

Warm Up and Stretching: What every athlete should know

Stretching has been performed for many years as part of warm up procedures with the goal of preparing athletes for competition, and decreasing injury incidence. However, the preventative benefits of stretching are not as clear cut as trainers originally guessed. Although stretching may still be an important part of a training program for some athletes, in some situations, understanding when and why to stretch and what the effects will be is important in determining the best utilization of stretching interventions for individuals or groups of athletes. Additionally, regardless of stretching, warm up should be part of every athlete's pre-work out regimen.

Warm up

Warm up is an important component to physical activity to decrease the risk of injury. However, stretching may or may not be a part of every warm up. A general cardio vascular warm up should be followed by exercises which mimic the type of activities and joint ranges of motion required for the physical activity that the athlete is preparing for. For example, if there is running and cutting involved in the sport, then incremental speed and difficulty should be included for running and cutting drills as the body becomes warm. Requirements for jumping may include jumping exercises starting with small two and one foot jumps progressing to simple plyometric leaps and bounds in similar body positions to ones utilized in the given sport. Highly technical sports should include neuromuscular preparation mimicking the technique required to complete those skills in simplified drills. Below I have outlined two recent studies regarding warm up and injury reduction, and the impact of stretching on performance.

A recent randomized control trial including 1837 handball players ranging from 15 to 17 years of age found that an intensive warm up including running, cutting, landing, neuromuscular control, balance and strength with a focus on core stability and quality of movement (e.g. knee over foot with knee/ankle flexion). No stretches were included in the intervention protocol. Over the course of a season, there were significantly fewer injuries in the intervention group relative to the control group (who partook in their normal preparation for training/competition).¹

Regarding warm up procedures including stretching, related to performance, a group of 97 male rugby union players were randomized into warm up groups each performing a different type of stretching (ranging from passive to active stretching protocols). All groups performed a 10 minute jog followed two 20 meter sprints. Then, they repeated the two 20 meter sprints following one of the above stretching protocols. The two groups stretching statically significantly increased their sprint times, and one of the active stretching groups had a significant decrease in sprint time. The decrease in the sprint performance following static stretch was attributed to increase in the musculotendonous (MTU) unit compliance and a subsequent decrease in ability to store elastic energy during eccentric contraction. The increased performance in one of the active stretching groups is not clearly understood, but may have been related to rehearsal of movement patterns.²

Specific Effects of Stretching on Performance

A recent review article on stretching outlines many of the impacts of stretching both in the acute phase post stretching and the effects of regular stretching. A 2-5% decrease in strength and power output follows an acute bout of stretching.³ To a recreational athlete, the difference should be insignificant, but for elite competition may have considerable impact on results. Another recent review article has clearly stated (in support of previous research) that acute bouts of stretching immediately before exercise do not decrease risk of injuries.⁴

Regular stretching may in fact increase strength and power over the course of multiple weeks in similar amounts to the decreases in strength seen immediately after stretching (2-5%).³ It is also possible that there may be a decrease in chance of injury associated with regular stretching.³

To Stretch or not to Stretch...

Warm up in some form related to the physical activity to follow should initiate training sessions and competition. The goal of warm up should be to increase blood flow to working muscles, and prepare MTUs for activity in the ranges of motion, and across the spectrum of stressors seen in the technical aspects of the given sport. Neuromuscular and psychological preparation as well as strategic preparation may also be important dependant upon the sport.

Stretching is an important component of physical activity and health. In order to gain significant benefits in strength and power, and decrease risk of injury, research suggests that it must be done regularly. It does not however act to decrease injuries when performed immediately before exercise, and may impact negatively upon performance immediately following stretching. Since there are quantifiable benefits to stretching yet may not be best utilized as a warm up, it may be most logical to practice regular stretching immediately following exercise when the joints and MTUs are well warmed up and maximal strength and power is no longer required in the immediate time following.

¹ Odd-Egil Olsen, Grethe Myklebust, Lars Engebretsen, Ingar Holme, Roald Bahr. Exercises to prevent lower limb injuries in youth sports: cluster randomised controlled trial. *British Medical Journal* 2005;330:449-; originally published online 7 Feb 2005

² Fletcher, Iain M, Jones, Bethan. The effect of different warm-up stretch protocols on 20 meter sprint performance in trained rugby players. *Journal of Strength and Conditioning Research* 2004;18(4): 885-888

³ Shrier, Ian. When and Whom to Stretch: Gauging the Benefits and Drawbacks for Individual Patients. *The Physician and Sportsmedicine* 2005; 33(3)

⁴ Thacker SB, Gilchrest J, Stroup DF, et al: The impact of stretching on sports injury risk: as systematic review of the literature. *Medicine and Science in Sports and Exercise* 2004; 36(3): 371-78