Research focuses on back pain

Ohio State University studies are aimed at reducing back injuries in the workplace.

By Michael B. Lafferty
Dispatch Science Reporter

After the common cold, back injuries are the most common maladies keeping American workers off the job.

But researchers at Ohio State University are zeroing in on exactly how workers injure their backs and what can be done to prevent it. That doctors don’t know how back injuries occur is measured by their continuing prevalence in the workplace.

“Doctors don’t really have a tool to tell them what’s going on inside the muscles,” said William Marras, who runs the university’s Biodynamics Laboratory. Marras holds joint appointments in industrial systems engineering and physical medicine and rehabilitation.

In Ohio in 1992, back injuries accounted for 22,747 lost time claims to the Ohio Bureau of Workers’ Compensation. A lost time claim is defined as an injury that takes a worker off the job for at least eight consecutive days. Back injuries also account for about 40 percent of the bureau’s medical claim costs. Nationally, the insurance cost for a back injury averages between $24,000 and $90,000.

“These are expensive injuries. It’s a real big concern,” said bureau spokeswoman Brenda Proctor.

The goals of the OSU research are to understand how back injuries occur, what weights can be safely lifted and how to design the workplace so injuries are reduced. The lab is funded by the Bureau of Workers’ Compensation, the National Institutes of Disability and Rehabilitation Research and AT&T Global Systems.

Marras describes the back as being like a clothes hanger. “Bend it 5,000 times and it’s eventually going to break,” he said.

Lifting, pushing, pulling and twisting produce back injuries. How far you twist, how fast you turn and how much you lift are factors. And older people have less tolerance to loads placed on their backs.

In a sense, back injuries are inevitable. But they are more likely if a person doesn’t take care to avoid them. Back injuries occur when the end plate between the bone and the disk in a person’s spine is stressed, producing many tiny microfractures. When a person gets older these microfractures result from smaller and smaller loads.

Lifting a 50-pound weight, for example, can exert up to 800 pounds of pressure on the spine. “What you do externally is magnified many times internally,” Marras said.

The OSU researchers have surveyed workers in more than 400 jobs in 75 industries to help understand how lifting injuries occur. Data is collected from workers wearing back monitors that record how they move during work. In addition to on-the-job measurements, researchers use a sophisticated harness and sensing device to measure the loads placed on the spine and muscles when a volunteer lifts and moves weights.

What the research has shown is that shear — or twisting — while lifting or supporting a load is much more important than the weight of the load. Rather than lifting and stepping at the same time, Marras said, it’s much better to lift, then turn or take a step.

“Twisting is a very dangerous motion,” Marras said. “And shear isn’t accounted for in the current Occupational Safety and Health Administration standards.”

Companies are making changes. Ford, General Motors and Campbell Soup have all used OSU’s research to redesign their workplaces. Marras said. One Ohio manufacturer of baseboards came to OSU after experiencing a 20 percent back injury rate among its workers.

“Since we changed the workplace in the baseboard company two years ago there have been no injuries,” he said.

Driving the message home on the shop or warehouse floor, however, is not always easy. Recommendations may be brushed off by production supervisors but maybe not by the company controller.

A company’s workers’ compensation premium is calculated not only on the basis of the industrywide injury rate but also by the claims filed by workers in specific companies.

“Find the people who pay the bills and they’ll listen to you,” Marras said.

The research, he said, is also paying dividends in the area of fake medical claims. Since back injuries are difficult to diagnose, doctors have a tough time determining when a person is faking an illness.

“That may not be the case for much longer. We’re zeroing in on a point where we can distinguish the fakers,” Marras said.