



Physical Therapy Associates of Schenectady, P.C.

subjects participated in traditional warm up exercises or a sports specific training program. The program consisted of education, stretching, strengthening, plyometrics, and sports specific agility drills designed to replace traditional warm up routines.

During the first season there was an 88% reduction in ACL injury versus the control group. In season there was a 74% reduction. The authors concluded that using a neuromuscular training program may have direct benefit in decreasing the number of ACL injuries in female soccer player.

Training Program in Preventing Anterior Cruciate Ligament Injuries in Female Athletes.2-Year Follow-up.
Mandelbaum, BR etal *American Journal of Sports Medicine* 2005 (33)

Physician submissions are greatly appreciated. If you would like to contribute to this newsletter please email the editors @ ptrotterdam@aol.com. Submissions are also prominently featured on our website for up to 3 months.

Effectiveness o a Neuromuscular and Proprioceptive

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Evidence for Physical Therapy

ACL Tears in Female Athletes Submitted by Dr. Eric Aronowitz

The ACL is the primary restraint to anterior translation of the tibia on the femur. When the ACL is torn, activities that require running, jumping, twisting, turning, acceleration, deceleration, are difficult to do. If a patient with an ACL deficient knee remains active and has persistent episodes of instability they will develop meniscal tears and arthritis within 15 years. In an active individual who is unwilling to change their lifestyle, an ACL reconstruction should be performed.

ACL tears are 4-6x more common in female athletes. The increased risk of ACL tears in female athletes along with an increased participation in athletics has led to a rapid rise in ACL injuries in female athletes. The reason for this gender disparity is multifactorial and is just becoming more understood.

Anatomical differences between males and females can play a role in the increased risk of ACL injury in female athletes. Females

typically have a wider pelvis which increases valgus alignment of the lower extremity. Females can also have a tighter intercondylar notch. These two differences place the female athlete at greater risk of ACL injury. Hormonal changes during the ovulation cycle has also been linked in some studies to higher rates of ACL injuries. These studies have shown a higher risk during the luteal phase of the ovulation cycle.

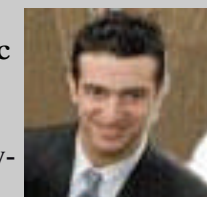
Neuromuscular imbalances which occur after puberty in female athletes can also lead to an increased risk of ACL tears. After puberty, males become disproportionately more powerful, whereas females become proportionately more powerful and do not experience a "neuromuscular growth spurt". This leads to increased stresses on the joints and ligaments and puts the female athlete at higher risk of ACL injury.

Neuromuscular imbalances can be broken down

into four categories. *Ligament dominance* occurs because the knee acts as a ball and socket joint. This results in more stress transferred to the ligaments rather than the muscles. Females tend to be *quadriceps dominant* and therefore land from jumps in relative extension putting increased stress on the ACL. Female athletes tend to fa-

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Union College and several local high schools. He is a member of the American Academy of Orthopaedic Surgeons, American Orthopaedic Society for Sports Medicine, and the Arthroscopy Association of North America. He is a fellow of the American Board of Orthopaedic Surgery. Areas of interest include: Sports medicine, shoulder/knee surgery, arthroscopy, and general orthopedics

ACL Tears in Female Athletes (cont.)

(Continued from previous page)

favor one leg and this leads to *leg dominance*. This puts the contra lateral knee at increased risk of ACL injury. Lastly, females tend to have less *trunk stability*. This leads to poor positioning of the lower extremity and increased force and torque on the knees increasing the risk of ACL injury.

