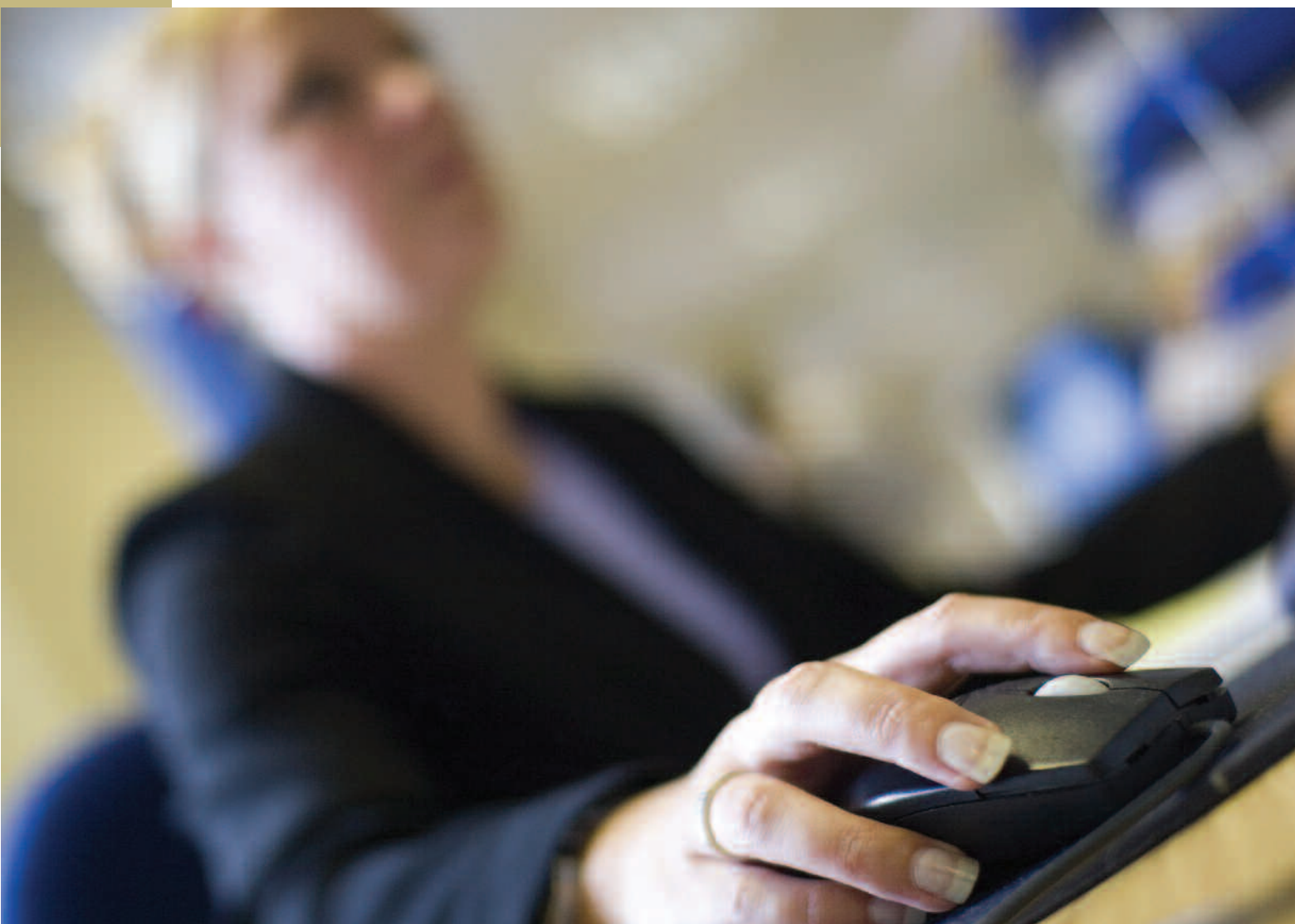
Computer-Related Symptoms

Bad posture disables unwitting computer users.

BY ERIK PEPER, PhD AND KATHERINE H. GIBNEY

Two years after his first ergonomic assessment for muscle pain, Mark was still suffering. His employer had followed the recommendations of the ergonomist by purchasing a new chair and keyboard, lowering the monitor, and installing an adjustable workstation with a slant table, yet Mark continued to complain of severe neck pain, tingling down his arms, and aching in his forearms. In fact, his discomfort had increased.

Mark's story is, unfortunately, a very common one. State and federal health and safety agencies, along with employers and workers, struggle to find the reason for computer-related discomfort besides ergonomics.



