

Preventing Damage to Ultrasound Probes

Probe Damage can be Costly and Lead to Patient Risk



CS Medical 

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Ultrasound probes play a crucial role in modern healthcare, providing valuable diagnostic insights to healthcare professionals in mere moments. However, transvaginal, transrectal, and surface ultrasound probes are delicate and susceptible to damage due to several factors inherent to their design and their use in medical settings. Understanding these factors can help healthcare professionals implement proper handling and care practices to minimize the risk of damage.

Preventing damage to ultrasound probes during reprocessing by adopting automated reprocessing solutions such as CS Medical's Ethos® Automated Ultrasound Probe Cleaner Disinfecter is key to providing patients with first class medical care. In order to understand how to handle ultrasound probes, one must first understand the intricacies of these devices.

The Spaulding Classification System

The Spaulding Classification System categorizes medical devices into three classes—critical, semi-critical, and non-critical—based on their risk of transmitting infections. Most ultrasound probes, due to their contact with mucous membranes or non-intact skin, fall into the semi-critical category. This classification mandates that these devices undergo high-level disinfection between each use, even if a probe cover or condom is employed, to ensure patient safety and prevent the spread of healthcare-associated infections (HAIs).

According to the Centers for Disease Control & Prevention (CDC), "Even if probe covers have been used, clean and high-level disinfect other semi-critical devices such as rectal probes, vaginal probes, and cryosurgical probes." They go on to double down on this recommendation: "Do not use a lower category of disinfection or cease to follow the appropriate disinfectant recommendations when using probe covers because these sheaths and condoms can fail."

One might be tempted to believe that requiring high-level disinfection between uses of ultrasound probes which have been used with a protective condom might not truly be necessary, but this is not so. In one study, transvaginal ultrasound probe sheaths from two different manufacturers were tested and up to 65% of unused probe sheaths were found to be perforated. That number rose to 81% after use.

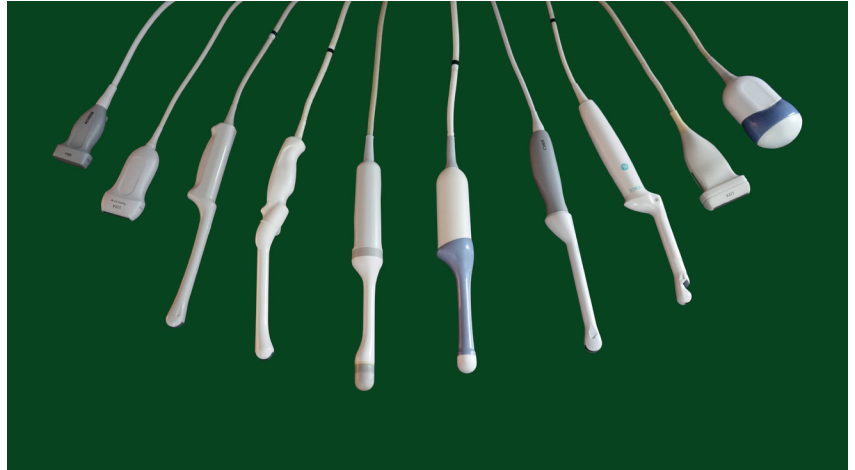


While probes must be high-level disinfected between each use, high-level disinfectants can be harsh and abrasive if not used properly and if their chemistries have not been approved for use with a particular ultrasound probe. Consequently, before high-level disinfection can take place, healthcare facilities must be diligent to ensure that the high-level disinfectants they use have been approved as materially compatible by the probe's manufacturer. Using an unapproved chemistry or reprocessing method could result in significant damage to an ultrasound probe.

Why are probes so easy to break?

Ultrasound probes are highly sophisticated and complex devices with multifaceted internal components, including transducer arrays, cables, and connectors. Within the transducer, piezoelectric crystals are arranged in an array or pattern. When electrical current is applied to these crystals, they vibrate and generate ultrasound waves. As these ultrasound waves encounter tissue, the crystals in the transducer receive the returning echoes, and these echoes are converted back into electrical signals for image formation. The precise arrangement of these crystals contributes to the probe's ability to produce high-quality ultrasound images.

