Sit-to-Stand to Move
Ergonomics and the dilemma of modern office life

By Peter Barber, Senior Product Manager, Knape & Vogt Manufacturing Company

We've seen it in the news and on TV: Sitting is bad for you. We've heard that "sitting is the new smoking"; office workers suffer from "sitting disease," and on and on.

Adult Americans do spend an average of more than 7.5 hours per day being sedentary (not counting sleep time). And employed adults who work primarily in office jobs spend up to 75 percent of their time at work sitting.

Recent studies suggest that even modest decreases in sedentary time can help reduce risk of obesity, cardiovascular diseases, diabetes and premature mortality. It's no wonder there's been a push toward furnishing the office with standing desks, but is that really the answer?

Ergonomics in the Office

Ergonomics (from the Greek word ergon meaning work, and nomoi meaning natural laws), is the science of refining a product's design to optimize it for human use. Human characteristics such as height, weight and proportion are considered, as well as information about such factors as human hearing, sight and temperature preference.

Computers and related products, including desks and chairs, frequently are the focus of ergonomic design. If these products are poorly designed or improperly adjusted, the user can suffer unnecessary fatigue, stress and even injury.

Injuries caused by poor ergonomics
- RSI – Repetitive Strain Injury
- RMDs – Repetitive Motion Disorders
- CTS – Carpal Tunnel Syndrome
- Cumulative Trauma Disorder
- Tendonitis

In correct ergonomic posture, all parts of the body are in a neutral position—shoulders relaxed with elbows close to the body, wrists straight and in line with forearms, elbows and knees at about 90 degrees in relation to the torso.

In this position, the standard desk—at 29 inches to 30 inches high and designed for writing by hand—is too tall. In the era of typewriters the secretarial return was introduced with a height of 26 inches to counter the strain of typing on the higher surface. Later, as desktop computers came into use, keyboard trays and drawers were added to desks to bring keyboards closer to typewriter height.

Rise of RSIs

In the 1980s, as computers became ubiquitous in office settings, workers started to experience repetitive strain injuries (RSIs)—stress and strain from keyboarding and mousing. Bureau of Labor Statistics data show an explosion of growth[1] in occupation-related RSIs between 1980 and 1990. While not all were related to office work, it became clear that the activities that made typing and data entry faster and easier also caused more stress and strain injuries as workers moved less and sat in fixed positions at their workstations.

According to BLS statistics 327,060 musculoskeletal disorders (such as sprains or strains from repetitive motion) accounted for 35.8 lost-work-day cases per 10,000 full-time workers in 2013.

Quick Keyboard Tips
- Put keyboard directly in front of you
- Shoulders should be relaxed and close to your body
- Wrists should be straight and in line with forearms

OSHA Guidelines

Attention to ergonomics increased in the 1990s with U.S. Health & Human Services regulations aimed at stemming the occurrence of injury. The Occupational Safety and Health Administration (OSHA) developed guidelines for selecting and arranging workstation components and described neutral body positions for decreasing injury.

Results of applying ergonomic principles to the office

- Improved employee risk awareness
- Reduced injury rates
- Increased productivity
- Improved employee satisfaction
- Full return on investment in less than one month

Companies began investing in ergonomically correct workstations to help reduce stress and strain injuries. The result has been reduced injury time away from work and increased productivity. For minimal spending on ergonomic equipment companies have found a quick payback on dollars invested and a lasting return on investment.

Ergonomically Correct Sitting Posture

A. The height of the workstation should allow you to work without reaching or bending. Keep commonly used items within easy reach.

B. Forearms should be parallel to the floor and at an approximate 90 degree angle with the upper arm.

C. Wrists, neck and head should be in a relaxed neutral position —not angled up or down.

D. The distance between your eyes and the monitor should be 15.7" or more—typically arm's length.

E. The top one-third of the computer screen should be positioned at or below eye level.

F. The depth of the seat should allow the back of the knees to extend beyond the edge of the seat. Thighs should be parallel to the floor.

