



## Laboratory Ergonomics: Micro-manipulation Tools and Modification Techniques

Certain laboratory tasks require using tools that promote pinch grips and awkward wrist postures.

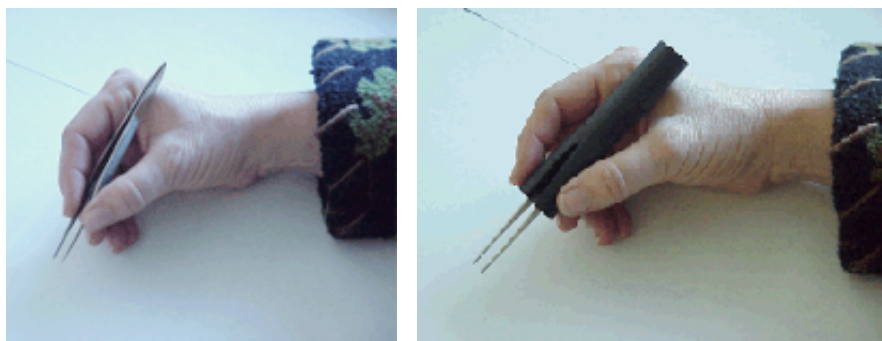
A pinch grip requires the tool to be grasped between the index finger and the thumb for precise manipulations. When a pinch grip is used intensively and for a long duration, such as when dissecting fruit flies, worms and plant specimens, fatigue may occur in the hand and forearm muscles. Over a period of time, this may contribute to developing a repetitive strain injury.

Some hand tools are designed to reduce pinch grip force and awkward postures. Older tools may be able to be modified.

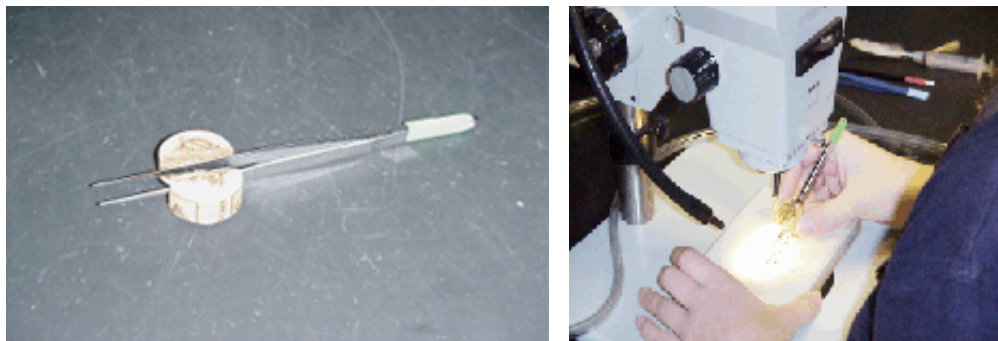
### The basic principle of a modification is to:

- Build up the part of the tool that your hand holds so it will fit your hand better and reduce pinch force or
- Change the angle of the handle so your hand holds the tool with a straight wrist.
- Use non-slip materials to reduce the force needed to hold the tool in position.

### Enlarging Forceps



To modify the forceps, purchase rectangular cylindrical **foam**. Partially cut the foam along both sides so the forceps can be placed inside.



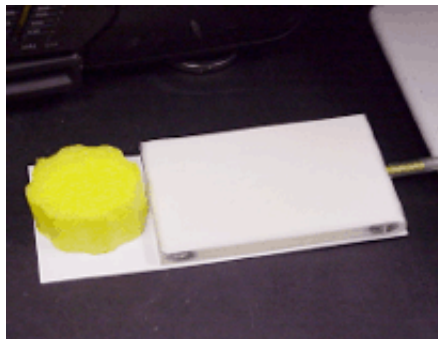
Another way to modify the forceps is to cut a wine cork in

half and then take one of the cut sections and cut it in half the long way. Glue the two halves to the outside of the forceps to enlarge your grip.

### Add a Handle



with handle added



with handle added



### Adding a handle to maneuver a rectangular object, such as a CO2 pad, can reduce using awkward and forceful hand postures.

To make a handle modification, attach the rectangular object (CO2 pad) to a 1/8-inch thick piece of plastic with Velcro (place the Velcro underneath the CO2 pad so it can be connected to the top of the plastic). Plastic can be custom-cut at Tap Plastics in El Cerrito (525-3508).

When measuring for the plastic, allow an additional 3-inches in length to attach the handle. A handle such as a knob, foam, cable clamp or T pipe molding can be attached to the outer 3-inches of the plastic piece with rubber cement. Make sure the handle will encourage using a neutral hand posture with a minimal amount of gripping force.



### Unsafe

The photo above shows how the fingers and thumb



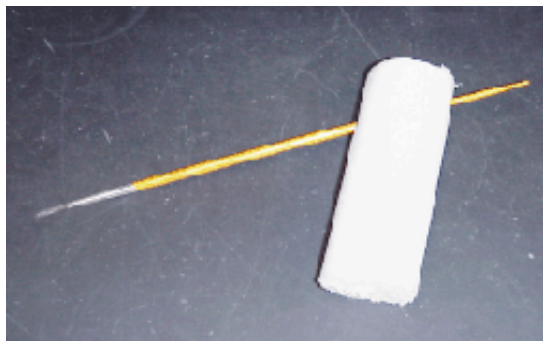
### Recommended

Here, the left hand

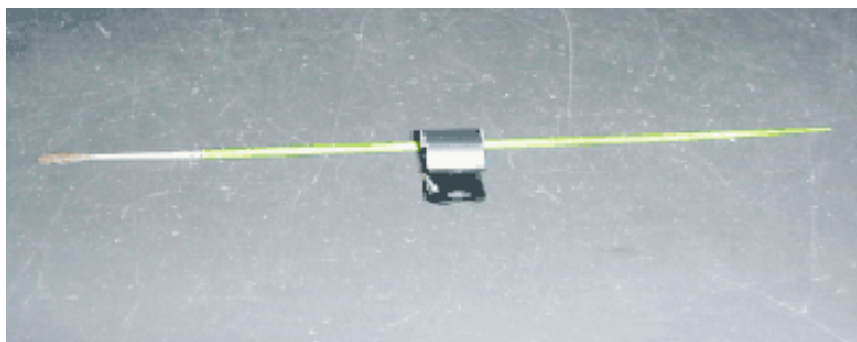
of the left hand are using an awkward and forceful posture to maneuver the CO2 pad in a fly lab. is using a less stressful posture because the fingers and thumb are holding a knob that has been attached to a piece of plastic.

### Alternative Handles

#### Creating Alternative Handles for Straight Tools Can Reduce Awkward Wrist Postures



**Above:** Insert the end of a paintbrush or feather into [Plastizote Tubing](#) to create an alternative way to grip and angle the tool.



Or, tape a 3/4 or 1-inch plastic cable clamp, depending on your finger size, onto the middle of the paintbrush. Insert your index finger inside of the cable clamp so you can more easily maneuver the brush. Plastic cable clamps can be purchased at most hardware stores.

### Enlarge a dissection needle tool to reduce pinch grip force

Purchase round cylindrical foam. Cut the foam along one side and slide it over the syringe or glass tube to help enlarge the grip.



