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Instrument Cassettes for Office Safety and Infection Control

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Instrument Cassettes for Office Safety and Infection Control

Abstract

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The goal of a dental infection control program is to provide a safe working environment that will reduce the risk of health care–associated infections among patients and occupational exposures among staff members. Minimizing the potential for percutaneous sharps injuries is a primary focus for a comprehensive infection control program. This article will review the advantages of using instrument cassettes, as well as provide an overview of engineering and work practice controls and instrument processing, to emphasize how appropriate use of instrument cassettes can improve office safety and infection control.

Learning Objectives

After reading this article, the reader should be able to:

- identify the advantages of using instrument cassettes in a dental setting.
- list items to consider when selecting a cassette system.
- define and provide examples of engineering and work practice controls.
- describe instrument processing procedures.

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Dental offices need clearly written policies, procedures, and guidelines to help ensure consistency, efficiency, and effective coordination of infection control activities.¹ There is the potential for percutaneous sharps exposure from handling numerous dental instruments. The most common risks of exposure are those from patient to health care personnel. Minimizing the potential for this mode of transmission, therefore, is a primary focus for a comprehensive infection control program. An important part of the office infection control program is selecting and using technologies and products to develop a safe and efficient work environment for patients and staff. Instrument cassettes

are an example of a product that can be integrated into a dental office and, when used appropriately, can increase organization and improve safety and infection control, both in the dental operatory and when processing instruments for reuse.

Overview

Instrument cassettes have been used for many years in hospitals to organize instruments into sets. In recent years they also have become popular in dental offices. A cassette can be used to hold and organize a complete set of instruments for a specific procedure inside a single container, eliminating the need to gather multiple packages for a procedure (Figure 1). Additionally,

Table 1—Advantages of using instrument cassettes.

- Saves time during instrument processing by keeping all the instruments for a specific procedure together in one cassette, from the chairside procedure through cleaning, rinsing, drying, packaging, sterilization, and storage
- Less handling of contaminated instruments during processing for re-use
- May decrease sharps injuries due to less handling of contaminated instruments
- May decrease sharps injuries chairside when reaching for instruments because instruments are more organized
- Helps to maintain instrument sterility during storage
- May decrease the need for repackaging and sterilizing because of instruments tearing paper/plastic sterilization wraps
- May increase instrument longevity by decreasing the need to replace instruments that become damaged or misplaced during instrument processing
- Allows aseptic and organized presentation of instruments chairside (Figure 2)



Figure 1—An example of a cassette with all of the instruments for a restorative dentistry procedure.

when using cassettes there is less handling of contaminated instruments during clean-up and reprocessing. This aspect can provide additional safety by streamlining instrument flow while saving time. Therefore, improved organization and efficiency are primary advantages of cassettes. There are other advantages to using a cassette system in a dental office, which will be discussed and are summarized in Table 1 and Figure 2.

Before purchasing any new product, it is necessary to consider what features are desired and will meet the needs of the dental practice. Cassettes are available in a variety of materials, sizes, and shapes (Figure 3). It is necessary to consider, when determining the best cassette size for the office, how many instruments and accessories are used for each procedure. A dental practice can often end up with several different sizes of cassettes in the office because of specialized instrument requirements for certain procedures (operative vs surgical). For example, the cassettes selected for hygiene procedures will probably be smaller than those selected for restorative or surgical procedures. It is also important to evaluate the size of your cleaning and sterilization equipment (eg, ultrasonic cleaner, instrument washer, sterilizer). Because cassettes will occupy more space compared with other types of packaging materials, ensure that the office has adequate storage space.

Perforated cassettes are preferable because completely solid containers may not allow steam or chemical vapor to reach the contents for sterilization to occur. The perforations also allow thorough cleaning when in the ultrasonic cleaner or instrument washer. Cassettes are commonly made of stainless steel, plastic, or aluminum. Both the cassette and any insert materials should be compatible with your cleaning solutions and sterilization method. For example, some plastic materials may be damaged by the high heat used with dry heat sterilizers.

Other features to consider are instrument rails, strips, holders, or racks inside the cassette that are used to hold instruments in place. If these are made of soft material, they may decrease scratching on the instrument surfaces. Also, check to see if the holding devices provide



Figure 2—An advantage of using instrument cassettes is that they can allow aseptic presentation of instruments chairside. When opening a wrapped cassette, be careful not to touch the inside of the wrapping material because it can serve as a sterile field for the instrument cassette.