G. Adjust the height of the seat so feet are resting firmly on the floor.

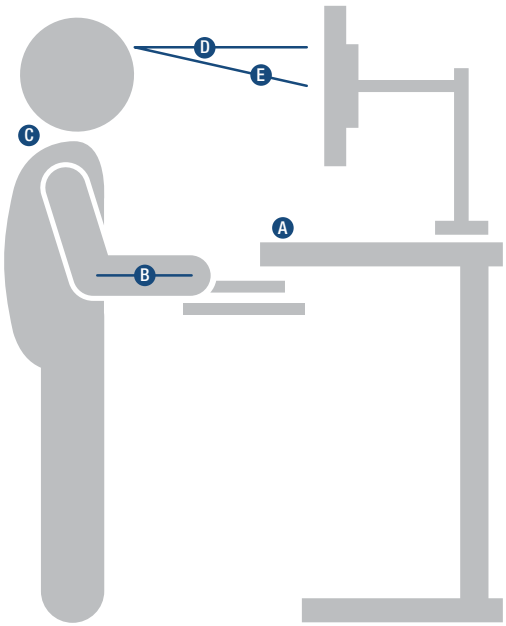
Moving is Key

Recently there's been much media attention given to the hazards of sitting. Despite the hype (as in "sitting is the new smoking"), there is research that links prolonged sitting with obesity and metabolic syndrome, the collection of risk factors for heart disease, diabetes and stroke. For workers who are sitting for long periods, ergonomic workstations and postures go a long way toward preventing injuries typical in an office environment. But in light of the studies potentially linking sedentary lifestyle to disease, might standing be a healthier way to work?

The truth is, standing for long periods is no better for health than prolonged sitting. The key is to *move*. Ideally, office workers should stand about eight minutes for every 20 minutes of sitting. Recent studies advocate sitting in increments of 20 minutes followed by eight minutes standing and two minutes moving around and stretching. Guidelines for combatting the "sedentary office" recently were issued by an international panel of experts and published in the British Journal of Sports Medicine. These experts advise spreading two to four hours of standing and "light activity" over the entire work day.

But as we begin moving more at work, here's another truth to keep in mind: Office furniture and computer components with poor ergonomic design can take a toll on worker health, whether sitting or standing.

When a worker is in a standing position most rules of ergonomics still apply. Whether sitting or standing, the keyboard and computer monitor must be angled properly and positioned at the right height for the individual user. Standing posture must be neutral as well, just as when seated.



Correct Ergonomic Standing Position

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Three Sit-Stand Ways to Keep People Moving

The goal is to move, despite the ease that technology provides for accomplishing tasks—the ease that essentially encourages workers to sit still at their desks and in front of screens all day. Some movement can take the form of walking to the printer or to the water cooler—even taking a quick turn through the hallways a couple of times during the day can help. Other movement can be gained through various types of sit-to-stand arrangements based on furniture and computer components. Three examples:

1. Adjustable Height Table with Add-ons

One solution for a proper sit-stand workstation begins with a **height adjustable table**, available with functions including a hand-crank, 2- and 3-stage electric and other adjustment styles, with height ranges to accommodate workers of varying stature. A height adjustable table allows workers to sit or stand, encouraging frequent transitions in work style to maximize comfort and productivity.

Positioning the keyboard and monitor on the desk, however, presents a number of ergonomic challenges. The keyboard height may not allow hands and arms to be in the optimal neutral position for typing. Monitor height and tilt adjustment are constrained by what little adjustability may be built into the monitor, so keyboard/monitor separation height is fixed. There might also be screen glare to contend with.

Tenor Arm

Legato Arm

Single Screen Concerto

Dual Screen Xtend

A better solution is to **add a standard keyboard arm** to the table. Knape & Vogt Waterloo offers the Tenor keyboard arm, specifically designed for use with electric height-adjustable tables, in addition to models such as the Legato, Momentum and Ovation keyboard arms. All are ANSI/HFES, 100-2007 and BIFMA G1-2002 compliant, meeting requirements for the seated 5th percentile female (22") up to a standing 95th percentile male (48.7"). Each provides full height, full tilt and storability adjustment so users can find their unique optimal position, sitting or standing, while using a height adjustable table.