This intricate design makes ultrasound probes susceptible to damage if not handled with extreme care. The transducer, in particular, which houses the delicate piezoelectric crystals can be easily compromised. The delicate nature of these internal components makes them vulnerable to damage if subjected to impact.



Common causes of damage and how to prevent them

Excessive and improper handling. Frequent and improper handling of ultrasound probes can lead to physical damage. Accidental drops or impacts, whether during transportation or while in use, can cause immediate damage to ultrasound probes. The fragility of the internal components makes them susceptible to breakage upon even minor impacts. Untrained, inexperienced, or overworked staff may inadvertently mishandle probes, not to mention run-of-the-mill accidents.

Reducing the number of times a probe must be handled is a huge step in mitigating the risk of ultrasound probe damage. Staff should be trained on proper handling techniques to minimize unnecessary stress on the probes. The Society of Diagnostic Medical Sonography (SDMS) states: "Automated processes are preferable because they reduce the risk of operator error." The most effective method for reducing handling is by automating the entire reprocessing procedure from cleaning to high-level disinfection and even the final rinse by employing the only completely automated system on the market: Ethos.



Unsuitable storage. The flexible cables connecting the ultrasound probe to the imaging system are central for transmitting data and power. Storing a probe with the cables bent or twisted too tightly can lead to damage, affecting the functionality of the probe. Storage conditions which expose probes to extreme temperatures, humidity, or pressure can affect the structural integrity of ultrasound probes. Some probes are even stored in busy halls or passageways making them vulnerable to accidents from passersby.

It's vital to follow manufacturer recommendations for storage to prevent damage. The SDMS also explains: "Suitable options for transducer storage include storage covers, boxes, or cabinets (e.g., HEPA-filtered, ventilated or non-ventilated)." One excellent storage solution which ensures compliance with the most rigorous standards is the CleanShield® Ultrasound Probe Storage Cabinet.

Improper reprocessing. Manual reprocessing is susceptible to human error, and even well-trained veteran staff members may inadvertently compromise the integrity of ultrasound probes. When manually reprocessing probes, there are many elements to keep track of, from contact time and temperature to the various cleaners and disinfectants needed to get the job done. With so many variables to juggle, it is easy to make mistakes. Not leaving a probe in high-level disinfectant

solution for long enough can result in a probe that still has contaminants on it which can develop into biofilm and significantly damage the probe. On the other hand, leaving a probe in that solution too long is, "likely to damage delicate and intricate instruments," according to the CDC.

Automated reprocessing devices like Ethos offer standardized procedures, meaningfully reducing the risk of errors in the disinfection process. Ethos has perfectly timed cleaning and disinfection cycles and ensures that probes are properly reprocessed each and every time, eliminating the worry that a probe may be damaged by poor technique.

The Consequences of Probe Damage

Damage to ultrasound probes has far-reaching consequences, impacting patient safety and healthcare budgets. When probes are compromised, it not only necessitates costly repairs or replacements, but also poses a significant risk of transmitting HAIs. Inadequate reprocessing can result in the survival of harmful microorganisms on the probe's surface, compromising patient safety and violating healthcare standards.

Healthcare facilities must recognize that damage to ultrasound probes is not only a clinical concern but also a financial one. The costs associated with repairing or replacing damaged probes, coupled with potential legal ramifications in cases of infection transmission, can strain the budgets of healthcare institutions. And these increased expenses are then passed on to patients in the form of higher healthcare costs. Implementing automated reprocessing solutions like Ethos can mitigate these financial burdens by reducing the frequency of repairs and replacements and easily ensuring compliance with regulatory standards.



Automated Reprocessing Solutions

To address the challenges associated with manual reprocessing, healthcare professionals should consider adopting automated solutions like CS Medical's Ethos Automated Ultrasound Probe Cleaner Disinfector. Ethos represents a breakthrough in ultrasound probe reprocessing, being the first device of its kind to receive clearance from the US FDA. This innovative technology streamlines the cleaning and high-level disinfection process for transvaginal, transrectal, and surface ultrasound probes in a single device, aligning with manufacturer recommendations.



Ethos presents a compelling solution to the challenges associated with manual reprocessing. By integrating advanced technology into healthcare facilities, professionals can ensure that transvaginal, transrectal, and surface ultrasound probes undergo both cleaning and high-level disinfection according to manufacturer recommendations without risking damage to probes.



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