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Protecting The Knee

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According to the NCAA's Injury Surveillance System, the knee has been one of the top two most often injured bodyparts in wrestling (the other being the shoulder). Moreover, the knee is the most common site of injury that requires surgery. Increasing the strength of the muscles surrounding your knees can lower your risk of sustaining an injury while wrestling. In addition, several precautions and guidelines can be used to ensure that the strength training program itself doesn't predispose you to a knee injury and is as productive as possible.

THE KNEE JOINT

Technically known as a "diarthrodial hinge joint," the knee is the largest and most complicated joint in your body. The knee joint has three articulations (or points where bones are in contact): two tibio-femoral joints and the patellofemoral joint. The former is an articulation of your tibia (the large bone in your lower leg) and

femur (the large bone in your upper leg); the latter of your patella (your kneecap) and femur.

Various tendons, ligaments and cartilages support and protect the knee. These connective tissues include the patellar tendon, collateral ligaments (medial and lateral), cruciate ligaments (anterior and posterior) and mensci (medial and lateral).

MUSCLES OF THE KNEE

Twelve muscles influence your knee joint, primarily your hamstring and quadricep groups (which account for a total of 7 of the 12 muscles).

Hamstrings

Your hamstrings or "hams" are located on the backside of your upper leg and actually include three separate muscles: the semitendinous, semimembranosus and biceps femoris. Together, these muscles are involved in flexing (or bending) your lower leg around your knee joint (raising your heel toward your buttocks) and in hip

extension.

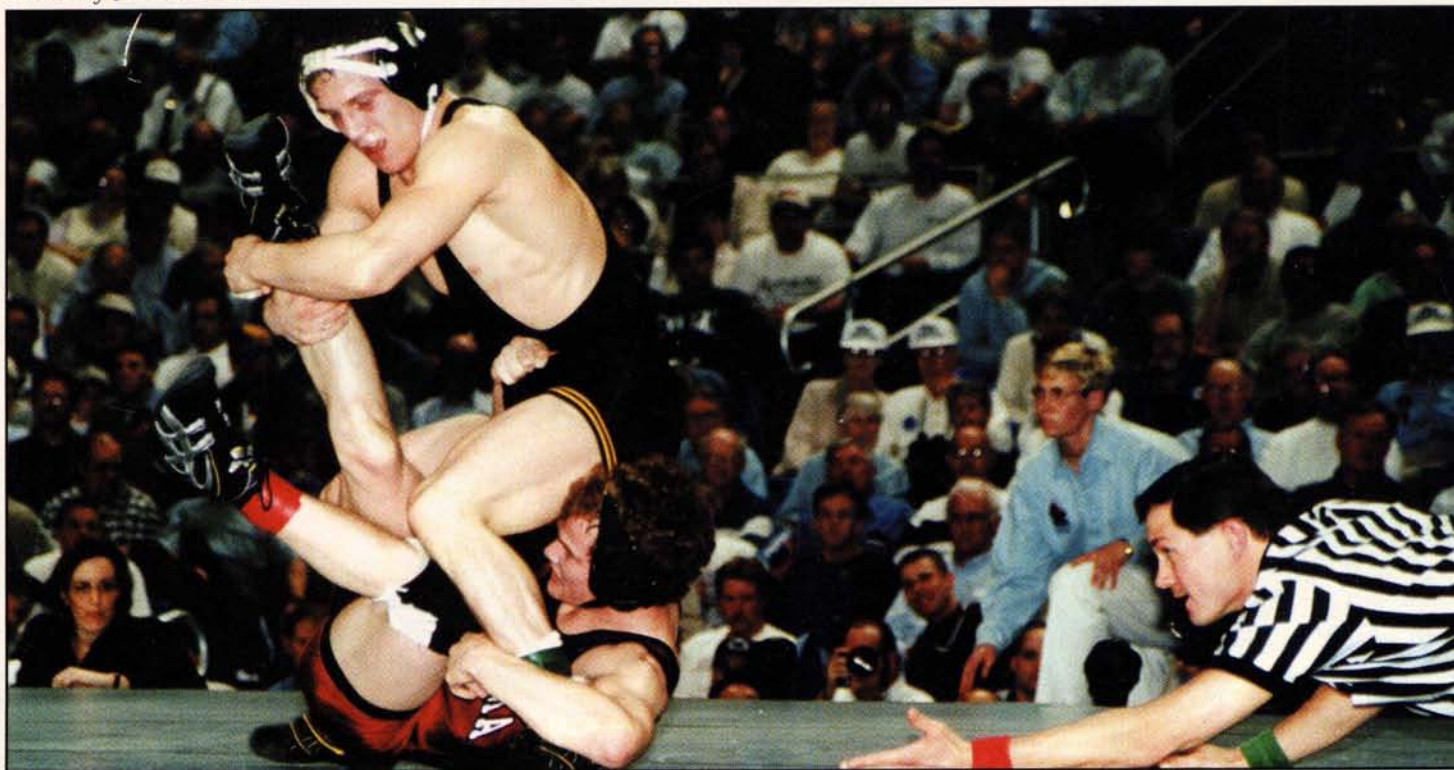
Quadriceps

Your quadriceps or "quads" are the most important muscles on the front part of your thighs. As the name suggests, the quadriceps are made up of four muscles. The vastus lateralis is located on the outside of your thigh; the vastus medialis resides on the inner (medial) side of your thigh above your patella; between these two thigh muscles is the vastus intermedius; and, finally, laying on top of the vastus intermedius is the rectus femoris. The main function of your quads is extending (or straightening) your lower leg at the knee joint.