ACL injury prevention is a hot topic in orthopedics especially in regards to the female athlete. Injury prevention focuses on those factors which we can change, and neuromuscular training techniques have been developed for female athletes to try and lessen their risk of ACL Injury. These training techniques have been proven in several studies to decrease the incidence of ACL injuries in female athletes. There are 4 essential components to neuromuscular training programs: biomechanical and feedback techniques, plyometrics, core stability training, and strength training. **Biomechanical Training** teaches females to use their knees as a “hinge joint” rather than a “ball and socket joint”. This tightens up the joint and addresses the issue of ligament dominance. **Plyometrics** is used to increase hamstring recruitment and strength. This is done through deep flexion drills and addresses the issue of quadriceps dominance. **Balance Training** starts proximally at the hips and trunk and works distally. This teaches athletes to land with equal stress on both legs, addressing leg dominance

Core Stability Training takes into account proprioception, strength, and stability training. Core strengthening takes stress away from the knees, transferring it to the core and addresses the lack of trunk stability in female athletes. O

be effective, these programs need to be fast paced, sports specific, and provide immediate feedback to the athlete in regards to posture, position, and balance.

Consultation with a certified athletic trainer or physical therapist can help female athletes become more educated about their risk of ACL injury and also help them set up a neuromuscular training program which is specific to their sport.

Exercise and Distress: The More the Merrier

by Dennis Judd PT, Cert. MDT

Researchers have found that any form of physical activity is associated with decreased psychological distress.

842 Men and women were asked to self report their activity level and the General Health Questionnaire were administered.

Various forms of physical activity all had a positive impact on reducing levels of distress. The researchers found that sports related activity had the strongest positive effect but activities like gardening and housework were also of benefit.

The amount of activity also had an impact. As little as 20 minutes a week of activity has a positive effect but the greater volume of exercise resulted in more substantial improvements.

Dose Response Relationships Between Physical Activity and Mental Health: The Scottish Health Survey. Hammer M. et al *British Journal of Sports Medicine* - 2009 v43 1111-1114

Non-Weight-Bearing Exercise to Improve Pain and Function in Patients With Knee OA

By Kevin McLaughlin MS,PT

Two different non-weight-bearing exercise regimens, proprioceptive training and strength training were evaluated for clinical and functional efficacy for patients with knee osteoarthritis (OA).

Individuals with OA are often exposed to both interventions. Exercises in weight bearing are generally recognized in the clinical setting. However, exercising in standing may aggravate symptoms in patients with OA.

Patients in the study were randomly assigned to the proprioception (PrT) group, strength training (ST) group, or no exercise (control group). Both PrT and ST interventions consisted of non-weight bearing.

Both PrT and ST significantly improved pain and function scores after the 8 week intervention. PrT led to greater improvements in proprioceptive function, while ST resulted in greater increase in knee extensor muscle strength.

Efficacy of 2 Non-Weight-Bearing Interventions, Proprioception Training Versus Strength Training, for Patients With Knee Osteoarthritis: A RCT.

Lin, Da-Hon et al *Journal of Orthopedic Sports Physical Therapy* 2009;39 (6)

Controlled Loading on the Lumbar Disc

by Dennis Judd PT, Cert. MDT

Increased loading on the discs of the lumbar

spine seems to reduce tissue degeneration. This finding, resulting from a large twin study, is contrary to the traditional model of the causes of disc degeneration.

These results may shed some light on why some types of back exercises seem to help individuals with back pain and why sedentary workers have as frequent complains of back pain as those who perform vigorous manual lifting. While there are questions about the optimal intensity, frequency, and duration of loading: it is clear that, like other musculoskeletal tissues, controlled stress is beneficial. The response of painful discs to this loading is unclear but the study raises hope.

Challenging the Cumulative Injury Model: Positive Effects of Greater Body Mass on Disc Degeneration. Videman T, Gibbons LE, Kaprio J, Battie, MC *The Spine Journal* (10)1 26-31

Reducing the Incidence of ACL Injuries In Female Athletes

By Kevin McLaughlin MS,PT

A 2005 retrospective study of female soccer players To determine whether a neuromuscular and proprioceptive performance program was effective in decreasing the incidence of anterior cruciate ligament injury within a select population of competitive female youth soccer players. Among female athletes it has not been established whether a neuromuscular and proprioceptive sports-specific training program will consistently reduce the incidence of anterior cruciate ligament injuries. Over the course of 2 seasons