

# KEEPING FIT WITH OPTM

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## JUMP INTO ACTION WITH A KNEE INJURY PREVENTION PROGRAM

Knee injuries have dramatically increased in the last 30 years. Anterior cruciate ligament injuries, specifically, have become an epidemic. There are approximately 95,000 ACL injuries annually. 38,000 of which occur in young females. They are 4-6 times more likely to suffer an injury than their male counterpart in the same sport performing at the same level.

The American Academy of Orthopedic Surgeons has determined that biomechanical, anatomical, environmental and hormonal conditions are major risk factors contributing to the ACL injuries in young women. However, no controlled studies have validated the distinct correlation between ACL injury and any particular risk factor. Neuromuscular training programs to modify biomechanical factors have effectively reduced the injury rate by 60-80% between participating and non-participating players in some studies.

Biomechanical factors, which can be modified, include balance, reaction time, muscle strength and flexibility and landing techniques. 60-70% of ACL injuries occur during the deceleration phase of landing or planting the foot to make a lateral move. The inability to control the alignment of the trunk and lower extremities during deceleration exposes the knee to vulnerable positions. Deficiencies in neuromuscular control of the trunk, hips and feet can compromise the control of the pelvis and lower extremity and place the knee in a valgus position. These deficiencies increase joint loads and the dependence on ligaments for joint stability. Females tend to land in a more erect position, which emphasizes the quadriceps for shock absorption. The quads are antagonistic to the ACL and this landing technique, combined with genu valgus, exposes the vulnerable ACL to injury.

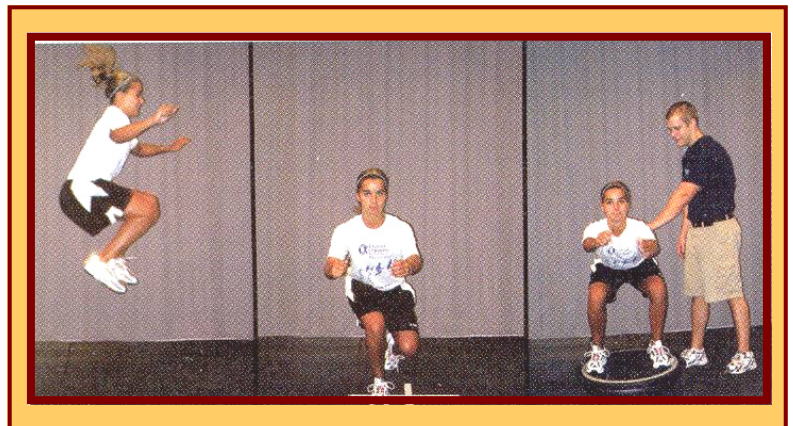
An injury prevention program consists of activities to train proper movement techniques and correct neuromuscular imbalances. The hamstring concentric strength must be restored to 60-80% of the quad, and the specific eccentric hamstring training must be performed to relieve the quad dominance of knee control. The symmetry of neuromuscular control between the lower extremities should be within 10%. The abdominals and spinal extensors must be able to control the trunk during landing and the hip muscles must be able to accept ground reaction forces to unload the quads and maintain proper alignment of the lower extremity. The posterior leg muscles must provide for foot and ankle alignment and force attenuation. All of these muscle groups contribute to counteracting the valgus drift of the knee.

A successful program must include the practice of proper landing techniques. The athlete is instructed to land on the "balls" of the feet, keeping the feet and knees straight forward, the chest over the knees and to land "as lightly as possible". Practice of avoiding vulnerable positions during forward, backward and lateral running, hopping, jumping and cutting is important for skill transfer to actual competition. A specifically designed injury prevention pro-

gram should be performed 3-5 times each week for a minimum of 15 minutes. One soccer organization substituted an intervention program for the traditional warm up, which proved to be very effective.

These same biomechanical factors contribute to a variety of painful conditions of the low back and lower extremities, including spondylolysis, trochanteric bursitis, patello-femoral joint pain, shin splints of all origins and sprained ankles. A sound training program, which develops neuromuscular control, educates about vulnerable positions and is incorporated into the regular sports training regimen, can be effective for many types of injuries and painful conditions and will improve physical performance.

All of the therapists at **OPTM** are experts in preventing and rehabilitating sports injuries. We have been specifically trained to analyze movement, identify risk factors, and design specific training programs to avoid injuries for people of all ages. **OPTM** provides evidence based practice and will always be a leader in the care for active individuals of any age.



Example of several exercises performed during dynamic neuromuscular training