



Laboratory ergonomics

Some tasks performed in research laboratories can lead to joint and muscle strains if done for prolonged periods. The following tips can help you to work effectively and reduce fatigue and strain during lab work.

Posture

Sitting

- If a job requires little physical effort and requires limited space, it should be done in a sitting position.
- If prolonged periods of sitting are required, an adjustable lab stool with a backrest is recommended. A backrest will provide support and promote good posture.
- Adjust the chair height so that your feet rest comfortably on the floor, footrest or foot ring.
- If precision work on a bench top is required, try tilting the chair seat forward to avoid leaning.
- Keep frequently used items within arm's reach.
- Set up work stations where there are bench cut outs to enable you to sit close enough to your work with clearance for your legs.
- If you also use a computer, make sure it is set up according to the office ergonomics guide.



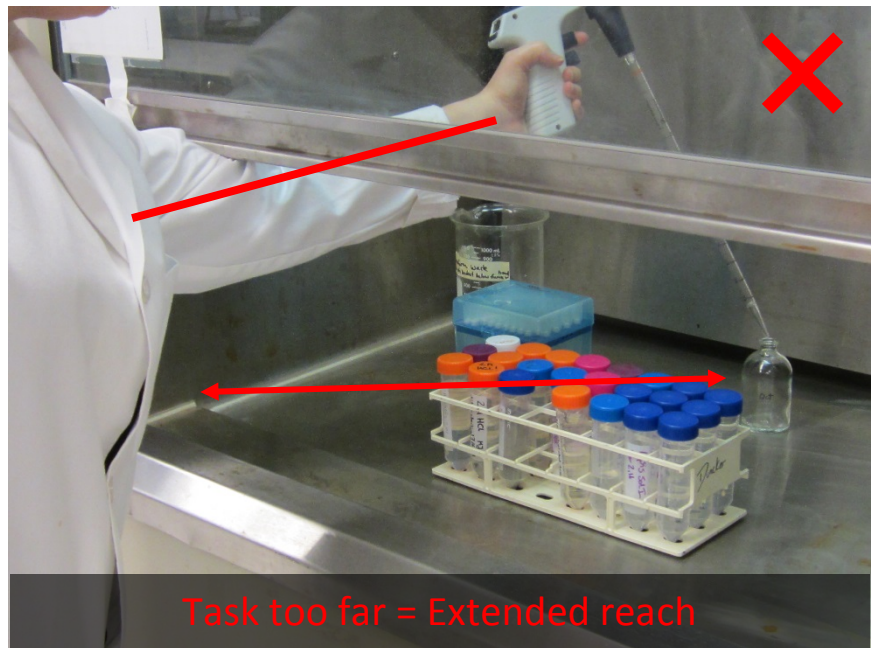
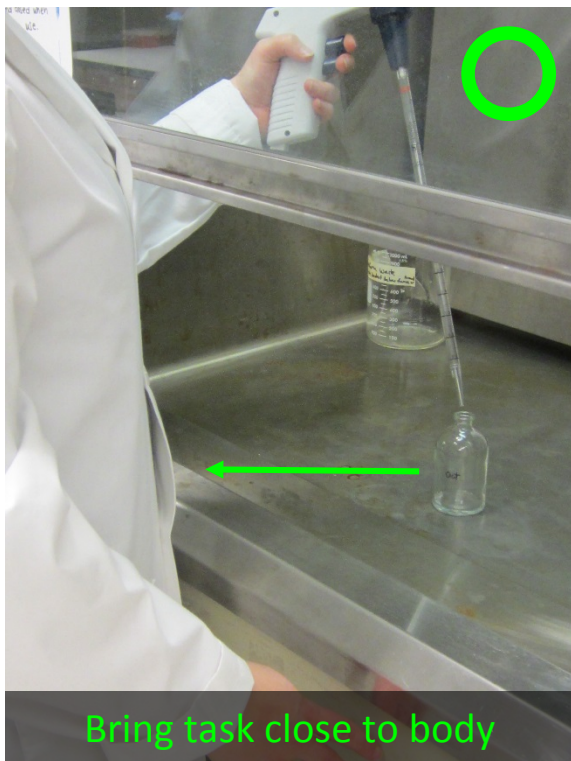


Standing

- Standing is a good working posture when longer reaches or handling of heavier objects are required. It provides greater freedom of movement, however it can be tiring.
- If prolonged standing is required at a workstation, use an **anti-fatigue mat and wear comfortable footwear**. Place one foot on a small stool and alternate to reduce pressure in the back.

Fume hoods and biosafety cabinets (BSCs)

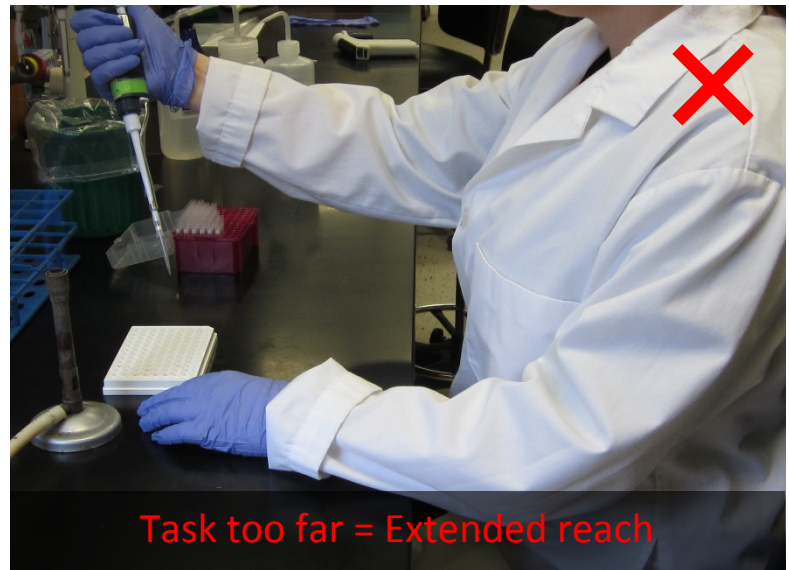
- Position materials in laboratory hoods/BSCs as close as possible to avoid extended reaching. Perform work at least 6" back into the laboratory hood for safety reasons.
- Apply **padding** to the front edge of the hood/BSC (away from the down draft) to reduce contact forces with the forearm and wrists. For biosafety cabinets, use a closed-cell foam padding that can be decontaminated.
- Make sure that lights in hoods/BSCs are working properly. Replace bulbs when necessary.
- Take short breaks to relieve forearm and wrist pressure caused by leaning on front edge of hoods/BSCs.





