

A Missing Link for Preventing Overuse Injury

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Every sports fan continually reads about their favorite athletes getting injured. Every team has a list of players on the disabled list. While there is a great deal of research promoting stretching and strengthening for injury prevention, there is conflicting opinion as to its validity. In a review of the literature to determine the effects of stretching - before and after exercising - on muscle soreness, risk of injury and athletic performance, the results did not prove favorable.¹ The authors stated further research was necessary.

Research suggests stretching, which increases flexibility beyond that needed for sport-specific movements, might cause injury. Increasingly, range of motion beyond function through stretching is not beneficial and actually can cause injury and decrease performance. General fitness, rather than stretching, might be a more important risk factor in injury prevention.²

Woods, et al., disagreed with the above and found that certain techniques and protocols have shown a positive outcome on deterring injuries. They found that a warm-up and stretching protocol should be implemented prior to physical activity. The routine should allow the stretching protocol to occur within the 15 minutes immediately prior to the activity in order to receive the most benefit.

Witvrouw, et al., seem to have resolved the controversy.⁴ They state that no scientifically based prescription for stretching exercises exists and no conclusive statements can be made about the relationship between stretching and athletic injuries. They feel that whether stretching will prevent injury depends on the particular sport. Sports such as soccer and football that call for bouncing and jumping require a high amount of elastic energy and utilize a high intensity of stretch-shortening cycles (SSCs). This requires a muscle-tendon unit capable of storing and releasing a high amount of elastic energy. If the demands in energy absorption and release rapidly exceed the capacity of the muscle-tendon unit, there might be an increased risk for injury. Stretching that helps to increase the viscosity of the tendon makes it more compliant, especially in sports requiring high-intensity SSCs, and might, therefore, prevent injury.

Stretching may be of limited or no benefit in sports such as jogging, cycling or swimming since these types of activities are of low intensity (limited SSCs). In these sports, most of the power generation is a consequence of active (contractile) muscle activity transferred through the tendon to the joint. In this case, a more compliant tendon might not be advantageous. Witvrouw, et al., state that stretching has no beneficial effect on injury prevention in these sports.⁴

Gremion agrees, stating that sports requiring increased flexibility (such as gymnastics, dancing or diving) might require pre-exercise stretching to optimize the level of performance, while sports with a slow stretch-shortening cycle would not benefit from stretching.⁵

In a recent randomized controlled trial, 1,020 Army recruits were given five exercises for strength, flexibility and coordination to prevent the most common overuse injuries (patellofemoral pain

syndrome, medial-tibial stress syndrome and iliotibial-band friction syndrome) that occur during the three months of basic training.⁶ The exercises were based on the intrinsic risk factors regarding these conditions. They were performed for 15 minutes duration, three times a week for 12 weeks. Exercises attempted to improve risk factors such as quadriceps flexibility, quadriceps and lower extremity strength, hip external rotation, hip flexion, hip abduction strength, knee-over-toe control and tibialis anterior strength. The exercise loads were progressively increased. This exercise protocol did not reduce the risk of injuries.

Buist, et al., conducted a study on novice runners to determine whether increasing the volume of exercise (graded-training group) over time would reduce the risk of an overuse injury as compared to the standard-training group.⁷ It was thought the body would adapt more gradually to the external impact forces of running in the graded-training group and, therefore, have less running-related injuries. However, the incidence of running-related injuries was not decreased by the graded-training group.

So, it appears some stretching and strengthening might help, and some stretching and strengthening might be useless. Strengthening tight tissue increases the tightness. A missing link in all of these stretching and strengthening studies is determining the status of the tissue before the exercises are recommended.

A perfect example is the recent quadriceps strain by Alex Rodriguez, the \$28-million-a-year third baseman for the New York Yankees. For no apparent reason, "A-Rod" strained his quadriceps. No one will question his work ethic regarding strengthening and stretching. What must be questioned is whether his quadriceps were ever evaluated regarding their intrinsic flexibility, their relation to his hamstring flexibility and the status of his myofascial-system (kinetic chain) relationships.

Possibly more important is the necessity to localize individual nodules or fascial restrictions that affect total function. Stretching exercises cannot release many of these localized lesions. Palpation, especially the use of instrument-assisted soft-tissue palpation such as Graston Technique, could determine the intrinsic soft-tissue restrictions that will prevent normal stretch and contraction and allow excessive overuse to occur. Evaluation of hip and lower-extremity rotators also might point to the quadriceps.

Just because an athlete appears to have a normal range of motion does not determine whether the total complex is normal. The missing link might be identifying and releasing local areas that stretching can never free up. Prevention should begin by evaluating and treating the intrinsic restrictions within the myofascial complex.

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