

Laboratory Safety Ergonomics for the Prevention of Musculoskeletal Disorders

This guidance is advisory in nature and informational in content. It is not a standard or a regulation, and it neither creates new legal obligations nor alters existing obligations created by OSHA standards or the Occupational Safety and Health Act. In preparing this guidance, OSHA reviewed existing practices and programs as well as available scientific information on ergonomics in laboratories, and reflects comments received from selected representatives of professional associations and laboratories.

Employers should recognize that laboratory workers are at risk for repetitive motion injuries during routine laboratory procedures such as pipetting, working at microscopes, operating microtomes, using cell counters and keyboarding at computer workstations. Repetitive motion injuries develop over time and occur when muscles and joints are stressed, tendons are inflamed, and nerves are pinched and blood flow is restricted. Working in awkward positions in laboratory hoods/biosafety cabinets can also present ergonomic problems. Employers can minimize occupational injuries and simultaneously improve worker comfort, productivity, and job satisfaction by becoming familiar with ways to control laboratory ergonomics-related risk factors. In addition to general ergonomic guidance, this fact sheet reminds employers to make laboratory workers aware of simple adjustments that can be made at the workplace.

Employers Should Train Workers to Be Aware of Their Posture

A worker's back is composed of three natural curves that form an S-shape. When the three natural curves are properly aligned, ears, shoulders and hips are in the same plane. Poor posture may lead to pain and serious injury. To avoid ergonomic-related risk factors, workers should be encouraged to:

- Use a chair that provides good back support and sit against the back of the chair.
- Lower the chair or adjust the foot ring or get a footrest, if their feet dangle.
- Tilt the seat forward or use a seat wedge when working in a forward posture; do not jut their chin forward when working. Adjust the position of their work, the work surface, or the chair so that they sit in an upright, supported position.
- Always try to work at a bench cut out; cut outs can help workers get close to their work while sitting against the back of their chair.
- Use supportive shoes and cushioned mats if required to stand for long periods.
- Keep frequently used trays and supplies within close reach.

Employers Should Train Workers to Keep Arms and Hands Relaxed

Employers should ensure that workers are aware of tensions that may occur as they perform different tasks. To avoid ergonomic-related risk factors, workers should be encouraged to:

- Keep their shoulders relaxed and their elbows close to their sides when working. Avoid reaching to use instruments and work materials.

- Maintain neutral wrist and arm postures when working; work with their wrists in a neutral or straight position as if they were shaking hands with someone.
- Sit close to their work area, keep objects close and adjust their chair to match the height of the bench.
- Avoid repetitive or forceful twisting and turning motions (e.g., opening valves or adjusting microscopes).
- Select equipment and tools that are the right size for their hands.
- Use padding and tubing to reduce pressure and force when working. For example, use rubber tubing or forceps to increase diameter and reduce pinch force. Soften sharp edges on work surfaces with padding.
- Use thin, flexible gloves that fit properly. Ill-fitting and poorly designed gloves increase pinch and grip forces when working.

Employers Should Train Workers to Avoid Static Positions

Workers should be encouraged to vary activities, change their position, and take short breaks every 20 minutes to rest muscles and increase blood circulation. To avoid ergonomic-related risk factors, workers should also be encouraged to:

- Shift their weight often when standing to work. Use a stool or shelf to prop up a foot to relieve pressure on their back.
- Alternate how they hold objects like forceps. To vary the task, workers can alternate holding with the thumb and index finger, and with the index and middle fingers.

Employers Should Train Workers to Avoid Ergonomic-Related Risk Factors When Pipetting

Workers should be encouraged to do the following when pipetting:

- Elevate chair rather than reaching up to pipette.
- Do not twist or rotate their wrist while pipetting.
- Alternate hands or use both hands to pipette.
- Hold the pipetter with a relaxed grip.
- Use electronic pipettes or light touch models whenever possible.
- Use minimal pressure while pipetting.
- Use a light amount of force or two hands to change tips.
- Use low profile tubes, solution containers and waste receptacles.
- Select a lightweight pipetter, properly sized for their hand.
- Use pipettors with finger aspirators and thumb dispensers to reduce thumb strain.
- Use latch-mode or electronic pipettors for repetitive pipetting.
- Take a 1-2 minute break after every 20 minutes of pipetting.

Employers Should Train Workers to Avoid Ergonomic-Related Risk Factors When Using a Microscope

Workers should be encouraged to do the following when using a microscope:

- Sit close to the work surface.
- Avoid leaning on hard edges.
- Pad forearms and edges.
- Keep elbows close to their sides.
- Adjust chair, workbench, or microscope as needed to maintain an upright head position.
- Elevate, tilt or move the microscope close to the edge of the counter to avoid bending their neck.
- Use adjustable eyepieces or mount your microscope on a 30° angle stand for easier viewing.
- Keep scopes repaired and clean.
- Spread microscope work throughout the day and share it with several people, if possible.
- Take short breaks. Every 15 minutes, close the eyes or focus on something in the distance. Every 30-60 minutes, get up to stretch and move.

Employers Should Train Workers to Avoid Ergonomic-Related Risk Factors When Using Hoods and Biosafety Cabinets

Workers should be encouraged to do the following when using hoods and biosafety cabinets:

- Remove unnecessary supplies from the work area.
- Perform all work 6 inches inside the hood.
- Position work supplies in their order of use, with those most frequently used near the front of the hood, but not closer than 6 inches from the face of the hood.
- Place equipment on approved elevated turntables for easy retrieval.
- Use diffused lighting to limit glare.
- Take short breaks to stretch muscles and relieve forearm and wrist pressure.
- Adjust chair/stool to a height that allows the shoulders to relax.

Employers Should Train Workers to Avoid Ergonomic-Related Risk Factors When Using Computers

Workers should be encouraged to do the following when using computers in the lab:

- Use adjustable keyboard platforms under lab benches that accommodate use of the mouse beside the keyboard.
- Where possible, position computer workstations in corners or other areas away from doors, entrances and passageways.
- Place monitor so their viewing distance is between 18 and 30 inches.
- Place monitor so the top of the screen is approximately at eye level. This allows the eyes to gravitate naturally toward the center of the screen.
- Use a document holder placed adjacent to and in the same plane as the computer screen.
- Use footrests, where possible, in order to allow them to change leg positions throughout the day.
- Use an appropriate keyboard, mouse or other input devices if they have existing musculo-skeletal problems.
- Take mini-breaks of 3 to 5 minutes for every 20-30 minutes of keyboarding or mouse work. These breaks can be spent doing mild hand exercises or stretches.
- Not to switch from computer keyboarding to pipetting activities (or vice versa) without an adequate break (at least 15 minutes) to allow the hands to recover.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; the teletypewriter (TTY) number is (877) 889-5627.

For assistance, contact us. We can help. It's confidential.



**Occupational Safety
and Health Administration
www.osha.gov 1-800-321-6742**