According to the Merriam Webster dictionary working hand in glove means in an extremely close relationship.\(^1\) Oral health care professionals work hand in glove in every sense of the word.

Dimentions of Dental Hygiene published two insightful articles on this topic. Here follows abstracts from those articles.

**Safe and Effective Use of Gloves\(^3\)**

Gloves provide the most important barrier to disease transmission.
By Joyce A. Moore, RDH, BSDH, CRCST On Dec 17, 2018

Oral health professionals are at daily risk of disease exposure, and gloves provide the most important barrier to disease transmission. Knowing how to perform proper hand hygiene, choose the right glove, and follow the steps for safe glove use will help keep clinicians and patients safe and healthy.

The Occupational Safety and Health Administration (OSHA) was created in 1970 to protect the health and safety of all workers. In 1991, the Bloodborne Pathogens (BBP) Standards designed to protect against bloodborne pathogens were finalized.

The United States Centers for Disease Control and Prevention (CDC) develops guidelines and recommendations to protect clinicians and patients. Infection control in dentistry is largely based on the CDC’s *Guidelines for Infection Control in Dental Health-Care Settings—2003*. In 2016, a companion document was released that provides a summary of the 2003 guidelines and new recommendations. OSHA and the CDC continue to develop regulations and recommendations to make practice safe for oral health professionals.
EVALUATING THE RISK

In the dental setting, gloves are just one of the types of personal protective equipment (PPE) mandated by OSHA. They are used to protect the wearer and patient from the spread of infection or illness during examinations and other procedures. Gloves provide an essential layer of barrier protection against direct contact with infectious agents that are transmitted during exposure to blood and bloody saliva, contaminated objects, and surfaces.

With more than 700 species of bacteria detected in the mouth,\textsuperscript{1} and the ability of some pathogens—such as methicillin-resistant \textit{Staphylococcus Aureus}—to live on a surface for up to 7 months,\textsuperscript{2} oral health professionals need to follow the basic principles of infection control.

Glove quality and integrity matter. It also ensures that performance criteria—such as leak resistance, tear resistance, and biocompatibility—are met. While the efficacy of gloves to reduce BBP transmission has been well established,\textsuperscript{3} they do not provide 100\% protection. When manufactured, new gloves will experience a small percentage of allowable defects, such as micro-tears, which may allow exposure to blood or bloody saliva. As such, performing hand hygiene after glove removal is imperative. In addition, glove integrity decreases over time, with the incidence of failure increasing between 30 minutes and 3 hours of use.\textsuperscript{4} Changing gloves during longer procedures will reduce this risk. Oral health professionals may also want to consult with manufacturers regarding the chemical compatibility of glove material and the dental materials being used.\textsuperscript{5}

In 2016, the FDA banned the use of powdered surgical and patient exam gloves after determining that the powder posed risks to clinicians, including possible airway inflammation, hypersensitivity reactions, granulomas, and scar tissue formation.\textsuperscript{6} No remaining glove stock with powder should be used.

GLOVE TYPES AND INDICATIONS

Most patient-care gloves are made of natural rubber latex or synthetic materials, such as nitrile or vinyl. These may either be ambidextrous, fitting both the right and left hand, or fitted, which are hand specific. Ambidextrous gloves may contribute to repetitive stress injuries, while hand-specific gloves typically offer better fit, more comfort, and reduce hand and wrist strain.\textsuperscript{7}

\textbf{Single-Use Disposable Patient Care Gloves}. Exam gloves are used for examining patients and performing procedures that involve contact with mucous membranes. They are not intended for surgical procedures. Surgical gloves are sterile gloves that should be used for all oral surgical procedures. A surgical hand wash must be performed before donning these gloves. Individually packaged pairs are often offered in hand-specific designs and sizes.
Nonpatient Care Gloves: Utility Gloves. Heavy duty utility gloves are a vital but often underutilized type of PPE. They are not used for direct patient care. Both OSHA and CDC indicate that chemical- and puncture-resistant utility gloves should be worn when processing contaminated instruments and performing housekeeping duties (eg, cleaning and disinfecting) and tasks involving chemicals. Heavy duty utility gloves offer significant protection against both percutaneous injury and chemical exposure. Typically composed of nitrile or neoprene, they should be washed and disinfected after use. Some types may be heat sterilized; this would be indicated in the manufacturer’s instructions for use (IFU). Oral health professionals should have their own pair of well-fitting utility gloves. Utility overgloves are similar to food-handling gloves. They may be worn over contaminated exam gloves to prevent cross-contamination when clinicians need to handle an item, such as retrieve a hand mirror from a drawer, during patient care.

MAKING THE BEST CHOICE

Choose the best glove based on the following considerations.

