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The knees to left, places the two walls.

Building a better keyboard

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Do your fingers hurt? Do your wrists feel as if they have been impaled with razor-sharp pieces of aluminum?

If you pound your period, slam-dunk your space bar with your thumb and generally turn your experience with your computer into an aerobic activity, then your pains are probably being caused by the way you are vigorously attacking your work.

But if you have a comfortable chair and you have trained yourself to type purposefully without pounding, the problem might be right at your fingers — a bad keyboard.

In recent years, companies ranging from small start-ups to some of the computer industry's major players have tried to design better keyboards. In stead of arranging the keys in four straight rows these keyboards curve or angle the keys so the they are easier for the fingers to strike. The result makers say, is an improved keyboard that's easier to use.

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Companies are

trying to overcome

bad designs and

bad habits

The Laser's keyboard, right, by Laser Computer Systems.

The Comfast Keyboard System, shows how three keyboard segments, Microsoft's Natural Keyboard right, bends the keys into a shallow V shape.

Fear of FDA keeps companies from making medical claims

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"Users find that the keyboard increases comfort and reduces fatigue," says Peter Aclly, a spokesman for Health Care Keyboard Co., which makes a product called the Comfort Keyboard System. Other models come from such companies as Lexmark, Microsoft and Kinesis.

But do these keyboards actually help prevent keyboard-related injuries, such as tendonitis, carpal tunnel syndrome, repetitive strain injury or overuse syndrome? Companies won't say — and they have a reason for being coy.

"For any product that is going to claim a medical curative property, it needs FDA (the U.S. Food and Drug Administration) certification," says Keth Kegley, Microsoft's product marketing manager for hardware products. "To qualify as a medical device is a lengthy complicated procedure."

No regulation

Even if Microsoft wanted to go through that procedure, it couldn't, asserts Kegley. "That procedure doesn't even exist. The FDA has not defined any kind of protocol to address this kind of disease."

Sharon Snider, an FDA spokeswoman, says that the FDA does not regulate ergonomic devices such as keyboards or chairs designed to promote better posture. And without regulatory approval from the FDA, she said, a company may not make medical claims about its product.

But Snider disputed the claim that her agency has no procedure for companies that want to go through the rigor of FDA approval for its keyboards.

"Any product that claims to treat or cure a disease is by definition a medical device," she said. "If a manufacturer wanted to market any medical device, with any claims on it, they (would) submit an application to the FDA and present data to show that it is fully effective for its intended treatment."

Lengthy process

The process approval takes at least six months, Snider said, and possibly much longer. She said that she was not aware of any keyboards that had been given such approval; she could not say if any companies were currently having their keyboards evaluated, since the approval process is confidential.

Microsoft funded a series of tests by Dr. David Rempel at the University of California, San Francisco. The results, recently presented at an ergonomics conference in Seattle, showed that users have a more natural posture when using the Microsoft Natural keyboard than when using a conventional keyboard. The unstated claim is that this posture will produce less injuries. But Microsoft's sales literature carefully avoids making any medical claims. Instead, the company merely claims that many people will find its keyboard more comfortable to use.

Does this approach make sense?

What is most comfortable?

"I've been in ergonomics for 30 years. If you can make people comfortable and get them to listen to the signals that are sent out by their body, the probability of getting so far that you have a medical claim will be reduced," says Dieter Jahns of Cesterick Associates, an ergonomics firm based in Bellingham, Wash.

But which keyboard is the most comfortable? Unfortunately, that question is a little like asking which car is the most comfortable, says Jahns.

"I think that people should use whatever they are the most comfortable with, and whatever they believe in," he says.

TO LEARN MORE

As you might expect, the Internet has lots of information about keyboards, RSI and related topics. For example:

■ Dan Waitch's Typing Injury Archive: <http://www.cs.princeton.edu/~dwaitch/typingarchive.html> — includes photographs of many different kinds of alternative keyboards and other input devices, as well as articles on how to prevent RSI and personal reports from RSI patients.

■ Paul Marzhausen's RSI Web Page: <http://www.engr.und.edu/~ee/eshop/rsi.html> — an informative site with diagrams and photographs of the correct and wrong ways to use keyboards. Many articles, as well as links to other resources.

■ The RSI Network Newsletter — for information, send an e-mail message "subscribe rsi" to majordomo@world.std.com.

The best way to choose a keyboard is to get a loaner keyboard from the manufacturer and try it out, Jahns adds. "It is a tool that needs to be worked with before you decide whether to dish out the money."

