Dynamic Chiropractic

SPORTS / EXERCISE / FITNESS

Sports Update

This month, we will investigate some studies that attempt to answer the following questions:

- What are the intrinsic risk factors for the development of anterior knee pain in the athletic population?
- Does crossover training have any benefit in ankle rehabilitation?
- What are the most frequent injuries seen in high-school wrestling?

Witvrouw E, Lysens R, Bellemans J, et al. Intrinsic risk factors for the development of anterior knee pain in an athletic population: a two-year prospective study. *American Journal of Sports Medicine* 2000;28(4):480-489.

Many factors have been associated with the development of patellofemoral pain. This syndrome is relatively common in the younger population (as high as one out of four encounter it in the non-athletic population, and more in the athletic population). It is characterized by retropatellar pain that is most apparent with certain activities like jumping, squatting, sprinting, walking, or running up or down stairs.

This study is unique in several ways: First, it is prospective and uses both men and women with a mean age of 18 years. Second, it measures a significant number of variables. Over a two-year period, 24 out of 282 students enrolled in a physical education program developed patellofemoral pain. It appears from this study that several consistent factors contributed to the development of this problem:

- a shortened quadriceps (measured by goniometer/range of motion testing);
- an altered *vastus medialis obliquis* muscle reflex response time (measured with EMG and the subject's response to a knee-jerk test);
- decreased explosive strength test results (measured with a vertical jump test); and
- a hypermobile patella.

All of these factors seem to be affected in individuals who developed patellofemoral pain over a two-year period. The authors suggest that perhaps a decrease in strength of the quadriceps and/or hamstrings is not enough to cause patellofemoral pain unless associated with a decreased explosive strength, or other factors mentioned above.

Uh BS, Beynnon BD, Helie BV, et al. The benefit of a single-leg strength training program for the muscles around the untrained ankle: a prospective, randomized, controlled study. *American Journal*

of Sports Medicine 2000;28(4):568-573.

The ankle is the most commonly injured joint in athletics, accounting for as much as 25% of time lost to injuries in running or jumping sports. Although it has been recognized for some time that there may be a cross-training effect with extremity exercise, it has not been applied in a randomized controlled trial for ankle rehabilitation. This crossover training effect occurs when one limb is exercised and the non-exercised limb demonstrates an improvement in strength (although with smaller gains than the trained limb).

This is an interesting study in that 10 subjects were each given a training program for the ankle using plantarflexion/dorsiflexion and inversion/eversion, consisting of isokinetic exercises performed in both concentric and eccentric modes. Five subjects each trained their dominant ankle, while the other five each trained a non-dominant ankle (determined by pre-training isokinetic measurement). The training occurred three times per week for eight weeks.

Subjects who each trained their dominant leg improved peak torque values (PTV) 8.5% in the trained leg and 1.5% in the untrained leg. Subjects who each trained the non-dominant leg improved PTV by 9.3% in the trained leg and 3.5% in the untrained leg. Improvements were as high as 40% peak torque, with a crossover increase of 19% in the untrained leg in eccentric inversion. No significant improvements were found in the control group who did no training exercise during this same period. These findings suggest possible strategies for early rehabilitation of ankle sprains using the uninvolved ankle first.

Pasque CB, Hewett TE. A prospective study of high school wrestling injuries.*American Journal of Sports Medicine* 2000;28(4):509-515.

Four hundred and fifty-eight male wrestlers from 14 high schools were used in this study. Preseason screening was used for baseline information; the wrestlers were followed through training and competition for one full season. There were 219 injuries in the 458 wrestlers, with an incidence of 52 injuries per 100. Not surprisingly, the shoulder (24%) and knee (17%) were the most commonly injured joints.

Interestingly, wrestlers who were older and had more experience had the highest injury rates. Sixty-three percent of injuries occurred in practice, although the injury rate was highest during competition. The most common wrestling scenario was injury subsequent to the "takedown" position (68%). More strenuous wrestling during practice also carried a higher incidence (68%) of injury.

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