

PolySeed®

Technical Report

Pipetting Injuries

If you spend several hours a day using a manually operated pipette, you know it can be a real pain...in the neck or the wrist or the elbow or the thumb, or just about any other part of the anatomy you care to name. The bad news is that prolonged pipetting can lead to serious repetitive strain injuries. The good news is there is a lot you can do to protect yourself.

See the simple charts below to learn how pipetting injuries happen and how to protect yourself by using proper posture, technique, and tools. An ounce of prevention is worth a pound of cure. Take the time now to inform yourself so you will not have to pay for it later.

<i>If you experience...</i>	<i>It could be caused by...</i>	<i>Which could result in...</i>
Pain & inflammation in the wrist and elbow	Tip insertion and using wrist movements to manipulate the pipette.	<u>Tendonitis</u> – inflammation of the tendon.
Pain on the thumb side of the wrist; thumb maybe tender to the touch, and a small knot maybe felt. The thumb may lock in position when bent.	Gripping the pipette tightly and performing repetitive and forceful plunger and tip ejection activities with the thumb.	<u>De Quervain's Syndrome</u> – an inflammation or tendonitis of the sheath or tunnel that surrounds two tendons that control movement in the thumb.
Pain where the finger or thumb joins the palm; swelling; finger or thumb locks in position while being extended.	Gripping the pipette tightly and performing repetitive and forceful plunger and tip ejection activities with the thumb.	<u>Trigger Finger</u> – Also known as “pipettors thumb”. An inflammation of the sheath around a tendon in the thumb.
Weakness in the hand or tingling in the thumb, index, and middle fingers; numbness or tingling in the palm of the hand; wrist pain; reduced finger and thumb movement; sharp radiating pain from hand to elbow or neck.	Flexing, extending, and rotating the wrist while pipetting, and inserting and ejecting.	<u>Carpal Tunnel Syndrome</u> – Compression of the median nerve and vessels running through the carpal tunnel in the wrist.

*Chart continued on page 2

Elbow pain the gradually worsens; pain radiates to the forearm and back of the hand when grasping or twisting; weakened grip; pain when the tendon is gently pressed near where it attaches to the upper arm.	Tip insertion and extension of the pipette away from the body.	Tennis Elbow – also called Epicondylitis , inflammation of the muscles of the forearm or their tendons near their origin on the bone of the upper arm.
Numbness or tingling in the ring or middle finger; loss of finger and hand strength; inability to straighten fingers; sharp sudden pain when elbow is touched.	Resting the elbow on a hard lab bench while pipetting.	Cubital Tunnel Syndrome – Compression of the ulnar nerve in the cubital tunnel in the elbow.

To protect yourself from the injuries listed in the chart above, you must correct awkward posture and minimize force, repetition effects and contact stress. Because pipetting injuries are caused by a combination of all four of these risk factors, all four areas should be addressed. Refer to the chart below to evaluate your pipetting practices. Make the necessary changes to reduce the pain of existing injuries and prevent new injuries from occurring.

<i>Minimize Awkward Posture</i>	<i>Minimize Force</i>
<ul style="list-style-type: none"> • Use shorter pipettes to reduce hand elevations • Position elbows as close to the body as possible, with arms and wrists extended straight, neutral positions (handshake posture, palm slightly down) • Keep work items within close reach to limit arm extension or twisting the neck and torso • Minimize situations and time that arms are in an elevated position • Use adjustable chairs or ergonomically designed stools with proper back, thigh, and foot support • Use “low profile” equipment (waste receptacles, solution containers, etc.) 	<ul style="list-style-type: none"> • Select/use pipettes that require less finger or thumb movement and physical effort when aspirating or dispensing fluids • Use only the force necessary to perform a task (avoid unnecessary exertion such as jamming on tips) • Avoid repeated pounding with the base of the palm (common when applying tips)
<i>Minimize Repetition Effects</i>	<i>Minimize Contact Stress</i>
<ul style="list-style-type: none"> • Distribute tasks to minimize continuous pipetting • Share workload between right and left sides of the body • Vary tasks among pipettor types where activation motions are different • Rotate pipetting tasks among several individuals 	<ul style="list-style-type: none"> • Select/use pipettors that best fit the user’s hand • Select pipettes that use the full hand with a relaxed grip span rather than a tight grip (clenched fist) • Avoid sharp or hard work surfaces when resting arms or elbows, providing mats or rest pads if possible
<i>In Addition,...</i>	
<ul style="list-style-type: none"> • Wrist rotation should not exceed 90° from the work surface • Arm/hand elevation should not exceed 12” from the work surface <ul style="list-style-type: none"> • Hand posture should remain relaxed • Use pipettes that accommodate variations in user hand sizes 	