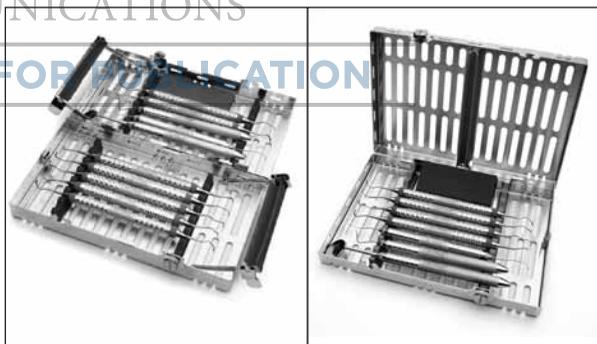


Figure 3—Cassettes are available in a variety of sizes and shapes.

adequate space between instruments to allow easy access during treatment and cleaning. Compartments within the cassette to place accessories such as rubber dam clamps, anesthetic syringes, burs, amalgam wells, and air water syringe tips would be advantageous.

The inclusion of important safety features, such as a built-in needle recapping device, can further reduce the potential for accidental needlestick injuries during patient care. Ask if there are any accessory items included or available for purchase to increase efficiency

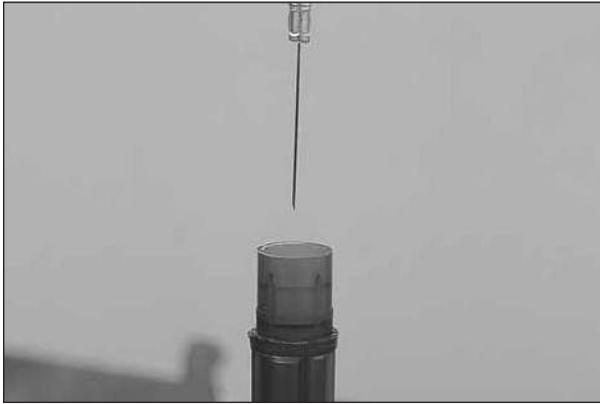


Figure 4—A cassette with a built-in needle recapping device.

or organization, such as bur blocks, endodontic file holders, or clips to hold smaller items. Some manufacturers offer customized cassettes or different inserts that can be placed inside the cassette to modify it to accommodate your instruments. Finally, it is important to check the durability and security of the closing mechanism or latch along with the ease of opening and closing the cassette.

Engineering and Work Practice Controls

Avoiding occupational exposures to blood is the primary way to prevent transmission of bloodborne diseases, including hepatitis B virus, hepatitis C virus, and human immunodeficiency virus, in health care settings. Exposures occur through percutaneous sharps injury, such as a needlestick or cut with a sharp object, as well as through contact between potentially infectious blood, tissues, or other body fluids and mucous membranes of the eye, nose, mouth, or nonintact skin (eg, exposed skin that is chapped, abraded, or shows signs of dermatitis). Most exposures in dentistry are preventable.¹

Strategies to reduce the risk of blood contacts or prevent the transmission of bloodborne diseases include the use of a combination of the hepatitis B vaccine, standard precautions, use of engineering controls, and modifications of work practices. These approaches, along with training and education, have contributed to a decrease in percutaneous injuries among dentists in recent years.²⁻⁵ To assist dental health care personnel to be as safe as possible with regard to sharps exposures, the Occupational Safety and Health Administration (OSHA) requires the use of engineering and work practice controls to eliminate or minimize employee exposure.⁶ Engineering controls are often technology based and isolate or remove the hazard from the workplace. Whenever possible, engineering controls should be used as the primary method to reduce exposures to blood and saliva from sharp instruments and needles. Examples of engineering controls include sharps disposal containers, safety needles, and safety scalpels.

Work practice controls are behavior based and intended to reduce the risk of blood exposure by altering the manner in which a task is performed. Work practices

commonly used in a dental setting include using a one-handed scoop technique to recap a needle; not bending or breaking needles before disposal; and not passing a syringe with an unsheathed needle. In many cases, engineering and work practice controls are used together to eliminate or minimize workplace hazards. For example, an engineering control such as a needle recapping device is often used to avoid recapping with 2 hands.

An instrument cassette can be considered both an engineering and work practice control. When using instrument cassettes, the instruments are organized in a single unit from the chairside procedure through cleaning, rinsing, drying, sterilization, and storage. Sharps injuries when reaching for instruments during a procedure may be reduced chairside because it is likely that the instruments will be more organized in a cassette. As previously mentioned, using cassettes may decrease sharps injuries during cleaning after the procedure because of decreased handling of contaminated instruments. A built-in needle recapping device inside the cassette (Figure 4) can also assist with one-handed needle recapping and eliminate the need to purchase a separate device.

