

JoVE: Science Education
Performing a Surgical Hand Scrub
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Overview

Skin is a natural barrier to infection; because of this, any surgery that opens the skin can lead to a post-operative infection. Despite the widespread use of antibiotics, post-operative wound infections still represent a significant problem for the healthcare community. They have a significant mortality associated with them and are one of the most common and serious complications of surgery.^{1,2} Furthermore, they have been shown to prolong hospitalization from 5 to 20 days per infection, which is associated with a significant increase in the cost of hospital care.^{3,4} Studies have even shown that the lack of awareness of aseptic techniques amongst medical staff leads to significant increases in post-operative wound infections.⁵

Human hands have been found to carry up to 10 million bacteria. Pre-operative hand-washing, or “scrubbing”, can reduce human resident bacterial flora to a minimum, inhibit the rapid rebound growth of microorganisms, and remove debris and transient microorganisms from the nails, hands, and forearms. The overall purpose of scrubbing is to decrease the risk of microbial contamination of the surgical wound.

There are two basic approaches to scrubbing. In the first, there is a designated amount of time that should be spent cleaning each area. For this, the total scrub time should be between 3 to 5 min. The second approach is the numbered stroke method. In this, a certain number of brush strokes are designated for each distinct area. While both methods are effective, the fact remains that a systematic approach should be learned to ensure the optimal results.

Commented [JS1]: The timing approach is primarily presented, as only one step (2.11) provides the number of strokes (for scrubbing the arm). Can you add the number of strokes needed for the other regions, or clarify that only one approach is represented?

Procedure

1. Preparation

1.1 Arrive dressed in appropriate surgical attire to enter the operating room. This attire includes scrubs; protective shoe coverings; a cap, bouffant, or hood to cover hair; a mask that covers the mouth and nose; and protective glasses. A beard should be fully covered by the mask and hood.

1.2 Remove any artificial nails and nail polish prior to scrubbing. Some facilities suggest that nail polish is allowable, as long as it is free of cracks and chips. Fingernails should be smooth and not visible over the fingertips.

1.3 Remove all jewelry from your fingers, hands, and forearms (rings, watches, bracelets, etc.).

1.4 Roll up the arms of your scrub top until it is at least 3 in above the elbow.

1.5 Check your fingernails, hands, and forearms for any open lesions or breaks in skin integrity.

2. Scrubbing

2.1 Select and open an impregnated scrub brush/sponge containing an antimicrobial agent. This should be done prior to wetting your hands, since these containers can be difficult to open. Different antimicrobial agents include hexachlorophene, povidone-iodine, and chlorhexidine gluconate.

2.2 Turn on a water tap and adjust the setting to a comfortable temperature and pressure. Excessively hot or cold water is harder on the skin and is too uncomfortable to wash with for the recommended amount of time.

2.3 Throughout the scrubbing procedure, maintain the hands above the level of your elbows to allow the scrub water with bacteria and contaminants to drip off your elbows. Bend slightly forward to keep your hands and arms away from your person, while also keeping your distance from unsterile surfaces, such as faucets and sinks.

2.4 Moisten hands, arms, and brush under the running water, and work the scrub brush into a lather.

2.5 Under running water, clean the subungual areas on both hands with a disposable nail file. Remember to hold the scrub brush in the palm of one of your hands.

2.6 Using the bristle side of the brush, scrub 20 strokes across the fingertips and under the fingernails on both hands.

2.7 Think of the fingers as having 4 distinct sides, and scrub 10 strokes on each side of each finger individually. Pay special attention to the webbed spaces between the fingers.

2.8 Next, scrub the palm and dorsum of the hand with 10 strokes on each.

2.9 Repeat the previous steps (2.7 to 2.8) on the other hand. At any point, water can be added to the sponge as necessary to maintain a good lather. The scrub for each hand should take 45 sec to 1 min. This length of time should be extended, if the hands and arms are grossly soiled.

2.10 Proceed to scrub the arms, keeping the hands higher than the elbows at all times. This allows the scrub solution containing bacteria and other contaminants to flow away from your already-cleaned hands.

2.~~10.14~~11 Scrub each arm in a spiral motion from the wrist to 2 in above the elbow for 1 min. Perform up to at least 30 strokes and count aloud for each stroke. This helps to ensure that the scrub time is not accidentally shortened.

2.1~~12~~ Repeat on the other forearm.

2.1~~23~~ Once a surface has been scrubbed, do not go back over it again as this. ~~This~~ can re-introduce bacteria to the clean area.

2.13 If your hand touches anything other than the brush, scrub the area contaminated for 45 sec to 1 min. If you are no longer holding the brush, ask someone to open another brush for you. If you must open a brush for yourself, repeat the scrub procedure from the beginning.

2.14 Drop the scrub brush into a trash can or sink.

3.2.15 Rinsing

3.2.15.1 Rinse the hands and arms by passing them through running water in one direction only, starting with your fingertips and following with your elbows.

3.2.15.2 Remember to keep your hands above the level of your elbows at all times.

3.2.15.3 Rinse thoroughly, ensuring the removal of all soap and debris.

3.4.2.16 Holding the hands higher than the elbows, allow excess water to drip into the sink. Do not shake the hands and arms.

3.5.2.17 Proceed to the operating room, using the back of your body to open the door. If any newly-scrubbed area touches anything, scrub the contaminated area for 1 min.

4.3. In the Operating Room

4.3.1 Dry your hands and arms by using a sterile towel and the aseptic technique.

4.3.2 Using the aseptic technique, don a sterile gown and gloves.

Summary

This video reviewed the importance of the aseptic technique and how to properly perform a surgical hand scrub to prepare for the operating room.

Understanding the correct method of a surgical hand scrub is one of the most important aspects of sterile technique. Using correct scrubbing methodology has been shown to

decrease wound infection rates leading to improved patient outcomes and decreased hospital costs. Prior to every surgery, a physician and surgical technician must “scrub in” before proceeding with the operation. Often, surgeons perform this routine daily and sometimes multiple times throughout the day, if they have more than one surgery scheduled. It is critical to develop sterile habits early on in one’s career as a surgical technician, medical student, or resident surgeon, as taking time to learn this technique pays dividends in the end.

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