



When are endoscopes, heat-sensitive devices ready to be handled safely?

by Kaumudi Kulkarni, M.S.

In sterile processing, knowing if the endoscopes and other heat sensitive devices are ready to be safely handled is of the utmost importance. The wide array of medical devices can be grouped under three rubrics based on how they are cleaned: manually cleaned, machine-cleaned or a combination of both.



Fig. 1 - Manually cleaned devices

A question I hear often is: Are manually cleaned devices safe to handle? Manually cleaned devices are generally perceived to be not as safe to handle, as the mechanically cleaned instruments. Many sterile processing personnel even take the added step of wiping the manually cleaned items with alcohol after they have been sent through the pass-through window. Manual cleaning is required for devices that are temperature sensitive, non-submersible or those that have size limitations (Fig. 1). Rigid endoscopes including arthroscopes and laparoscopes that have power cords, lenses and electronics components are often manually cleaned for the same reasons.

There is a novel concept that adds a level of safety to handling manually cleaned devices on the clean side of the sterile processing area. This no-touch technology does not replace manual cleaning, but supplements it. The concept is to pass the manually cleaned devices from the decontamination side to the clean side through an ultraviolet (UV) disinfection system that is placed in the pass through window (Fig. 2). This way, the manually cleaned devices are further disinfected before they come to the clean side. This concept is similar to the well-established use of UV radiation to disinfect hospital rooms.



Fig. 2 - UV Disinfectant placed at Pass through window

UV light is a small part of the entire electromagnetic spectrum, which is made up of other types of radiation including gamma ray, X-rays, visible light, infrared, microwaves and radio waves, all at different wavelengths. UV disinfection has long been known and is an accepted practice in the medical field since the mid-20th century.

UV light is very versatile and can be used for disinfecting water as well as destroying harmful microorganisms on surfaces and in the air. The UV light spectrum can be broadly sub-divided into the following energy bands, distinguished by the radiation wavelengths: UV-A, UV-B, UV-C and Vacuum UV (Fig. 3). It is the intensive UV-C radiation, in the wavelength range of 254 nm that reaches the microorganisms and directly impacts their DNA. The mode of action of the UV-C radiation is that it breaks the molecular bonds inside microbial DNA, thus destroying the germ and its pathogenic effects.

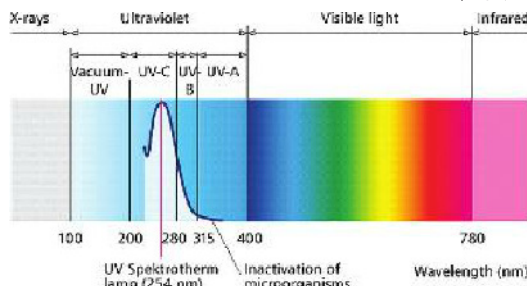


Fig. 3 - UV Light Spectrum - Image Courtesy: wedeco.com

To evaluate the use of UV disinfection at the pass through window, an independent study was conducted on cleaned instruments. In the study, 14 manually cleaned and 49 mechanically cleaned medical devices were obtained from local area hospitals. The design of the experiment was to obtain a count of bacteria growing on the medical devices from both of the device sets.

After swabbing, the clean devices were passed through the UV disinfectant (Fig. 4). The cycle time of the UV disinfectant was one minute. A bacterial count was taken on both the manually and mechanically cleaned instruments after they came out of the UV disinfectant.



Fig. 5 - UV Indicator from Healthmark Industries, Fraser, MI

UV sensitive chemical indicators (Fig. 5) were used to help ensure that the inside chamber of the UV disinfectant was indeed exposed to the 254 nm wavelength. These indicators are specifically designed to monitor the UV radiation dosage in UV-C disinfection systems. When exposed to a UV radiation of 254nm for an extended period of time, the indicators demonstrate a distinct color shift that provides a simple visual confirmation.

The study demonstrated that the manually cleaned devices did have a higher bacterial colony-forming units (CFU) count than the machine-washed items and that the UV radiation did result in significant reduction of the CFU counts, thereby improving the safety of handling these instruments.

It is well established that with UV light technology it is possible to destroy a large number of harmful microorganisms, inexpensively and with high efficiency, without the addition of chemicals and without harmful side effects.

Hearing staff concerns and addressing their issues by bringing new research into practice is the mantra for an ever evolving sterile processing department. At the end I would like to say do your due diligence, because when it comes to safety, tomorrow is too late, today is about time! **HPN**



Fig. 4 - UV Flash Disinfectant Courtesy of Midbrook Medical, Jackson, MI

Kaumudi Kulkarni, M.S., is Business Development Microbiologist, Healthmark Industries.