Laboratory Ergonomics Training
Washington University In St. Louis
Agenda

- What is Ergonomics
- Why Ergonomics
- Musculoskeletal Disorders (MSDs)
- Musculoskeletal Disorder Risk Factors
- Common Ergonomic Hazards in the Lab
  - Pipetting
  - Microscopy
  - Laboratory Hoods and Biological Safety Cabinets
  - Microtome or Cryostat
  - Test Tube Handling
  - Computer Workstations
Ergonomics

Ergonomics is the science of fitting the job to the worker doing the job. This is done by:

- Reducing exposure to MSDs (Musculoskeletal disorder) risk factors and,
- Involving engineering and administrative controls
Why Ergonomics?

- 1.8 million work-related MSDs each year
- 600,000 require time away from work to recover
- Ergonomics prevents MSDs
Musculoskeletal Disorder (MSD)

Injury or disorder of the nervous system or soft tissue:

- Muscles
- Tendons
- Ligaments
- Joints
- Cartilage
Muscular Skeletal Disorders (MSDs)

- Carpal tunnel syndrome (wrist)
- Tendonitis
- Tenosynovitis (thumb)
- Cubital Tunnel (elbow)
- Trigger Finger
Ergonomic Risk Factors

- Cause or risk factors of MSDs
  - Repetitive motions
  - Forceful exertion
  - Awkward positions or movements
- Contact Stress
- Applying Force
Signs & Symptoms of MSDs

You will feel pain or have swelling in your:

- Hands
- Wrists
- Fingers
- Forearms
- Joints
- Elbows
MSD-Related Pain

Pain described as:

- Tightness
- Stiffness
- Discomfort
- Soreness
- Burning
- Coldness
- Tingling
- Numbness
Report Symptoms Immediately

- Report any MSD signs or symptoms to your supervisor immediately
- Follow University reporting procedure @
  - www.insurance.wustl.edu
  - www.ehs.wustl.edu
- Begin medical treatment early
Pipetting Risk Factors

- Repetitive motion of the hands, forearm and thumb, or fingers
- Pinch grip when handling pipette tips, or opening vials
- Bending and twisting of the wrist
- Working with "winged" elbows (elbow held at an elevated position away from the body)
- Neck bent forward or to the side and/or jutted chin
- Awkward and static postures
- Excessive force of the thumb
Pipetting Tips

- Alternate between sitting and standing.
- Minimize awkward body posture.
- Avoid resting arms on sharp workstation and lab bench edges. Pad edges if necessary.
- Take frequent microbreaks of 1-2 minutes at least every 30 minutes. Alternate activities to minimize continuous pipetting for long periods.
- Maintain straight wrists. Keep the elbows close to the body.
- Share the workload between the right and left hands. Rotate pipetting tasks with other qualified lab colleagues.
Pipetting Correctly

- Keep waste bins, beakers, and other frequently used items as close as possible.
- Relax your grip on the pipette.
- Use shorter pipettes and pipette tips.
- Choose pipettes that require minimal hand and finger effort and comfortably fit your hand.
- Utilize automated processes or multi-channel pipettes for highly repetitive jobs.
- Clean pipettors on schedule basis to reduce sticking.
- Use an adjustable chair or stool.
Microscopy Risk Factors

- Awkward and static posture of the lower back
- Wrist and palm contact pressure in the carpal tunnel area
- High repetition
- Eye strain and fatigue
- Awkward and static posture of the neck and head
Microscopy Tips

- Use a fully adjustable ergo-task chair or stool with built-in solid foot rest. Adjust the chair to fit you properly.
- For prolonged standing alternate between feet, wear low-heeled shoes with good cushioning or use anti-fatigue floor mats.
- Pull the microscope to the front edge of the work surface for upright posture and elevate if needed.
- Adjust the eyepieces and angle of observation to prevent neck strain. Use adjustable microscope stands.
- Provide armrests to support forearms during knob adjustments.
Microscopy Tips

