

# Electric stimulation of torn ligaments cuts rehab time by two-thirds

ATLANTA—A new technique that promotes healing of soft-tissue injuries through electricity could revolutionize sports medicine. A tiny electric stimulator implanted into surgically repaired knees obviates the need for plaster casts and cuts rehabilitation time by two-thirds, says a Canadian orthopedist.

Dr. William D. Stanish, assistant professor of surgery at the University of Dalhousie in Halifax, Nova Scotia, has repaired 125 ruptured ligaments and tendons in the past three years using his novel electric stimulation technique. His first 70 patients all show improved stability at 30 months' follow-up, he told the American Academy of Orthopedic Surgeons meeting here.

Orthopedists have long used electric stimulation to heal refractory stress fractures. The fracture apparently disrupts the electric potential between bone cells. When Japanese researchers revealed in the 1970s that ligaments and tendons also have electric potential, Dr. Stanish began animal tests to "see if electric stimulation could work in soft tissues as well as in bones," he told MWN.

**Clinical tests.** He found that an artificial electric environment could normalize the tensile strength of ruptured ligaments. In clinical tests, Dr. Stanish, chief medical officer of the Canadian Olympic team, adapted the same type of electric stimulator used to knit bones and applied it to his athletic patients who had ruptured ligaments during sports events.

The director of the Nova Scotia Sports Medicine Clinic, Dr. Stanish has since repaired 110 severely in-

jured knees and 15 Achilles tendons. Most of the 125 athletes have returned to competition within six months, compared with an average out-of-action time of about 18 months with conventional treatment, he says.

Dr. Stanish implants a tiny titanium battery next to the newly repaired ligament or tendon. The 1½-inch-long, pencil-thin battery delivers a constant 10-to-20 microampere current through an 8-inch-long wire coiled around the ligament or tendon. "The patient is not aware that he or she is being stimulated," he says.

**Implant.** The 30-minute implant operation takes place in the hospital a few days after surgery. The patient's knee or ankle is swathed in a dressing, not a plaster cast. In four or five days, the patient is discharged from the hospital. When the dressing comes off a few weeks later, Dr. Stanish encourages his patients to begin rehabilitation by swimming or riding a stationary bicycle. They can begin "pumping iron" about one month after surgery, he says.

Six months later, he removes the battery by an arthroscopic procedure and does a biopsy of the ligament or tendon to check blood flow. Healthy new tissue simply grows over the battery's wire. The only side effect has been tissue reaction to the titanium implant in three patients.

The first 70 patients had anterior cruciate ligament tears and had moderately or severely unstable knees, Dr. Stanish says. After ligament repair and electric stimulation, three stress tests showed that 84% had completely stable knees or only mild instability. This is comparable to

results from conventional treatment. Not only is the repair quicker than wearing a plaster cast for six to eight weeks, but it's more complete, according to the athletes, says Dr. Stanish. The patients report that electric stimulation seems to restore torn ligaments and tendons closer to preinjury condition than does conventional treatment.

Within 20 weeks, about 40% of the athletes returned to competition in their chosen sports—including ice hockey, racquetball, football, and soccer, he reports. More than 90% of the first 70 patients returned to their normal jobs with no limitations.

---

*The technique is 'one of the most promising advances in the past five years.'*

---

What's more, Dr. Stanish told the academy that "92% of the patients frankly expressed they would undertake a similar operation if the uninjured extremity followed the same [injury] scenario."

Though this is a preliminary report, Dr. Stanish is enthusiastic about enhancing ligament strength through early motion and electric stimulation. "Aggressive surgery on unstable knees is the kiss of death for an elite athlete," he says. "Ligaments break down; muscles atrophy. Now we have a new way to speed along repair of soft-tissue injuries."

Dr. Stanish's technique is "one of the most promising advances in the past five years," says Dr. Lyle Micheli, director of sports medicine at Boston Children's Hospital. Damage to ligaments and tendons accounts for more than half of all sports injuries, he adds. "Dr. Stanish has come up with an exciting application of the healing power of electricity. Once orthopedists pick up on it, weekend as well as elite athletes will benefit."