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Q&A

[BY MATT BRZYCKI]

Does electrical muscle stimulation increase strength?

Electrical muscle stimulation (EMS) has been used for years to rehabilitate muscles after injury or surgery. Because of its success in those applications, EMS has been proposed as an alternative or adjunct for healthy individuals who want to increase their muscular size and strength.

In one study, researchers examined an EMS device that was marketed to the general public and could be purchased over the counter. One group of subjects received stimulation from the device according to the manufacturer's recommendations. A second group of subjects received "sham" stimulation from a device that looked identical to the other but was modified by the researchers so that it didn't transmit any electrical current. (The latter group was told that they'd receive a lower current that "should be less noticeable.") After eight weeks, there were no differences between the two groups in terms of

skinfold measurements, muscular size or muscular strength. And here's a real shocker: When piloting the procedure, the researchers received a small superficial burn from the electrode.

While previous research found that EMS is effective for increasing muscular size and strength, those studies used high-quality, medical-grade devices. Plus, the studies typically examined one or two muscles, which is a far cry from a total-body regimen.

Be advised that over-the-counter EMS devices have several drawbacks. For one, the devices may be inaccurate and of poor quality. Also, the electrical current may be too uncomfortable for many individuals. **FM**



What is the bilateral deficit?

The term "bilateral deficit" refers to the fact that the sum of the force produced by two limbs separately (unilaterally) is greater than the force produced by the same two

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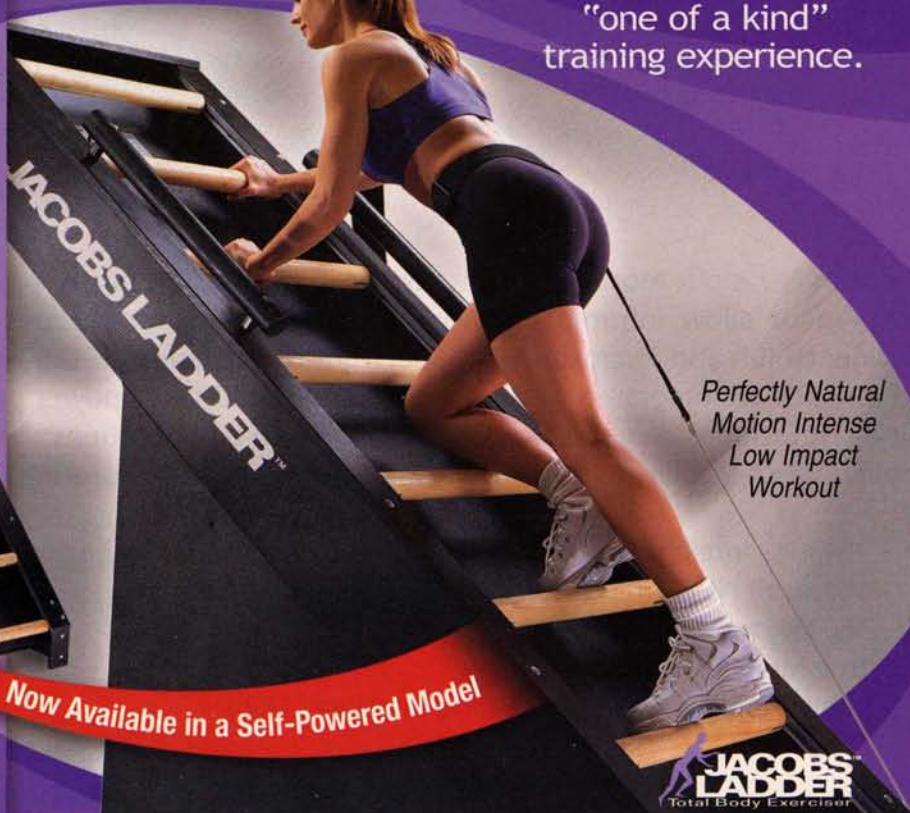
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limbs simultaneously (bilaterally). Consider the leg extension: If clients produce 50 pounds of force with their right legs and then 50 pounds of force with their left legs, it adds up to 100 pounds of force. It's logical to think that clients should be able to produce at least 100 pounds of force when they perform the exercise with both legs at the same time. But they can't because of the bilateral deficit.

There's no consensus among researchers as to why this phenomenon occurs. Theories include neural inhibition and a reduced utilization of fast-twitch fibers. In any event, studies have shown that the bilateral deficit is about 85 percent. So, in the aforementioned example, if clients produced 50 pounds of force with each leg separately — a sum of 100 pounds — they'd be able to produce about 85 pounds of force with both legs simultaneously. **FM**



Are closed kinetic chain exercises safer than open chain exercises?

Rehabilitative professionals often use the terms “closed kinetic chain exercise” and “open kinetic chain exercise.” A closed kinetic chain exercise is one in which the feet are in contact with a surface, such as a squat or leg press; an open kinetic chain exercise is one in which the feet aren't in contact with a surface, such as a leg extension.

It has been thought that open kinetic chain exercises place an excessive amount of stress on the knee joint. But what does the research say? In a study that involved 27 patients with patellofemoral (knee) pain, researchers concluded that closed kinetic chain exercises “are only a little more effective” than open kinetic chain exercises in reducing pain and increasing functionality. The researchers felt that the notion of avoiding open kinetic chain exercises in the treat-

ment of patellofemoral pain is “unfounded.”

Another study simulated closed kinetic chain exercises and three types of open kinetic chain exercises using three-dimensional computer models. The stresses during open kinetic chain exercises weren't significantly different from those generated by closed kinetic chain exercises.

Bottom line: Closed kinetic chain exercises aren't significantly safer than open kinetic chain exercises. **FM**

Do you have questions that you need answered? Email them to edit@fitnessgmt.com.

Matt Brzycki is coordinator of recreational fitness and wellness programs at Princeton University, Princeton, N.J. He has more than 22 years of experience at the collegiate level and has authored, co-authored or edited 14 books.

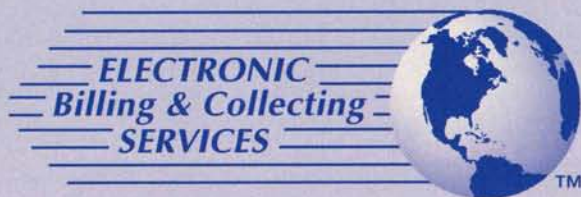
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