Surgical Hand Antisepsis, Gowning and Gloving
Objectives

- To understand the importance and principle of surgical hand antisepsis
- To understand the principle of surgical gown and glove techniques
- To reinforce techniques of donning sterile gowns and gloves
Surgical Hand Antisepsis

- A systematic washing and scrubbing of the hands and forearms using especially developed techniques
- A process to destroy transient microorganism and inhibit the growth of resident microorganism
Surgical Hand Antisepsis

- Transient organisms
  - Microorganisms that are introduced onto the skin surface by contact.
  - Mechanical scrubbing and surgical cleansing agents will remove most of the bacteria

- Resident organisms
  - Microorganisms whose natural habitat is the skin.
  - Comprised mostly of gram-positive and gram-negative bacteria.
  - Exist in large numbers under the fingernails and in the deeper layers of the skin (such as the hair follicles, the sweat glands, the sebaceous glands).
  - scrubbing removes the resident bacteria from the surface and just beneath the surface of the skin.
  - After a time, the resident organisms in the deeper layers of the skin are brought to the surface by perspiration and the oil secretion of the sebaceous glands and the bacterial count is again increased.
  - Sterile gloves are worn to prevent contamination from this source.
Surgical Hand Antisepsis

- 4 factors affecting the effectiveness of surgical hand antisepsis:
  - The preparation before cleansing
  - The choice of antiseptic solution
  - The cleansing method
  - The duration for hand cleansing
1. Preparation before Scrubbing

- The removal of finger rings / jewelry, nail polish and artificial nail.
- Finger rings and jewelry can harbor microorganism and dead skin.
- Dark nail polish obscures the subungual space and the likelihood of careful cleansing is reduced.
- Artificial nail increases the microbial load on hands and interferes bacteria removal during cleansing.
2. Choice of Antiseptic Solution

- Mainly antimicrobial soaps, aqueous scrubs (e.g. Iodophors and biguanides), alcohol rubs and alcohol rubs containing additional active ingredients (e.g. biguanides)

- Alcoholic chlorhexidine was found to have greater residual antimicrobial activity (Centre for Health Protection, 2009)

- A review done by Tanner et al. (2008) stated that biguanides (e.g. chlorohexidine gluconate) are more effective in removing microorganism on hands than Iodophors (e.g. providone iodine)
3. Hand Antisepsis Process

- Time or counted stroke method
- Standardized and anatomical
- Directions by the antiseptics manufacturers should be followed
- If hands are visibly soiled,
  - wash hands with plain soap before performing surgical hand preparation.
  - Debris from underneath fingernails should also be removed. (CHP, 2009).
- All surfaces are exposed to mechanical scrub and chemical antisepsis processes
  - 7 steps of hand washing + Forearms
7 Steps of Hand-washing

Hand Hygiene Prevents Infection

Hand Hygiene Technique seven steps
Each step should be repeated at least 5 times

1. Palm to palm
   掌心對掌心
2. Right palm over left dorsum with fingers interlaced and vice versa
   右掌心對左手掌背，手指交錯，交替清潔
3. Palm to palm with fingers interlaced
   掌心對掌心，手指交錯
4. Rotational rubbing back of fingers to opposing palm with fingers interlocked
   手指逆時針，旋轉指尖背及掌心
5. Rotational rubbing of right thumb against left palm and vice versa
   左手大拇指順時針，右手掌背，交替清潔
6. Rotational rubbing of finger tips to opposing palm and vice versa
   指尖對掌心，旋轉指尖背及掌心
7. Rotational rubbing of wrists by opposing palm and vice versa
   腕部旋轉順時針，交替清潔
7 Steps of Hand-washing

Distribution of areas missed during hand-washing
(Ref: Taylor LJ, SRN, SCM. An evaluation of handwashing techniques, Nursing Times, Jan 1978).

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Hand Antisepsis Process

- Hands and forearms should be held higher than the elbows and away from the surgical attire allowing water to run from the clean to the less clean area down the arm in order to prevent contamination.
Alcohol-based Surgical Handrub

- Follow the manufacturer’s instructions
- Apply alcohol-based products on dry hands only.
- Use sufficient amount of product to keep hands and forearms wet throughout the procedure.
- After alcohol-based surgical handrub procedure, hands and forearms should be allowed to dry thoroughly before donning sterile gloves.
- Do not combine surgical hand antimicrobial soap with alcohol-based surgical handrub sequentially.
4. Duration of Hand Antisepsis

- When using surgical antimicrobial soap, scrub hands and forearms for 2 to 5 minutes as recommended by the manufacturers. Long scrub times, such as 10 minutes, are not necessary (CHP, 2009).