WORK STYLE AND AWARENESS

Research conducted by Erik Peper, PhD, and his colleagues at the Institute for Holistic Healing Studies at San Francisco State University (SFSU) has shown that a person working at the computer often has chronic muscle tension of which he/she is unaware. The study used biofeedback to measure muscle tension, respiration patterns and hand temperature. They found that 95 percent of employees unconsciously raise their shoulders as well as maintain a low level of tension in their forearms while using a keyboard and mouse. They also found that breathing becomes more shallow and rapid over time. (Please see Figure 1.) Sustaining a tense posture with raised shoulders, arms reaching forward, quick breathing, and sometimes, cool fingers, inhibits the body from relaxation and puts a person at risk for an injury associated with discomfort at the workstation. Chronic tension gets worse because people are unaware of holding any tension. In many cases, employees are deeply involved with their work or they ignore the tension until they feel pain. Most employees in the study thought their muscles were relaxed when they were sitting correctly at the computer. However, the actual physiological data in Figure 1 showed a different picture. Even when using the wrist rest, their arms and shoulders were not totally relaxed.

NO BREAKS AND INCREASED STRESS

Muscles are designed to alternate between tension and relaxation. When held in constant contraction, discomfort and referred pain are more likely to occur. Working at the computer without a break (micro, large movement or lunch) is analogous to holding your arm out in front of you for a very long time without rest. In addition, the visual stress of working at the monitor tends to increase chest breathing, exacerbating the tension in the upper back, neck and shoulders, as well as decreasing peripheral circulation.

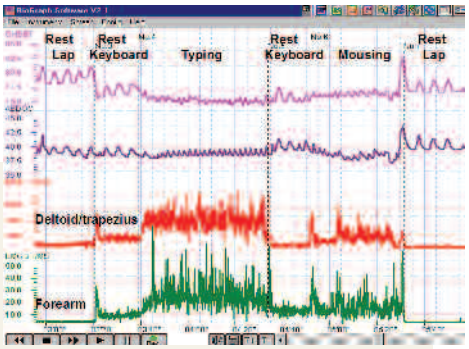


FIGURE 1: A representative recording of a person working at the computer.

MICRO-BREAKS

Micro-breaks are one to two second interruptions of muscle tension every 60 seconds. During activity, muscles contract around the blood vessels, inhibiting blood flow. If tension is maintained without interruption in a static effort, blood as well as lymph flow is continuously inhibited at a time when more flow is required. When effort is dynamic, with the alternation of tension and relaxation, blood and lymph are pumped through the muscles and health is maintained. (Please see Figure 2.)

Standing and walking involve dynamic effort: you can stand or walk for extended periods of time without discomfort because your blood and lymph flow matches your effort. However, if you were to stand holding a leg up in a static effort, you would experience discomfort quickly because static effort demands similar blood/lymph flow to dynamic effort, but none is being supplied. Chronic static effort can result in stress immobility syndrome with injuries similar to those found in repetitive motion injury (RMI).

Figure 2 is a simple illustration of the body's blood and lymph

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FIGURE 2: Graphic illustration of how blood flow and lymph circulation is reduced during static efforts.

flow during activities. Taking micro-breaks during static muscle activity, such as working at the computer, changes the blood and lymph flow from static to dynamic. A portable electromyography (EMG) biofeedback machine with a 60-second delay alarm is a superb trainer for learning to take micro-breaks while working at the computer. A threshold for relaxation is set and, as the person works at the computer, the EMG gives an auditory signal whenever the muscle activity occurs above the set threshold for more than 60 seconds. The 60-second timer resets itself each time the muscle activity drops beneath the threshold.

NEW EMPLOYEE TRAINING IN A SYSTEMS PERSPECTIVE

Prevention and remediation of computer-related disorders must address the whole system, utilizing real-time, objective measurements. A systems approach to prevention should include proper ergonomics as well as training in work style, somatic (body) awareness, regeneration, stress management, vision care, fitness and corporate support. Biofeedback takes the guesswork out of ergonomics by providing objective muscle tension measurements, and it helps employees become aware and change their work habits. Employee computer-training should expand beyond information training to include how to work at the computer while maintaining health and productivity. During the same SFSU study, a nine-month follow-up of employees who participated in a six-week training session utilizing biofeedback found that symptoms decreased by 73 percent.

When employees develop awareness and acquire the skills to work healthfully at their peak, this alarming epidemic will abate. Using a group-training model that included muscle biofeedback for micro-break training, the SFSU study found that trained employees, as compared to the control group, reported a significant overall reduction in work-related symptoms. This included significant reduction of muscle strain of the head, neck and shoulders, wrists and hands, arms and overall tiredness. **AF**

Erik Peper, PhD, is an international authority on biofeedback and self-regulation. As professor and director of the Institute for Holistic Healing Studies at SFSU, director of Work Solutions USA and president of the Biofeedback Foundation of Europe, he has published numerous books and articles as well as application software programs for biofeedback. His research interests focus on the psychophysiology of healing, autonomic self-regulation and optimum human functioning.

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