



E·O·H·S·S
ENVIRONMENTAL & OCCUPATIONAL
HEALTH & SAFETY SERVICES

Laboratory Ergonomics:

a guide to proper work
practices and design of
your work environment

According to the Bureau of Labor Statistics, work-related musculoskeletal disorders (WMSDs) amounted to 53.3% of all occupational illness and injuries in 2002. Of the 639.8 thousand reported cases of WMSDs, only 203 cases are from the laboratory technologists and technicians.

Does this mean that laboratory personnel do not experience any WMSDs? Or is it under-reported?

Laboratory personnel, in addition to the risk of working with hazardous substances, are constantly exposed to many ergonomic risk factors because of the nature of their work. However, most laboratory personnel do not associate injury with the working conditions and set-up of their workspaces.

Ergonomics is the science of fitting jobs to workers and is the tool used to design appropriate workstations. Laboratory workstations should be designed or modified so that good body alignment can be achieved.

This brochure is intended to provide valuable information about workplace practices aimed at reducing the risk of work-related musculoskeletal disorders.

◆ What are work related musculoskeletal disorders (WMSDs)?

Work-related musculoskeletal disorders (WMSDs), including cumulative trauma disorders (CTDs) and repetitive strain injuries (RSIs), are a group of health problems caused by over-use or misuse of muscles, tendons and nerves. WMSDs are caused by any combination of the following factors:

- Repetitive Tasks - performing the same movement over and over
- Awkward or Fixed Posture - working in an awkward position or holding the same position for a long time
- Fast Pace - having to work quickly
- Duration of Task with Insufficient Recovery Time - inadequate rest breaks
- Excessive Force
- Contact Stress - resting the forearms or wrists on the hard edge surface
- Pinch Grip
- Standing for Long Periods of Time

◆ What are the symptoms of WMSDs?

Early detection of symptoms help prevent the onset of WMSDs. Symptoms associated with repetitive exposure to laboratory ergonomic risk factors include:

Low back pain or pain in the thumb, finger, wrist, forearm, elbow, neck, and shoulder. Other early warning signs include:

Numbness	Decrease joint motion	Redness
Weakness	Aching	Tingling
Clumsiness	Swelling	Burning
Loss of strength	Pain	Cracking or popping of joints

◆ What are the risk factors and preventative measures for WMSDs?

	Risk Factors	Preventative Measures
Biological Safety Cabinets/ Chemical Hoods	Working in a biological safety cabinet or chemical hood requires employees to assume a variety of awkward postures due to limited work access and lack of adjustability. This restricts movement and therefore significantly increases the stress on joints of the upper extremities, neck and back.	<ul style="list-style-type: none"> • Always assume a proper sitting posture. • Plant feet firmly on floor or foot rest. • Sit back in the chair for back support. • Keep thighs parallel to floor. • Ensure adequate leg clearance. • Use anti-fatigue mats when standing for long hours. • Avoid resting forearms and wrists on the edge.
Centrifuges	Rotors present a unique lifting hazard in the laboratory. They can weigh up to 35 pounds and are awkward in shape.	<ul style="list-style-type: none"> • Use a second person to assist with lifting and removing. • Use a cart to transport the rotors.
Computer Workstations	Working at the computer for long hours can lead to CTDs such as carpal tunnel syndrome, muscle aches and pains, and vision problems.	<ul style="list-style-type: none"> • Ergonomically designed chairs/ stools, furniture and equipment with adjustable features should be provided. • Maintain proper working postures and work practices.

Glove Boxes	Glove boxes require extended static loading on the shoulders and reaching and extending on the arms. In addition, the thick gloves makes the user over-compensate on the grip strength.	<ul style="list-style-type: none"> • Move all materials to be used for the experiment in the main chamber. • Use highly absorbent hand powder for glove comfort. • Vary other tasks with glove box work so that static loading on the arms can be minimized.
Laboratory Work-Benches	Due to the fixed heights and lack of adjustability, workbenches can expose researchers to a variety of ergonomic risk factors, depending on the laboratory procedure being used.	<ul style="list-style-type: none"> • Provide anti-fatigue mats. • Provide ergonomically designed chairs, stools and workbenches with adjustable features. • Set workbench height: <ul style="list-style-type: none"> • Above elbow for precision work • Below elbow for light work • 4" - 6" below elbow for heavy work
Microtomy	Manual rotary microtome use in histology laboratories requires performing many repetitive functions. In the course of one day, a laboratory technologist may use between 40 to 50 cassettes, hence turning the microtome wheel for at least one thousand times.	<ul style="list-style-type: none"> • Use an automatic microtome • Reduce force when operating hand wheel. • Apply padding to the edge of the work surface. • Place microtome on appropriate workbench height. • Ensure adequate leg clearance and adjust the chair to proper height.
Microscopy	Operating a microscope for long hours can put strain on the neck, shoulder, lower back, eyes and arms/ wrists if the workstation is not set up properly.	<ul style="list-style-type: none"> • Adjust the eyepiece and angle observation by placing the microscope on adjustable stand. • Use extended eye tube or variable height adapter to achieve proper neck and head position. • Ensure adequate leg and knee clearance under the workbench.
Overhead Lifting	Due to lack of space in the laboratory, many laboratory workers must store equipment and supplies on overhead shelves.	<ul style="list-style-type: none"> • Avoid storing heavy objects above shoulder height. • Use a stable footstool to reach objects stored on shelves. • Store materials that are frequently used on shelving unit no higher than shoulder height.
Pipetting	Stress associated with pipetting includes: <ul style="list-style-type: none"> • Excessive thumb force • Working with elbows extended away from the body • Repetitive motion • Awkward and static postures • Twisting and bending of body parts like wrists and torso in an unnatural position 	<ul style="list-style-type: none"> • Use an electronic or latch mode pipetter. • Use thin-walled pipette tips that are easy to dispense. • Work with arms close to the body. • Adjust height and position of sample holders, solution container and waste receptacle within reach and at the same height. • Use an ergonomic stool or chair to provide proper support.

To avoid muscle stress from performing too many repetitive motions with insufficient recovery time, try to vary job tasks during the work day. Exercise during breaks helps to relieve physical stress and strain.

What Should I Do If I Have Symptoms?

- Report any symptoms to the supervisor immediately
- Complete an Incident Report (Form 70)
- Forward a copy of the Incident Report to Risk and Claims Management and EOHSS.

Staff will be referred for medical evaluation by Risk and Claims Management, and EOHSS can evaluate the workstation for proper design, posture and furniture.

If you have any questions, would like an assessment of your work area, or need a list of ergonomically approved furniture and equipment, please call the Department of Environmental and Occupational Health and Safety Services (EOHSS):

Newark

973-972-4812

Scotch Plains

908-889-2486

Piscataway/ New Brunswick

732-235-4058

Stratford/ Camden

856-566-6189

For additional information on ergonomics, visit our website:

<http://www2.umdnj.edu/eohssweb/eohss.htm>

