

Flexibility Considerations : Static Stretching

by Joe Giandonato, MS

Flexibility training is often found to be a boring, yawn-worthy topic when discussing its implementation within a strength and conditioning program for an athlete. In my observations as a personal trainer, former athlete, and seasoned gym rat, I have noticed that the overwhelming majority of gym-goers don't stretch, and if they do, it's usually some half-assed variation of the battery of static stretches they did in their PE class years ago, under the not-so watchful eye of their gym teacher.

Discussing flexibility training will often cause the mind to wander, much like the eyes of the gym teacher, whose were either fixated on the ass of some 21-year-old-looking piece of jailbait while she performed a standing hamstring stretch, or the clock - counting down the minutes until they could enjoy their next cigarette and thirst quenching, teeth rotting, Type 2 diabetes inducing, caffeine infused soft drink. (Yes, I've actually had gym teachers who smoked and would tote around a large bottle or "Big Gulp" of soda around with them). Man, the topic flexibility training is so dry, that I'm contemplating bashing the rest of the teachers I had in high school, however, we have a job to do, and that, along with my clothes and books from high school sitting in my attic, is to toss static stretching routines in the trash.



The concept of using static stretching as a viable form of flexibility training is more dated than the Hefty bags of Fubu jerseys, Old Navy tech vests, and skin-tight Abercrombie shirts I'm ashamed to have worn in high school and still own.

Though not all of us own mementos from high school, I'm pretty sure most of us possess these pieces of common knowledge as it pertains to stretching:

- Stretching helps us "warm up", priming our cold muscles for the work that lay ahead of them.
- Stretching feels good, much like warm showers. And since they both feel good, they probably are good for me!
- Stretching will really help out with flexibility.

Well while I'm not going to outright reject most of those statements, as I would if I were a high school girl who was asked out by a scrawny, short white guy wearing a Fubu jersey, I will maturely and objectively debunk the aforementioned statements as nothing more than glorified myths. And we all know that high school girls aren't mature and certainly aren't capable of being completely objective.

So stretching helps you warm up? How so? I'm interested in hearing this one! I guess a simple tug of the sarcomeres, which are basic units of contraction within muscle fiber and lies between the thin and thick myofilaments, adequately prepares someone for a hellish

workout? Well let's continue to delve into what is happening at the cellular level during a stretch, shall we?

During a stretch, the area of overlap between the between the contractile proteins, or myofilaments, decreases, thus allowing the muscle fiber to elongate. When the muscle fiber achieves its maximum resting length, or when all of the sarcomeres are fully stretched, additional stretching via Proprioceptive Neuromuscular Facilitation and Ballistic stretching, which will be discussed in subsequent articles, places force on the surrounding connective tissue (ligaments and tendons). This force permits the full stretching of each individual muscle fiber within the muscle being stretched. However, in order for one to reap the benefits from stretching, one must make sure that the stretched muscle return to its proper resting length. Stretching can become problematic when one hasn't properly warmed up, or when they take the stretched muscle far beyond its maximum resting length.

Stretching, in conjunction with a cardiovascular warm up - which will increase body temperature and facilitate blood flow, will in most cases, serve as an adequate preparation for most exercise session. Stretching alone will not suffice, especially static stretching.

Improper stretching, which includes stretching excessively and / or beyond one's natural range of motion will, undoubtedly, make a person more susceptible to injury (1). So while it may feel good - especially when a hearty yawn accompanies, stretching may become detrimental if performed too much. It should also be noted that stretching must be appropriate for the intended demand, either sport or activity (1), so stretching protocols must be individualized. The article points out sports such as soccer and American football, require "a muscle-tendon unit that is compliant enough to store and release the high amount of elastic energy that benefits performance in such sports." Conversely, activities conducted at significantly lower intensities and at longer durations (i.e. jogging, cycling, and swimming), require less intense stretching. The study also found that stretching alone does not prevent injury in these activities.

On a side note, hot showers will only exacerbate the body's inflammatory process following injury or activity.

The third statement is the most true, but not entirely true. I know you're probably having a flashback to the NSCA CSCS exam or the MCATs (provided you were smart enough to survive pre-med classes), but let me first apologize for the ambiguity, and second, give me the chance to answer.

