Stretching Pre/Post Sports Event

By Joshua Morton, LMP, MAISS, MMLT

There has been much research about stretching and performance. Specifically, the discussion centers on whether it's a good idea to stretch before a competitive sports event.

The goal of flexibility training is to relax and create length in the muscles; however, this needs to be done in accordance with our natural physiological mechanisms. A better understanding of these mechanisms allows us to work *with* our body instead of telling our body what to do. It is also important to understand what effects different methods of stretching have on us. If we understand these things and the activities we are stretching for we can take care of our bodies safely and effectively without exposing ourselves to risk.

To reduce your chance of injuries you want to be certain of two things. Your joints need be flexible *and* stable. This means training your muscles properly. When it comes to stretching, your body reacts in very clear ways depending primarily on the length of time you hold your stretch. Your flexibility training should leave your muscles relaxed, but not inhibited. It is also essential to "quiet down" or eliminate the sensitivity of the muscle spindle cells. The spindle cells are like guards in the muscle bellies. As long as they remain on "high alert" the muscles cannot relax and lengthen safely. This will significantly impair your performance as well as making you prone to injury due to your muscles ability to lengthen when the need arises.

Current research takes into account various stretching modalities from static to dynamic, from passive to active. What has been found nearly across the board is that static (prolonged) stretching has a detrimental effect on performance. The main reason for this is that static stretching has an inhibitory effect on muscles. After roughly 30 seconds, the Golgi tendon organs inhibit the muscle, creating an inhibitory effect. Notice the word used is *inhibitory* not relaxing. There is a big difference between inhibition and relaxation when it comes time for your muscles to act. An inhibited muscle will be slow to react as opposed to a relaxed muscle being ready and able to work. Inhibition can lead to injuries in the muscles, tendons, ligaments and joints. This is especially true during athletic endeavors when movements are quick, powerful and often unpredictable. However it doesn't really matter whether you are in your kitchen cooking, or on the soccer field, an

inhibited muscle creates an unstable environment, setting you up for an increased potential of injury.

The research on dynamic stretching differs from static stretching. Dynamic is characterized by constant change and continual movement. In stretching it means that the stretch is never held for a long period of time, in fact the stretch is not held statically at all. The joint is in constant motion; the muscles are continually changing their length. What the research does show nearly across the board is that dynamic stretching helps to prepare the body for performance. There is no inhibition of the tissues following this type of flexibility training. Instead circulation and stability are increased due to the repeated active contractions. The type of dynamic stretching that has been studied so far typically puts a person through a series of *eccentrically* loaded positions. This is not purely stretching but rather a training of the muscle's ability to handle loads in different planes of movement.

With that in mind, dynamic stretching is not exactly like Active Isolated Stretching (AIS) but shares the similarity of active joint movements. Currently there are no *published* research studies specifically on AIS although they are in the works. What has prompted this research is the consistent and conclusive clinical evidence of the effectiveness of AIS. Another factor that fuels the interest and research is the evidence that is surfacing against static stretching being beneficial for sports performance.

Through clinical observations we can see clearly that AIS increases sports performance and provides an excellent warm-up and cool-down for any physical activity. AI Stretching is a completely different form of movement than "dynamic" and static stretching. First of all, AIS avoids eccentric loading of the joints and uses active muscle contractions to engage reciprocal inhibition, which relaxes the muscles in the most physiological advantageous manner possible. AIS is very specific, allowing us to focus on one muscle at a time, whereas most other systems overburden the nervous system with gross, multi-plane movements. In the AIS system, one muscle relaxes and stretches while the opposite one is contracted and strengthened. The muscle being stretched is only inhibited for a short duration, (1 ½ to 2 seconds) – not for an extended period of time. This short duration avoids triggering a complete inhibition of the muscle. As a result the muscle is lengthened and then allowed to shorten and relax again. Blood and lymph flow strongly back into the muscle and then you stretch again. Each repeated

stretch creates progressively more length in the tight muscle leading to a more relaxed state without creating any inhibition of the muscle. Inhibition is avoided by not triggering the Golgi organs. In addition it is also important to understand that holding a stretch for a short time prevents the muscle spindle cells from engaging and tightening the targeted muscle.

