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Getting a Grip on Being Cool on a Hot Day

By AIMEE BERG

Every year, athletes die of heat stroke. Road crews, firefighters and soldiers work and fade in sweltering conditions. Millions of others suffer from medical problems made worse by the heat. Now two inventors have come up with a device that may provide a solution.

For two years, the Defense Advanced Research Projects Agency, which gave us the Internet, has been financing the research on a hand-held device that essentially cools the body from the inside.

The device, CoreControl, is a coffee pot-size chamber with a cold metal cone in the center. The user grips the cone and holds it for three to five minutes. Afterward, users report feeling not cooler, but fresher and ready to work again.

Unlike more common cooling strategies like cold towels, cooling vests or gel packs, CoreControl focuses special radiator-like blood vessels in the palm of the hand to take the heated blood that is normally pumped throughout the body during and after exertion and send cooler blood back to the body core instead.

A vacuum in the CoreControl chamber enlarges the vessels to help prevent vasoconstriction, the same phenomenon that causes fitness enthusiasts to keep sweating after a cool shower. If exposed to extreme cold, the body thinks it needs to retain heat, a fact that explains why plunging a hand into a bucket of ice is also ineffective in shedding body heat quickly.

"All we're doing is putting the body back to normal by increasing heat loss capacity," said Prof. Craig Heller, a biologist at Stanford who, along with his colleague Dennis Grahn, invented CoreControl.

The Food and Drug Administration approved it in 2003. Its developers say no negative side effects have been reported.

Scientists say it is impossible to overuse.

"If you start cooling down too much, you've got a whole hierarchy of response mechanisms that says: 'Wait a minute, this isn't right. I'm getting cold,' and starts to retain heat," Dr. Grahn said.

Because each CoreControl unit costs \$3,295, buyers have mostly been large institutions like college and professional sports teams, hospitals and the military.

Since the spring of 2003, athletes at the University of Miami have had the option of using CoreControl on the sidelines. "Our primary use is trying to prevent heat illness and let athletes work out without cramping in the heat and humidity down here," said Scott McGonagle, Miami's head athletic trainer. "Our quarterbacks, wide receivers, defensive backs are the biggest users. Our linemen don't use it that much, because a lot of them have tape on their hands."

The device has also been used in a pilot study of wounded Iraq and Afghanistan veterans, said Bill Swisher, a spokesman for Walter Reed Army Medical Center in Washington.

"The goal was to make their therapy more comfortable and, specifically, to cool off while they were doing therapy," Mr. Swisher said. "We found it to be very successful." For active soldiers, the research projects agency has been testing the technology in extreme conditions and simulated combat. The agency is also testing a device that quickly warms soldiers in extremely cold climates.

Some experts say CoreControl could also be useful for people with multiple sclerosis.

"Heat sensitivity is a big issue in patients with M.S.," said Nicholas LaRocca, director of health care delivery and policy research for the National Multiple Sclerosis Society in New York. "Whether this strategy of putting a hand into a cold chamber works, I haven't seen the studies."

This winter, the University of New Mexico will conduct the first independent study to compare the effectiveness of CoreControl with that of a cooling vest and a cool water hand-bath. The subjects will be tested in a laboratory heated to 107 degrees with 30 percent humidity.

"It's plausible CoreControl will remove some body heat," the lead researcher, Suzanne Schneider, said.

"But the question is, How much heat can you extract that way?"

She added, "The conditions we're going to use, I think, are a lot harder and a lot stronger" than those in previous studies.

Meanwhile, Dr. Grahn and Dr. Heller are back in the laboratory, trying to devise a model that is more portable, flexible and disposable. Within the next year, they said, they also hope to create a cooling sock or a boot. Radiator-like blood vessels like those in the palms are also in the soles of the feet.

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