Instrument Processing

The goal of instrument reprocessing is to deliver sterile instruments to patients. When cleaning and processing contaminated instruments between procedures, the instrument recirculation system should be logical and organized to: (1) efficiently accomplish reprocessing and sterilization; and (2) minimize procedures that can place employees at risk for percutaneous sharps exposures or other hazards.⁷ Instrument cassettes streamline instrument processing by keeping all the instruments for a specific procedure in a single cassette from the chairside through cleaning, rinsing, drying, packaging, sterilization, storage, and delivery to chairside for the next patient. This may save time and increase efficiency, in addition to decreasing the potential for sharps injuries. Additionally, using cassettes may decrease the need to replace instruments that can become damaged or misplaced during processing.

The following section reviews steps involved during instrument reprocessing, with an emphasis on how cassettes can improve safety and infection control in the dental office.

Chairside Instrument Preparation

Instrument processing should take place in a designated central processing area to more easily control quality and ensure safety, and staff members should be trained to use work practices that prevent contamination of clean areas.^{1,7,8} Preparation for instrument processing begins chairside. Handling contaminated instruments carefully to prevent occupational exposures is essential. After patient treatment, wear personal protective equipment appropriate for the job (eg heavy-duty utility gloves) and discard all disposable sharp objects, such as needles

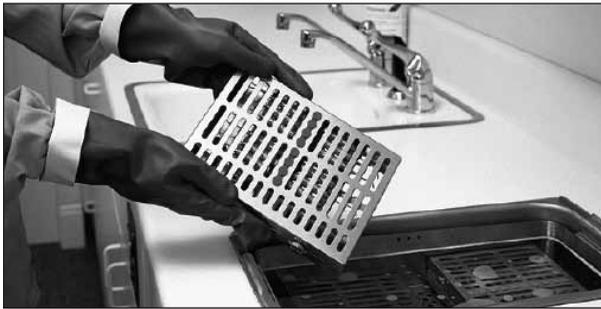


Figure 5—An instrument cassette with instruments can be placed in the ultrasonic cleaner (top) or an instrument washer (bottom) as a unit, decreasing the handling of contaminated sharps.

automated equipment for cleaning dental instruments. Ultrasonic cleaners are very popular. Instrument washers are becoming more popular in dental practices and can streamline the instrument cleaning process. When using perforated instrument cassettes, the cassette can be placed directly into the ultrasonic cleaner or instrument washer (Figure 5).

After cleaning is complete, the cassette is removed and allowed to dry before wrapping. Again, there is no direct handling of the instruments during cleaning or, afterward, sorting instruments, decreasing the potential for injury. To summarize, using automated cleaning equipment in combination with instrument cassettes is preferred over handscrubbing and can result in a “no-touch” system that is safer and more efficient for office staff members.

Packaging

The purpose of packaging is to protect instruments from contamination after removal from the sterilizer and maintenance of sterility during storage. Packaging materials must be compatible and designed for the type of sterilization process being used (eg, steam autoclave, dry heat, unsaturated chemical vapor) and cleared by the Food and Drug Administration (FDA). Packaging materials include bags, wraps, pouches, and wrapped perforated instrument cassettes. Instruments should never be stored unpackaged, because an unwrapped item does not have a shelf life.¹ Instrument cassettes are very useful and a popular way to package dental instruments, as virtually every US and Canadian dental school uses them to train students.

It is important to note that if using an instrument cassette, all instruments for that specific procedure should be placed inside the cassette, eliminating the need for miscellaneous packages that need to be brought into the operatory for treatment. Furthermore, by having the instruments prearranged in the cassette, the decreased handling may even allow for a quicker set-up for the next patient. After the instrument cassette is cleaned and dried, the cassette can be opened and any disposable gauze items can be placed inside before sterilization. It is important to follow the manufacturer’s recommendations for cleaning, wrapping, and sterilizing the cassettes.

