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Leveraging Ergonomics to **Boost Lab Productivity** and Reduce Strain

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CELLTREAT Scientific Products

BODY MECHANICS

PREVENTION STRATEGIES WORK

What exactly is Ergonomics?

- The **study & design of tasks, workplaces, and equipment** considering people's capabilities and limitations.

- **Removes barriers to productivity**, and human performance by fitting products, tasks, and the environment to people.

The Science of Work

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Why Care about Ergonomics?

Work-related musculoskeletal disorders (WMSDs) are **the single largest job-related injury and illness problem** in the US

Ref: Occupational Safety and Health Administration (OSHA) November 14, 2000

Industry Impact

Work-related musculoskeletal disorders (WMSDs) account for 34% of all reported illnesses and injuries, totaling 626,000 days away from work/year

U.S. Employers are paying $15+ billion/year in workers comp costs for WMSDs

Ref: Occupational Safety and Health Administration (OSHA) November 14, 2000

Investing in Ergonomics = Return on Invesment

- Lost productive time from common pain conditions costs est. $61 billion/year
- Research has shown that for every $1 spent on Repetitive Strain Injuries (RSI) prevention, companies get back $17.80 in returns.

1,780% RETURN + Engaged, Happy, Healthy Employees

Ref: Stewart et al, JAMA. 2003;290:2443-2454

Ref: Buckle and Devereux 1999 report - European Agency for Safety and Health at Work

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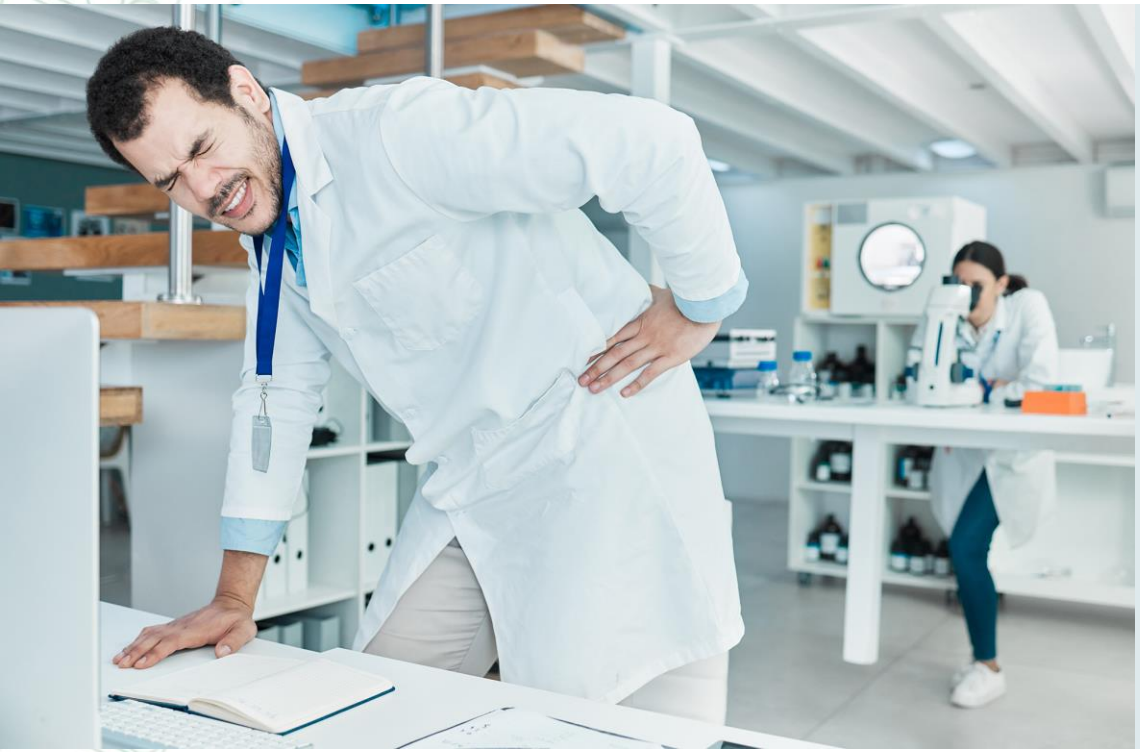
Lab Ergonomics

