

## Electro-membrane microcurrent therapy reduces signs and symptoms of muscle damage.

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Lambert MI; Marcus P; Burgess T; Noakes TD  
MRC/UCT Research Unit for Exercise Science and Sports Medicine, P.O. Box 115,  
Newlands, South Africa. [mlambert@sports.uct.ac.za](mailto:mlambert@sports.uct.ac.za).

**PURPOSE:** Delayed onset muscle soreness (DOMS) occurs after unaccustomed physical activity or competitive sport, resulting in stiff, painful muscles with impaired function. Acustat electro-membrane microcurrent therapy has been used to treat postoperative pain and soft tissue injury; however, its efficacy in reducing symptoms of muscle damage is not known. **METHODS:** Thirty healthy men were recruited for a double-blind, placebo-controlled trial. The muscles of their nondominant arms were damaged using an eccentric-exercise protocol. Subjects were then randomly assigned to treatment with either Acustat or a matching placebo membrane for 96 h and monitored for a total of 168 h. **RESULTS:** Subjects in both groups experienced severe pain and swelling of the elbow flexors after the eccentric exercise. After 24 h, the elbow joint angle of the placebo group had increased significantly more than those in the Acustat group (13.7 +/- 8.9 degrees vs 7.5 +/- 5.5 degrees; placebo vs Acustat,  $P < 0.05$ ), possibly as a consequence of the elbow flexor muscles shortening. For the first 48 h after exercise, maximum voluntary contraction of the elbow flexor muscles was significantly impaired in the placebo group by up to 25% ( $P < 0.05$ ), whereas muscle function was unchanged in the Acustat group. Peak plasma creatine kinase activity was also lower in the Acustat group (peak = 777 +/- 1438 U.L-1) versus the placebo group (peak = 1918 +/- 2067 U.L-1; ( $P < 0.05$ ). The membranes were well tolerated by the subjects in both groups without any adverse effects. **CONCLUSION:** These data show that treatment of muscle damage with Acustat electro-membrane microcurrent therapy reduces the severity of the symptoms. The mechanisms of action are unknown but are likely related to maintenance of intracellular  $Ca^{2+}$  homeostasis after muscle damaging exercise.

Major Subject Heading(s)	Minor Subject Heading(s)	CAS Registry / EC Numbers
<ul style="list-style-type: none"> <li>• Athletic Injuries [therapy]</li> <li>• Electric Stimulation Therapy [methods]</li> <li>• Muscle, Skeletal [injuries]</li> </ul>	<ul style="list-style-type: none"> <li>• Adult</li> <li>• Athletic Injuries [complications] [diagnosis]</li> <li>• Biological Markers [blood]</li> <li>• Calcium [metabolism]</li> <li>• Creatine Kinase [blood]</li> <li>• Double-Blind Method</li> <li>• Elbow</li> <li>• Exercise [physiology]</li> <li>• Homeostasis</li> <li>• Isometric Contraction</li> <li>• Muscle, Skeletal [metabolism] [physiopathology]</li> <li>• Pain [etiology] [therapy]</li> <li>• Treatment Outcome</li> </ul>	<ul style="list-style-type: none"> <li>• 0 (Biological Markers)</li> <li>• 7440-70-2 (Calcium)</li> <li>• EC 2.7.3.2 (Creatine Kinase)</li> </ul>