1. The task at hand. Gloves should be chosen based on the procedure to be performed (eg, patient exam or surgery)
2. Material: latex or nonlatex
3. Skin sensitivity: consider latex or nitrile allergies
4. Size: Offices should have a variety available
5. Fit: a snug but comfortable fit is best. If too large, gloves may impede task performance. If too small, they may cause hand discomfort.
6. Ambidextrous or hand-specific gloves: based on clinician preference while considering the length of procedure time
7. Tactile sensation: sensitivity should not be significantly reduced. Consider grip, glove thickness, and if the material will be slippery when wet.

SAFE GLOVE USE

Hands are the main pathway of disease transmission. Hand hygiene is the most effective way to prevent the spread of infection, thus it must always be done prior to gloving. Routine hand washing with antiseptic hand wash, the use of antiseptic hand rub, or surgical hand antisepsis are all types of hand hygiene. Oral health professionals involved in patient care must be able to perform this task correctly and at the right time. The use of gloves never replaces the need for cleaning hands.
Safe glove use includes accuracy in technique when donning (putting on) and doffing (removing) gloves (Figure 1 and Figure 2). Gloves are the last item of PPE put on prior to patient treatment and their removal follows a specific sequence. If any of these steps are not followed correctly, there is a high risk of skin contamination. Gloves must never be reused.

**FIGURE 1.** The World Health Organization recommends the following steps for donning gloves. After taking a glove out of the original box, touch only a restricted surface of the glove corresponding to the wrist at the top edge of the cuff (A). Don the glove. Take the second glove with your bare hand and touch only a restricted surface of the glove corresponding to the wrist (B). To avoid touching the skin of the forearm with the gloved hand, turn the external surface of the glove to be donned on the folded fingers of the gloved hand, thus enabling you to glove the second hand (C). Once gloved, hands should not touch anything that is not defined by indications and conditions for glove use.

Occasionally during treatment, a clinician must leave a patient to retrieve an instrument or device. If gloves aren’t removed, cross-contamination can occur when touching other surfaces or items. Removing just one glove means that bacteria on that hand could transfer to clean items. The best options are to use a cover glove, or remove both gloves, perform hand hygiene, and then retrieve the item.

Healthy, intact skin is the best defense against pathogen transmission and infection. Selection and use of appropriate medical grade moisturizers and other hand hygiene products are necessary. In an effort to prevent dryness and contact dermatitis often caused by frequent hand hygiene, clinicians often apply lotions. However, lotions with a petroleum-base can hinder the effectiveness of latex gloves. Therefore, oral health professionals should consider using only water-based lotions during the workday.
FIGURE 2. The World Health Organization recommends the following steps for doffing gloves. Pinch one glove at the wrist level to remove it (A), without touching the skin of the forearm and peel away from the hand, thus allowing the glove to turn inside out. Hold the removed glove in the gloved hand and slide the fingers of the ungloved hand inside between the glove and the wrist (B). Remove the second glove by rolling it down the hand and fold into the first glove. Discard the removed glove (C). 

Adverse skin conditions can develop due to glove use, chemical exposure, and repeated hand hygiene. Allergies and sensitivities related to gloves should be evaluated by an allergist or dermatologist to pinpoint the cause and direct a course of treatment.

Long nails and hand jewelry can interfere with proper glove selection, cause difficulty when donning, and are likely to create tears and/or punctures. Artificial nails are not recommended as they have been linked to outbreaks of bacterial infections. Natural nail tips should be kept less than a ¼ inch long.

Gloves stored in areas with considerable moisture, light, or heat are likely to degrade; shelf life varies by type and manufacturer.

CONCLUSION

Gloves are a critical component of PPE necessary for protection against bloodborne pathogens and exposure to other harmful pathogens. Proper hand hygiene along with the proper use of the correct glove will dramatically reduce the likelihood of infection for both oral health professionals and patients. Dental hygienists [all oral health care workers] must have a clear understanding of appropriate glove use in order to be confident they are providing the safest dental visit.
REFERENCES


The Role of Gloves in Breaking the Chain of Infection[^4]

Practicing proper glove protocol will help oral health professionals reduce the risk of occupational exposure.

By Nancy Goodwin, CDA, RDH, MEd On Mar 1, 2018

More than 30 years have passed since oral health professionals switched from wearing virtually no personal protective equipment (PPE) to donning gloves, masks, protective clothing, and eye protection with all patients.[^1] The Occupational Safety and Health Administration’s (OSHA) Bloodborne Pathogen (BBP) Standard defines how oral health professionals should protect themselves from blood and other potentially infectious materials (OPIM), and specifies what type of PPE should be worn and when.[^2] The proper use of gloves remains a vital component of clinicians’ PPE.

