SSI PREVENTION – SURGICAL SITE
SKIN PREPARATION AND SURGICAL HAND PREPARATION

Things you should know!

- Most guidelines prohibit wearing any jewellery, watches, or artificial fingernails by the surgical team because they can be associated with change of the normal flora and impede proper hand hygiene.
- Adequate time (washing with soap and water for minimum 2 min, maximum 5 min; rubbing with an alcohol-based handrub for 1.5-3 min, according to manufacturer’s instructions) is essential for adequate surgical hand preparation.
- Almost all studies discourage the use of brushes. These may be beneficial only on visibly dirty hands before entering the operating room.
- Combinations of alcohol and chlorhexidine or alcohol and an iodophor formulated to paint the area of the incision have been shown to lead to a longer lasting antimicrobial barrier than prepping with aqueous materials.
- Studies have provided controversial results about the higher efficacy of chlorhexidine/alcohol or iodophor/alcohol products to reduce skin colonization rates or SSI rates. In any case, these products were superior to aqueous povidone-iodine products.

Things you should do right!

SURGICAL HAND PREPARATION

1. Artificial nails should be prohibited among staff working in the operating theatre and rings, wrist-watch, and bracelets should be removed before beginning surgical hand preparation.
2. If hands are visibly soiled, they should be washed with plain soap before surgical hand preparation and debris should be removed from underneath fingernails using a nail cleaner under running water. Brushes are not recommended for surgical hand preparation.
3. Surgical hand antisepsis should be performed using either a suitable antimicrobial soap* or suitable alcohol-based handrub** (the latter should be applied on dry skin).
4. Surgical hand and forearms antisepsis using an antimicrobial soap should last 2–5 minutes or for the length of time recommended by the manufacturer. A visible clock should be placed besides the sink to facilitate compliance.
5. The procedures recommended by WHO should be followed when handwashing with a medicated soap (Table) or using an alcohol-based handrub (Figure).

SURGICAL SITE SKIN PREPARATION

6. The incision site skin should be carefully washed and cleaned around incision site; then an antiseptic preparation based on either chlorhexidine/alcohol or iodophor/alcohol should be applied with sterile gauze and instruments and let drying before incision.

*Soaps containing either chlorhexidine or povidone-iodine.
**Alcohol-based handrubs with optimal antimicrobial efficacy usually contain 75 to 85% ethanol, isopropanol, or n-propanol, or a combination of these products. Products also including chlorhexidine would even be more suitable for surgery because of its prolonged effect.
Table. Procedure for surgical scrub with a medicated soap

<table>
<thead>
<tr>
<th>Procedural steps</th>
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<tbody>
<tr>
<td>• Start timing. Scrub each side of each finger, between the fingers, and the back and front of the hand for 2 minutes.</td>
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<tr>
<td>• Proceed to scrub the arms, keeping the hand higher than the arm at all times. This helps to avoid recontamination of the hands by water from the elbows and prevents bacteria-laden soap and water from contaminating the hands.</td>
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<tr>
<td>• Wash each side of the arm from wrist to the elbow for 1 minute.</td>
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<tr>
<td>• Repeat the process on the other hand and arm, keeping hands above elbows at all times. If the hand touches anything at any time, the scrub must be lengthened by 1 minute for the area that has been contaminated.</td>
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<tr>
<td>• Rinse hands and arms by passing them through the water in one direction only, from fingertips to elbow. Do not move the arm back and forth through the water.</td>
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<tr>
<td>• Proceed to the operating theatre holding hands above elbows.</td>
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<tr>
<td>• At all times during the scrub procedure, care should be taken not to splash water onto surgical attire.</td>
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<tr>
<td>• Once in the operating theatre, hands and arms should be dried using a sterile towel and aseptic technique before donning gown and gloves.</td>
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Sources:
Figure: Procedure for surgical hand preparation recommended by WHO

The handrubbing technique for surgical hand preparation must be performed on perfectly clean, dry hands. On arrival in the operating theatre and after having donned theatre clothing (cap/hat/bonnet and mask), hands must be washed with soap and water. After the operation when removing gloves, hands must be rubbed with an alcohol-based formulation or washed with soap and water if any residual talc or biological fluids are present (e.g. from the glove is punctured).

Surgical procedures may be carried out one after the other without the need for handwashing, provided that the handrubbing technique for surgical hand preparation is followed (Images 1 to 17).

1. Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your left hand, using the elbow of your other arm to operate the dispenser.

2. Dip the fingertips of your right hand in the handrub to decontaminate under the nails (5 seconds).

3. Images 3–7: Smear the handrub on the right forearm up to the elbow. Ensure that the whole skin area is covered by using circular movements around the forearm until the handrub has fully evaporated (10-15 seconds).

4. See legend for Image 3

5. See legend for Image 3

6. See legend for Image 3

7. See legend for Image 3

8. Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your right hand, using the elbow of your other arm to operate the dispenser.

9. Dip the fingertips of your left hand in the handrub to decontaminate under the nails (5 seconds).
10 Smear the handrub on the left forearm up to the elbow. Ensure that the whole skin area is covered by using circular movements around the forearm until the handrub has fully evaporated (10-15 seconds)

11 Put approximately 5ml (3 doses) of alcohol-based handrub in the palm of your left hand, using the elbow of your other arm to operate the distributor. Rub both hands at the same time up to the wrists, and ensure that all the steps represented in images 12-17 are followed (20-30 seconds)

12 Cover the whole surface of the hands up to the wrist with alcohol-based handrub, rubbing palm against palm with a rotating movement

13 Rub the back of the left hand, including the wrist, moving the right palm back and forth, and vice-versa

14 Rub palm against palm back and forth with fingers interlinked

15 Rub the back of the fingers by holding them in the palm of the other hand with a sideways back and forth movement

16 Rub the thumb of the left hand by rotating it in the clasped palm of the right hand and vice versa

17 When the hands are dry, sterile surgical clothing and gloves can be donned

Repeat the above-illustrated sequence (average duration, 60 sec) according to the number of times corresponding to the total duration recommended by the manufacturer for surgical hand preparation with an alcohol-based handrub.