Elevated Risk Factors for Laboratory Personnel



Risk Factors:

Repetition

Force

Contact Stress

Posture

Resulting in:

- Carpal Tunnel Syndrome (CTS)
- Tendinitis
- Trigger Finger
- Shoulder/Neck Syndromes

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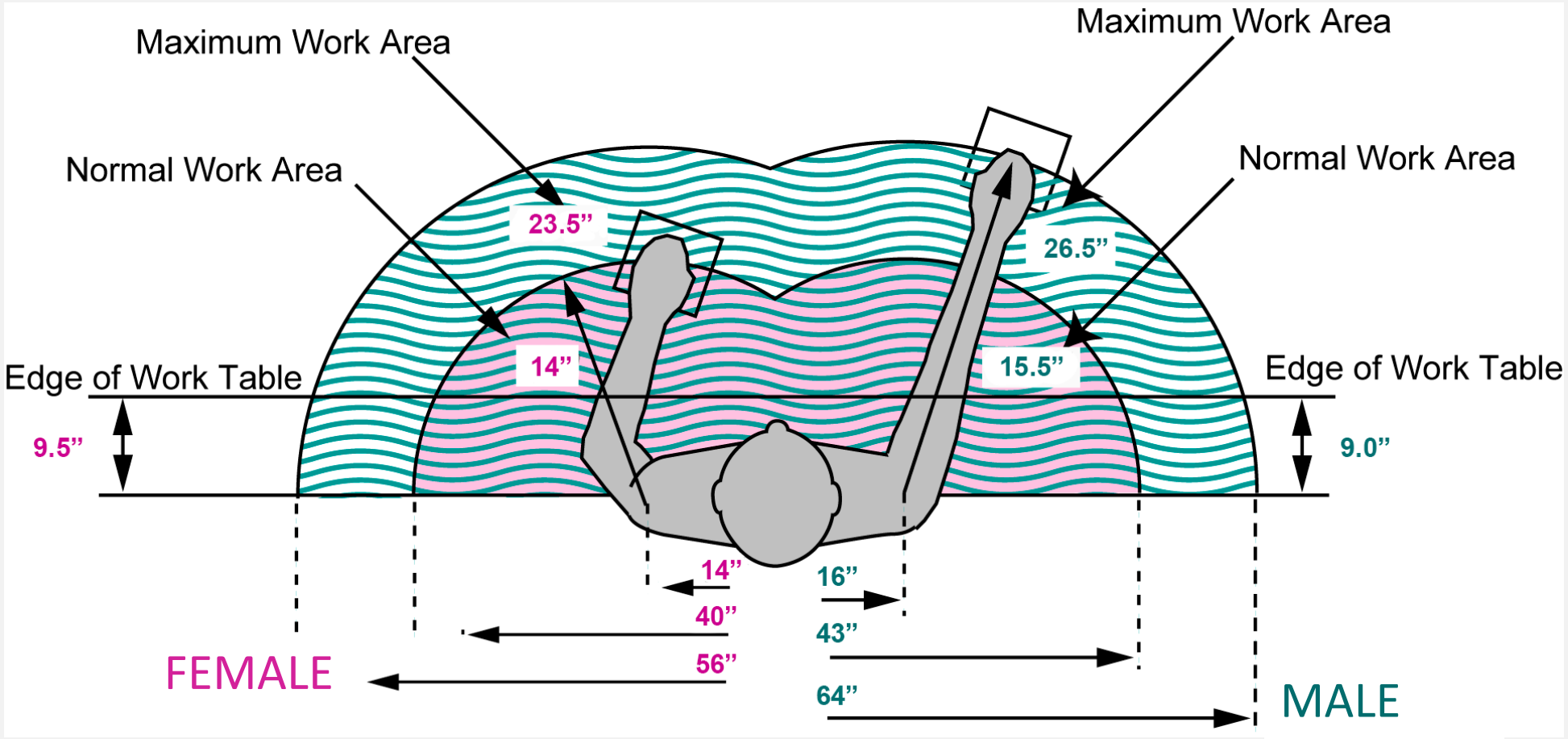
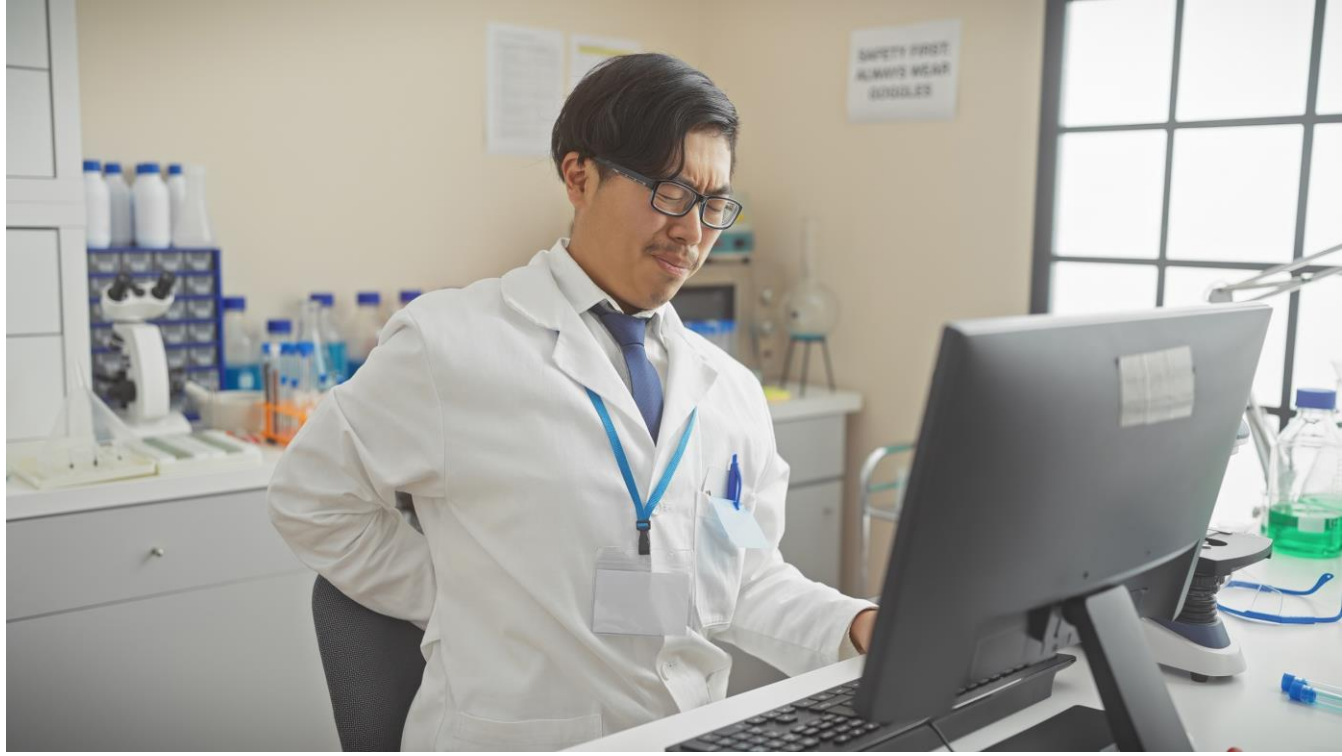
Issue: Lab Mechanics



What EH&S Directors are Seeing



In Lab Challenges:

- Keyboards
- Chairs
- Small working spaces
- Bench
    - Bench height, leaning, repetitive movements, improper location of external devices like keyboards/monitors, tube opening, and other micro hand manipulation.
      Lack of adjustability for those who are very petite or very tall.
    - Liquid handling pipetting

