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Creating a Generation Of Slouchers

By SALLY McGRANE

AS schools around the country push to increase students' use of computers, a small but growing number of educators and researchers say that children are risking injury because they are not being taught sound ergonomic practices along with basic computer skills.

There is little hard evidence that young people are suffering the kinds of computer-related injuries that adults do -- mostly neck and back strain and repetitive stress injuries like carpal tunnel syndrome. But some ergonomics experts say such problems may become widespread, particularly as more children begin using computers at very young ages and use them for more hours each day.

"We know that adults who have started working with computers over the last 20 years have developed a lot of repetitive injuries," said Cheryl Bennett, an ergonomics specialist who works for Lawrence Livermore National Laboratories in Berkeley, Calif. "We don't know what's going to happen to kids over 20 years -- the human race hasn't been through this before. Younger bodies are more forgiving, but could it lead to serious disabilities?"

While no one yet knows what the long-term impact of poor ergonomic habits may be on children, what is clear is that most children's habits are indeed poor. Many parents are not aware of sound ergonomic practices. Others may adopt such practices for themselves when they develop problems but give little thought to the possibility that their children may develop the same kinds of injuries.

Not everyone thinks that early computer use poses a risk to children. According to Dr. Leonard Gordon, the chief of hand surgery at the California Pacific Medical Center in San Francisco, "younger people tend not to have as much of a problem" with repetitive stress injuries, compared with adults. "The high school students I see with problems are in very high-pressure schools," he said, "and are often also involved in playing an instrument in a high-pressure, high-stress environment."

That could change as more children use computers earlier, Dr. Gordon said. Or learning to use the computer at a young age may actually help reduce the risk of injury in the long run, he contended. "Kids who grow up using their hands a lot build up a tolerance," he said, "unlike adults who haven't used their hands much, then start using them."

But ergonomics experts say the schools, which are often eager to teach children how to use computers, need to teach children how to use computers properly.

"If you are going to use this technology in schools, you need to teach children how to use it," said Dr. Alan Hedge, a design and environmental analysis professor at Cornell University who has been looking at the ergonomic impact of computers on children. "At the moment, computers are thrown on any flat surface, and you're supposed to work any way you can. It's creating very bad habits. While there is a limited base of knowledge about children and computers, there are no studies coming out saying there's no problem.

"In adults, there's a latency of up to 10 years. But if you start at 10, what happens? We've got the first generation of college students who have had the opportunity to grow up with computers, and there's a marked change. It's just horrendous to see a 19-year-old with carpal tunnel."

Dr. Hedge said that without efforts to teach sound ergonomic practices, the problem would only get worse as computer use increased in the schools. "When they mass-computerize schools -- a computer on every

desk -- they need to make sure it's the right desk," he said. "Otherwise, you'll see the same problems we see in adults."

Dr. Hedge said that much of the research on the impact of computer use at young ages was being conducted outside this country. Some of the findings are cause for concern.

At a meeting of the International Ergonomics Association in San Diego last summer, for example, Leon Straker, a professor at Curtin University of Technology in Perth, Australia, presented the results of research he had conducted on the effects of computer use on children.

After studying 1,404 students in 43 classrooms in Canada and Australia, he found that classroom computer stations were quite poor according to ergonomic standards. He found that 60 percent of the 314 students, 10 to 17 years old, who he studied at three schools in Australia complained of neck or lower-back pain. The students were required to use laptops, and they each spent about 17 hours per week working on them.

In the United States, much of the information about injuries is anecdotal. Dr. Scott Bautch, a chiropractor in Wausau, Wis., said that most of the children he treated 10 years ago had been the victims of traumatic injuries but that he was now seeing children as young as 14 coming in with pain in their wrists, hands, necks or lower backs because of computer use.

Young people have "insidious onsets" of problems, Dr. Bautch said, which is usually something that he sees in adults. "They've had headaches for the last two months," he said, "or they reached a hand up and now they can't move their neck."

