

The Proper Use of Muscle Stretching in the Treatment of Sports Injuries

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Stretching is a topic of much confusion. Misinformation abounds in both the lay and professional literature. To fully understand the role of muscle stretching in health and in injury treatment and rehabilitation, one must first look at the purpose behind this activity. Why stretch a muscle? One must also look at the way in which stretching is carried out. What is the best way to stretch a muscle in a certain situation? Of course, the ultimate question must be asked: Should muscles be stretched at all?

To answer these questions, let us first look at static stretching (SS) as it is performed by individuals by themselves, and the circumstances under which it is believed by many to be appropriate for a muscle.

The first circumstance is before or after an athletic event, training session or workout. It is felt that SS in this situation is helpful to prevent injury,¹⁻⁶ aid in warm-up or cool-down,¹ improve performance,^{1,5,7} and prevent postexercise muscle soreness.⁸ While it is a commonly held belief that SS accomplishes these goals, there is very little or no evidence that supports this notion.⁹ And there is evidence that it actually increases injury susceptibility in addition to predisposing the muscle to developing either chronic muscle tightness or chronic muscle inhibitions.^{9,10,11}

A popular practice these days amongst athletes and fitness advocates is the use of proprioceptive neuromuscular facilitation (PNF) stretching. The stretching methods that people have labeled PNF are supposedly based on the principles outlined by the developer of this technique, Dr. Herman Kabat. If one looks at the definitive text written on the topic of PNF,¹² one will see that SS is not mentioned on a single page. In fact, PNF is a technique of rehabilitation of deficient neuromuscular mechanisms and has nothing to do with stretching. To see athletes being taught to perform PNF stretching techniques on each other by well-meaning but uninformed coaches, trainers, doctors, and therapists, without regard for normal neuromuscular principles, is unfortunate. It reinforces the questionable idea that SS is an appropriate activity for a normal muscle and it trivializes the complex principles behind true PNF.

It is certainly important to have normal full muscle length when engaging in a workout, practice session or athletic event. It has been said that "a long muscle is a strong muscle, a short muscle is a weak muscle." When a muscle is at its normal resting length it has the greatest potential for full overlapping of its actin and myosin filaments in its sarcomeres. This creates a maximum ability to produce a strong and smooth contraction. Potential for injury is lessened because the muscle has a greater ability to accommodate sudden increases in length, e.g., when a hurdler needs to fully extend the lead leg when jumping over a hurdle. But the way in which this muscle length is attained and maintained can make a critical difference in the health of the muscle involved.

A much more appropriate approach to muscle warmup and lengthening than SS is dynamic range-

of-motion training (DROM).¹³ DROM allows the muscle to be gently lengthened by contracting its antagonist, thereby relaxing it via reciprocal inhibition as it is lengthening. Exercise bands can be used for increased resistance, thus increasing the reflex inhibition. This is a much more natural and neurophysiologically sound method of muscle lengthening than SS.

DROM applies to muscles that are already of normal or near normal length and are free from functional pathology. When a muscle is affected by functional pathologies such as myofascial trigger points, interneuron dysfunction, limbic system dysfunction or muscle tightness, specific muscle lengthening procedures must be applied by the doctor to restore normal function. The procedures include postisometric relaxation,^{14,15} intermittent cold with stretch for trigger points,¹⁶ and interneuron dysfunction and postfacilitation stretch^{17,18} for limbic system dysfunction and muscle tightness. Through the use of inhibiting techniques such as isometric contraction, eye movements, breathing, and counter irritation, these methods allow lengthening of the involved muscle after it has been reflexly inhibited. Once normal length and function has been established, it is essential that these methods be stopped and a program of DROM be instituted, as normal muscles should not be passively stretched.

By following the basic principles of muscle function and dysfunction, one can have an appropriate approach to effectively treating and rehabilitating the muscular system.

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