Ref: Environmental Health & Safety Directors, Feb. 14, 2025 Survey

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What EH&S Directors are Recommending

- Ergonomic **equipment to help with posture**
  - ✓ Padded arm rests
  - ✓ Proper seating, fully adjustable for tall/short personnel height
  - ✓ Step stools
  - ✓ Carts
  - ✓ Pipettors with option for thumb or index finger activation
  - ✓ Pipettes with light ejection force
  - ✓ Aliquoting serological pipettors
- Rest breaks
- More staff to help with workload

Ref: Environmental Health & Safety Directors, Feb. 14, 2025 Survey

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What Lab Furniture Companies are Saying

Laboratory seating solutions should include:

- Chairs with the proper back support height
- Adjustable back support heights for different user's heights/angles
- Built in lumbar support to help keep body aligned
- "Waterfall" (sloped front) seats are recommended
- Foot rings are also recommended to relieve pressure on the thighs and lower legs

X

Ref: Jim Dahl, ECOM Seating, Blue Ridge Ergonomics; March 5, 2025

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Pipetting is an Ergonomic Risk

Pipetting is the #1 Cause of Pain & Discomfort in the Lab

High Repetition
Excessive Force
Contact Stress
Awkward Posture

Repetitive Strain Injuries (RSIs)

- Carpal Tunnel Syndrome
- Tendinitis
- Epicondylitis (Tennis Elbow)
- Trigger Finger
- Tension Neck Syndrome
- Tenosynovitis (Tendon inflammation)

If left untreated

- **Permanent damage**
- **Surgery**
- **Long-term pain**

Ref. Occupational Safety and Health Administration (OSHA), November 14, 2000

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Issue: Pipette Product Design

Axial (Traditional) Pipette

- 40+ years old
- Proper ergonomic posture was not known or considered when it was invented
- Simplest & least expensive way to make a pipette

Ergonomic Pipette

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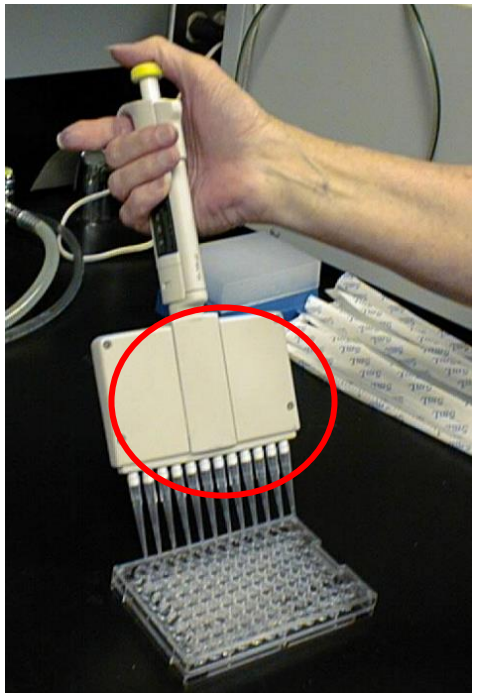
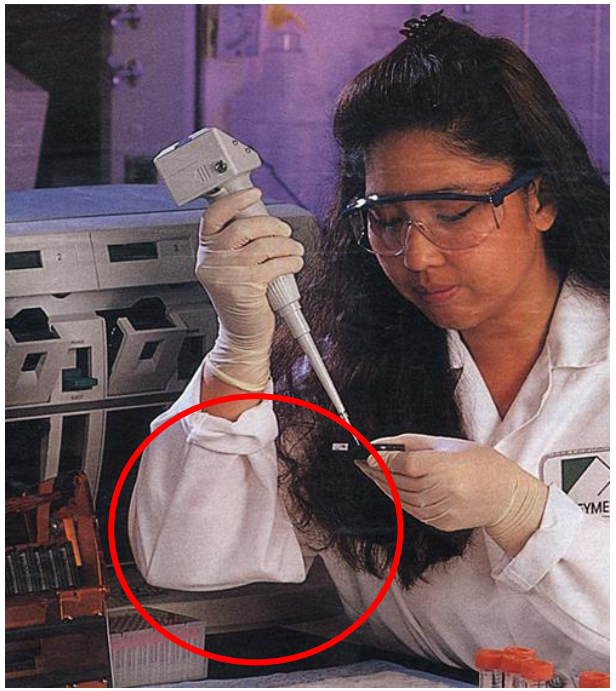
Issue: Product Quality & Usability