KNEE EXERCISES

Multiple-joint movements for the lower body -- such as the deadlift, squat and leg press -- are important because they address a large amount of muscle mass, including the hamstrings and quadriceps. The best way to provide direct stimulation for these muscles, however, is to perform

1999 NCAA Division I Wrestling Championships. 141 lb. finals, Doug Schwab, Iowa, decisioned Michael Lightner, Oklahoma, 4-2. Photo by Jack Stanbro.



single-joint or isolation movements. There are two main single-joint movements that can be used to isolate the hamstrings and quadriceps using conventional equipment:

1. Leg curl. This is the best movement for isolating your hamstrings. You can perform this exercise sitting, standing or laying prone using a machine (either selectorized or plate-loaded) or manual resistance.

2. Leg Extension. You can isolate your quadriceps with this movement. This exercise can be done on a machine (either selectorized or plate-loaded) or with manual resistance.

GUIDELINES AND PRECAUTIONS

Sometimes the strength training program is the genesis of knee problems and may actually predispose you to an injury.

The following precautionary measures can lower that risk while making your workouts more productive:

1. Perform 1 - 2 multiple-joint movements for your lower body 2 - 3 times per week. Multiple-joint movements incorporate an integrated effort of several major muscles.

2. Avoid doing "full" squats with a barbell. If you prefer to do this movement, do not squat down to a point where your hips are near your ankles. Squatting this deeply increases the stress placed upon the knee ligaments and cartilage. If you do barbell squats, limit your range of motion such that in the bottom position your upper legs are roughly parallel to the ground. Remember, too, that barbell squats are contraindicated for those with low-back pain.

3. Do single-joint exercises for your hamstrings and quadriceps. Only through single-joint movements can these muscles be targeted directly.

4. Do exercises for your hip area before those for your hamstrings and quadriceps. Here's why: Multiple-joint movements require the use of smaller, weaker muscles to assist in the exercise. (As a rule of thumb, the legs are the weak link when performing multiple-joint movements for the hips and the arms are the weak link when performing multiple-joint movements for the upper body.) If you fatigue your smaller muscles first -- in this case, your hamstrings and quadriceps -- you'll weaken an already weak link. As a result, you'll limit the workload placed on the larger, more powerful muscles of your hip region and restrict the potential for their

development.

5. Provide equal attention to your hamstrings and quadriceps. These muscles -- as well as all others in your body -- are arranged in such a way that they perform opposing functions: Your hamstrings flex your lower leg and your quadriceps extend your lower leg. When one muscle acts in opposition to another, it is referred to as an "antagonist." It is important to provide antagonistic partnerships with an equal -- or nearly equal -- amount of work so that there isn't a muscle imbalance between the two areas. In particular, the hamstrings are very susceptible to pulls and tears. Strong hamstrings are necessary to balance the effects of the powerful quadricep muscles. Therefore, you should perform approximately the same volume -- that is, frequency of training, number of exercises, sets and repetitions -- for your hamstrings as you do for your quadriceps.

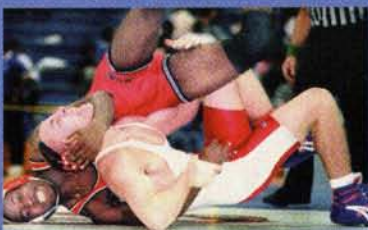
In this way, you will (1) target the two major muscles that effect your knee joint -- your hamstrings and quadriceps -- in a direct and balanced manner; (2) avoid overtraining your quadriceps (assuming that other exercises in your program offer a minimal amount of indirect work for that muscle); and, most importantly, (3) protect your knees against injury.

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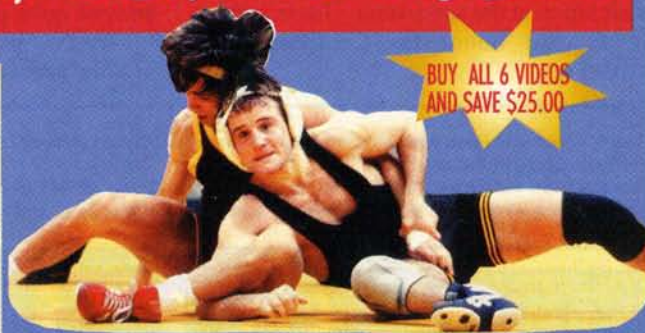
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