



November 2012

Volume III, Issue III
Dr. Bob Lehr, Editor

**CONNECTICUT INTERSCHOLASTIC ATHLETIC
CONFERENCE**

CIAC COACHES UPDATE

The CIAC Fall Season is winding down; champions have been or will soon be crowned. Despite the best efforts of Hurricane Sandy to wreck our post-season, tournaments have been held because of some creative scheduling by our leagues and the state's coaches.

Congratulations to all the coaches and their respective teams that made one of the CIAC tournaments.

Coaches and student-athletes that participate in a winter sport are in the initial phase of their season in preparation for the challenging competitions on their schedules. I hope all coaches remember to find some positive aspects in their coaching efforts, for they are always present although they are not always evident.

**Best wishes from everyone at the CIAC
for a wonderful holiday season**

The Role of Stretching in Exercise Performance and Injury Risk

Ian McMahan, MA, ATC, PES – Active Care Physical Therapy (San Francisco)

I confess: I dislike stretching. I'm always anxious to get started with my run, bike ride or basketball game and never want to spend precious time lying on my living room floor. But we've all been told from our very first P.E. class that stretching before exercise helps prevent injury and improves performance. Or does it?

Many of us use the same stretches that we were taught in those very first experiences in exercise and athletics. Coaches, fitness professionals, and athletic trainers have long believed and taught that stretching before exercise is vital; hence, many injured athletes are filled with guilt and regret, believing that more frequent stretching would have kept them out of the athletic training room or doctor's office. But are they right? Researchers recently began to examine how muscles and tendons respond to stretching and how this relates to exercise performance and injury risk. Their findings suggest it may be time to update the old rules about stretching.

Why do we stretch? The most fundamental principle of stretching seems to hold true, that is, consistent stretching improves flexibility. However, the important question to ask is: does the improvement in muscle and tendon flexibility actually protect athletes from injury? Researchers from the President's Council for Physical Fitness concluded that "only normal levels of flexibility are needed for a low risk of injury." The council further reported that there seemed little basis to conclude that stretching before exercise lowered the risk of injury in individuals with normal levels of flexibility. Additionally, a study that examined injury rates among Australian army recruits found no useful difference between recruits who underwent pre-exercise stretching programs and those who did not stretch. However, there is evidence that either extreme inflexibility or hyperflexibility can increase the chance of injury.

While increases in short-term flexibility do not lower injury rates, many recent studies have also reported that stretching immediately before exercise may actually hinder athletic performance. Researchers attribute the decrease in performance to changes in the muscle-tendon unit as well as a decreased signal from nerves to working muscles. One study, performed by scientists from the University of Newfoundland, found that reaction time, movement time and balance were all reduced after 20 minutes of standard stretching before exercise. At the Olympic or elite levels, even the smallest reductions in these important variables could have a significant effect on athletic performance, especially given the slim margin of difference between competitors. Interestingly, it was also found that the control group's pre-exercise routine that consisted of only a warm-up significantly increased their balance, reaction and movement time scores, suggesting that a warm-up of general and sport-specific activity can have a positive effect on performance.

Stretching also seems to have a negative effect on muscular force manifested in jumping and sprint performance. In a group of experienced sprinters, stretching resulted in significantly slower 50-meter sprint times. Similarly, several studies found reductions in vertical jump height after pre-exercise stretching. In a critical review of the literature, Dr. Ian Shrier found that 20 out of 21 stretching studies reported a negative effect of stretching on a variety of jumping performance variables.

There were no studies that found a positive effect. However, while pre-exercise stretching seemed to have negative effects on jumping performance, a pre-exercise running warm-up increased performance when compared with no warm-up.

It seems that gym teachers may not have had it wrong after all: those warm-up laps around the gym before P.E. may have had a positive effect on the ensuing game of dodge ball. In a study by U.S. Army researchers, McMillian also found that, compared with a stretching warm-up, an active warm-up before exercise improved performance on power and agility tests. While the study did not directly investigate the cause for these changes, they hypothesized that stretching may reduce the amount of muscle available for contraction because of a diminished nerve signal. Another proposed theory was that while contracting, the stretched muscle-tendon unit had to take up the increased "slack" of the stretched muscle before general movement could occur.

