



Dynamic Flexibility for Endurance Sports

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Introduction

Among the various aspects of training (cardio, strength, power, etc.) coaches debate most about flexibility. In the old days, pulling your arm across your chest and your heel to your butt for 20-30 seconds was considered a good way to warm up before working out or racing. Why? Not because scientific evidence supports those methods, but because that is how your coaches were taught to stretch so it is how they taught you. Current research suggests, however, that this type of stretching may not only inadequately prepare you for running, but can actually hinder performance (Stone, et al, 2006). Numerous sources, though, still tout the necessity of including stretching in your program. The conflicting evidence can easily confuse an athlete or a coach – if you are unsure about when to stretch, how to stretch, or whether to stretch at all . . . continue reading.

Static vs. Dynamic Stretching

In both static and dynamic stretching, the purpose is to take the muscles through a greater than normal range of motion (ROM). Static means that the stretch is being held and the muscles are at a constant length (e.g. the aforementioned quad stretch). Dynamic stretching implies that the muscles and joints are moving as you stretch (e.g. a body squat). During dynamic stretching, we are steadily loading (increasing length) and unloading (shortening) the muscles across multiple joints. This method assists with taking joints through a greater than normal ROM while also warming up the mind-muscle connection (a.k.a. neuromuscular system).

Chronic vs. Acute Stretching

We can further define stretching techniques as either acute (a single session) or chronic (multiple sessions over weeks or months). An acute bout of static stretching has very little effect on performance; it actually inhibits performance in explosive sports such as sprinting and weightlifting. Acute, static stretching also appears to have little effect on injury prevention, although long-term flexibility training likely will decrease risk of injury and can definitely improve function and performance (Stone, et al, 2006). Thus, the optimal method is to incorporate some combination of static and dynamic stretches in your flexibility training to improve ROM over time.

Physiology Behind Stretching

Muscles act like rubber bands keeping joints together, aligning joints for movement, and propelling limbs through three-dimensional space at varying speeds. Evidence strongly supports the fact that the body functions best when muscles are at ideal lengths (based on the sport's requirements). This "ideal length" for endurance athletes is often achieved through the chronic stretching methods described above. Athletes must understand that the longer a rubber band stretches (up to a point), the farther it will shoot – this principle describes why Rehab United Strength Coaches and Physical Therapists emphasize loading and unloading muscles at their optimal length in all planes of motion (sagittal, frontal, transverse) to enhance flexibility and sport-specific strength in all our programs.

Physiology Behind Stretching (Cont.)

As mentioned, the optimal stretching length differs for everyone – it is possible to pull the rubber band too quickly and risk snapping it (never a good idea if you want to finish the race without a limp). Therefore, we teach to avoid ballistic stretching (bouncing) at speeds that do not allow relaxation to occur within the muscle fibers.* Knowing that muscles rely on internal components such as muscle spindles and Golgi tendon organs (“buzz words” for you science buffs) to monitor changes in length and tension and report back to the nervous system during movement, it makes sense to develop a stretching method that compliments the neural needs associated with the contract/relax patterns in sport. These techniques are gaining popularity as athletes find themselves able to push farther into the lengthened transformational zones with increased comfort.

*Advanced stretching techniques often include ballistic movements

Fundamentals of Stretching

- 1) **3-Dimensional:** Load the muscles and tendons in all three planes (see “Functional Training” for description); stretching the muscle in only one plane does not adequately change the length of the muscle or increase sport-specific ROM.
- 2) **Sport Specific:** Create a warm up and flexibility program that mimics the actions of the sport in an effort to produce improved awareness of body positioning (e.g. high knees, butt kickers).
- 3) **Controlled Movement:** Perform each stretch at a speed slow enough to allow the nervous system to relax the muscles.

Exercise Examples

- 3D Hip Drives (Dynamic Hip Flexor Stretch)
 - Place one foot on a box, bench, or chair and drive that knee forward as you swing your arms overhead, to the left, and to the right
 - Return to the starting position after each drive – repeat 5-10 times in each direction
 - When driving arms to the left or right, push the hip in the opposite direction
 - Make sure the back foot (the one on the ground) faces forward and the back knee remains straight (it’s okay for the heel to come off the ground)



Starting Position



Overhead Arm Swing (Sagittal Plane)



Right Side Drive (transverse, frontal)



Left Side Drive (transverse, frontal)

Exercise Examples (Cont.)

- 3D Hamstring Stretch (Static & Dynamic)
 - Hold each position for 10-30 seconds
 - Swing or reach arms to both sides 5-10 times each



Forward Reach



Inside Reach



Outside Reach



Inside Swing



Outside Swing

Summary

Regardless of the current controversy with stretching, we know this much: increasing flexibility (joint ROM) over time can improve performance and reduce injury risk. Your warm-up (before a workout or race) must always include dynamic flexibility exercises that take the joints through a greater than normal ROM in all three planes of motion. Acute, static stretching may decrease explosiveness, but is requisite in a comprehensive flexibility program. At RU Sports Performance Center we incorporate numerous multi-joint, dynamic-based techniques to achieve increases in flexibility and to properly stimulate the nervous system to improve performance. Good luck with your training and as we say – always *Train the Way You Play*™.

Visit our website for details on our programs: www.rehabunited.com (click on *Sports Performance*).

Cheers,

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Reference

Stone, M., O'Bryant, H., Ayers, C., & Sands, W. (2006) Stretching: Acute and chronic? The potential consequences. *Strength & Conditioning Journal*, 28, p. 66-74.