

Ergonomic Healthcare Sink Design: Matching the Tool to the User



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According to the Occupational Safety and Health Administration (OSHA), “ergonomics is the practice of designing equipment and work tasks to conform to the capability of the worker.” The ultimate purpose of this practice is to prevent injuries to working men and women while they are performing their tasks. Preventable injuries create a host of negative consequences to workers and their employers, including pain and an inability to perform tasks, healthcare and worker’s compensation costs, temporary staffing costs, possible turnover and retraining costs, lost productivity and morale, and lost revenue.

OSHA’s Occupational Safety and Health Act of 1970 mandates that employers provide workplaces that are “free from recognized hazards that are causing or are likely to cause death or serious physical harm” to employees. This mandate applies to workplaces in all industries. The agency recommends that all employers identify and address ergonomic stressors in the work environment as part of their safety and health plan.

Healthcare worker hazards

Hospitals are among the most hazardous places to work, says OSHA. During the 12 months of 2011, the Bureau of Labor Statistics recorded 253,700 work-related illnesses and injuries in U.S. hospitals; this is a rate of 6.8 illnesses/injuries per 100 full-time hospital workers. This rate was higher than the construction, manufacturing, and private industry segments! Many healthcare-related injuries appear to be caused by overexertion and reaction during patient handling. Because of the mandate to “do no harm,” healthcare workers may be putting their own safety at risk to help patients.

However, there are other hospital workplace hazards. In sterile processing departments (SPDs) the ergonomic hazards are typically musculoskeletal disorders (MSD) associated with bending, reaching and repetitive motion tasks. Specifically, in the pre-cleaning area, dirty instruments are delivered in batches, from the operating rooms, emergency rooms, imaging departments or other clinical areas of the hospital. Workers must sort, take apart and manually pre-clean each device or instrument, and then prepare it for disinfection or sterilization processes. These tasks are performed hundreds of times a week, and have typically been done while standing at static, deep sinks designed for the restaurant industry. In addition, the channels of devices such as endoscopes must be flushed manually with cleaning solutions, and many departments still use large syringes to flush each channel with fluid multiple times by hand.

Focus on ergonomics

Whether they are performed in the GI department or the sterile processing department, pre-cleaning processes are rife with potentially uncomfortable activities; from prolonged standing in one place, to awkward postures and repeated extreme bending, to performing repetitive wrist and arm movements that can cause pain and numbness. Some ergonomic solutions, which were designed to be added to existing department equipment, are already available. They include: ergonomic floor mats to reduce fatigue, protective countertop mats to reduce the risk of contact trauma and to protect delicate instruments; shallow sink inserts that bring soaking and cleaning activities to an ergonomic standing position; and automated channel-flushing systems to assure consistent flushing and reduce the risk of carpal tunnel and other wrist and hand injuries.

However, when a department is ready to remodel, or a new facility is being built, an opportunity is created to identify ergonomic hazards and address them more thoroughly through better designed pre-cleaning workflows and permanently installed injury-prevention solutions. OSHA has provided specific “possible solutions” to help address ergonomic injuries in the SPD (also known as Central Supply); they are intended to be applied to other similar work areas in the hospital. Among other suggestions, they include:

- Redesign workstations so packaging and equipment can be reached while maintaining elbows close to the body
- Use height-adjustable work surfaces
- Minimize prolonged overhead activity (to avoid reaching over shoulder height)

In addition, the the American National Standards Institute (ANSI) and the Association for the Advancement of Medical Instrumentation (AAMI) issued a joint document, the ANSI/AAMI ST79: 2006, which offers more detailed recommendations for setting up a decontamination area:

“Sinks should not be so deep that personnel must bend over to clean instruments. An ideal decontamination sink is approximately 36 inches (91 cm) from the floor and 8 to 10 inches (20-25 cm) deep, enabling a person of average size to work comfortably without undue strain on his or her back... the sink should be of a width and length to allow a tray or container basket of instruments to be placed flat for pretreatment or manual cleaning. ... there should be enough sinks to accommodate concurrent soaking, washing and rinsing. Sinks should be large enough to contain large utensils and instruments.”

This standard also states:

“Designing the area to facilitate proper workflow and to provide adequate space for necessary equipment reduces the potential for cross-contamination and enhances efficiency. ...The design and location of sinks can facilitate proper cleaning as well as employee safety. Sinks located too high or too low increase the risk of back injury or strain. Sinks need to be deep enough to allow items to be cleaned beneath the surface of the water. Considering human factors during the design phase can help prevent worker injury.”

All utility sinks are not healthcare reprocessing sinks!

Since the sink area is the primary pre-cleaning work site, every effort should be made to make this station as ergonomic as possible. In the past, healthcare facilities had few options for sinks that could be used to reprocess devices. Their stainless steel sinks, not designed for healthcare functions, were unnecessarily deep. When used for healthcare instrument reprocessing activities, they have been a source of MSD of the hip, back, shoulder, and arm.

Healthcare manufacturers have begun to identify the need to supply more ergonomic equipment and have been developing and marketing better tools for this market. In 2012, a sink insert system with an automated flushing pump was launched into the market. It was intended for technicians performing pre-cleaning on channeled surgical, endoscopic and robotic devices. The purpose of this insert system was to bring the sink basin up to a more ergonomic height and to eliminate repetitive manual channel flushing, a cause of carpal tunnel and other MSD.

