Ergonomics update

Computer use and CTS: What's the link?

According to media reports of recent research studies by researchers in Denmark and those at the Mayo clinic in Scottsdale, Ariz., there is no association between computer use and carpal tunnel syndrome (CTS). This apparently contradicts widely held assumptions about the causes of computer-related injuries, so what's the truth?

CTS is caused by compression of the median nerve as this passes through the carpal tunnel, a narrow channel in the wrist between the carpal bones of the wrist (tunnel roof) and the transverse carpal ligament (tunnel floor). Sustained compression of the median nerve disrupts the axonal transport of fluids and this causes damage to the nerve fibers, a process termed neuropathy. The median nerve is a mixed nerve with both sensory and motor fibers. The sensory fibers are those first affected, and intermittent paresthesia (numbness, tingling) of the thumb and first two fingers often signifies the early stages of CTS.

A questionnaire follow-up survey of 5,658 Danish workers was conducted one year after a baseline survey had been completed by 6,943 workers. The survey collected self-reported data on carpal tunnel syndrome symptoms. The prevalence of self-reported symptoms at the baseline survey was 10.9 percent. The incidence of new or worsened CTS symptoms at the one-year survey was 5.5 percent. The prevalence of median nerve symptoms at one-year was 1.2 percent. At the baseline, there was no association of psychosocial factors (high work demands, high job pressure, low job control, low social support) or physical factors and possible CTS. At the one-year follow-up, the average computer use for men was eight hours per week and for women was 9.3 hours per week and there was no significant association between keyboard use and possible CTS. At the one-year follow-up, the average mouse use for men was 12.5 hours per week and for women was 14.7 hours per week and there was a significant association between mouse use greater than 20 hours per week and possible CTS. The authors concluded that computer use is unrelated to carpal tunnel syndrome.

The fact that the Danish workers only used their keyboard for an average of 8-9 hours per week is a serious limitation. This can hardly be considered intensive keyboard use, especially by U.S. standards where workers may be keying intensively for greater than 30 hours per week.

A questionnaire survey of workers using computers at the Mayo clinic in Scottsdale was conducted. Complete data were received for a sample of 257 respondents (81.8 percent return rate). Some 95 percent of respondents were women. Of these, 181 employees (70.4 percent) reported no symptoms of CTS, but 70 employees (29.6 percent) did report hand paresthesia. From subsequent interviews, 27 employees (10.5 percent) were classified as having CTS. Of these employees, nine people (3.5 percent) met a clinical definition of CTS and showed changes in nerve conduction velocity. Researchers concluded that this prevalence of CTS is comparable to that for CTS among the general population, and therefore computer use cannot be associated with the development of this syndrome.

Before finally concluding that there is no association between CTS and computer use it is worth considering the following issues:

A Swedish study shows that CTS prevalence rates peak between 45-65 years of age. The mean age of workers in the Mayo study was 41 years, which suggests that this population had not yet reached peak prevalence.

It is uncertain how many of the 25 percent of those who were hurting, but who didn't meet the strict clinical criteria for CTS, may develop this syndrome in the foreseeable future.

CTS is characterized as a progressive and chronic disorder. The Mayo study provides a snapshot of current CTS injury prevalence.

No details are given of the occupational history of employees. Workers who develop CTS either tend to be assigned to less computer intensive work in organizations or they opt out of this type of work. The snapshot of the Mayo workers gives no information on the extent to which this might be a self-selected "healthy sample."

So does computer use cause CTS? Ergonomists have never claimed that computer use is the sole cause of CTS. Ergonomics research shows that computer users often adopt poor wrist postures, and working in deviated postures is thought to increase the risks of injury. Ergonomists have always maintained that computers can be used safely providing the user works in a neutral posture.

The Mayo study doesn't provide any definitive answer on the association between computer use and CTS, and the truthful answer is that we still don't know precisely what this is. What we do know is that computer use often is associated with a variety of musculoskeletal complaints, and these adversely affect performance at work. We also know that musculoskeletal complaints can be successfully prevented by working at a computer in a neutral posture.

What the Danish study shows is that intensive mouse use is related to possible CTS, and other variables, such as psychosocial factors, are unrelated.

Source: Cornell University Ergonomics Web