- Do not rest forearms on the edge of workstation; use padding
- Take stretch and eye breaks and rotate tasks.
- Don’t use a microscope for more than 5-hours a day.
- Maintain straight wrists and keep elbows close to the body.
- Ensure that sufficient knee and leg space is available.
Fume Hoods and Biological Safety Cabinets Risk Factors

- Constrained knee and leg space, especially in older BSCs
- Contact pressure on the forearms, wrists and knees, or legs
- Awkward and static posture of the neck, back, legs, arms and wrists
- Constrained body position, overloading muscles, tendons, and joints in asymmetrical manner
- Working with elbows winged
- Overreaching
Fume Hoods and Biological Safety Cabinets Tips

- Adjust the chair properly before you start work so it provides adequate back support. Remove the chair arms if they interfere with the ability to get close to your work. Sit back in the chair for lumbar support.

- Prevent extended reaching. Place materials as close as possible to you.

- Avoid resting arms on the sharp edges of the hoods or cabinets. If possible apply closed-cell foam padding to the front edge of the hood or cabinet.

- Remove drawers, supplies, refrigerators from under the cabinet or hood to provide leg room.
Fume Hood and Biological Safety Cabinet Tips

- If you must stand to work at the hood or cabinet alternate between feet, wear low-heeled shoes with good cushioning or use anti-fatigue floor mats.
- Take short breaks to relieve forearm and wrist pressure caused by leaning on front edge of hoods/BSCs.
- Maintain straight wrists and keep elbows close to the body.
Microtome & Cryostat
Risk Factors

- Older equipment may not be serviced, lubricated or maintained properly.
- Older equipment has more repetitive, force and stress issues.
- Workstation surface height at sitting or standing position.
- Proper sitting position and posture.
- Constrained knee and leg space, especially in older labs.
- Contact stress on the forearms, wrists, elbows.
- Awkward and static posture of the neck, back, arms and wrists.
- Working with elbows winged.
- Overreaching
Microtome & Cryostat Tips

- Ensure older equipment is serviced, lubricated and maintained properly. When possible update equipment.
- Retrofit older equipment to lessen repetitive movement, force and stress risks.
- Consider use of an automatic foot operated cryostat when frequent cryosectioning is performed.
- Adjust the workstation height to keep arm closer to the body in both the sitting and standing positions.
- Prevent extended reaching. Place materials as close as possible to you. Don’t work with elbows winged.
- Remove drawers, supplies, refrigerators that interfere with knee and leg space.
Microtome & Cryostat Tips

- Apply padding to the front edge of the workstation to prevent contact stress on the wrists, forearms, elbows.
- Eliminate awkward and static posture to the neck, back, arms and wrists by ensuring proper sitting position and posture with chair or stool adjustments.
- Take frequent rest breaks and do stretching exercises.
- Rotate tasks during the day.
- Use both the right and left hands when possible.
- Keep slides, cassettes, tweezers, brushes, water baths and other equipment within reach to prevent reaching.
Test Tube Handling Tips

- Adjust the chair properly before you start work so it provides adequate back support. Remove the chair arms if they interfere with the ability to get close to your work. Sit back in the chair for lumbar support.
- Arrange tubes to minimize reaching and twisting by placing them as close as possible to you.
- Use container to raise test tube racks when necessary.
- Use both hands to open and close test tubes.
- Use cap removers to minimize pinch grip.
- Use a vortexer mixer rack instead of holding tubes by hand.
Test Tube Handling Tips

- Avoid resting arms on the sharp edges of the workstation or lab bench.
- Remove drawers, supplies, refrigerators from under the cabinet or hood to provide leg room.
- If you must stand to work at the hood or cabinet alternate between feet, wear low-heeled shoes with good cushioning or use anti-fatigue floor mats.
- Take short breaks to relieve forearm and wrist pressure.
- Maintain straight wrists and keep elbows close to the body.
If your computer workstation is not set up ergonomically correct it will cause MSD risk factors to the eyes, neck, shoulders, upper and lower back, elbows, wrists, fingers and legs.
Computer Ergonomics Training Tips

- For the full training session to address MSD risk factors at your computer workstation go to our webpage www.ehs.wustl.edu. Go to Office Ergonomics and training.