

APPENDIX IV

Laboratory Ergonomics

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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. When pipetting is done for more than 300 hours in a year, the prevalence of hand and shoulder pain increases.

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).
- Use adjustable chairs or stools with built-in solid footstools. Don't use a foot ring, which could compress blood vessels in feet, and don't use high stool which can force you to work with a bent neck.
- Don't elevate your arm without support for protracted 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 protracted periods.

Recommended Measures for Using a Microscope

- Don't use a microscope for more than five hours per day and spread its 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.