

## APPENDIX C

# PROCESSING SURGICAL GLOVES

The risk in reusing surgical gloves is that processed gloves have more inapparent tears than new ones and therefore provide less protection to the wearer. Sterilization (autoclaving) and high-level disinfection (steaming) of gloves, when correctly performed, however, can provide a high quality product (**Chapter 14**). In addition, **double gloving** for high-risk procedures can be done. Therefore, processing surgical gloves constitutes an **appropriate reuse of disposable items** where resources are limited (Daschner 1993).

### HOW TO DECONTAMINATE AND CLEAN SURGICAL GLOVES BEFORE STERILIZATION OR HIGH-LEVEL DISINFECTION (HLD)

**STEP 1:** Before removing soiled surgical gloves, immerse hands briefly in a container filled with 0.5% chlorine solution.

**STEP 2:** Remove gloves by turning inside out and soak them in the chlorine solution for 10 minutes.

(Performing **Steps 1 and 2** insures that both surfaces of the gloves are decontaminated.)

**Note:** Latex rubber surgical gloves should be discarded after processing three times because the gloves tear more easily with additional processing (Bagg, Jenkins and Barker 1990; Martin et al 1988).

**STEP 3:** Wash gloves in soapy water, cleaning inside and out.

**STEP 4:** Rinse gloves in clean water until no soap or detergent remains. (Residual soap or detergent can interfere with sterilization or HLD.)

**STEP 5:** Test gloves for holes by inflating them by hand and holding them under water. (Air bubbles will appear if there are holes.)

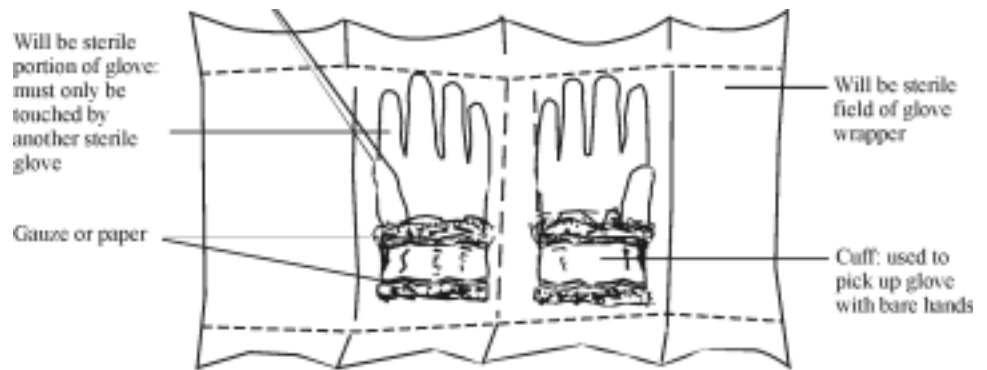
**STEP 6:** Gently air dry gloves inside and out before proceeding with sterilization. (Gloves which remain wet for long periods of time will absorb water and become tacky.)

### HOW TO STERILIZE SURGICAL GLOVES

**Remember:** Higher temperatures and pressures are destructive to gloves.

After decontamination, cleaning and drying, gloves must be packaged prior to sterilizing by autoclaving. First, fold the cuffs of the gloves out toward the palm so that after sterilization they can be put on easily and without contamination. Next, put gauze or paper inside each glove and under the fold of the cuff and wrap the gloves as shown in **Figure C-1**. (Do not tie tightly or wrap glove packs with rubber bands.) Finally, place them in a wire basket on their sides to allow optimum steam penetration. (If gloves are stacked in piles, penetration of steam under the cuffs may be poor.) Autoclave at 121°C (250°F) for 30 minutes and at a pressure of 106 kPa (15 lb/in<sup>2</sup>).

**Figure C-1. Preparing Gloves for Autoclaving (Steam Sterilization)**



Source: South East Asia Office (SEARO)/ World Health Organization 1988.

Immediately after autoclaving, gloves are extremely friable and tear easily. Gloves should **not** be used for 24 to 48 hours to allow their elasticity to return and to prevent tackiness (stickiness) (**Table C-1**).

