

## Tips for Ergonomic Pipette Use and Handling

Working with pipettes in laboratories demands a lot of concentration and precision. Pipettes are often used to carry out reactions involving chemical reagents. Risks are always associated with working with chemicals. Using pipettes for long hours is associated with an increased risk of hand and shoulder ailments. There are a number of safety factors that should be considered while working with pipettes, such as the weight and length of the pipette, the force required to operate the pipette and how the pipette fits into the hand. Pipettes are available in a large range of makes and models in the market. Each of them have varying features in terms of ease of use, technical specification and price. The various features of the pipette will influence comfort and ease of use. Here we will be concentrating on the ergonomic aspects of pipette design and use.

### Ergonomic Design

The consideration of ergonomics during the design and manufacture of pipettes ensures safe, comfortable and efficient pipettes. Reliability and accuracy are essential for the repetitive usages of pipettes. The design of a product must take the users into consideration and what tasks they perform, what type of equipment they use and the environment in which they work. A pipette's design should allow for a neutral position of the user's wrist and hand. It should not require an excessive amount of force for operating the pipette and it should minimize any contact stresses incurred to the hand. The following are some of the main ergonomic points to consider when selecting a pipette. A good pipette must have the following characteristics. It should have good grip and be comfortable to hold. It should be light in weight and shouldn't have any sharp edges or ridges. A pipette must have easy tip ejection and fitting. It should be suitable for right or left handed use. The plunger should be convenient requiring minimal force.

### Proper Working Posture

- While working with pipettes, it is important to place minimum strain on muscles, ligaments, tendons, etc.
- Proper working height is important during pipetting while sitting or standing. The wrong height will put extra pressure on the upper limbs. If it's too low, the person will hunch over and put strain on his back and neck. In case of excessive working height, the person's shoulders and arms will be working in a raised position, putting excessive strain on the muscles.
- There should be a suitable chair for longer hours of pipetting. There should be enough leg space under the work surface to help the person sit closer to the work. The chair should be adjustable so

that a good working posture is achieved. If the feet don't rest comfortably on the floor with the seat at proper height, then footrests should be used.

- The wrist should be relaxed - not extended, flexed or rotated. The shape of the pipette hilt might affect the posture of the wrist.
- In a properly designed pipette, the thumb should not have to apply significant force.
- The various devices on the work surface should be positioned to allow a good working posture. The position and height of solution containers, sample holders and other equipment should minimize the need for twisting, bending or awkward stretching.

## **Hazards of Repetitive Pipetting**

Laboratory workers repeat the task of pipetting again and again. According to researchers, the more repetitive the task of pipetting, the higher the chances of developing upper limb problems. To reduce the adverse effects of excessive pipetting, vary the work routine. You might introduce tasks that require varying postures and regular breaks. In fact, frequent breaks are more effective than working for longer hours and taking a longer break. Alternate between a number of different tasks. Using an electronic pipette or a multipipette can also reduce the effects of repetition.

## **Optimally Designed Pipette**

Pipettes shouldn't require excessive force while operating. If extra force is needed, the plunger is likely difficult to operate. Highly viscous liquids might be the other reason for a forceful action. Pipettes designed with a shorter plunger are preferred because they require less effort. The movement of depressing the plunger should be smooth. The effort to hold the pipette should be minimal. Some textured material or small ridges will reduce the effort required to grip the pipette. However, the most effective way to decrease the amount of force to be applied is to use an electronic pipette. They require less effort in terms of operating, but they weigh more and may cause strain when holding for longer periods.

## **Choose the Proper Pipette**

A number of pipettes are available on the market. You should choose one that's easy to operate and provides safe and secure pipetting. These guidelines will help you select a suitable pipette.

- The pipette should be lightweight. Choose one that is cushioned or contoured to your hand.
- Choose a pipette that uses your fingers instead of thumb to operate a trigger.
- You should pick a plunger with low spring pressure and short length of travel.
- Choose a pipette of proper size. Wrap your hand around the pipette; if it covers less than half of the pipette, the pipette is too big. But if your hand wraps around the whole pipette, it is too small.
- The tip ejector should require minimal force. Thin-walled tips are easy for ejection. If possible, use pipette-specific tips.



### **Further Information**

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