Clenched Hand



Over-Rotation & Wrist Bending

Arm Suspension

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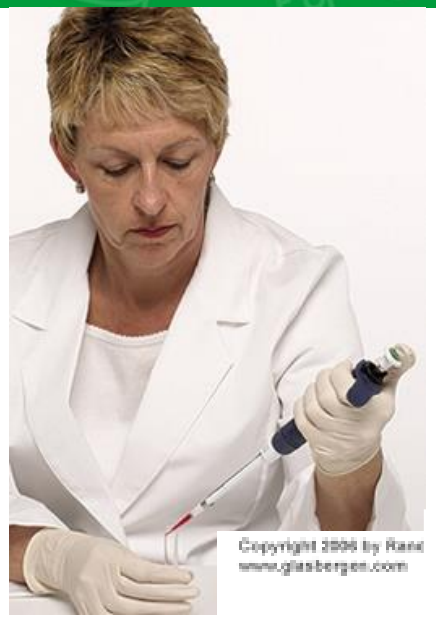
Issue: CTS is Common Among Lab Workers

- Carpal Tunnel Syndrome (CTS) = median nerve at the wrist is compressed.
  - Median nerve supplies sensation to the thumb, first two fingers, part of the third finger and hand muscles.
  - Tissues within the carpal tunnel are subjected to increasing fluid pressure as the forearm is rotated from a neutral position of 45° pronation (palm down) to full supination.
  - This rotation **can increase fluid pressure in the carpal tunnel by as much as 285%**
  - Women are 3x more likely to develop CTS*



Ref: Johns Hopkins Medicine Newsletter

We've mitigated these pains with
2 Product Solutions from VistaLab

Pipetting Reinvented

- Ergonomically-correct pipetting
- Productivity and comfort
- Less injury and fatigue

Designed with:

- ✓ Non-axial structure
- ✓ Contoured shape
- ✓ Freestanding
- ✓ Adjustable hook
- ✓ Large contoured plunger

Ergonomic Pipette

Traditional Pipette

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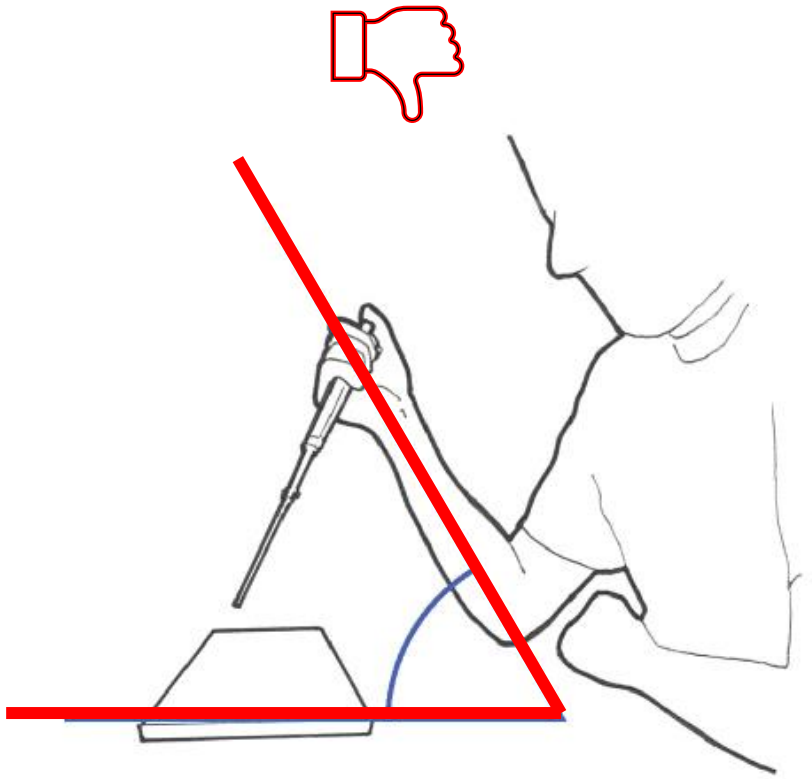
Issue: Pipetting Posture



