Can massage chairs or a vibrating mouse prevent computer-related injuries?

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This chair with an undulating seat is a prototype of one of the ergonomic products Professor Alan Hedge studies to determine what kinds of products would prevent back and other problems caused by sitting in front of a computer all day. Lindsay France/University Photography

A chair that undulates, a mouse that vibrates, a monitor suspended over a desk on a movable arm. These are some of the kinds of newfangled ergonomic products that Alan Hedge, international authority on office ergonomics, studies to see if they can prevent repetitive motion injuries among the estimated 100 million people who now use computers in the

United States.

"One-third to one-half of all compensatory injuries are repetitive-motion injuries associated with office-type work," says Hedge, professor of design and environmental analysis in Cornell's College of Human Ecology.

Back injuries also account for one-third of all workplace injuries. A decade ago most of these were associated with heavy lifting. Today they are mostly caused by people sitting for longer periods of time -- often in front of a computer.

The younger onset of computer use makes the current rate of compensatory damage claims the canary in the coal mine. There is typically a 10- to 15-year latency before injuries start to develop, Hedge has found. In the early 1990s he showed that the average age of workers reporting carpal tunnel syndrome was late 30s to early 40s; last year, he found the average age of onset had dropped to the mid-20s and even younger for some people.

"Now kids are using computers at age 2, so by the time they enter the workforce they'll already be primed for injuries," Hedge says. "This is very serious because an injury can become life-changing; carpal tunnel, for example, is not curable. They'll have to manage this chronic condition for the rest of their lives."

To better determine how design concepts can prevent such injuries, Hedge's Cornell Human Factors and Ergonomics Research Group studies innovative products. Among his recent projects:

• **Vibrating mouse:** To see if a vibrating mouse could prevent upper extremity musculoskeletal disorders in computer users by signaling people to take their hand off the mouse to avoid overuse, Hedge and

graduate student Chris Moe reported at the Human Factors and Ergonomics Society Annual Meeting in October 2007 that although subjects do remove their hands more often with a vibrating mouse than with a conventional mouse, they tended to hold their hand just above the mouse.

"This position is potentially more detrimental because of a potential increase in static muscle activity required to hover the hand," Hedge says, concluding that people should rest their hands on a flat surface when they feel the vibration.

• **Undulating chairs:** Another study examined whether a seat that made a continuous massaging, wavelike movement at an adjustable rate would alleviate back pain in people whose pain increases when they are seated. Although his findings were mixed, Hedge and graduate student Erin Lawler concluded that the movable seat was a concept with promise, particularly for individuals with back problems.

• **Movable arms for monitors:** A third study looked at how suspending a flat panel computer monitor on a movable arm affects people's comfort, posture and preference. Hedge and graduate student Kathryn Boothroyd found that people unanimously liked the monitor arm because they could adjust their LCD screen, and it gave them more room on their desktop for documents.

"We saw fewer complaints about neck problems and about the workstation because people had more space," says Hedge. He was surprised, however, that users liked the versatility of the movable arm to show others what was on their screen. "This simple design change in screen adjustability has many potential benefits associated with it," Hedge concludes.

"Everything we do can be summed up in the phrase: Good ergonomics is

great economics," Hedge says. "More than 90 percent of a company's costs are people costs, so making small investments in improving the workplace by using good ergonomic products pays huge dividends."

Source: By Metta Winter, Cornell University