- Both CDC (2002) and AORN (2007) state that 2 – 6 minutes is as effective as 5 minutes and a lengthy scrub is unnecessary.

- Hand antisepsis must be repeated if an unsterile object is touched.
Video

Surgical Hand

Antisepsis
Surgical Gowning Technique

- **Principles:**
  - **Touch only the inside of the gown**
    - Touching the outside of the gown while donning it, the gown is considered contaminated.
  - **Scrubbed hands and arms are contaminated if they fall below waist level or touch the body.**
    - Keeps hands and arms above the waist and away from the body and at an angle of about 20 to 30 degrees above the elbows.
  - **After donning the surgical gown, the only parts of the gown that are considered sterile are the sleeves (except for the axillary area) and the front from waist level to a few inches below the neck opening.**
Surgical Gowning Technique

- Pick up the entire folded gown from the wrapper by grasping the gown through all layers, being careful to touch only the inside of the neckline. Step back from the table to allow maneuver.
Surgical Gowning Technique

- Hold the gown away from the body and allow it to unfold with the inside toward the wearer.
- Be careful that it does not touch either your body or other unsterile objects.
Surgical Gowning Technique

- Keep hands on the inside of the gown while it completely unfolds.
- Slip both hands into the open armholes, keeping the hands at shoulder level and away from the body.
Surgical Gowning Technique

- Push the hands and forearms into the sleeves of the gown, advancing the hands only to the proximal edge of the cuff if the closed gloving technique will be used. If open gloving technique will be used, advance the hands completely through the cuffs of the gown.
- The circulator pulls the gown over the scrubbed person’s shoulder, touching only the inner shoulder and side seams.
- Tie or clasp the neckline and tie the inner waist ties of the gown, touching only the inner aspect of the gown.
- The gown should be completely fastened by the circulator before the scrub person dons gloves to prevent contamination from the gown flapping.
Surgical Gowning Technique
Surgical Gloving Technique

- Provide a bacterial barrier between the patient and the healthcare worker.
- Powder of gloves:
  - As glove lubricant
  - Postoperative complication: powder granuloma
  - Powder falling out from hand and gloves becomes a vehicle for dissemination of microorganisms throughout the operating room.
  - Gloves must be wiped thoroughly after they are put on and before approaching the sterile field.
Surgical Gloving Technique

- Closed-gloving technique
- Open-gloving technique
Closed-gloving Technique

- Preferable over open-gloving method when initially donning sterile gown and gloves.
- Hands are pushed through the cuff openings as the gloves are pulled into place.
- Cannot be used in subsequent gloving as the cuffs collect moisture and become damp during wearing, and therefore are considered unsterile.
Closed-gloving Method

- Pick up a glove by its folded cuff edge with a sleeve-covered hand.
- Note that gloves are packaged with a wide folded cuff so the nurse can don the gloves without touching the outside surfaces with bare fingers.
Closed-gloving Method

- Place the glove on the opposite gown sleeve, palm down, with the glove fingers pointing toward your shoulder.
- The palm of your hand inside the gown sleeve must be facing upward toward the palm of the glove.
Closed-gloving Method

- Place the glove's rolled cuff edge at the seam that connects the sleeve to the gown cuff.
- Grasp the bottom rolled cuff edge of the glove with your thumb and index finger.
Closed-gloving Method

- While holding the glove's cuff edge with one hand, grasp the uppermost edge of the glove's cuff with the opposite hand.
- Take care not to expose the bare fingers while doing this.
- Continuing to grasp the glove; stretch the cuff of the glove over the hand
Closed-gloving Method

- Using the opposite sleeve-covered hand, grasp both the glove cuff and sleeve cuff seam and pull the glove onto the hand.

- Pull any excessive amount of gown sleeve from underneath the cuff of the glove.

- Repeat the procedure to the other hand. Check to make sure that each gown cuff is secured and covered completely by the cuff of the glove.
Open-gloving Method

- Scrub person takes one glove from inner glove wrapper by placing thumb and index finger of opposite hand on fold of everted cuff at a point in line with glove’s palm and pulls glove over hand, leaving cuff turned back.
Open-gloving Method

- Scrub person takes second glove from the inner glove wrapper by placing gloved fingers under everted cuff.
Open-gloving Method

- Scrub person introduces free hand into glove and draws it over cuff of gown and upper part of wristlet by slightly rotating arm externally and internally.

- Bring turned-back cuff on other hand over wristlet of gown by repeating the above step.
Final Tie of Gown
Final Tie of Gown
References

- Centre for Health Protection (CHP, 2009). Recommendations on Prevention of Surgical Site Infection. Hong Kong: Centre for Health Protection.
The End