



## Ergonomics for the Prevention of Musculoskeletal Disorders

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. Become familiar with ways to control laboratory ergonomics-related risk factors.

### Be Aware of Their Posture

Your 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.

- 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 chin forward when working. Adjust the position of work, the work surface, or the chair so that you sit in an upright, supported position.
- Use supportive shoes and cushioned mats if required to stand for long periods.
- Keep frequently used trays and supplies within close reach.

### Keep Arms and Hands Relaxed

- Keep their shoulders relaxed and elbows close to sides when working. Avoid reaching to use instruments and work materials.
- Maintain neutral wrist and arm postures when working; work with wrists in a neutral or straight position as if you were shaking hands with someone.
- 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 your hands.
- Use padding and tubing to reduce pressure 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.

### Avoid Static Positions

Change your position, and take short breaks every 20 minutes to rest muscles and increase blood circulation.

- Shift their weight often when standing to work.
- Use a stool or shelf to prop up a foot to relieve

pressure on the back.

- Alternate how you hold objects like forceps.

### Avoid Ergonomic-Related Risk Factors When Pipetting

- Elevate chair rather than reaching up to pipette.
- Do not twist or rotate 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 your 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.

### Avoid Ergonomic-Related Risk Factors When Using a Microscope

- Sit close to the work surface.
- Avoid leaning on hard edges.
- Pad forearms and edges.
- Keep elbows close to 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 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.

### Avoid Ergonomic-Related Risk Factors When Using

(CONTINUED ON REVERSE)

For more information contact [wfuehs@wfu.edu](mailto:wfuehs@wfu.edu).

### **Hoods and Biosafety Cabinets**

- Remove unnecessary supplies from 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.

### **Avoid Ergonomic-Related Risk Factors When Using Computers**

- 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 change in leg positions throughout the day.
- Use an appropriate keyboard, mouse or other input devices if you have existing musculoskeletal problems.
- Take mini-breaks of 3 to 5 minutes for every 20 to 30 minutes of keyboarding or mouse work. These breaks can be spent doing mild hand exercises or stretches.