



Hand Hygiene

Hand hygiene is a general term that applies to handwashing, antiseptic handwashing, using an antiseptic hand rub, or surgical hand antisepsis. Hand hygiene is the most important aseptic procedure in the prevention of health-care-associated infections. Hand hygiene significantly reduces microbes on the hands and protects both patients and the dental staff. Wearing gloves does not replace hand hygiene, but is an adjunct providing consistent protection from bloodborne pathogens and is required by the Occupational Safety and Health Administration (OSHA).



Hand-Hygiene Indications

- When hands are visibly soiled
- After barehanded touching of inanimate objects likely to be contaminated by blood or saliva
- Before and after treating each patient—before glove placement and after glove removal
- Before leaving the dental operatory, laboratory, or instrument processing area
- Before regloving after removing gloves that are torn, cut, or punctured

Hand-Hygiene Methods

Methods	Agent	Technique	Duration (minimum)
Routine handwash	Water and non-antimicrobial detergent (e.g., plain soap*)	- Wet hands and wrists under cool running water - Dispense handwashing agent sufficient to cover hands and wrists	15 seconds
Antiseptic handwash	Water and antimicrobial agent/detergent (e.g., chlorhexidine, iodine and iodophors, chloroxylenol [PCMX], triclosan)	- Rub the agent into all areas, with particular emphasis around nails and between fingers, before rinsing with cool water - Dry hands completely with disposable towels before donning gloves - Use a towel to turn off the faucet if automatic controls are not available	
Antiseptic hand rub	Alcohol-based hand rub [†]	- Apply the product to palm of one hand - Rub hands together, covering all surfaces of hands and fingers, until hands are dry [†] - Follow manufacturer's recommendations regarding volume of product to use	Rub hands until the agent is dry [†]
Surgical antisepsis	Water and antimicrobial agent/detergent (e.g., chlorhexidine, iodine and iodophors, chloroxylenol [PCMX], triclosan)	- Remove rings, watches, and bracelets - Remove debris from underneath fingernails using a nail cleaner under running water - Wet hands and wrists under cool running water - Using an antimicrobial agent, scrub hands and forearms for the length of time recommended by the manufacturer's instructions before rinsing with cool water - Dry hands completely (using a sterile towel is ideal) before donning sterile surgeon's gloves	2–6 minutes
	Water and non-antimicrobial detergent (e.g., plain soap*) followed by an alcohol-based surgical hand-scrub product with persistent activity	Follow manufacturer instructions for surgical hand-scrub product with persistent activity	Follow manufacturer instructions for surgical hand-scrub product with persistent activity

* Pathogenic organisms have been found on or around bar soap during and after use. Use of liquid soap with hands-free dispensing controls is preferable.

[†] 60%–95% ethanol or isopropanol. Alcohol-based hand rubs **should not** be used in the presence of visible soil or organic material. If using an alcohol-based hand rub, apply adequate amount to palm of one hand and rub hands together, covering all surfaces of the hands and fingers, until hands are dry. Follow manufacturer's recommendations regarding the volume of product to use. If hands feel dry after rubbing hands together for 10–15 seconds, an insufficient volume of product likely was applied. The drying effect of alcohol can be reduced or eliminated by adding 1%–3% glycerol or other skin-conditioning agents.

Lotions and Gloves

The primary defense against infection and transmission of pathogens is healthy, unbroken skin. Frequent handwashing with soaps and antiseptic agents can cause chronic irritant contact dermatitis among dental health-care personnel (DHCP). Lotions are recommended to ease the dryness resulting from frequent handwashing and more recently to prevent dermatitis resulting from glove use. However, petroleum-based lotion formulations can cause breakdown of latex gloves. For that reason, lotions that contain petroleum or other oil emollients may affect the integrity of gloves and should only be used at the end of the workday. Therefore, when selecting hand-hygiene products, information should be obtained from the manufacturer regarding possible interactions of lotion and antiseptic products (e.g., alcohol-based hand rubs, antimicrobial soaps) and the effect of petroleum or other oil emollients on the integrity of gloves.

Petroleum-based lotion products can cause breakdown of latex gloves.

Storage of Hand-Care Products



Hand-care products, including plain (non-antimicrobial) soap and antiseptic products, can become contaminated or support the growth of microorganisms. Liquid hand-care products should be stored in either disposable closed containers or closed containers that can be washed and dried before refilling. Soap should not be added to a partially empty dispenser, as this practice of "topping off" may lead to bacterial contamination of soap and negate the beneficial effect of hand cleaning and disinfection. Lotions should be dispensed in small, individual-use containers or pump dispensers that are not opened or refilled to reduce contaminants and bacterial growth.

Alcohol-Based Hand Rubs



Alcohol-based hand rubs are alcohol-containing preparations designed for application to the hands for reducing the number of viable microorganisms on the hands. These are antiseptic agents not requiring the use of water. In the United States, preparations usually contain 60%–95% ethanol or isopropanol. Alcohol-based hand rubs are not appropriate for use when hands are visibly dirty or

Alcohol-Based Hand Rub Technique

- **Apply the product to the palm of one hand.**
- **Rub hands together, covering all surfaces, until hands are dry.**

contaminated with proteinaceous materials. When hands are visibly dirty or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids, wash hands with either a non-antimicrobial soap and water or an antimicrobial soap and water.

