



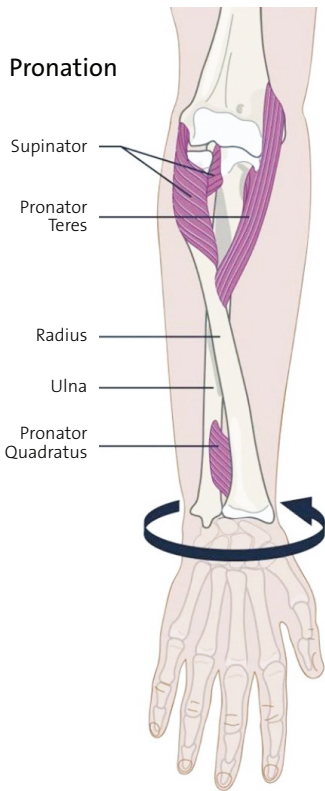
The vertical mouse: healthier mousing at no cost to performance

A qualitative usability study on the vertical mouse's speed, accuracy, and ergonomics compared to a horizontal mouse

The ergonomic, vertical mouse made its debut in the '90s as **the healthier, more efficient alternative to the traditional horizontal mouse**. It looks less like a mouse and more like a small contoured mountain with an angled slope between 40-70° and a body ergonomically shaped to fit the user's hand.

Its vertical orientation, coupled with its contouring allows the user to rest their hand in a comfortable grip around it and mouse in a neutral 'handshake' or 'thumbs up' position. With a vertical, natural grip, the user is also able to maneuver the mouse using their large arm muscles, which is safer and healthier than pivoting from the elbow and wrist all day.

For those who want to prevent, heal, or are suffering from mousing-related RSIs (Repetitive Strain Injuries) and MSDs (Musculoskeletal Disorders) such as carpal tunnel syndrome, tendonitis, computer shoulder, mouse arm or elbow, or arthritis, the vertical mouse may be a pivotal addition to the workstation.



A closer look at the benefits of vertical mousing

Reduces Wrist Pronation

A horizontal mouse causes wrist pronation. When the wrist is pronated, the inward turning of the hand scissors the ulna and radius bones. This twist stresses attached muscles and compresses the median nerve within the carpal tunnel while pinching tissue and stressing joints. A vertical mouse allows the user to grip the mouse at an angle that keeps the forearm and wrist in neutral positions. A neutral position also improves circulation, aiding in the healing of an injured area.

Reduces Tension in the Wrist and Hand

An ergonomic vertical mouse requires less grip strength to operate because it is contoured to the hand. The user can, therefore, release tension in their hand and wrist as they mouse, which prevents fatigue and injury. Less muscle activity means less risk of chronic overuse.

Allows User to Maneuver with Large Arm Muscles

With the wrist oriented in a neutral position and the hand relaxed in a comfortable hold, the user can operate the mouse with their arm muscles rather than the smaller muscles in their wrist and elbow. Mousing with the arm muscles is healthier and safer, and gives the wrist a chance to heal in the case of injury.

Who should use a vertical mouse?

1. Employees who are experiencing the warning signs of an injury in the shoulders, elbows, forearms, wrists, or hands. Warning signs may include pain, aching, burning, tingling, numbness, weakness, stiffness, or cramping
2. Employees who are prone to discomfort in their shoulders, elbows, forearms, wrists, or hands
3. Anybody who wants to mouse more comfortably, safely, and efficiently

Easy to adopt, comfortable to use

To work with a vertical mouse, the user lays their hand around the mouse as the shape of it guides, resting their thumb in the thumb indentation and relaxing their fingers on its contours.

The key to comfortably operating the device is to use the large arm muscles for moving it around the desk. An extended lip on the right side of the mouse makes using a vertical mouse easier because the user's pinky can rest on the lip.* Rather than encountering traction from the soft fleshy side of the hand lying on the desk, the device can glide freely because the hand is fully supported. This smooth glide makes navigating using the arm easier. Other helpful design features to look for in a vertical mouse include wirelessness, Bluetooth and USB connectivity, DPI adjustment, and a forward/back button.

Once accustomed to maneuvering from the arm, mousing 'vertically' becomes second nature.

**Each type of vertical mouse model will have a slightly different lip style that supports each hand shape and size uniquely*





The study: 40 computer users, 4 mice, vertical v. horizontal

To investigate the benefits of a vertical mouse, the Kensington team conducted a quantitative usability study led by a third-party group of ergonomic experts and consultants.

The ergonomists leading the study gathered 40 computer users who mouse more than four hours per day to participate. Each user moused with one of four mice designs at a time — either the Kensington Pro Fit® Ergo Vertical Wireless Mouse, the Kensington Pro Fit® Ergo Wireless Mouse*, the Kensington Pro Fit® Mid Size Mouse, or a leading competitor’s standard horizontal mouse recognized for its speed and accuracy. As the participants worked with each mouse type, the research team captured data on forearm extension, ulnar deviation, speed, and accuracy.

To measure forearm extension and ulnar deviation, the research team fit participants with two EMG (electromyography) sensors: one placed at the posterior forearm extensor muscle/tendon site and one placed at the lateral forearm ulnar deviator muscle/tendon site. Using an EMG software analysis tool, the team was then able to measure muscle activation forces at each location, isolating muscle tension created when using each mouse style.

**Both the Kensington Pro Fit® Ergo Vertical Wireless Mouse and the Kensington Pro Fit® Ergo Wireless Mouse are vertically-oriented mice*



EMG sensors helped measure activation forces at each site.