**BLOODBORNE PATHOGEN STANDARD**

OSHA published the BBP Standard in 1991 to protect health care workers from bloodborne infection. It was later expanded to include all patient secretions and excretions except sweat.[^3] A review of the “chain of infection” is the first step in properly adhering to the BBP Standard (Figure 1). Potential infectious agents reside in reservoirs that can include surfaces, instruments, or patients. The potential pathogen must leave the reservoir through a portal of exit and move via direct or indirect transmission to a portal of entry in a susceptible host. The point of an infection control program—including the wearing of PPE—is to break this chain of infection at as many points as possible. Proper use of gloves will effectively protect the hands from becoming a portal of entry for potential bloodborne pathogens.
PPE should be procedure specific. As such, oral health professionals should wear appropriate PPE whenever they may have hand contact with blood, OPIM, or contaminated surfaces/items. All clinical procedures fall into this category and examination gloves are adequate for these situations. When clinicians follow these recommendations, the risk for transmission is greatly decreased. A review of the specific guidelines for glove use is always a good practice, as numerous studies continue to document problems with compliance. The most common compliance issues include failure to perform proper hand hygiene before placement and after glove removal, improper removal that causes hand contamination, and the wearing of artificial nails and/or rings.

GLOVE TYPES AND RECOMMENDATIONS

Several types of gloves are used in the dental setting, such as sterile, examination, heavy-duty utility, and overgloves. For all clinical procedures—excluding surgery, which requires sterile gloves—examination gloves are recommended. They are available in a variety of materials, are nonsterile, either ambidextrous or designed for right or left hands, and come in a variety of textures. The addition of left and right sizing and different textures were made to help improve the ergonomics of clinical practice. Historically, latex gloves were the most popular option, but due to problems with microtears and latex allergy/sensitivity, nitrile gloves are gaining popularity. Powdered gloves are no longer available, as they were banned by the United States Food and Drug Administration (FDA) in January 2017 due to their ability to cause illness/injury.

The Professional Board for Dental Assisting, Dental Therapy and Oral Hygiene requested the South African Health Products Regulatory Authority (previously known as the Medicines Control Council) to advise on local regulations with regards to the used of powdered gloves in South Africa.

Sterile gloves come individually packaged, are manufactured on specific right and left hand forms, and come in exact sizes. They are more costly, and are reserved for surgical procedures. Evidence has not demonstrated that sterile gloves are more effective at reducing infection risk during nonsurgical procedures, so they are not recommended for routine use.
Heavy-duty utility gloves should be used for disinfection, cleaning tasks, and instrument processing, as examination gloves are not recommended for these activities.\textsuperscript{14} Using examination gloves for these procedures increases the likelihood of occupational exposure and the wicking of disinfectants to the skin.\textsuperscript{14}

Overgloves are similar to food-handling gloves, and are not recommended for use in patient care. They may be worn over contaminated examination gloves to prevent cross contamination when clinicians need to retrieve or handle an item during patient care.

**BEST PRACTICES**

Proper hand hygiene is key to effective glove use.\textsuperscript{15} Wearing gloves is not a substitute for hand hygiene, and is of limited value if hand hygiene is not routinely and meticulously performed. The US Centers for Disease Control and Prevention (CDC) *Guidelines for Hand Hygiene in Healthcare Settings* state that one of the most common factors in noncompliance with hand hygiene protocols is the false sense of security provided by gloves.\textsuperscript{16} Contamination of the hands is likely during glove removal, and can also occur through undetected breaks in the glove during procedures,\textsuperscript{17} so performing hand hygiene both before donning and after removal is essential.
Unfortunately, a high percentage of oral health professionals report they do not perform hand hygiene between patients.\textsuperscript{18,19}

Myers et al\textsuperscript{18} conducted a study of 4,107 dentists on the knowledge, attitudes, and practices of CDC hand hygiene guidelines. They found that 71% always or almost always washed with soap/water and 22% almost always or always disinfected with an alcohol-based hand sanitizer between patients. The dentists who were most familiar with the CDC guidelines were most likely to use acceptable hand hygiene procedures than dentists who were less familiar with the guidelines.

In a study by Garland,\textsuperscript{19} dental hygienist participants reported a high level of knowledge and compliance with infection control guidelines with only a few exceptions that were not related to hand hygiene. Handwashing procedures, or the proper use of an alcohol-based hand rub are recommended before donning gloves and immediately after glove removal. For hands that are visibly soiled, handwashing with soap and water is required.\textsuperscript{20}

Another factor to consider is that glove integrity decreases with time worn. There is not an exact time recommended to wear one pair of gloves, but the incidence of glove failure through microtearing increases between 30 minutes and 3 hours of use.\textsuperscript{21} This should be considered during longer dental procedures, and gloves should be changed often to reduce this risk.