Next, a **monitor arm** supports flat panel displays at the correct height, angle and focal distance for ergonomic viewing. A monitor support also eliminates screen glare. Knape & Vogt's Concerto and Xtend single and dual monitor arms feature best-in-class reach and height adjustability with sleek designs and easy installation.

Knape & Vogt also offers ergonomic accessories to reduce stress and strain, such as laptop support, document holder, foot rest and CPU holder to round out the sit-stand setup using a height adjustable table.

2. Retrofit Solution

For a solution that makes use of existing office furniture, a **sit-to-stand keyboard arm** can be attached to a fixed surface for fully ergonomic sit-to-stand functionality. Knape & Vogt offers Momentum and Ovation keyboard arm and tray combinations that achieve standing height of more than 14 inches plus tilt capability of 25 degrees. Add a monitor support and CPU holder and other accessories to outfit a complete sit-stand solution at minimal cost.

Duet Dual Arm Keyboard Support

A **dual keyboard arm** from Knape & Vogt converts a conventional single surface workstation into a split level sit-to-stand work center. With height adjustment to 19 inches, the Duet Dual Arm can be mounted directly to the underside of an existing work surface, providing functionality and stability for an inserted or full length secondary surface.

As with a height adjustable table, the fixed height table also requires a monitor support. Knape & Vogt's Concerto or Xtend monitor arm will ensure the position of the monitor at the correct height, angle and focal distance, whether sitting or standing, and will eliminate screen glare.

3. All-in-One Retrofit Solution

Altissimo Dual Workstation

Knape & Vogt also offers a **complete sit-stand workstation** for retrofitting existing workstations with sit-stand capability. The Altissimo Workstation with single or dual monitor support allows users to move from seated to standing in a single motion. It is the only retrofit, height adjustable device that meets ANSI/HFES 100-2007 standards for a seated 5th percentile female up to a standing 95th percentile male. The unit provides a keyboard area and a secondary support surface for tablet, phone and documents, so everything moves when the user moves. The integrated monitor support allows positioning of the monitor at the correct height, angle and focal distance.

Accessories round out this package as well, with a foot rest to provide relief while standing and an inline document holder to reduce neck and back strain.

With its small footprint, the Altissimo can easily be moved out of the way when not in use to free up desk space.

It's said that the best ergonomic position is the next ergonomic position. To accommodate this movement, workers need their workstations to adjust to them whether sitting or standing, not vice versa. Furniture and components that allow workers to move effortlessly, to keep blood flowing and muscles moving, will be sought-after for the office.

Knape & Vogt Waterloo is a leading single source supplier of highly engineered ergonomic products and components for the office. Our reputation is built on the design and manufacture of exceptional ergonomic equipment that combines aesthetics with industry-leading performance. We aim to deliver the highest value products at a range of very competitive price points. We encourage OEM designers and engineers to request a consultation with one of our representatives by filling out our web form or calling 800-253-1561.

Peter Barber is a senior product manager for ergonomics for Knape & Vogt Waterloo, part of the Grand Rapids, Michigan-based Knape & Vogt Manufacturing Company. With more than 22 years of engineering and product design experience in the field of ergonomics, Barber holds several U.S. and Canadian patents for office furniture components.

Reference

[1] Caroline Rose, Ed., "For People For People Concerned About Tendinitis, Carpal Tunnel Syndrome, and Other Repetitive Strain Injuries." August 1992, *RSInetwork #7, ftp://ftp.cs.princeton.edu/pub/typing-injury/rsi-network/07RSINET.txt.*

KNAPE & VOGT
2700 Oak Industrial Dr. NE
Grand Rapids, MI 49505-6026 USA
1.800.253.1561 | 616.459.3311
Fax: 877.636.3290
www.kv.com