Unfortunately, the need to wrap a cassette is sometimes misunderstood. It is necessary to have perforations in the cassette because completely solid containers may not allow the sterilizing agent (eg, steam or chemical vapor) to reach the contents. If an additional wrapping material, such as a sterilization wrapper or a paper/plastic pouch, is not used to wrap the cassette, the contents will not remain sterile during storage because of the perforations in the cassette. Before wrapping the cassette (Figure 6), place an internal chemical indicator among the instruments. If an opaque packaging material is used, the internal indicator will not be visible on the outside of the package. In this case, an external indicator should be placed on the package in addition to the internal indicator.

and burs, in sharps containers. Discard all other disposable items appropriately, including gauze, cotton rolls, articulating paper, and cotton tip applicators, using regulated waste containers when indicated. If instruments are returned to the cassette immediately after use during treatment, the cassette can be closed securely and transported to the instrument processing area. Alternatively, if the instruments are removed from the cassette for patient treatment, then they would have to be returned to the cassette before transport. Instruments should be carefully arranged, preparing them for the next patient use, because they will not be removed from the cassette during instrument processing.

The instruments are now ready for transport to the central instrument processing area. Reusable sharp instruments should be placed in an appropriate container at the point of use to prevent percutaneous injuries during transport to the instrument processing area.^{1,6} An additional container can be used for this, but if the instruments are secured inside the cassette by using instrument rails or small compartments, a second carrying container may not be necessary for transport.

Cleaning and Decontamination

The basic premise of aseptic technique—clean it first—applies to instrument processing. Cleaning involves the removal of debris as well as organic and inorganic contamination. Because of the potential for injury from sharp instruments, handscrubbing should be avoided as much as possible.^{1,7} Most dental offices use

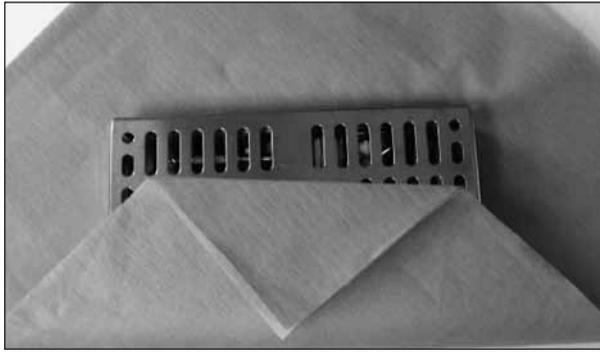


Figure 6—Cassettes must be wrapped or pouched after cleaning and before sterilization to ensure sterility is maintained.



Figure 7—Wrapped cassettes inside a sterilizer.

Sterilization

In dentistry, the 3 most common methods used to sterilize patient-care items are steam under pressure (autoclaving), dry heat, or unsaturated chemical vapor. Steam sterilization is dependable and cost-effective and is the most widely used method for items that are not sensitive to heat or moisture.¹ All sterilization equipment legally sold in the United States must be cleared by the FDA and used according to manufacturer instructions.

Correct loading of the sterilizer chamber is essential. Items to be sterilized should be arranged to allow adequate circulation of the sterilizing agent. Because the size and shape of instrument cassettes vary, consider the size of the sterilizer chamber when selecting and purchasing sterilizers and cassettes (Figure 7). They will most likely take up more space than other types of packaging materials. Accessories, such as racks or trays, are usually provided with the sterilizer, or can be purchased separately, to help with proper loading procedures. Usually, packages should be placed in the chamber on their edges so that the sterilizing agent contacts every surface of every article.

Additionally, it is important to ensure that the cassette materials are compatible with the sterilization method being used in the office. Instrument packs should be allowed to dry inside the sterilizer chamber before removing and handling. Packs should not be touched until they are cool and dry because hot packs act as wicks, absorbing moisture and, hence, bacteria from hands and the environment. Also, wet packs can tear more easily.

Storage

The purpose of storage is to maintain sterility until the package integrity is broken at the time of use. Packaged instruments and other items must be stored in a manner that prevents contamination. Sterile dental items and clean patient-care supplies should be stored in a clean and dry enclosed area. Closed cabinets limit dust and inadvertent contact with the sterile items. Sterile instruments or patient-care items should not be stored where they might become wet, such as under a sink.¹ Because cassettes take up more space than instruments in pouches, consider the size of storage space. Sterility is more assured when instruments are stored inside the cassette until use.

Also, a wrapped cassette may decrease the need to repackage and sterilize items because of sharp or heavy instruments tearing paper or plastic package materials.

Summary

An important part of the office infection control program is selecting and using technologies and products to develop as safe a working environment as possible for patients and staff. Instrument cassettes are an example of a product that can be integrated into a dental office and when used appropriately can increase organization and improve safety and infection control.

Disclosure

The opinions expressed in this text are those of the author and do not reflect the official policy of the US Department of Defense or other departments of the US government.

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