Infection Control related to Nelson Tools for Cleaning Hearing Instruments

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Background Information:

Infection control refers to the conscious management of the environment for purposes of minimizing or eliminating the potential spread of disease.[1,2] In response to the AIDS epidemic, during the mid to late 1980's, the Centers for Disease Control and Prevention (CDC) issued a number of recommendations and guidelines for minimizing cross-infection of bloodborne diseases to healthcare workers. These guidelines were based on the principle that every patient is assumed to be a potential carrier of and/or susceptible host for an infectious disease. Eventually, these pronouncements were officially formalized into the Universal Blood and Bloodborne Pathogen Precautions. More commonly referred to as universal precautions, the general pronouncements are as follows:

1. Appropriate personal barriers (gloves, masks, eye protection, gowns) must be worn when performing procedures that may expose personnel to infectious agents
2. Hands must be washed before and after every patient contact and after glove removal
3. Touch and splash surfaces must be pre-cleaned and disinfected
4. Critical instruments must be sterilized
5. Infectious waste must be disposed of appropriately

CDC 1987[3]

Differentiation of Terms:

Cleaning refers to procedures in which gross contamination is removed from surfaces or objects without killing germs.[1,2] It does not necessarily involve any level of germ killing but cleaning is an important prerequisite for other processes in which killing germs remains an objective. Cleaning must occur prior to disinfection or sterilization as the effectiveness of these procedures may be compromised without it.

Disinfection refers to a process in which germs are killed. The term encompasses a wide range of germ killing.[1,2] Levels of disinfection vary according to how many and what specific germs are killed. Household disinfectants kill a limited number of germs commonly found in the household. In contrast, hospital-grade disinfectants are much stronger and kill a larger number and variety of germs. As such, hospital-grade disinfectants should be incorporated in infection control protocols implemented in patient care settings, including clinics, hospitals, or private practice facilities where audiology services are provided.

Sterilization involves killing 100% of vegetative microorganisms, including associated endospores [1,2] When microbes are challenged, they revert to the more resistant life form called a spore. Sterilants, by definition, must neutralize and destroy spores because if the spore is not killed, it may become vegetative again and cause disease. Whereas disinfection may kill some germs, sterilization, by definition, kills all germs and associated endospores each and every time.

Cleaning:	removal of gross contamination
Disinfecting:	killing a percentage of germs
Sterilization:	killing 100% of germs including endospores

Nelson Tools- Preferred Infection Control Recommendations:

According to the CDC, critical instruments must be sterilized. Critical instruments refer to those instruments or objects introduced directly into the bloodstream (e.g., needles), non-invasive instruments that come in contact with intact mucous membranes or bodily substances (e.g., blood, saliva, mucous discharge, pus), or instruments that can potentially penetrate the skin from use or misuse. Non-critical

items are those instruments or objects that either do not ordinarily touch the patient or touch only the externally intact skin. ***Since nelson tools are designed to clean hearing instruments that have been removed from the ear and are not intended to be inserted in the ear canal, these tools are considered non-critical instruments. From this perspective, Nelson Tools must be first cleaned and then disinfected prior to re-use. Furthermore, the hearing instrument should be cleaned and then disinfected following any procedures incorporating use of Nelson Tools.***

For purposes of further clarification, cerumen is not considered an infectious substance, per se, unless it is contaminated with blood, blood by-products, ear drainage, and the like. Given the color and viscosity of cerumen, the audiologist is not in a position to determine with 100% accuracy whether the cerumen is contaminated with these substances. From that perspective, cerumen must be treated as a potentially infectious substance. **Keep in mind, however, that these same instruments are designed to remove cerumen and dirt from hearing instrument ports. In the event a Nelson Tool becomes contaminated with copious amounts of cerumen or blood (or other suspect substances) residing in hearing instrument ports, it should be cleaned and then sterilized prior to reuse although such an occurrence will most likely be very rare.**

Disinfection of Nelson Tools:

- Immediately following the use of a Nelson Tool, clean the tool by wiping its surface completely using either a paper towel, disinfectant towelette, or Kleenex, being careful not to make direct or indirect contact with the contaminated surface
- Dispose of paper towel, disinfectant towelette or Kleenex into the regular trash
- Disinfect the same surface by wiping the surface complete using a fresh disinfectant towelette or spray the surface of the entire probe tip with disinfectant spray and then wipe the surface with a paper towel.

Sterilization challenges inherent to Nelson tools as a function of VA approved sterilants:

The use of heat pressurization via an autoclave is not recommended with Nelson Tools. In the event gas sterilization is an available, this option is considered suitable for Nelson Tool sterilization. Typically, this process involves the use of Ephylene Oxide although there may be other alternative gases used. In the absence of gas sterilization, the only other alternative is to sterilize instruments via cold sterilization. There are only two EPA-approved liquid chemicals that may be used for sterilization. Glutaraldehyde solutions in concentrations of 2% or higher (i.e. brand name products such as Wavicide, Cidex) or 7.5% or higher levels of hydrogen peroxide (H_20_2) (i.e. brand name products such as Sporox) are the only chemicals approved by the EPA for cold sterilization. It is the current understanding of Oaktree Products, Inc. that the V.A. system has not approved the use of glutaraldehyde-based sterilants, permitting the use of only those sterilants containing 7.5% or higher levels of H_20_2. Great care should be taken to limit the exposure of the Nelson Tools to the minimum sterilization cycle as damage may occur to the wooden handles if submerged for longer periods of time.

***Sterilization of Nelson Tools:**

- Following the use of Nelson Tools, place in the designated container for later cleaning and sterilization.
- Immediately after the last appointment of the day, designated covered containers holding contaminated Nelson Tools are to be brought to the hazard area by designated personnel. Designated personnel must wear gloves while transporting the closed containers.
- While wearing gloves, clean the surfaces of Nelson Tools with the Nelson Tool Brush cleaner or some other type of brush. Depending on the specific tool, a paper towel or disinfectant towelette may be used.

- Once the instruments are cleaned, with gloved hands carefully place the tools in the appropriate tray containing cold sterilant. Cover the tray and allow instruments to soak according to manufacturer's directions.
- Remove gloves and wash hands according to designated procedures.

***NOTE: Nelson tools have wooden handles that when submerged in sterilant, over time, will change color and somewhat degrade in appearance.**

Retrieval of sterilized instruments

- After cold sterilization is complete, put on a fresh pair of gloves.
- Remove tools from the solution, placing each instrument on a designated tray.
- Rinse instruments in a sink designated as a cleaning sink.
- Allow instruments to air dry.
- Return instruments to their appropriate location(s) for reuse.
- Cold sterilant should be changed according to manufacturer's instructions or sooner if the solution becomes visibly soiled.

For more information, contact A.U. Bankaitis or Robert Kemp of Oaktree Products.

References:

1. Bankaitis, A.U. and Kemp, R.J. (2003). *Infection Control in the Hearing Aid Clinic*. Boulder, CO: Auban.
2. Bankaitis, A.U. & Kemp, R. J. (2005). *Infection Control in the Audiology Clinic* (2nd edition). St. Louis, MO: Auban, Inc.
3. CDC. (1987). Recommendations for prevention of HIV transmission in healthcare settings. *MMWR*, 36(2s).