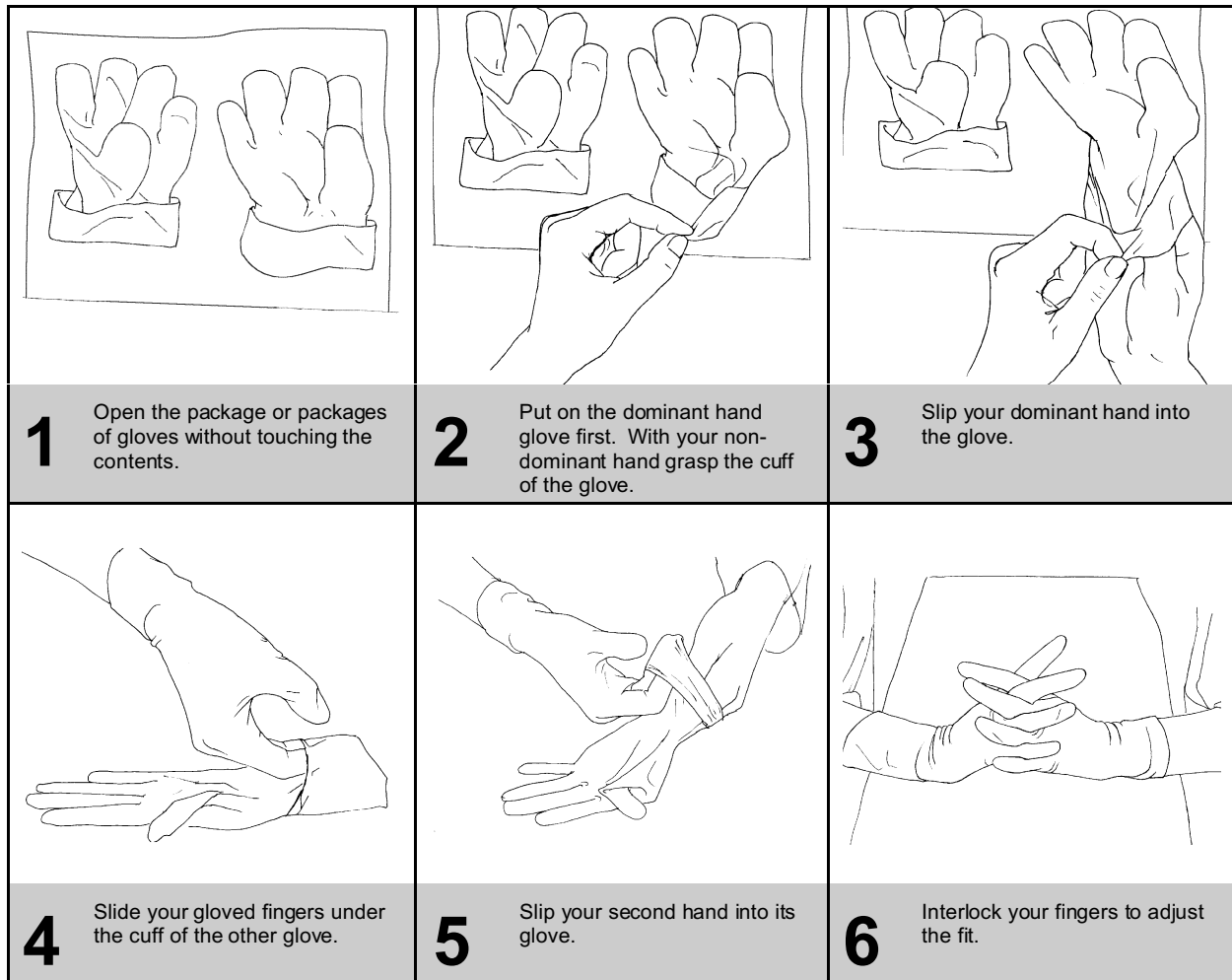


Figure 18.1 Donning Sterile Gloves

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5. You will first glove your dominant hand (right if you are right-handed, left if you are left-handed). As you don the gloves remember that you must not touch the outside surface of a glove with your bare hands. This would contaminate them.
6. Using your non-dominant hand, grasp the cuff of the glove for your dominant hand. The inside of the glove, including the cuff, is the only part you can touch with bare fingers.
7. Carefully pull the glove over your dominant hand. Try to insure that your thumb and fingers slide into the proper spaces. (If you do have trouble, wait until you have your second glove on to fix the fit. Do not ever touch the outside of the sterile glove with your bare fingers.)
8. Now you are ready to apply the second glove. Slip the fingers of the gloved hand underneath the second glove's cuff.
9. Carefully pull the second glove over the nondominant hand. Make sure that the bare skin of your hand or wrist never comes in contact with the outside (sterile) surface of either glove.
10. Once the second glove is on, interlock fingers and make any necessary adjustments for proper fit. Again, be sure to touch only the sterile sides of the gloves.

Simulated Catheterization

1. From now on in this procedure, your dominant hand will always be used to handle sterile objects. Your nondominant hand will be used to touch non-sterile objects. Therefore your nondominant hand will now be considered non-sterile.