Stretching will indirectly improve flexibility, it will however, help improve extensibility. Extensibility in soft tissues is related to the resistance of tissue as it lengthens (2). And as we should know and mentioned earlier, a muscle lengthens during a stretch. A muscle that lengthens with less resistance is termed to be more compliant, resistance to stretching depends largely on mechanical and neural factors (2). If you have poor soft tissue quality – tight, overactive muscles rife with fascial adhesions and if you lack sufficient neural and neuromuscular efficiency you definitely won't be flexible. You can bang out all the

butterfly and hurdler stretches you want, but you won't be doing much to improve flexibility, that is, if you can even assume both of those positions in the first place! Simply stated, flexibility requires extensibility and that's only achieved once the aforementioned "mechanical and neural factors" are addressed.

Now it's time to tell every gym teacher I've had, to shove it! Retrospectively, had I never performed static stretches, I would've posted a Jordan-esque 30 ppg and smoked 90% of my classmates in the mile, while my gym teacher watched from the parking lot, choking on his soggy Newport in disbelief. Okay, not quite. But still, let me ream off a laundry list of studies that show that static stretching does squat when it comes to improving performance.

- Researchers at the University of Western Australia, School of Sport Science found that static stretching inhibited performance on both repeated sprint ability and change of direction speed (3).
- Australian researchers in an unrelated study found that warm-ups that included submaximum running and practice jumps (dynamic stretching) caused greater increases in performances than static stretching, by margins of: +3.2% in the drop jump, +3.4% in concentric jump height, +2.7% peak concentric force, and a staggering +15.4% improvement in rate of force developed (4).
- Italian researchers conducting a study on the effect of static stretching on leaping performance in rhythmic gymnasts, noted decreases in flight time and increased ground contact times in the group who statically stretched prior to performances. Static stretching also indirectly, yet significantly reduced ($p < 0.001$) the scores awarded by the judges (5).
- A study conducted by the Physiotherapy Department at the Kapooka Health Centre in Australia, which included 1538 participants from the Australian Army, noted that stretching protocols do not produce clinically meaningful reductions in risk of exercise-related injury in army recruits (6). In the study, 333 injuries occurred throughout 12 weeks of basic training, 158 injuries were sustained by members in the stretch group and 175 in the control group.
- Another study using military subjects showed that the injury rate in the static stretch group was not much lower than the group who did not stretch and did not prevent bone or joint injuries (7).
- Researchers found that static stretching may reduce endurance performance and running economy during endurance events (8).

Before this laundry list grows any larger, one should consider the benefits, or lack thereof, that accompany solely performing static stretches in athletic and active populations. If a trainee desires to perform static stretches, they may do so to attenuate eccentric exercise-induced muscle damage (9). Also, before the laundry list grows, I have a few things to toss in the dryer and for your information, that does not include my Fubu jerseys and Tech vests. They are getting dropped off at the Goodwill box, much like excessive static stretching from my workouts and hopefully yours too. Stay tuned for future editions of "Flexibility Considerations".

Until next time...

References

- Witvrouw E, Mahieu N, Danneels L. Stretching and injury prevention: an obscure relationship. *Sports Med.* 2004;34:443-449.
- McNair PJ, Stanley SN. Effect of passive stretching and jogging on the series elastic muscle stiffness and range of motion of the ankle joint. *Br J Sports Med.* 1996;30:313-318.
- Beckett JR, Schneiker KT, Wallman KE. Effects of static stretching on repeated sprint and change of direction performance. *Med Sci Sports Exerc.* 2009;41:444-450.
- Young WB, Behm DG. Effects of running, static stretching and practice jumps on explosive force production and jumping performance. *J Sports Med Phys Fitness.* 2003;43:21-27.
- Di Cagno A, Baldari C, Battaglia C. Preexercise static stretching effect on leaping performance in elite rhythmic gymnasts. *J Strength Cond Res.* 2010;24:1995-2000.
- Pope RP, Herbert RD, Kirwan JD. A randomized trial of pre exercise stretching for prevention of lower-limb injury. *Med Sci Sports Exerc.* 2000;32:271-277.
- Amako M, Oda T, Masuoka K. Effect of static stretching on prevention of injuries for military recruits. *Mil Med.* 2003;168:442-446.
- Wilson JM, Hornbuckle LM, Kim JS. Effects of static stretching on energy cost and running endurance performance. *J Str Cond.* 2009;13 Herbert RD, Gabriel M. Effects of stretching before and after exercising on muscle soreness and risk of injury: systematic review. *Br Med Jour.* 2002;325:468.

About the author

Joe Giandonato is a Philadelphia-area healthcare professional and personal trainer, he holds an M.S. in Exercise Physiology and has nearly a decade of personal training experience. Presently, he trains clients at Broad Street Fitness in Philadelphia, PA.