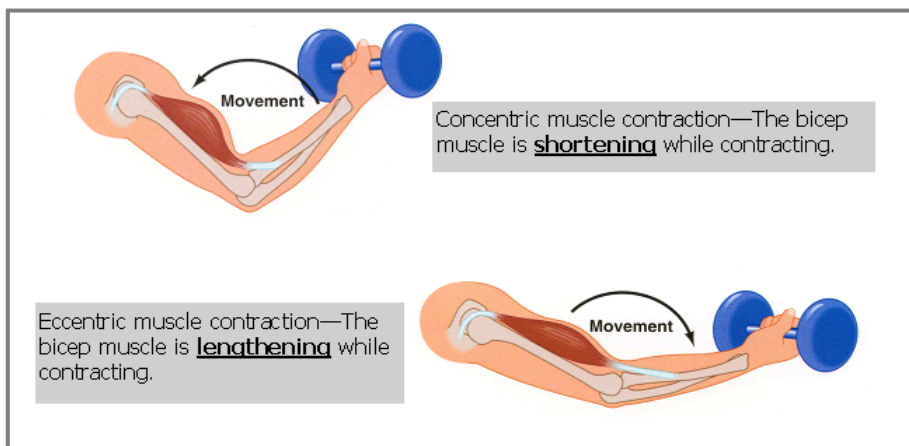


Can Eccentric Loading Cure Chronic Tendinitis and Tendinosis?

I wanted to share with you some really exciting research that has been happening in the last 10 years on eccentric loading and how it might help those suffering with tendon-related ailments such as Achilles tendinitis or tendinosis (i.e. precursor to tendinitis), and the most common form of Shin Splints.

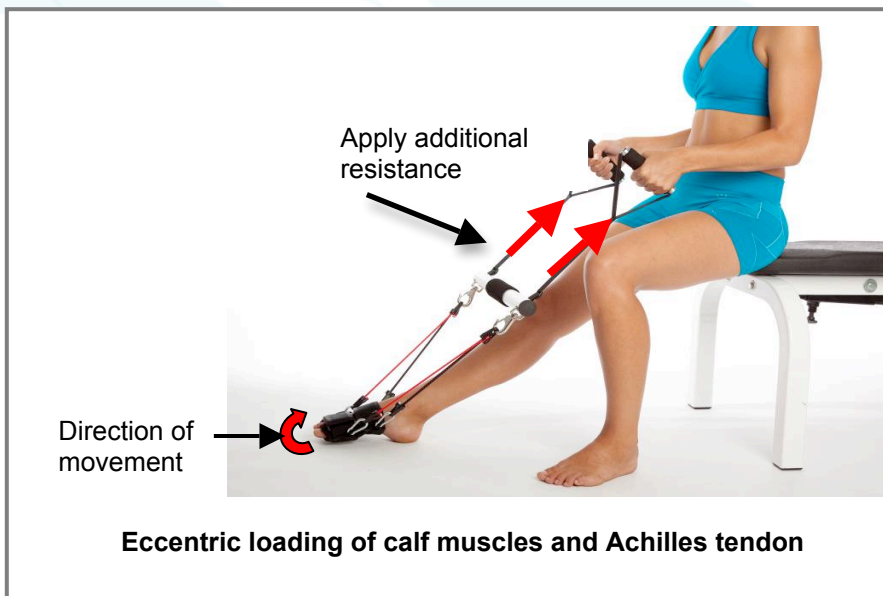


But before we get into the research, we need to first answer the question “What is eccentric loading?” An “eccentric” muscle contraction is one in which the muscle is lengthening while under tension, while a concentric muscle contraction is one in which the muscle is shortening while developing tension (see diagrams below). For example, at the gym you’ll sometimes see an athlete doing bicep curls with a training partner. The athlete curls the weight to the top position (concentric contraction), and then slowly lowers the weight back to the start position

(eccentric, or ‘negative’ contraction) under control while his/her partner presses down on the bar to increase the weight. This training method, known as eccentric loading, is used because the added resistance on the controlled eccentric contraction produces a greater training stimulus, and has been shown to result in greater strength increases as compared to traditional training methods.

The potential benefits of eccentric loading are incredibly exciting when it comes to the foot and ankle, not only for strengthening but also for rehab. Eccentric loading has been shown to result in complete rehabilitation of Achilles tendinitis and tendinosis in a number of research studies to date, which is ironic in light of the fact that the original injury typically occurs as a result of a high-force eccentric contraction. Based on the results of these studies, it is thought that eccentric loads delivered in a controlled environment (i.e. rehabilitation setting) are needed for optimal tendon adaptation.

How AFX helps: With standard exercise equipment, it is difficult to apply controlled eccentric loads through a full range of motion to the muscles that cross the ankle joint, and to the intrinsic muscles of the feet. AFX allows for unassisted, controlled eccentric loading of these muscles through a full range of motion, with its unique unilateral resistance system that is user-controlled. As a result of this feature, we have developed an eccentric loading program (see *AFX Eccentric Loading program*), and are incorporating eccentric loading into our injury-specific and athletic-specific training programs. Try them out and let me know what you think!



Case Study: Heavy-load eccentric calf muscle training for the treatment of chronic Achilles tendinosis [1]

Fifteen recreational running athletes (12 males; 3 females; mean age, 44 years) with Achilles tendon pain underwent an eccentric-resistance exercise program of progressively increasing loads. The eccentric-resistance group was compared to a similar control group (11 men; 4 women; mean age, 40) of patients with recalcitrant (i.e. difficult to manage) Achilles tendon pain who were treated with rest, non-steroidal anti-inflammatory drugs, orthotics, and physical therapy, which included a standard resistance training program. The high-force eccentric exercise program consisted of calf raises twice a day, 7 days a week, for 3 sets of 15 repetitions. The subjects performed the concentric part of the exercise bilaterally (raising both heels), while using the impaired side only to do the eccentric lowering phase in a slow, controlled fashion. Once the exercises were possible with little or no discomfort, they were instructed to add resistance by using additional weight. After 12 weeks, all subjects in the eccentric-training program returned to pre-injury levels of running activity, whereas subjects in the conventional resistance exercises group (that did not include high-force eccentric exercises) ultimately required surgery. Alfredson's results are also strengthened by a 2-year follow-up, where 14 of the 15 runners in the high-force exercise group were still running pain free, while 1 went on to surgery. Similar findings have also been reported when using eccentric loading as part of the resistance exercise program in patients with tendinoses at the knee and elbow [2-5].

~ By Rick Hall

Rick is the Principal Scientist for Progressive Health Innovations, and co-inventor of the AFX. Rick has a M.Sc. in Biomechanics, and has conducted research in athletic performance enhancement, exercise physiology, and injury prevention for over 20 years. He is a member of the International Foot and Ankle Biomechanics Community, and is also a reviewer for the Journal of Biomechanics.

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