

APPENDIX IV

Laboratory Ergonomics

The Pressure of Pipetting

Pipetting involves several ergonomic stressors - force exerted by the thumb, repetitive motions and awkward postures, especially of the wrists, arms, and shoulders. And these can be exacerbated by mental pressure resulting from the need for accuracy, precision, and timing demanded by many pipetting procedures.

Recommended Protective Measures for Pipetting

- Rotate pipetting tasks among several people.
- Take short micro-pauses of a few seconds, when you can't take a longer break.
- Use only the force necessary to operate the pipetter.
- Choose pipettors requiring the least pressure.
- Work with arms close to the body to reduce strain on shoulders.
- Keep head and shoulders in a neutral position (bent forward no more than 30 degrees).
- Avoid elevating your arm without support for prolonged periods.
- Use shorter pipettes. This decreases hand elevation and consequent awkward postures.
- Use low profile waste receptacles for used tips. They should be no higher than the top of the tubes being filled.

Microscope Use

Using a microscope involves several ergonomic stressors: sitting for long periods of time; awkward postures of the neck, shoulders, upper extremities and back; and stresses on wrists, arms, elbows, and shoulders. Visual muscles may also be subject to static loading due to maintaining convergence and accommodation for a relatively fixed focal distance for prolonged periods.

Recommended Measures for Using a Microscope

- Spread out microscope use out over the entire workday so you don't spend long uninterrupted periods at the task.
- Keep scopes clean and use illuminators and shadow boxes properly to avoid visual and musculoskeletal strain.
- Adjust chair height so thighs are horizontal and feet are flat on the floor. Chair height should be adjustable from 15-21 inches. If necessary, use a foot rest to support the feet and prevent contact stress on the back of the legs.
- Make sure the backrest provides proper lumbar support and adjust the lumbar support so it fits the inward curvature of your lower back. Be sure to readjust when you change positions.
- Select chairs with well-padded armrests to increase stability without compressing the ulnar nerve in your arm.

- Position work surfaces high enough to allow close inspection without inclining your head beyond 17-29 degrees.
- Use a cutout worktable to place you close to the scope while providing support for your forearms.
- Periodically close your eyes or look at an object in the distance to relieve the static loading on your visual muscles.
- Remember the 20-20-20 rule: every 20 minutes or so, look at something 20-feet away for 20-seconds to reduce eye strain.
- Avoid leaning on hard edges—use pads or supports
- Spread microscope work throughout the day and between several people, if possible. Don't use a microscope for more than 5 hours per day.