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NEWS RELEASE

ATHLETES TAPE JOINTS FOR ADDED STRENGTH, PROTECTION, NEW RESEARCH LOOKS AT WHETHER IT'S EFFECTIVE

DAYTON, Ohio — In many sports, athletes use tape and wraps to bolster the body's own internal network of ligaments and tendons that govern motion. Football players tape their ankles, tennis players wrap their elbows and rock climbers tape their fingers.

Does wrapping and taping help support the ligaments and tendons that link muscle to bone and allow the body to move? Or are athletes getting more psychological support than physical back-up?

"It's been used for years in sports, and it's a common-sense notion that taping would add strength. But nobody has ever shown conclusively that it makes a difference," said Aaron Buerk, a 29-year-old rock climber and third-year resident in orthopedic surgery at Wright State University.

He is working with researchers at the University of Dayton Research Institute to test taped and untaped fingers to see if a wrapped finger will bear more pressure. Buerk explained that pulleys attach tendons to bones and it's the pulleys that break, causing the rupture that impedes dexterity.

"It's called 'bowstringing' because the tendon pulls away from the bone at the joint where the finger bends — because the pulleys have ruptured and aren't functioning to hold the tendon close to the bone," said Buerk, who practices at Miami Valley Hospital. "We do tons of hand surgeries, some to repair these pulleys. We can sew it together or remove a tendon from the arm and wrap that around the bone and tendon, like a doughnut that goes around them both."

If the research shows external wrapping supports internal anatomy, "we can prevent ruptures and also help people who have already experienced this kind of rupture. If we can show there's an advantage to wrapping, we can wrap a repaired tendon and help it heal faster," Buerk said.

The design for the test was devised by UDRI researchers Ira Fiscus, research engineer in

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the materials engineering division; and, from the metals and ceramics division, Bud Graves, senior research engineer, and Steve Goodrich, chief ceramic technician. They designed the test using a universal tester made by Instron Corp. The six-foot-tall H-shaped metal frame supports the cadaver hands used for testing and the gripping apparatus that holds the tendons until they rupture. A computer captures the data for analysis, and post-test dissection will reveal more details about the damage.

There are three tendons in each finger — two on the flexor side, which enable the finger to curl toward the palm, and one on the extensor side, allowing the finger to straighten. Each of the tendons continues through the wrist and forearm.

Buerk is concentrating on the flexor tendons in his study. The UDRI device is designed to test the tendons in what rock climbers call the “crimp grip,” where the first joints of the fingers are hyperextended and the remaining joints of the hand are flexed.

The H-bar supports the fingers of the hand, which is also steadied by four metal rods, with the targeted finger resting in a shallow indentation. For each test, Buerk isolates the two flexor tendons that control the targeted finger. He places the end of each tendon into a modified metal lug and uses dry ice to freeze the tendon to the metal. The lugs are gripped tightly while the H-bar steadily rises until the first pulley ruptures, generally the one located between the first joint and knuckle. Levers control the pressure on the tendons at a 3:1 ratio to mimic the natural balance of anatomy.

Three fingers are tested on each hand — the test doesn't apply to the little finger — and the research calls for 15 sets of hands to be tested. Half will be taped and half will not be wrapped. Buerk expects to finish testing and have results in the spring.

“There's probably a subtle difference,” he said. “We most likely can't do a lot to support externally what nature has provided so beautifully internally. But if a taped finger will withstand even minimal increased pressure, that's worthwhile.”

The research is supported by a \$10,000 grant from Wright State University School of Medicine.

The University of Dayton Research Institute employs about 350 full-time researchers, scientists and support staff, who conduct \$40 million of sponsored research annually. It is the region's leading research-and-development organization.

For media interviews, call **Aaron Buerk** at (937) 208-2127; **Steve Goodrich** at (937) 229-4492; **Bud Graves** at (937) 229-4415 and **Ira Fiscus** at (937) 229-2264.