Pipetting

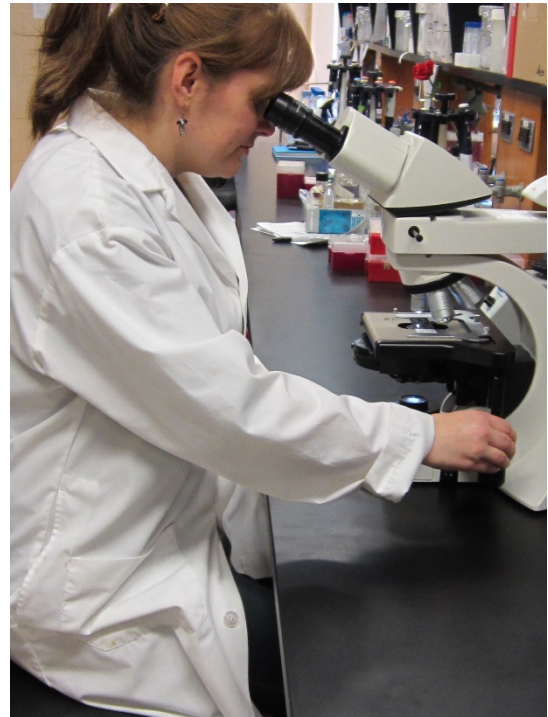
- Elevate your chair according to **the working height, rather than the bench height** to avoid working with arms elevated.
- Purchase an electronic or a latch-mode pipettes to replace manual plunger-operated pipettes. Both of these units reduce the need for excessive thumb force and repetition. Electronic pipettes are strongly recommended for highly repetitive tasks.
- Multi-finger controls help distribute the force among several fingers rather than continuously using the same finger. Some pipettes have a button on the top which may require the thumb to be repeatedly extended out of a relaxed, neutral position.
- Use thin-walled pipette tips that are easy to eject.
- Limit periods of continuous pipetting to 20 minutes or less. Vary activities, or take frequent short breaks (e.g., 2 minutes for every 20 minutes of pipetting).
- Rotate pipetting tasks among several people.
- Work with arms close to the body to reduce strain on shoulders, and avoid resting elbows or forearms on a hard surface.
- Keep head and shoulders in a neutral position (bent forward no more than 30 degrees).
- Do not twist or rotate your wrist while pipetting.
- Use low profile waste receptacles for used tips. These should be no higher than the top of the tubes being filled.
- Use a stand or fixture to hold the pipette when not using it, rather than holding it in your hand.
- Use a tool to open microtubes if required on a repetitive basis.





Microscopy

- Adjust the eyepieces and angle of observation to prevent neck strain. Use adjustable microscope stands to adjust height and angle of the microscope. Move the microscope close to the edge of the counter to avoid bending your neck.
- **Use a cut-out work table. This puts you close to the scope yet gives an area for supporting forearms.**
- Avoid leaning on hard edges.
- Take stretch breaks and rotate tasks.
- Use risers and angled microscope arm supports to relieve fatigue and strain.
- Ensure that sufficient knee and leg space is available by removing false fronts or supplies from beneath the bench.
- Use television systems to eliminate the use of binocular eyepieces when appropriate.
- To reduce eyestrain, every 20 minutes look away from your work and focus on an object 20 feet away for 20 seconds.



Glove boxes

Working in glove boxes or anaerobic chambers requires extended static loading on the shoulders. Extending the arms for more than a couple of minutes can become very exhausting. In addition to static loading and frequent side reaching, the thick gloves also make the user over compensate on grip strength. The following are recommended for control of ergonomic hazards associated with using a glove box:

- Move all needed materials for the experiment from the side chamber to the main chamber at one time to reduce the amount of side reaching
- Use highly absorbent hand powder for glove comfort
- Rotate tasks and take frequent breaks to avoid long continuous use of glove boxes
- If necessary, use a sit-stand seat to alleviate stress on the low back



Micro-manipulation and fine motor skills

- Use plastic vials with fewer threads. This will reduce twisting motions during capping and uncapping lids.
- When using forceps, use small pieces of foam similar to the type used on pencils and pens, to prevent soreness on the fingertips. This will distribute the force over a greater surface area, thus reducing the compressive forces on the soft tissue.
- Practice using the forceps between the 1st and 2nd digits instead of using the thumb and 1st digit. Then try alternating between the two positions to reduce the use of the thumb. The thumb is used repetitively with almost every job task performed in the laboratory.
- Tilt storage bins toward the worker to reduce wrist flexion while reaching for supplies.
- Encourage micro-breaks and hand exercises.

