

Proper Warm-Up and Stretching

Sponsored by MGH Sports Medicine and MGH Department of Physical Therapy

The Massachusetts General Hospital Sports Medicine Service and Department of Physical Therapy recommends the methods and strategies for preventing injuries and illness, and to help appropriately manage them if they occur. We hope that this short article contributed from MGH physicians, physical therapists, and athletic trainers that will prove informative for coaches, parents and players.

Warm-Up and Stretching: An Update

Warm-up and stretching exercises have long been considered to be an integral part of any exercise program or sport. While many consider stretching and warm-up to be the same thing they are not.

Warm-up exercises are movements and activities that *mimic* the movements that occur during any particular sport. These warm-up exercises, which gradually increase in intensity, are aimed at elevating muscle temperature prior to actual sport participation. They are also meant to improve flexibility, strength, endurance, and agility and minimize the risk of injury. While stretching exercises can be a part of a warm-up routine, stretching exercises alone should not be considered the actual warm-up for a sport.

Stretching exercises, completed as a part of a pre-exercise warm-up routine, have long been thought to decrease the chance of incurring an injury such as a muscle strain or "pull." Some recent studies and reviews in the health care literature however, suggest that for many sports, this may not be the case.^{1,2,3} Based on these reports, some researchers now even feel that stretching before exercise is probably unnecessary except for sports that require extreme flexibility such as dance, gymnastics and figure skating or sports that require a lot of starting, stopping and change of directions like tennis does^{4,5}. These researchers feel that the time spent on stretching may be better spent on a more thorough warm-up. In contrast other studies^{2,6}, including those specific to soccer⁶⁻¹¹ have demonstrated the positive benefits from stretching toward the prevention of muscle injuries.

Needless to say these conflicting reports have not only caused questions to be raised within the sports medicine community but also in the coaching community. While some of the recent studies published in the medical literature have not demonstrated that stretching and flexibility programs may have prevented or reduced the incidence of injury, few have shown that any harm has been caused from the performance of a stretching and flexibility program.

What should you do as a coach or athlete?

Having the appropriate amount of flexibility necessary for their chosen sport should still be a goal of all athletes. Stretching and flexibility exercises should still be part of an athletes training and discipline. Just like sport specific strength, co-ordination or skill, flexibility is governed by the "use it or lose it" principle. Good flexibility usually only comes with a good stretching program.

Each individual athlete differs concerning what they feel is necessary for stretching and flexibility. It is each player's individual responsibility to establish good training and injury prevention habits that they will carry through throughout their career. As players age and mature, they tend to develop a sense of what they need to do as an individual to feel "loose" prior to the start of play. For many players this is effective and beneficial, however, others can get stuck in a "habit" and not alter their warm-up and stretching routine as they age and mature. Without appropriate attention to their changing needs injury may result. If the athlete develops problems that are related to a lack of proper flexibility and warm-up, than further work on stretching with the coach or someone else (such as a physical therapist or athletic trainer) may be required.

Stretching Guidelines

The following are some suggested guidelines for all athletes. The purpose of this section is to provide a framework for a proper stretching program in conjunction with practice and pre-game warm-up activities.

1. Slow and Steady

- Start your flexibility program slowly and cautiously to avoid any chance of injury at the outset.
- Expect your progress to be slow but consistent
- Most stretching should be done slowly and avoid "bouncing" or quick stretching. While there is a place in athletic for quick, dynamic stretching this usually requires one on one guidance and program development with a coach, physical therapist or athletic trainer. This type of stretching is very sport specific for high velocity sports such as gymnastics, martial arts, hurdles in track and field or other similar activities.
- Hold stretches for 15-30 seconds each. Holding a stretch longer is not any more effective. This is however a very individual aspect to stretching and if you want to hold the stretch longer feel free to do so.
- The first 3-4 repetitions of any stretch you do are the most important. They are also the ones most likely to cause any soreness or injury so they should be done cautiously and carefully.
- The number of repetitions that are necessary to allow the athlete to feel "loose" and ready to go varies based on the individual.

2. Stretching Sequence

- *General Warm-Up*
As muscles contract and work heat is produced and the muscles temperature increases. This tends to make stretching safer and more effective. The general warm-up should consist of repetitive, non-fatiguing exercises of the muscle groups to be stretched. This could consist of easy jogging, side stepping, cycling for the legs and arm circles or gently swinging a bat or some other similar type of activity for the arms of a baseball player.
- *Pre-Participation Stretching*
Slow static stretching should now be incorporated as part of the practice or pre-game activities. Stretching exercises should be completed as described in #1 - Slow and Steady. Doing stretching at this time during the warm-up allows the athlete to capitalize on the

flexibility and muscle activity they have gained from the general warm-up as described above.

- *Neuromuscular Warm-up - Activity Simulation*

The purpose of this part of the warm-up is to begin to simulate the athlete's actual activity. The velocity of the activities and drills chosen, and the range of motion throughout which they are carried out should be progressively increased over a series of repetitions. The general warm-up and pre-participation stretching will enable the muscles and other tissues to tolerate the stress imposed on them during this phase of the warm-up and prepare the athlete stresses of practice or play.

- *Participation*

The athlete is now ready to practice or play the game in as safe a manner as is possible. While muscle strains and "pulls" could still occur, the coach and athlete have done as much as they can to attempt to minimize that chance.

- *Post-Participation Stretching - Cool Down*

After practice or game play, the muscles and surrounding tissues are at their highest temperature. Slow stretching should now be done again. Stretching at this time has two effects. First it will assist in further improving flexibility and second, it will assist in decreasing or preventing muscle soreness commonly present after strenuous activity.

When doing this, the muscle or muscle group to be affected should be maintained in an elongated position as the athlete "cools-down." This static stretch can assist in maintaining any flexibility gained.

There are many books available for the coach and athlete that demonstrate specific stretches for all muscle groups and sports. Two books that the coach and the athlete should consider purchasing are the following:

Sport Stretch by Michael J. Alter

Stretching by Bob Anderson

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