14% Less posterior forearm extension and 13% less ulnar deviation with the Kensington Pro Fit® Ergo Vertical Wireless Mouse

Mouse Comparisons – Mean with Standard Deviation for Baseline Tension in Microvolts (µV)*

	Extension** Mean (Standard Deviation)	Ulnar Deviation*** Mean (Standard Deviation)
Kensington Pro Fit® Ergo Wireless Mouse	14.65 (8.119)	16.90 (11.017)
Kensington Vertical Mouse	13.65 (6.927)	13.58 (7.092)
Kensington Pro Fit® Mouse	14.05 (6.255)	16.10 (10.157)
Logitech M325 Mouse	15.87 (9.177)	15.65 (8.307)

The results of the EMG testing showed the **Kensington Pro Fit® Ergo Vertical Wireless Mouse produces 14% less forearm tension and 13% less ulnar tension than the traditional horizontal mouse.**

N=40, **Extension refers to forearm muscle tension, *Ulnar deviation refers to ulnar muscle tension*

Kensington Pro Fit®
Ergo Vertical Wireless
Mouse produces:



less forearm tension
and



less ulnar tension
than the traditional
horizontal mouse.

Additionally, baseline muscle tensions measured at both points was the lowest with the vertical mouse of all four mouse models. According to research, a computer user's baseline muscle tension should remain below 15 microvolts to reduce the likelihood of developing a musculoskeletal disorder. The microvolt measurements of forearm extension and ulnar deviation with the Kensington Pro Fit® Ergo Vertical Wireless are both well below 15, according to the data. These data points confirm that the Pro Fit® Ergo Vertical Wireless Mouse prevents wrist pronation, reducing muscle tension in the forearm and ulnar regions. Its use can, therefore, aid in the prevention and healing of serious RSIs and MSDs.

Kensington Pro Fit® Ergo Vertical Wireless Mouse's accuracy and precision on par with leading competitor's mouse designed for accuracy and precision

Through a paired samples t-test*, the ergonomists compared mouse accuracy and precision of the Kensington Pro Fit® Ergo Vertical Wireless to the leading competitor horizontal mouse — a device recognized for its micro-precision. The results were impressive: there was no statistically significant difference in these performance categories between the two devices. The important takeaway here: **Kensington's Pro Fit® Ergo Vertical Wireless mouse delivers the ergonomic benefit of reduced wrist pronation at no cost to accuracy and precision.**

**The team used the Fitts' Law tests to measure accuracy and precision rates*

Kensington's Pro Fit® Ergo Vertical Wireless mouse delivers the ergonomic benefit of reduced wrist pronation at no cost to accuracy and precision.

Kensington Pro Fit® Ergo Vertical Wireless Mouse rated most comfortable mouse design, for conforming to the hand "naturally"

The research team also gauged general user preferences in a focus group held after the study. "It conformed to my hand naturally" was the most repeated comment. Participants rated the Kensington Pro Fit® Ergo Vertical Wireless Mouse as the most comfortable of the four mouse designs.

The conclusion is that a vertically-oriented mouse such as the Kensington Pro Fit® Ergo Vertical Wireless Mouse or the Kensington Pro Fit® Ergo Wireless Mouse is a more comfortable mouse design than its horizontal alternative in a traditional mouse.

“As a Certified Professional Ergonomist (CPE) involved with numerous product usability studies over the past two decades, I believe that the Kensington Pro Fit Ergo mouse hones an exceptional ergonomic design promoting long lasting hand comfort with exceptional precise movement.”

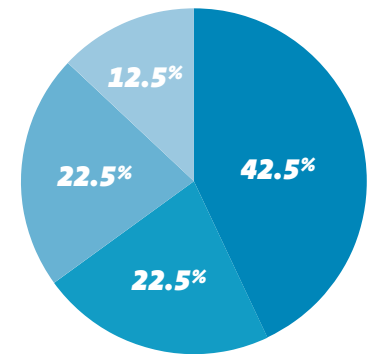
— Jeannie VS Iverson, CPE MS HFE, MS OT



Conclusion: Kensington Pro Fit® Ergo Vertical Wireless Mouse is the user's choice

Mouse Preference: Ranking Order*

	Number of People Who Ranked as First Choice
● Kensington Vertical Mouse	17 (42.5%)
● Kensington Pro Fit Ergo Wireless Mouse	9 (22.5%)
● Logitech M325 Mouse	9 (22.5%)
● Kensington Pro Fit Mouse	5 (12.5%)



*N=40

The Kensington Pro Fit® Ergo Vertical Wireless Mouse delivers ergonomics at no cost to accuracy and precision. It is sloped at 46.7° to position the wrist neutrally and contoured to fit the hand comfortably. An extended lip on the right side gives the pinky a resting place, offering complete support to the entire hand for smoother muscle group movement. A fully-featured six-button design couples ergonomics with functionality — left, right, forward, back, and DPI (800/1000/1200/1600) buttons and a scroll wheel outfit the device. Its nano receiver provides wireless connectivity, and its low battery indicator ensures users will always have enough power to get through the workweek.



Pro Fit® Ergo Vertical Wireless Mouse—Black



Pro Fit® Ergo Vertical Wireless Mouse—Gray



Pro Fit® Ergo Wireless Mouse—Black



Pro Fit® Ergo Wireless Mouse—Gray



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