Frequent use of alcohol-based formulations for hand hygiene can cause drying of the skin unless emollients, humectants, or other skin-conditioning agents are added to the formulations. In several recent prospective trials, alcohol-based rinses or gels containing emollients caused substantially less skin irritation and dryness than the soaps or antimicrobial detergents tested. Allergic contact dermatitis due to alcohol hand rubs is very uncommon. However, with increasing use of such products by health-care personnel, it is likely that true allergic reactions to such products will occasionally be encountered.

Alcohol-based hand rubs will not replace the need for sinks or other hand-hygiene supplies (e.g., soap, paper towels) because when hands are visibly dirty, contaminated with proteinaceous material, or visibly soiled with blood or other body fluids, they must be washed with either a non-antimicrobial soap and water or an antimicrobial soap and water. Also, because personnel may experience a "build-up" of emollients on their hands after repeated use of alcohol-based products, certain manufacturers recommend washing hands with soap and water after 5-10 applications of a gel.

Alcohol-based hand rubs cannot be used if your hands are visibly contaminated.

Another consideration when deciding to introduce alcohol-based products into your practice is the potential for confusion between soap and alcohol hand-rub dispensers. Alcohol hand-rub dispensers should not be placed adjacent to sinks. This may cause personnel to routinely wash their hands with soap and water after each use of an alcohol hand rub, which is not necessary and is not recommended, because it may lead to dermatitis.

Adherence of health-care personnel to recommended hand-hygiene procedures has been poor with an overall average rate of only 40% in hospital settings. Because of this, the CDC recommends the use of alcohol-based hand products as an option for routine use, primarily to increase compliance in hospital settings. Although alcohol-based hand rubs have the potential to increase hand-hygiene compliance, sinks and hand-hygiene supplies (e.g., soap, paper towels) are readily available in dental operatories unlike in many other health-care settings. Therefore alcohol-based hand rubs may not be indicated in each operatory. Alcohol-based hand rubs may be most useful in exam rooms or radiology work areas where multiple patients are seen in a short period of time and frequent handwashing is indicated. Another indication may be in dental residencies where staff members are performing frequent patient checks. If you think the use of alcohol-based hand rubs will increase compliance with hand hygiene or might help decrease dermatitis symptoms, then the addition of these products to the dental clinic may be indicated. Careful evaluation is indicated before deciding to introduce alcohol-based hand rubs or any new hand-hygiene product into your practice.

Alcohol-Based Hand Rubs

ADVANTAGES

- + Fast acting and effective antimicrobial action (if hands are not visibly soiled)
- + Potential to improve skin condition—cause less dermatitis (if the product contains emollients)
- + Potential to increase hand-hygiene compliance

DISADVANTAGES

- Cannot be used when hands are visibly dirty or contaminated
- Must carefully follow manufacturer instructions for amount of product to use and time to “rub”*
- Flammable (see safety precautions listed below)
- Possible “gritty” feeling on hands when used with powdered gloves or from emollient “build up” after repeated use
- May be more expensive than traditional hand-hygiene agents

* If hands feel dry after rubbing hands together for 10–15 seconds, it is likely that an insufficient volume of product was applied.

Alcohol-Based Hand Rubs and Fire Safety

In Europe, where alcohol-based hand rubs have been used extensively for years, the incidence of fires associated with such products has been low. The results of a recent survey in the U.S. also support this. However, since alcohols are flammable, precautions should be taken to minimize any potential fire risk. Recently, the National Fire Protection Association (NFPA) published amended guidance to the Life Safety Code (LSC) allowing alcohol-based hand rubs in health-care facilities if several safety conditions are met:



- The egress corridor width is 6 feet or greater and dispensers are separated at least 4 feet apart.
- The maximum individual dispenser fluid capacity is 1.2 liters for dispensers in rooms, corridors, and areas open to corridors and 2.0 liters for dispensers in suites of rooms.
- If using wall-mounted dispensers, do not install over or directly adjacent to electrical outlets and switches.
- In locations with carpeted floor coverings, dispensers installed directly over carpeted surfaces are permitted only in areas with sprinklers.
- Each smoke compartment may contain a maximum aggregate of 10 gallons of alcohol-based hand rub solution in dispensers and a maximum of 5 gallons in storage.

Because dispensers should not be installed near electrical outlets and the restrictions on the amount of product in operatories, dental clinics may want to consider using smaller pump dispensers instead of purchasing wall-mounted dispensing systems.

Selected References and Additional Resources

CDC. Guideline for hand hygiene in health-care settings: recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. MMWR 2002;51(No. RR-16).

CDC. Guidelines for infection control in dental health-care settings – 2003. MMWR 2003; 52(No. RR-17):1–66.