2. With your dominant, sterile hand pick up the catheter (glass tube) from its package. Be careful not to touch the outside of the package or any other non-sterile surface with this hand.
3. With your non-sterile hand pick up the test tube (patient's urethra) by the rim. Your non-sterile glove will now be contaminated with bacteria (just like when touching a patient). That's ok.
4. Carefully insert the glass tube (catheter) into the test tube (urethra). Avoid touching the patient with your sterile hand.
5. Set the test tube back into the test tube rack.
6. Have a fellow student lift the lid from your Petri plate. Touch the agar with each hand on the appropriately labeled side of the plate.
7. Carry the test tube that was infected with "normal flora" and place it in the tray of disinfectant.

Removing Gloves

1. At the completion of a medical procedure, both gloves are considered to be contaminated with possible pathogens from the patient.
2. Stand in front of a biohazard container.
3. With your dominant hand grasp the wrist of the other glove and pull it off. Continue holding this glove with your dominant (still gloved) fingers.
4. Now slide the fingers of your bare hand underneath the cuff of the glove on your dominant hand. Grasp the undersurface of this glove and pull it off, so that it wraps inside-out over the first glove. The idea is that the two “dirty” gloves will be wrapped up together with the clean surface of the second glove on the outside. Discard the gloves in the biohazard container.
5. Wash your hands again.

