# Reducing risk with instrument processing steps

By Katherine Schrubbe, RDH, PhD, MEd
*Independent Compliance Consultant*

The correct and appropriate processing of reusable dental instruments is the foundation of any dental practice. Lack of standardized protocols for cleaning and sterilization puts both dental team members and patients at risk for injury and disease transmission. Breaches in instrument reprocessing protocols have put dentistry in the news and emphasize the importance of thorough and consistent infection control practices. Thus, proper instrument processing is one of the most important tasks to ensure patient safety.

The dental profession predominantly relies on OSHA standards for healthcare worker safety and CDC guidelines to provide a safe environment for team members and patients. Another key organization for instrument processing standards is the Association for the Advancement of Medical Instrumentation (AAMI). AAMI Standard 79 is a comprehensive guide to steam sterilization and sterility assurance in healthcare facilities, reinforcing the CDC Guidelines for Infection Control in Dental Health-Care Settings.

The American National Standards Institute oversees the creation of guidelines that impact businesses and adopts AAMI standards rather than developing new ones.

Although the standard is not regulatory in nature, it is considered best practice for steam sterilization and instrument reprocessing and can be helpful in standardizing sterilization protocols across practice settings. The ADA also has numerous best practice documents that reinforce utilization of current CDC guidelines for instrument processing. Find the best practice documents at ADA.org/resources/research/science-and-research-institute/oral-health-topics/infection-control-and-sterilization.

It is necessary to understand the types of instruments used in dentistry. The Spaulding Classification system identifies medical devices as critical, semi-critical and noncritical according to the degree of risk for infection while using the items. Dentistry utilizes all three categories of instruments:

- Critical instruments – Surgical instruments, scalpel blades, scalers and surgical dental burs are examples of devices those that normally enter sterile body tissue such as the bloodstream or bone.
- Semi-critical items – These include mouth mirrors, which contact mucous membrane but do not penetrate soft tissue.
- Noncritical items – X-ray heads, pulse oximeters, cameras and blood-pressure cuffs can be surface-disinfected and pose a low risk of cross-contamination.

Both critical and semi-critical items must be heat sterilized or single-use disposable.

When transporting contaminated instruments to the processing area, OSHA requires the use of a container that is labeled with a biohazard symbol, puncture resistant, and leakproof on the sides and bottom. Both AAMI and the CDC recommend that the container also be sealed or have a cover. This is to ensure worker safety while transporting contaminated instruments.

## Six steps

There are typically six steps in the instrument processing cycle.

1. The first step is to ensure all soil has been removed prior to cleaning, packaging and sterilization. This is a simple but important step, as instruments become

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contaminated with blood, saliva, tissue fluids and dental materials as well as microbes from the patient's saliva and blood during treatment. This debris is referred to as bioburden, which can provide insulation to sterilizing agents such as steam, making the process ineffective. All bioburden must be removed prior to cleaning, packaging and sterilization. If needed, instruments can be placed in a holding pre-soak enzymatic solution first to prevent drying of any bioburden.

2. The second and most important step is actual cleaning. Studies have demonstrated that a soiled instrument cannot be sterilized successfully. Manual scrubbing of instruments is still an acceptable practice but not highly recommended, as it puts the dental team member at risk for occupational injury and cross-contamination.

   Ultrasonic machines rely on cavitation to remove soil from an instrument surface and are more frequently used. Busier practices that process large quantities of instruments may use a washer-disinfector, a specialized, FDA-approved medical device that appears similar to a home dishwasher. To aid in the process, monitors may be deployed to demonstrate that cleaning was successful. While carrying out these tasks, it is important for team members to wear appropriate PPE, including heavy-duty gloves.

3. Next, ensure that all cleaned instruments are packaged appropriately. When cleared by the FDA, sterilization packages must demonstrate they maintain purity for at least six months. It is important to choose the correct size pouch for instruments. AAMI states that the proper sizing and application of pouches allows for adequate air removal, steam penetration and drying. The package should provide about 1 inch of space between the items in the pouch and the sealed edges. Cassettes are often used and also must be placed in a sterilization pouch or wrapped in paper.

   In each of these options, chemical indicators are used in packaging to provide a visible verification that certain rules were met inside the sterilizer. The parameters used include time, temperature and steam. CDC guidelines recommend placing an internal indicator in each package; an external indicator should be used when the internal option is not visible from the outside of the package.

   Dual-indicator pouches are available through many manufacturers to meet the stated criteria. During cassette use, a separate chemical indicator (preferably a chemical integrator) must be placed *inside* the cassette, and the packaging (pouch or wrap) must have an external indicator as well.

4. The fourth step is the sterilization process. The CDC states that steam under pressure (autoclaving) is the process of choice whenever possible, as it is considered safe, fast and most cost-effective for healthcare facilities. It is crucial to follow the instructions for all sterilizers, including timing, temperature of packages and loading of the chamber. Packages should have space between them so the steam has access to all surfaces.

5. Sterile storage is the next step in the cycle. Sterilized instruments should be stored in closed or covered cabinets, in low dust areas and away from moisture. The event-related shelf-life approach is most commonly used to assess how long packages will remain clean.

   This method indicates that the package is sterile indefinitely, unless there is an event causing it to be contaminated, such as a tear, brittle plastic, wet packaging or an item that has fallen on the floor. Any of these compromises call for reprocessing. Prior to use, packaging should be reinspected for tears, punctures, open seals or improperly turned chemical indicators. Sterile packages must remain sealed and intact until ready for use. It is best to verify the chemical indicator has changed color and then open the package in front of the patient to demonstrate it has been correctly processed.

6. Quality assurance plays a large role in this last step in the instrument processing cycle. The quality-assurance measures include physical, chemical and biological verification. All three are important for patient safety:

   - Mechanical monitoring involves checking gauges, lights and displays on the sterilizer to detect gross malfunction.
   - Chemical monitoring relates to a change in color of indicator package markings, strips or tape.
   - Biological monitoring, considered the gold standard, is a direct assessment of the sterilization process by determining whether the sterilizer kills spores.

   For steam sterilization, biological indicator strips or vials are used with the challenge organism, *Geobacillus sterothermophilus*. These "spore tests" must be done on a weekly basis in the office or by mail to an external site, and results must be logged. The CDC has information on how to manage a biological indicator failure and provides an example of three years – the timeframe used by The Joint Commission – to maintain record results.

Following OSHA, CDC and AAMI standards and guidelines takes the guesswork out of processing and preparing instruments that are used in dental care. It is best to have written protocols for team members so that everyone carries out these tasks consistently and safely. Regardless of the type or size of the practice, a clear understanding of proper instrument processing protocols is vital to reduce the risk of disease transmission, cross-contamination or injury to the dental team and patients. ■

*Those interested in learning more about this topic can view the webinar recording: Instrument Processing: Step-by-Step with Quality Assurance Systems, presented by Katherine Schrubbe, RDH, PhD, MEd, now available in the AAOMS CE on Demand Library at AAOMS.org/CEonline.*

**Sources:**


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*This is number 188 in a series of articles on practice management and marketing for oral and maxillofacial surgeons developed under the auspices of the Committee on Practice Management and Professional Staff Development and AAOMS staff. Practice Management Notes from 2002 to present are available online at AAOMS.org.*