It is important to distinguish between stretching immediately before exercise and a general program of flexibility training. The decreases in muscular force, reaction time and balance after acute stretching may not apply to a regular program of stretching performed at other times. In a critical review of the literature by Shrier, seven studies suggested that regular stretching improved performance in many of the same areas mentioned in previous paragraphs. One of those studies found that regular hamstring stretching resulted in increased hamstring muscle performance.

There's more: athletes whose sports demand high levels of flexibility like gymnasts, dancers and figure skaters may actually improve performance with stretching before exercise because performance in those sports rely on the limits of motion. While those individuals would also suffer a decrease in muscular force, balance, and reaction time, it would presumably be outweighed by an increased ability to achieve the necessary range of motion extremes for those activities.

What does this mean for coaches, athletic trainers, and athletes? The evidence suggests that athletes can benefit from a regular stretching program, if it is properly timed so that athletes are not stretching immediately prior to competition. Following this advice would seem to be important for almost every athlete as most sports encompass facets of power, reaction time, and balance. Another valuable piece of the pre-exercise routine should be both a general warm-up, such as light jogging, and one that is sport-specific.

References

Shrier I. Does Stretching Improve Performance? A systematic and critical review of the literature. Clinical Journal of Sports Medicine. Sept 2004; 14:267-73

Behm D.G., Bambrury A., Cahill F., Power K. Effect of Acute Static Stretching on Force, Balance, Reaction Time, and Movement Time. Medicine & Science in Sports Exercise. 2004; 36(8): 1397-1402

Power K., Behm D., Cahill F., Carroll M., Young W. An Acute Bout of Static Stretching: Effects on Force and Jumping Performance. Medicine & Science in Sports & Exercise. 2004;36(8):1389-96

Kokkonen J., Nelson A.G., Eldredge C., Winchester J.B. Chronic Static Stretching Improves Exercise Performance. Medicine & Science in Sports & Exercise. 2007;39(10):1825-31

Rubini E.C., Costa A.L., Gomes P.S. The effects of Stretching on Strength Performance. The American Journal of Sports Medicine. 2007;37(3):213-24

Pope R.P., Herbert R.D., Kirwan J.D., Graham B.J. A randomized trial of preexercise stretching for prevention of lower-limb injury. Medicine & Science in Sports & Exercise. 2000;32(2):271-77

Thacker S.B., Gilchrist J., Stroup D.F., Kimsey D.C. The Impact of Stretching on Sports Injury Risk: A Systematic Review of the Literature. Medicine & Science in Sports & Exercise. 2004;36(3):371-8

Witvrouw E., Mahieu N., Danneels L., McNair P. Stretching and Injury Prevention. The American Journal of Sports Medicine. 2004;34(7):443-9

Nelson A.G., Driscoll N.M., Landin D.K., Young M.A., Schexnayder I.C. Acute effects of passive muscle stretching on sprint performance. Journal of Sports Science. 2005;23(5):449-54

Fletcher I.M., Anness R. The acute effects of combined static and dynamic stretch protocols on fifty-meter sprint performance in track and field athletes. Journal of Strength and Conditioning Research. 2007

McMillian D.J., Moore J.H., Hatler B.S., Taylor D.C. Dynamic vs. Static-Stretching Warm-up: The Effect on Power and Agility Performance. Journal of Strength Cond Res. 2006;20(3):492-9

President's Council on Physical Fitness. June 2000 3(10)

Ian McMahan

Ian McMahan is the head athletic trainer at Active Care Physical Therapy in San Francisco. He has a master's degree in exercise physiology from the University of Maryland. He has worked with many professional and elite athletes from a variety of sports, including athletes from Major League Baseball, the National Football League and the San Francisco Ballet.

Reprinted with permission of the United States Olympic Committee