The active pumping action of AIS with short repeated movements creates a powerful vascular and lymphatic flush. The increase in circulation of blood and lymph to the targeted tissues infuses them with vital nutrients, which go deeper and deeper into the muscles as they open up with each repetition. The repeated pumping action prepares the muscles for action, making them relaxed, stable, and infused with everything they need for optimal performance. They are fully oxygenated - they are relaxed - they are ready to work.

If we take a closer look at the "dynamic" aspect of AIS, we can observe many positive physiological benefits. Active movement encourages better neurologic control by training the joint to move through specific ranges and planes of motion. With improved neurological activity, a muscle can respond more efficiently and appropriately to the action being asked of it. The repetitive retraining process also has a positive effect on proprioception, delivering new input to your brain as to where your joint is in time and space and what it can do. The end result is better coordination.

Taking everything previously discussed into consideration, we come to the following conclusion: Because of the tremendous flushing and pumping action of AIS on the tissues and joints, it is not only appropriate but also advantageous to utilize AIS before and after a sports event.

There are, however, a few important factors to consider. If you are competing in an event and have never been stretched according to the principles of AI Stretching, it is not a good idea to stretch immediately before an event. You may not have the time needed to integrate the work that has been done, leaving your body unaccustomed to new patterns of movement. This may throw off your game and create the potential for injury.

That said, if you have enough time to stabilize what has been loosened up and can regain balance through functional strengthening exercises, AI Stretching is a

perfect pre-event training even if your body is unfamiliar with this flexibility system. This type of stretching can even be done on the day of an event.

However, if you do not have the appropriate amount of time to prepare your body completely, it is not advisable to do AIS right before an event. Your body may not adjust quickly enough to the work you've done and you may be prone to injury due to the newly acquired ability of your joints to move.

Taking everything into consideration, it is ideal to start working with AIS protocols at least two weeks before an event.

If you are athlete preparing for a competitive event who is already accustomed to AIS, you will realize performance gains from pre-event AI Stretching and strengthening exercises specific to your sport. You will also suffer fewer injuries due to your preparations taken leading up to and just before your event

There are some exceptions to consider when working with athletes or preparing for your event. Runners and cyclists, for example, move in a linear plane and therefore will improve their performance even if they have never experienced AIS. The chance of their being "thrown off" or becoming more prone to injury is slim since their movements are not complicated and are usually not explosive. They can benefit from specific AIS exercises just before their event even if they have no previous experience with AIS. For example, stretching a runner's or cyclist's quads, hamstrings, calves, shoulders and neck before an event should increase their endurance without any of the undesired effects that may result from stretching someone unfamiliar with AIS.

The precautions about giving an athlete lead time to get accustomed to AI Stretching applies strongly to sports that utilize quick and/or complicated movements across several planes such as tennis, soccer, football, baseball etc. If you loosen up this type of athlete without allowing sufficient time for them to incorporate the changes before their event, their stride, their swing, their jump will be different. They may be prone to injury and their performance may decrease since they are not used to how their body moves. Even though their joints are more mobile and their functionality improved, they will require extra time to incorporate these changes before going back out on the field or court.

In general, if you can function smoothly and powerfully through your personal ROM, you are operating to your fullest potential. It is not "fluidity" of movement that is at issue; it is UNTRAINED movement that can cause injury. Full ROM without stability and balance can lead to injury. Training for full ROM with stability and balance increases performance without inflicting injury.

In conclusion, AIS is highly effective for improving performance and is in general a great warm-up for any physical activity. However, a period of adjustment may be necessary in preparing for a competitive sports event. Without stabilizing joints loosened by stretching, power is lost and the potential for injury is greater. Athletes need time to adjust proprioceptively and functionally to a greater range of movement achieved through AIS.

(Editorial contribution by Susan Guttzeit, LMP, MAISS)