**Table C-1. Tips to Help Avoid Glove Problems**

**PROBLEM: TACKY OR STICKY GLOVES**

Probable Cause	Recommended Solution
Residual liquid soap or detergent	Reduce amount of liquid soap or detergent used when washing gloves. Rinse gloves at least three times in clean water.
Heated to high temperature for too long	Use <b>30 minutes</b> sterilizing time at 121°C (250°F) and remove gloves from sterilizer as soon as cycle is completed.
Gloves sterilized with other goods	Sterilize gloves separately.
Gloves not allowed to dry completely after steaming	Wear “wet” within 30 minutes or allow to dry for 4 to 6 hours before using.
Surfaces of gloves touching each other	Gauze or paper wicks should be inserted between the palm and back of hand of each glove and between the hand of the glove and the turned-back cuff. This allows steam to contact all surfaces during sterilization and prevents surfaces from adhering to each other.
Breakdown (deterioration) of rubber (latex) (Rubber gloves deteriorate while stored even though they have not been used. They become soft, sticky and unusable.)	Store in a dry, cool area. Do not store in direct sunlight.

**PROBLEM: EXCESSIVE TEARING OR RUPTURING**

Gloves used too soon following sterilization	<b>Do not</b> use gloves for 24 to 48 hours after sterilization. This allows gloves to regain their elasticity before use.
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Source: Tomlinson 1991.

## HOW TO HIGH-LEVEL DISINFECT SURGICAL GLOVES BY STEAMING

After surgical gloves have been decontaminated and thoroughly washed, they are ready for HLD by steaming (McIntosh et al 1994). (See **Chapter 12** for more information on steaming.)

**STEP 1:** Fold up the cuffs of the gloves so that they can be put on easily and without contamination after HLD.

**STEP 2:** Place gloves into one of the steamer pans that has holes in its bottom. To make removal from the pan easier, the cuffs should be facing outward toward the edge of the pan (**Figure C-2**). Five to fifteen pairs can be put in each pan depending on the size (diameter) of the pans.

Figure C-2. Gloves in Steamer Pan



**STEP 3:** Repeat this process until up to three steamer pans have been filled with gloves. Stack the filled steamer pans on top of a bottom pan containing water for boiling. A second empty, dry bottom pan (without holes) should be placed on the counter next to the heat source (see **Step 9**).

**STEP 4:** Place the lid on the top pan and bring water to a full **rolling** boil. (When water only simmers, very little steam is formed and the temperature may not get high enough to kill microorganisms.)

**STEP 5:** When steam begins to come out between the pans and the lid, start the timer or note the time on a clock and record the time in the HLD log.

**STEP 6:** Steam gloves for 20 minutes.

**STEP 7:** Remove the top steamer pan and put the lid on the pan that was below it (the pan now on top). Gently shake excess water from the pan just removed.

**STEP 8:** Place pan just removed onto the empty bottom pan (see **Step 3**). Repeat until all pans containing gloves are restacked on this empty pan and the top pan is covered with the lid. (This step allows the gloves to cool and dry without becoming contaminated.)

**Remember:** Be sure there is sufficient water in the bottom pan for the **entire** 20 minutes of steaming.

**Remember:** Do **not** place pans containing gloves on a table top, counter or other surface as gloves will be contaminated.

**STEP 9:** Allow gloves to air dry in the steamer pans (4 to 6 hours) before using.<sup>1</sup>

**STEP 10:** Using a high-level disinfected forceps, transfer the dry items to a dry, high-level disinfected container<sup>2</sup> with a tight-fitting cover. Gloves can also be stored in the stacked and covered steamer pans as long as a bottom pan (no holes) is used.

## REFERENCES

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Martin MV et al. 1988. A physical and microbial evaluation of the re-use of non-sterile gloves. *Br Dent J* 165(9): 321–324.

McIntosh N et al. 1994. *Practical Methods for High-Level Disinfection of Surgical Gloves*. Paper presented at American Public Health Association Annual Meeting. Session no. 2285, Washington, D.C., 31 October–4 November.

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<sup>1</sup> Alternatively, allow gloves to cool for 5 to 10 minutes before wearing “wet.” Gloves should be used within 30 minutes, if possible. After this time, the fingers of the gloves stick together, and the gloves are hard to put on despite being damp. Gloves that have been removed from the steamer pan(s) to be worn “wet” but were not used during the clinic session should be reprocessed before using.

<sup>2</sup> How to prepare a high-level disinfected container: For small containers, boil water in the covered container for 20 minutes, then pour out the water, which can be used for other purposes, replace the cover and allow container to dry. Alternatively, and for large containers, fill a plastic container with 0.5% chlorine solution and immerse the cover in chlorine solution as well. Soak both for 20 minutes. (The chlorine solution can then be transferred to another container and reused.) Rinse the cover and the inside of the container three times with boiled water and allow to air dry.