That's easy for companies that buy lots of keyboards. Consumers shopping for an alternative keyboard should make sure they can return it for a refund if they don't like it.

Biofeedback

In Oakland, an organization called SHARE (short for Spine Hand Arm Rehabilitation Ergonomics), uses biofeedback to help people decide which keyboard is right for them. People who are referred to SHARE can try out different keyboards while they are wired up with a variety of monitors that sense pain and stress.

"Because there are so many different kinds (of alternative keyboards), you really need to match the person and their body type and their size to the keyboard that is going to help them the most," says Kathy Bender, a biofeedback therapist at the clinic.

But while she's seen hundreds of people helped by the alternative keyboards — many have had good results with the Kinesis model, she says — Bender believes it's more important for people to adopt good working habits than to have a high-tech, ergonomic keyboard.

"We teach people to key differently — to lighten their keystroke and reduce movement of their wrists while keying, and to let their upper body relax and improve their posture," she says. "Most people slam the space bar with the right thumb, and most people hold their little finger up in the air." habits that can lead to problems.

Good instruction

Experts say it's more important for employees to receive good instruction in how to use normal keyboards than for employers to rush out and purchase expensive ergonomic devices. That approach can also be much cheaper.

For instance, one common keyboard problem in corporate America is the height of the desk. Whereas most desks in the workplace are 29 or 30 inches high, the American National Standards Institute recommends that keyboards should be placed on surfaces that are 24 inches high, says Microsoft's Kegley.

What's keeping desks half a foot too high? "A combination of tradition, lack of knowledge ... and skepticism that desk height is a risk factor," says Microsoft's Kegley.

Choices

Professional ergonomists say that no single keyboard is best for

ALTERNATIVE KEYBOARDS

All of the alternative keyboards on sale in the United States work with IBM-compatible computers, but some companies offer adapters for Apple Macintosh computers.

■ Apple Adjustable Keyboard. Apple Computer Inc. \$99 (Mac only) Note: No longer manufactured in United States, must be special-ordered, typically through any retailer.

■ Comfort Keyboard System. Health Care Keyboard Co. (414) 538-2160. \$795 (PC, Mac, Sun and others)

■ FlexPro Keyboard (800) 262-6006. \$199 (PC)

■ Kinesis Keyboard. Kinesis. (800) 454-8374; (206) 402-8100. \$390 (PC); \$490 (Mac)

■ Select-Ease. Lexmark. (800) 359-5436; (806) 232-3000. \$179 (PC)

■ Microsoft Natural Keyboard. Microsoft. \$99 (PC) An adaptor for Mac computers can be purchased through retailers.

all users. It's important, they say, for users to try a range of different keyboards and see which one suits them best.

Here are a few models:

■ At \$795, Health Care Keyboard Co.'s Comfort Keyboard System consists of three keyboard segments — a left-hand section, a right-hand section and a numeric keypad — each mounted on universal joints, which let the sections be tilted or swiveled to any possible angle. A second adjustment on the Comfort Keyboard allows the user to move the segments closer together or farther apart, in order to accommodate users with different shoulder widths.

■ For roughly half the price of the Comfort System, you can chase the Kinesis keyboard. This keyboard takes a different approach, by doing away with rows of keys altogether. Instead, Kinesis places the keys in two wells in which you can rest your fingers. But unlike the Comfort Keyboard, the Kinesis is not adjustable: one size fits all.

■ With a street price of under \$100, the Microsoft Natural Keyboard simply bends the keys for the left hand and the keys for the right hand into a shallow "V" shape. The keyboard's sole adjustment allows the user to change the keyboard's height and vertical angle. According to the company, "The Microsoft Natural Keyboard features a carefully researched, attractive design that provides a more comfortable alternative to standard keyboards."

■ Lexmark takes a slightly simpler approach. Its keyboards have a hinge in the middle, making it possible to change the angle between the keys used for the right and the left hands.

All of the alternative keyboards on sale in the United States work with IBM-compatible computers, but some companies offer adapters for Apple Macintosh computers.

■ Although Apple sells its own Apple Adjustable Keyboard for the Macintosh, the product has been all but withdrawn from the U.S. market. "The status with the Adjustable Keyboard is that we are no longer manufacturing it in the U.S.," says Lynn Lawler, a spokeswoman for the company. Although the Adjustable Keyboard is made in Europe, it is not carried by Apple dealers and must be specially ordered.

Apple has moved production of the Adjustable Keyboard from the United States to Europe. According to Apple, the keyboards are readily available there. However, in the United States, they are not carried any longer by Apple dealers, and must be specially ordered.