In 2015, the same manufacturer introduced a permanent replacement option for the hazardous deep sinks currently being used; a sink designed specifically for healthcare reprocessing. Unlike many existing SPD sinks, it addresses all the relevant OSHA ergonomic recommendations for the SPD, to help hospitals reduce the risk of injury to technicians. Specifically, the sink’s features fulfil the following OSHA ergonomic recommendations:

OSHA Recommendation	Sink Feature
Redesign workstations so ... equipment can be reached while maintaining elbows close to the body	A height-adjustable sink allows fully customizable placement of the basin and tools for individual technicians. A sink insert can be added inside the sink to further improve ergonomics, or placed on a height-adjusted countertop for an additional ergonomic wash, soak or rinse area close to the user
Minimize prolonged overhead activity	A height-adjustable attached pegboard and other movable hanging storage systems assure each user of customized shoulder-height and lower reaching for equipment, to bring tools to their fingertips
Use height-adjustable work surfaces ... to minimize head tilt	The height adjustment range of this specific sink enables the optimal ergonomic working height setting and head tilt for virtually any user, to help avoid strain and injury. Adding a sink insert further enhances height comfort for each user
Rotate workers through repetitive tasks	The ability to instantly customize the height and reach of this new sink electronically with the push of a button makes it fast and easy to rotate staff members with different ergonomic needs and capabilities at the workstation
Limit excessive reaching and back flexion in sinks	Replacing a traditional deep sink with a height-adjustable reprocessing sink and optional sink insert helps avoid excessive reaching and flexion
Avoid excessive repetitive manual force or handling	The sink is power-driven with a simple electric pushbutton to minimize the effort needed to adjust it

Building effective tools for actual users

Industrial sink manufacturers are typically focused on designing sinks for multiple utilitarian purposes. They do not have a deep understanding of what is needed in specific healthcare environments. Because of the critical role they play in making medical instruments safe for reuse on patients, healthcare reprocessing sinks, much like the sterilizers and cleaning chemicals used in these areas, could logically be classified as “medical devices.”

Before selecting a sink intended to be used as a medical device reprocessing tool, hospital decision-makers must consider this: are they using a local fabricator or supplier with general sink design experience, or consulting a healthcare specialty manufacturer with extensive research and observation-based knowledge of the reprocessing function and its related requirements?

In order to design and produce healthcare equipment that is safe and protective as well as useful and productive, there are four key areas that must be addressed:

1. *Ergonomics*: awkward or uncomfortable movements or positions cause pain and discomfort, but can also affect efficiency and productivity. Effective organization and placement of tools is an important component of ergonomic function as well.
2. *Workflow*: It's important to understand the flow of tasks and activities, the challenges and bottlenecks, the specific items being processed, and which specific chemistries and processes are being used. In addition, the workflow requirements of all reprocessing stakeholders must be considered, from the end-user technicians to facility management and the infection control department. Everyone should express their objectives and challenges in order to design the best solution for all.
3. *Inventory*: the specific device inventory of each facility must be understood, including the dimensions of each device, and all the tasks and challenges involved in reprocessing them. For example, eye trays are processed differently from endoscope trays, and endoscope trays are different from robotics sets, but all processes may need to be performed at the same sink. Manufacturers add value when they develop flexible solutions that allow easy, safe and efficient reprocessing for all types of surgical specialties. Planning for inventory growth and turnover is also a consideration for this area.
4. *Guidelines*: manufacturers should help departments navigate relevant standards and guidelines (such as those from OSHA, AAMI, SGNA, AORN, and IAHCSSMM) that may affect their functions, and should assure that their sinks and other tools help healthcare providers meet or exceed those guidelines.

The clutter factor

There is a strong indirect correlation between clutter and productivity in any workplace. Cluttered work stations add to workers' time and effort, add to personal stress and morale, and can eventually affect the quality of work. In healthcare reprocessing areas, poor job quality can have a much more serious consequence; it can affect worker and patient health and safety.

Reprocessing areas are typically complex environments, with numerous cleaning tools and brushes, instructions, jugs of chemistries, and device parts and tubing, in and around the sinks. Clutter and disorganization is a very common condition in these work areas because of the inherent nature of the work. A messy pre-cleaning workspace requires more reaching, untangling and other musculoskeletal activity, which adds to the ergonomic stressors already in play. And, since moisture is a constant element around sinks, heavily cluttered areas also carry the risk of becoming a breeding ground for organisms that can contaminate surfaces, tools and devices.

OSHA and other authorities have recognized the importance of eliminating clutter and organizing workspaces. OSHA standard, 29 CFR 1910.22 (a) states: "All places of employment ... shall be kept clean and orderly and in a sanitary condition."

Sink design must also take the need for organization into account, and must incorporate elements that help organize the space immediately around the technician in an ergonomic way. Height-adjustable pegboards allow the arrangement of whatever tools and storage elements are needed in a specific area, off the counters and close to the workers. This enables a sanitary, productive and high quality workspace.

A well-designed sink is a safe and efficient value

OSHA has made it clear that attention to proper ergonomics helps reduce injuries and discomfort that can affect a worker's ability to function, and that identifying and addressing ergonomic issues should be a mandatory practice for all industries. Providing an ergonomic workplace can also help employers reduce healthcare and other costs related to avoidable injuries, so it is in their best interest to do so.

By simply installing and using a powered, auto-height adjustable healthcare reprocessing sink, employing an automated device-flushing system, and providing ergonomic storage to organize the immediate workspace, sterile processing management can eliminate unnecessary pain and costs, and can develop a safe, efficient and highly productive workflow that better supports the clinical areas of their hospital. Although the design and development of these ergonomic tools may be a complex job for the manufacturer, these industry-specific tools provide a simple and valuable solution for healthcare providers.

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