

Ask the Doctor: The four 'W's' of flexibility

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Smooth coordinated movement patterns are critical to success in athletics. One of the quickest methods to improve an individual's ability to move is to improve their flexibility. Flexibility is simply the range of motion possible by a single joint or series of joints. Flexibility is often misunderstood, and the majority of people do not use the proper technique at the proper time.

Generally speaking there are three types of stretching techniques that are commonly implemented to increase flexibility for athletic performance. The three techniques are dynamic, static, and neuromuscular.

Dynamic stretching was discussed in a previous article.

A dynamic warm-up is actively moving to the stretch, by progressively increasing the intensity and range of motion of the movement, from a walk to full speed. As the warm-up precedes the stress on the muscles and nervous system should progressively increase as well.

The purpose of the dynamic warm-up is 1) to prepare the body for the work about to be done 2) to reinforce the fundamentals of speed development and movement.

The dynamic warm-up should follow activation exercises and be completed immediately prior to plyometrics, agility and/or speed work. It is commonly believed that static stretching done prior to an explosive activity such as hockey or sports in general will cause the athlete to be less explosive.

During static stretching, the muscle should be stretched until a point of mild discomfort and hold for 20-30 seconds for one-to-three sets. To increase the extensibility of the tissue, the body temperature should be elevated. This can best be accomplished by five-to-10 minutes of light aerobic activity (i.e. biking, jogging).

In the continuum of a daily training program, static stretching should be completed at the beginning of the workout after soft tissue work and prior to the dynamic warm-up. Static stretching should be done at the end of the training session before some sort of soft tissue work.



ASK THE DOCTOR

By Dr. Jeff S. Pierce



In terms of performance enhancement, static stretching should — generally — not be used prior to and/or during heavy strength training and explosive activity such as plyometrics, agility, sprints, interval work, and Olympic lifting.

Neuromuscular stretching uses various combinations of active contractions, relaxation, and short duration static stretching (two-to-10 seconds). The two most commonly used neuromuscular stretching techniques are proprioceptive neuromuscular facilitation (PNF) and Active Isolated Stretching (AIS). To properly describe these two techniques two definitions are essential, agonists and antagonists. The agonist refers to the muscles which contracts to produce a movement. The quadriceps acts as an agonist to straighten the leg (extend knee) while sitting. The antagonist is a muscle being stretched in response to the contraction of the agonist. The hamstring acts as an antagonist, while knee is being straightened.

During movement the antagonist reflexively relaxes as the agonist contracts.

During AIS the athlete actively (under their own power) moves his/her joint to the end of their active range of motion. Once the individual reaches the end of their range of motion an implement (i.e. rope, partner, immovable object) is used to gradual and gently passively pull the extremity further beyond that. The extremity is then returned to full resting length. AIS is done up to 10 times progressively increasing the stretch each time. The passive stretch should be no longer than two seconds. AIS can be used

any time during a training session, but is commonly used prior to and during the workout.

There are various types of PNF stretching techniques; a commonly used technique is slow-reversal-hold-relax. An athlete lies on his/her back and the partner passively pushes his/her straightened leg toward their chest until a mild discomfort is felt in back of their thigh (hamstrings). Then the athlete pushes the leg back into the partner resistance contracting his/her hamstrings (the muscle groups being stretched), holding this for 10 seconds. After 10 seconds the athlete is instructed to relax his/her hamstring and actively pulls their leg toward their chest with the muscles on front of their thigh (quadriceps); in conjunction, with pressure applied by their stretching partner to push the straightened leg to the chest. This position is held for 10 seconds. The reflexive relaxation of the muscles on the front of thigh (caused the contraction of the muscles on the back the thigh) ultimately increasing the athlete's range of motion more so than if only static stretching were used. PNF stretching is done three times, after each time the athlete should be able to progressively, within reason, increase their range of motion.

To achieve optimal performance, the proper flexibility technique should be applied at the proper time. In the beginning and end of a training session, use AIS after soft tissue work. Prior to movement dynamic flexibility is used. During the remainder of a training session use AIS stretching.