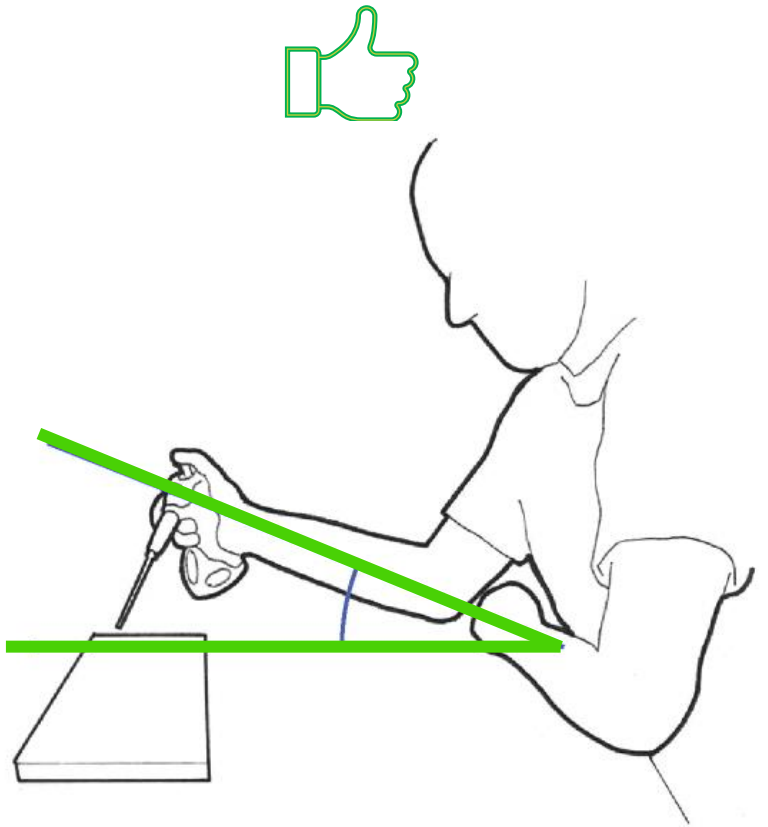
Avoid a high pipetting angle which stresses the shoulder

Leading contributors to tendon injury

Action
Elevated arm, forearm supination, wrist extension, radial deviation

Consequence
Shoulder & upper arm injuries, elbow problems, swelling within tendon linings

Leads To
Lateral epicondylitis



Keep a low arm angle to reduce stress especially in constricted space (e.g. hood)

Must Haves for Truly Ergonomic Pipettes

Adjustable hook and contoured body shape

Added support
No "clenched fist"

Low-force tip attachment

Easy "click on" tip acquisition mechanism

Low-force spring loaded tip eject

Minimal thumb force & tips "flick" off

Low force plunger plus large button

Use whole thumb instead of only finger tip

Self-standing

Tips remain elevated - no risk of contamination

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Redesigning the Pipette

Study: Can ergonomic design of pipettes reduce stressors related to upper limb musculoskeletal disorders (MSDs)?

Conclusion: The re-designed pipette, **(Ovation™) showed a significant reduction in the most important MSD risk factors for pipetting,** as compared to two other traditional axial-design pipettes.