Dr. Bautch treats his 13-year-old daughter, Kaleah, for the headaches, back pain and neck stiffness she experiences after using computers at school. "I'm a smaller person," she said, "and at school, the desktops are real high. I have to put my forearms and elbows up to reach the keyboard, and I have to arch my neck to see the screen." Her friends also complain about the computers at school, she said. "The bigger people fit better," she said, "but lots of people stretch and say, 'My fingers hurt' or 'My back hurts.' "

At Cornell, one of Dr. Hedge's graduate students studied a group of children using computers in their classroom in Detroit. "She found that none of the children she was observing were using a non-risk posture," Dr. Hedge said. "And 40 percent had a high-risk posture. Had it been a company she was observing, she would have said to the employer, 'You need to make changes immediately.' "

At Cornell's Web site for ergonomics (ergo.human.cornell.edu), Dr. Hedge has posted tips on good ergonomic practices, including things like proper keyboard and monitor heights, and wrist positions. The site also shows photos of sixth and eighth graders working at ergonomically incorrect and ergonomically correct stations. "We're mainly concerned with posture," Dr. Hedge said, "and whether the postures kids are using are the postures that in adults pose a high risk for injury."

Schools find it hard to make computer stations ergonomically correct because many children use the same computer, and each one probably needs a different setup. And money for new furniture may be limited.

Willie Cade, the president of Computers for Schools, a nonprofit group based in Chicago that refurbishes used computers for public school use, said that ergonomics was often the last thing on school administrators' minds.

"It's a budget issue," Mr. Cade said. "The desks and how they're placed -- schools do a terrible job with that, universally." He said that most schools, especially in poor districts, were struggling to get computer access.

"If it's a choice between a new roof and an ergonomic desk, it's no choice," said Mr. Cade, whose program, which has branches in 34 states, has provided 100,000 computers to schools. But, he added, he does not see ergonomics as a major issue for now. He estimates that schools in the United States still need nine million computers, and until they get them, ergonomic needs are not a pressing concern.

Dr. Inger Williams works as an ergonomic consultant for offices and schools and teaches as an adjunct assistant professor at the Center for Visual Science at the University of Rochester in New York. She received a grant from the State of Oregon's Occupational Safety and Health Division in 1997 to study whether there was a need for ergonomics education in schools. Based on findings from that study, she set up a Web site

(www.open.k12.or.us/cergos) that provides information on ergonomic principles and inexpensive, make-do ways to protect children using computers in schools.

"The problem is that schools are not aware that these are concerns," Dr. Williams said, "and they're worried that it will cost money to introduce ergonomics." She suggests that schools have a supply of inexpensive items like boxes and pillows so children can choose them to adapt workstations to their needs. "Children really resonate with ways to make themselves more comfortable" once the concepts are explained, Dr. Williams said.

"It becomes reflexive," Dr. Williams continued, "like putting on a seat belt."

Diane Tien, a technology assistant at Blackwell Elementary School near Seattle, saw that there was very little information about teaching ergonomics to children, so she set up her own weeklong educational program, called Get Tech Fit, in April. She was aided by one of Dr. Hedge's graduate students.

"The P.E. class did exercises to help dramatize what muscles people use when at the computer," Ms. Tien said. To teach the benefits of good posture, students in the gym classes practiced sitting up straight while balancing a heavy ball on their heads, then slumped and balanced the ball on their neck and shoulders. The librarian had students use the Web to research repetitive stress injuries, and the music teacher talked to students about singing with good posture or bad.

The instruction varied from grade to grade, Ms. Tien said. Younger children had a simpler presentation, in which a character named Squirmy Wormy made his wormhole ergonomic, she said, while older children were given more responsibility to sit straight and practice simple "ergo-cizes."

Ms. Tien decided that there was a need for her program after a district wide tax was adopted in 1998 to provide the schools with more computers. That extra money helped the school district increase the ratio of computers to children to one to four.

"Elementary school is the age when kids learn life skills," Ms. Tien said, "and this is one of them. If we're going to support technology, we really need to grasp how it affects the body and start teaching proper habits."

But Bill Erlendson, a director at the San Jose Unified School District in San Jose, Calif., said ergonomics was not an issue there. The district's 32,000 students -- kindergarten to 12th grade -- have one computer for every three or four students. "Kids aren't at the computer for an extended period of time," he said. "Kids move around so much. They don't sit in one position for hours, like we do."

After last summer's International Ergonomics Association meeting, Dr. Hedge, Dr. Williams and others decided to create a committee on ergonomics and children. Ms. Bennett, of the Lawrence Livermore National Laboratory in California, is chairwoman of the committee; she said one of the group's first projects would be to create an information database. It will work on making ergonomic information available to parents, teachers and researchers and will try to raise awareness of the issue.

"The clock is ticking," Dr. Hedge said. "We know there's a latency period for these injuries. Most likely, we have a three- to five-year window. But there's an ostrich mentality -- we may have to wait until children become injured and start suing to make real changes."