

Warm-Up and Stretching

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Most coaches do not question the wisdom of warm-up prior to training. There are many reasons for warming up before training, but the area to benefit the most from the warm-up is muscle in general -- skeletal and heart muscle in particular.

Warm-up and the heart.

The heart is your most aerobic tissue. While physical training does a little to improve the pump function of the heart, training really improves how the body uses blood (and oxygen) effectively reducing the work required by the heart. The heart is very good about matching oxygen supply to itself and oxygen required by its cells. If oxygen demand is greater than oxygen supply, the heart is ischemic. Research on adults (this has not been explored in children) has shown that intense exercise in the absence of warm-up can cause the heart to become ischemic, but with warm-up, the same exercise does not produce ischemia. The reasons for this are very complex.

This tip is for you coaches. Don't go out and work hard with your players without warming-up first. This is hard on your heart.

Warm-up and the muscles.

Skeletal muscle is what most people consider to be benefited by warm-up. Players and coaches correctly believe that warm-up helps prevent muscle strains ("pulls"). Most researchers think a strain occurs when muscle is lengthened and then is activated while it is still lengthened: you reach wide for a tackle (stretch the groin), then you have to contract your leg muscles upon contact (muscle activation). When studying animals, the muscle is stretched, then activated until muscle failure (a strain). However, if the muscle is warmed by as little as 1°C, the length the muscle can be pulled prior to failure is greater; on the field that means that same reach for a tackle doesn't cause a strain.

The question of proper warm-up has been debated for years. For the longest time, stretching was an integral part of warm-up. More recently, we have learned that a warm muscle responds to stretch better than a "cold" muscle. Thus, the current suggestion is to do light physical activity to increase body temperature (to the point where sweating begins is a good marker), then do the stretching. Another excellent time to do stretching is after the workout. This lets the muscles take advantage of the warm body temperature and also allows the body temperature to slowly return to pre-exercise levels. Coaches have their preferred stretching exercises. How you do them is another matter. How many repetitions of a stretch for how long is enough? Again, we go to the lab and look at animals. Research shows that the greatest increase in muscle length occurs in the first 4 stretches. Also, little increase in muscle length occurs after holding a stretch for 30 seconds.

For an effective stretching workout, hold each stretch for 30 seconds for up to 4 repetitions of each stretch. In soccer, the most commonly strained muscles are in the thigh. Concentrate your efforts on the middle muscle in the front of the thigh (rectus femoris), the hamstrings (back of the thigh) and the groin.