Ref: National Institute for Occupational Safety and Health & Duke University Study: Evaluation of the Effectiveness of a Re-designed Pipette for Reducing the Risk Factors for Musculoskeletal Disorders. *Part of the NORA Ergonomic Intervention Project for evaluation of effectiveness of engineering interventions. Ming-Lun (Jack) Lu, Ph.D. and Sunil Sudhakaran, M.S. AEP. March 24, 2005*

Results also from studies performed at major universities

What Lab Technicians Are Saying

"He then suggested using ergonomic pipettes instead of regular ones. I switched to Ovation M Manual pipettes and after **only one week of using them the pain substantially reduced. The pain in my right hand is now completely gone and I feel normal again**."

-Margarete Diaz Cuadros, Brigham and Women's Hospital

"I made the switch to Ovation pipettes, and **within a month my wrist pain was completely gone**. I now have my own lab and will be urging all of my trainees to use Ovation pipettes from the beginning, hopefully avoiding the issues I had to go through."

- Dan Dickinson, UT Austin

"I manually pipette many samples a day. That caused a lot of pressure on my shoulder and elbow, and especially my thumb when ejecting tips. I developed elbow pain and numbness that was diagnosed as carpel tunnel syndrome and required surgery.

Now I'm using an Ovation and haven't had any further problems."

-Dawn Cherry, Medical Laboratory Technologist

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What we've done for Pipetting with Tips we've also done for Pipetting with Serologicals

ali-Q™ Aliquoting Pipet Controller

- Lightweight – powerful research tool that weighs only 350g (12.35oz)
- Curved body is easy to grasp
- No need to crane neck and hold up controller to watch the pipet graduation lines during aspiration/dispensing
- Sensitive buttons are activated with a gentle press
- Eases the strain of being under the hood
- Faster aliquoting = less stress time doing repetitive motions

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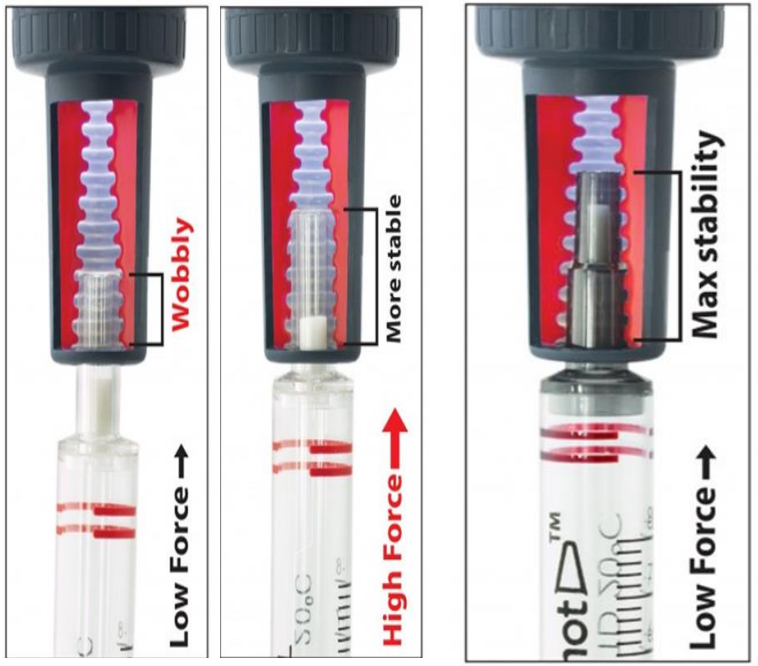
Wobble-not™ Serological Pipets

Low insertion force = Less wrist strain, less pain. More ergonomic.



Standard Pipet

Less dripping. More accurate pipetting.

Work application benefit:
Increased torsional stiffness = less wobble, more stable

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Key Takeaways

- Make sure your insurance covers worker's comp and ergonomic tools

- Consider how you can make your lab more ergonomically friendly if it isn't today. Main ergonomics focus on:
  - Pipetting
  - Seating
  - Hardware

- Already purchased a traditional pipettor?
  - Consider a demo with your local rep.
  - We also have an Ovation™ trade-in

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You Can't Ignore the Importance of Ergonomics in your Lab.

Thank you &
Stay Ergonomically Healthy

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