

# 'Shocking' New Therapy

## PT takes e-stim under water for ACL rehab

By Jonathan Bassett

Mention the words electrical stimulation and water in the same sentence, and the reactions may range from skepticism to outright ridicule. But a New Hampshire PT has successfully combined the two modalities in ACL rehabilitation, and sees the potential for broader uses down the road.

"People get nervous until you show them how you're doing it," said Rick McAvoy, PT, aquatic program coordinator at Rehab 3, Somersworth, NH. He is reporting increased patient comfort and enhanced clinical results with the underwater e-stim unit he devised.

McAvoy became aware of the possibility of performing e-stim under water after a representative from a prominent manufacturer of electrotherapy products visited his clinic. "I always think in terms of water therapy because that's where I primarily treat," he said. "And thankfully, our clinic is pretty aggressive in trying new techniques."

Working with engineers at the electrotherapy company, McAvoy placed an e-

stim unit, the size of a small transistor radio, into a waterproof box. Three wires emerge from the box. The first contains two electrodes that are placed on the muscle being stimulated; the second is wired to a trigger switch, the third to a heel switch.

All electrodes and contacts are covered with a translucent adhesive to improve electrical contact. Safety is not an issue, McAvoy said. "You're only talking about a 9-volt battery," he explained. "The worst thing that could happen if it takes on water is that you'll ruin the unit."

The handheld unit allows for greater freedom of movement. "I like having it in the water because it keeps the patient mobile," McAvoy said. The heel switch, round and roughly three inches in diameter, is placed inside an underwater shoe and will activate stimulation when weight is placed on it. The trigger switch can also be used to initiate stimulation, such as during closed-chain movements like squatting.

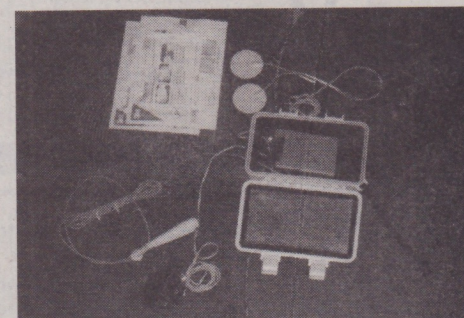
A primary benefit of underwater e-stim is patient tolerability, McAvoy noted. "Some people are defensive to e-stim because it's uncomfortable," he said. "These people are reporting increased comfort." Also, the procedure allows McAvoy to introduce valuable closed-chain exercises sooner, which he feels aids in returning muscle function quickly and thoroughly.

McAvoy and a colleague are launching a research study comparing aquatic therapy and land-based treatment in postsurgical ACL patients. The study will examine the benefits of each on balance and proprioception. What makes this analysis unique, he said, is that now he is able to incorporate e-stim into both study groups, instead of just land patients. "That should give us a better comparison of the two," he said.

And McAvoy sees a greater potential for the unit in the future. He used to work with patients with neurologic disorders, and he believes it could help with foot-drop complications of stroke victims, for instance. He has also developed a similar waterproof box for use with EMG in the water.

McAvoy plans to introduce the underwater e-stim unit at the Aquatic Therapy Rehab Institute's national symposium, held this August in Orlando, FL. Bringing actual units with him and allowing hands-on demonstrations, should prove superior to just lecturing on the subject, he said. "If you just talk about it, there's still that reluctance."

Representatives of the electrotherapy



Components of the underwater e-stim unit.

product company told McAvoy that although the idea is intriguing, there is no researchable data on underwater e-stim. As such, they are eagerly awaiting the results of McAvoy's research. "I didn't really understand why this hasn't been tried before, except in a very limited capacity years ago for edema reduction," McAvoy said. "Because I'm just changing the medium; I'm not changing the function or the capabilities of the unit."

But the possibility of increased comfort and enhanced clinical results is worth investigating further, McAvoy believes. "I'm not saying this is the be-all, end-all," he stressed. "But I think it presents a good adjunct to traditional therapy." ■

For more information on e-stim in the water, contact Rick McAvoy at Rehab 3 at Marshbrook, 237 Rte. 108, Suite 101, Somersworth, NH 03878; (603) 749-6686; or e-mail [surf@cybertours.com](mailto:surf@cybertours.com).

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### Underwater E-stim

#### 1. Preprogrammed regimen selection.

The waterproof trigger or heel switch should be plugged into the outlet on the side of the e-stim device and will control its operation. Unit is securely sealed in the waterproof box.

#### 2. Electrode placement (one channel/two electrode placement for VMO recruitment).

Use two medium electrodes. The active (-) electrode (white lead) is placed above and medial to the superior medial border of the patella. The inactive (+) electrode (red lead) is placed 15 cm distal to the femoral triangle. All electrodes should be covered with a translucent adhesive.

#### 3. Closed chain exercises/gait training.

Depressing the waterproof trigger switch will initiate stimulation of CH1 during closed chain exercise. The trigger switch may be used during gait training in the stance phase. The remote waterproof heel switch is placed inside the client's water training shoe and will initiate the CH2 stimulation program when the weight is on the heel switch during the stance phase of gait.

#### 4. Treatment program.

Intensity should be set to client tolerance. A visible muscle contraction of the VMO is desired when the client depresses trigger/heel switch. Intensity is set on the pool deck prior to sealing the unit in the waterproof box. Rate: 35-50 PPS. Timing control: C or N for triggered stimulation.