**FINGERNAILS AND JEWELRY**

Wearing artificial nails is a popular trend, but their use is discouraged among health care professionals by both the CDC and the World Health Organization.\textsuperscript{22} There is an increased likelihood of pathogenic microbes growing under and around artificial nails, and handwashing protocols cannot adequately remove them.\textsuperscript{23} The length of time the nails are worn increases the likelihood for Gram-negative bacilli and yeasts to be found.\textsuperscript{23} Artificial nails have also been linked to poor handwashing practices and more tears in gloves, as well as disease outbreaks that could be traced to specific individuals in hospital settings.\textsuperscript{24,25}

Although not a proven risk for disease transmission, the wearing of rings increases the bacterial load on the hands and is discouraged.\textsuperscript{26} Nail length is another factor, as the majority of microbes that can be cultured from the hands are found under fingernails. The CDC recommends that nails be kept clean, and that nail tips be kept to less than $\frac{1}{4}$ inch in length.\textsuperscript{16}

**CONCLUSION**

The proper use of gloves is an important component of PPE for every oral health professional. Effective glove use includes the performance of meticulous hand hygiene prior to donning gloves and after glove removal, wearing the appropriate glove for the clinical task at hand, keeping
natural nails trimmed short with no artificial adornments, and following recommendations for length of time worn. Practicing these protocols with consistency will reduce the risk of occupational exposure.

REFERENCES


Please read the CDC’s Guidelines for Hand Hygiene for Health care professionals[5] in additional course notes.

More helpful hints:

- Use the CDC’s Handwashing song for mindful hand washing.
  [https://tools.cdc.gov/podcasts/media/mp4/WashHandsEveryday_OC.mp4](https://tools.cdc.gov/podcasts/media/mp4/WashHandsEveryday_OC.mp4)
- Watch this video:
  [https://www.youtube.com/watch?v=Zj0znMTAgwA](https://www.youtube.com/watch?v=Zj0znMTAgwA)

**Question Time**

To qualify for your CPD points, you have to get 70%. You have 3 chances in order to achieve this. Good luck!

If more than one correct answer applies, all correct answers need to be chosen.
1. The ________ developed infection control guidelines and recommendations to protect clinicians and patients.
   a. HPCSA
   b. CDC
   c. OSHA

2. Which of the following are recognised as personal protective equipment (PPE) in dentistry?
   a. Gloves
   b. Masks
   c. Closed shoes
   d. Glasses

3. Gloves provide 100% protection against bloodborne pathogens.
   a. True
   b. False

4. During long procedures, gloves should for safety sake be replaced every:
   a. 30 minutes
   b. hour
   c. 8 hours

5. Which glove is used for examining patients and performing procedures that involve contact with mucous membranes?
   a. Single-Use Disposable Patient Care Gloves.
   b. Surgical gloves
   c. Heavy-duty utility gloves
   d. Overgloves

6. Which gloves are not for patient use?
   a. Single-Use Disposable Patient Care Gloves.
   b. Surgical gloves
   c. Heavy-duty utility gloves
   d. Overgloves

7. What is the main pathway of disease transmission?
   a. Air borne bacteria
   b. Blood borne bacteria
   c. Through the hands

8. When choosing the correct glove for the task the need for regular hand washing is reduced
   a. True
   b. False

9. When doffing gloves, which of the following procedures are out of sequence
   a. Pinch one glove at the wrist level to remove it.
   b. Without touching the skin of the forearm and peel away from the hand, thus allowing the glove to turn inside out.
c. Discard the removed glove.

10. Choose the correct answer/s:

Contamination of hands is likely to occur
   a. during glove removal.
   b. through undetected breaks in the glove during procedures
   c. when using a lanolin based hand lotion

11. An alcohol rub should be used on visibly soiled hands
   a. True
   b. False

12. Which of the following statements about artificial nails are false?
   a. There is an increased likelihood of pathogenic microbes growing under and around artificial nails.
   b. Handwashing protocols can adequately remove pathogenic microbes around artificial nails.
   c. Wearing artificial nails comprise the integrity of your gloves.

13. Which of the following fact or facts about sterile gloves are not true:
   a. Sterile gloves come individually packaged, are manufactured on specific right and left hand forms, and come in exact sizes.
   b. They are more costly, and are reserved for surgical procedures.
   c. Sterile gloves are more effective at reducing infection risk during nonsurgical procedures.

14. Choose the correct statements about the following statement:

   The CDC recommends that
   a. nails be kept clean
   b. nail tips be kept to less than ¼ inch in length.
   c. Artificial nails be replaced 3 monthly

15. Effective glove use includes:
   a. the performance of meticulous hand hygiene prior to donning gloves and after glove removal.
   b. wearing the appropriate glove for the clinical task at hand.
   c. keeping natural nails trimmed short with no artificial adornments, and following recommendations for length of time worn.

References
2. https://dimensionsofdentalhygiene.com/