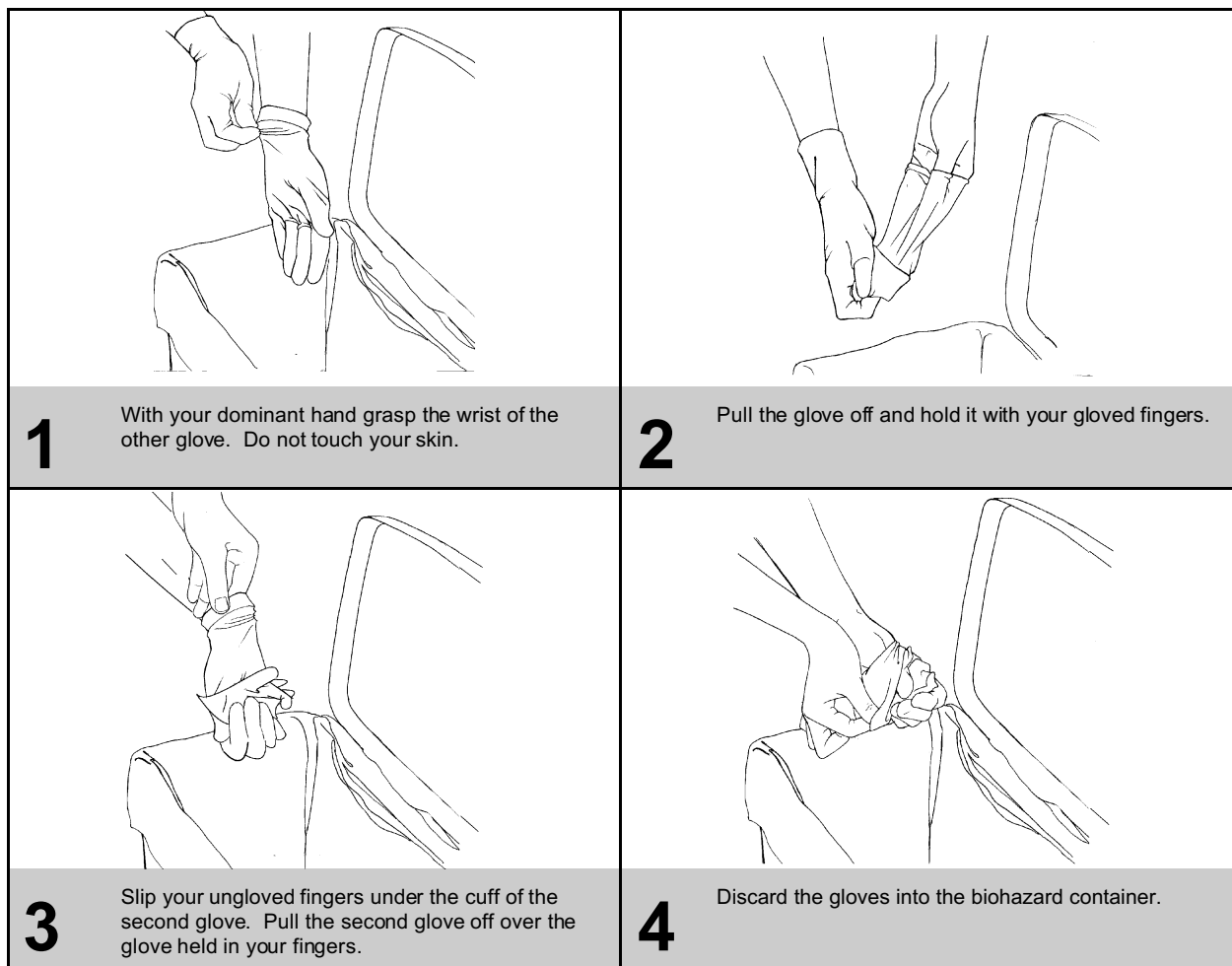
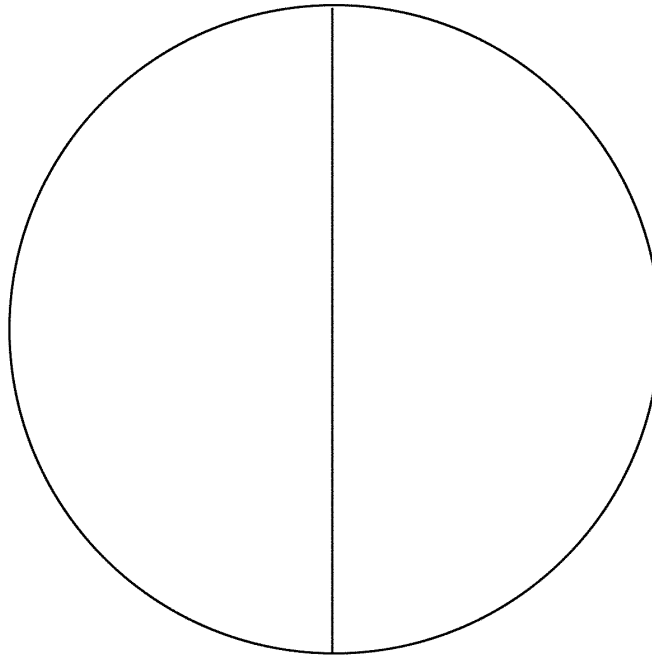


Figure 18.2 Removing Sterile Gloves

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Results

1. Draw the microbial growth of your plates in the circles below.



Non-sterile Hand

Sterile Hand

2. Was your aseptic technique effective? Explain.

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3. There is a trend in medicine today toward increased home health care. Patients are going home sooner and requiring more acute nursing care in the home. You can probably imagine that performing a catheterization or sterile dressing change in a home environment could provide additional challenges for a home health care worker. List one such possible obstacle and describe what you might do to solve the problem.

Scientific Inquiry

- An unopened box of toothpicks is supposedly sterile. Check out this assumption. If this is true, how long do the toothpicks remain sterile once the box is opened? What precautions could keep them sterile longer? What is the longest period of time you can keep them sterile?