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Elastic Muscle

The length of your bones is set by your genetic heritage and childhood nutrition. It cannot be altered, except by arduous, long-term surgery and drugs. But the range of motion of your limbs and spine is determined more by the habitual movements you make. It can be improved dramatically by simply changing those movements.

Knowing how to improve your range of motion is crucial to athletic power. The length of your stride, the degree you can bend and twist without strain, the arc through which you can move your arms, even your speed of movement, all depend on the flexibility of your joints and the length and elasticity of your muscles. Muscles cannot apply their full power unless you can move limbs freely throughout their full range.

We all know well how a stiff neck or back or shoulder restricts our movements. Yet many athletes we ask, don't make the mental connection between the temporary limits imposed on movement by stiff muscles and joints, and the permanent limits imposed on performance by poor flexibility.

Most athletes do stretch, but often in a perfunctory or incorrect way, and with only a vague notion of the benefits. Many consider stretching an unimportant part of their training. I hope to convince you otherwise because, without good flexibility, you will ***never*** be able to apply your full power.

Stretching Prevents Injury, Boosts Speed

Some research shows little benefit from stretching. But when you examine the stretching programs used they are ***pathetic!***.[1,2] And that's being kind. Controlled studies using decent stretching programs all show substantial reductions in muscle and connective tissue problems and more rapid healing of injuries.[3-6]

Numerous studies show that flexibility training also increases speed of movement. Why this is so was unclear until recent research by Terara et al at Kyoto University in Japan. They showed that flexibility training enables movements to be made with less energy.[7]

Important work by Wilson at the University of New England in Australia shows why flexibility reduces the energy required to move. Muscles that are more flexible show greater use of what is called **elastic strain energy**.[8] In practical words, you go off like a stretched rubber band.

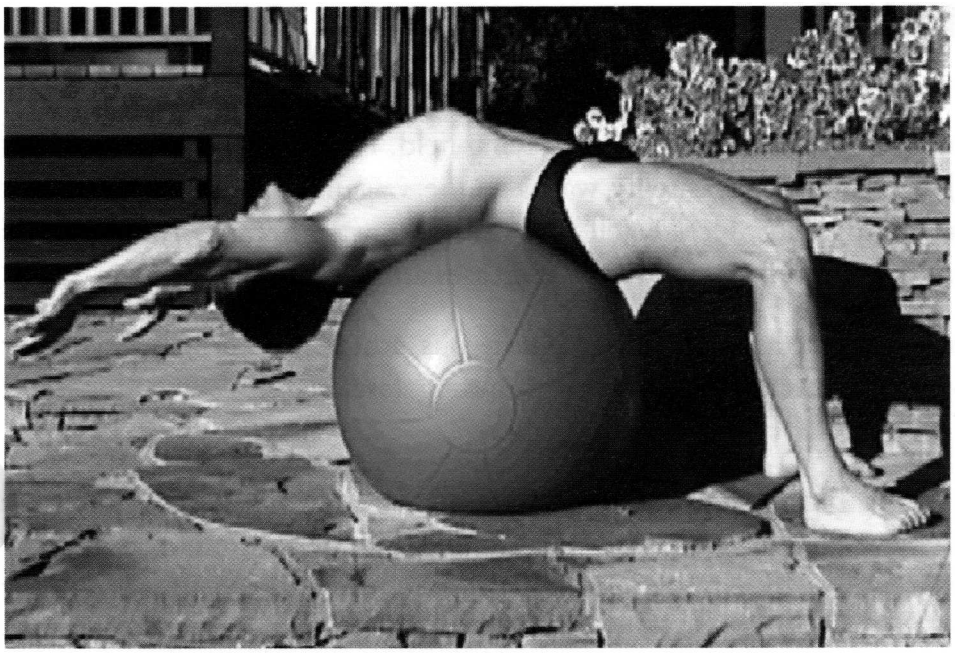
You will learn more how stored elastic energy boosts speed of performance when you read The Vital Link in Chapter 25 and Plyometrics in Chapter 26. Anything that adds to your speed gives you a big edge on power.

Range Of Motion Boosts Power

The increased power of movement resulting from flexibility training is further enhanced by increased range of normal motion. In a representative study, Hortobagyi and colleagues at the University of Physical Education in Budapest, Hungary, trained healthy students in stretching, three times weekly for seven weeks. They used six exercises for stretching quadriceps, hips and hamstrings. Subjects were then tested for flexibility. The distance that subjects could stretch in front-to-back splits, for example, increased by an average of 9.5 inches for each leg, a total of 19 inches.[9]

At the Colgan Institute, we have improved the power of many runners by increasing the flexibility of their quadriceps, hips and hamstrings. Over our 8-week Extension-Connection Cycle, flexibility in the front-to-back splits improves by up to 12 inches for each leg, a total of 24 inches. This improvement translates into a passive increase in normal stride length of up to 4 inches.

Such an increase in stride length makes a big difference to performance. Here's a prime example from our files. The records show a runner who had a stride length of 53 inches before the stretching program, and a more powerful stride length of 56.8 inches after 8-weeks of



Michael Colgan demonstrating an abdominal stretch on the Swiss ball.

stretching. Before the program, we counted his strides in two 10Ks with a pedometer. He required an average of 7,417 strides to complete the race. After the stretching program, he completed a10K in 6948 strides, 469 fewer strides. Compared with the distance covered with his former stride length, that's an improvement of 633 meters.

Some coaches have criticized findings like these, saying that, though the stride is longer it is also slower, because the leg has to move a greater distance. Not so. As the studies above indicate, the lesser energy cost per stride enables the leg to move at a greater speed for a given level of energy. So the cadence or leg turnover speed of runners on stretching programs does not decline. And running times often improve dramatically.

For the runner noted above, his 10K time had been stuck between 40 and 41 minutes for a year, with a personal best of 40:02. Over the next six months he continued stretching and we used the pedometer to count his strides in several 10K races. He took 6923 – 7160 strides. Compared with his old stride, he gained between 400 and 700 meters in a 10K. His personal best time improved by a whopping 2:05 to 37:57.

Despite such findings, gym programs rarely work with range of motion as a component of athletic power. But that's going to change fast. Leading the charge is the Les Mills Bodybalance Program from New Zealand, which uses an integrated combination of yoga, balance and stretching exercises.