

Female Athletes and ACL Reconstruction: Rehabilitation Integrating Acupuncture and Medical Herbology

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Female athletes and their participation in sports events have increased dramatically over the past 20 years. ACL injuries in female athletes also are on the rise. As motor skill level, physical musculature and speed increase, so, too, do the injuries. The anterior cruciate ligament (ACL) is the most common injury site in women's sports. Women athletes at greatest risk are those who are involved in sports that require pivoting, cutting, jumping and twisting movements. Noncontact ACL injuries are far more common in women than men, and sports in which ACL injuries occur most frequently include gymnastics, soccer, basketball, field hockey, volleyball, lacrosse, softball, rugby and martial arts. Integrating Oriental medicine within the ranks of the sports medicine team can provide valuable modalities in the rehabilitation of ACL injuries.

Injury Mechanism (Western)

ACL injuries in noncontact sports include: hyperextended knee with a one-stop landing; twisting/deceleration force upon the knee in cutting or pivoting maneuvers; and landing from a jump in which the knee is internally rotated and hyperextended. Internal (intrinsic) risk factors include hormones, joint laxity, muscle strength, ligament size, neuromuscular strength, lower limb alignment, and intercondylar notch width. External (extrinsic) factors include type of shoe, training/conditioning level, shoe surface interface friction, and equipment used. The most common ACL injuries result from a forceful twisting motion (knee flexed and foot planted, causing external rotation of the tibia on the femur).

The above stated injuries include risk factors such as Q-angle and hamstring/quadriceps ratio. The Q-angle (the angle formed by a line from the ASIS [anterior superior iliac spine] to the center of the patella and then a line from the center of the patella to the tibial tuberosity) represents the direction force of the quads during directional force exerted upon the patella during lower-leg extension. Usually, females have greater Q-angles than males, and reflect less-developed *vastus medialis oblique* muscles and weak hamstrings, which contribute to noncontact ACL injuries. Normal ranges for Q-angle measurements are from 15°- 17°. Usually, if the measurement is greater than 20°, this is considered abnormal.

The hamstring/quad ratio reflects the female athlete's tendencies to have weaker hamstring strength, as the hams are ACL agonists working synergistically with the ACL to prevent anterior translation of the tibia. The quads act as antagonists to the ACL, creating force that creates anterior tibial translation. When balanced, these opposing forces assist in protecting the knee. Female athletes tend to have greater quad muscle strength over the hamstrings, thus predisposing female athletes to ACL

injuries.

Injury Mechanism (Eastern Perspective)

Female athletes in general, as with all athletes (due to training schedules in conjunction with work and school schedules), create pre-existing conditions upon their lifestyles. Common pre-existing deficiencies related specifically to the knee represent Kidney *qi* deficiency and/or Kidney yang deficiency. Over time, this gives rise to external invasion of *bi* syndrome, specifically wind, cold and damp, that can invade the channels of the Kidney/Urinary Bladder.

Muscles need nourishment, and the Spleen *qi* provides and supports that nourishment, along with the Liver blood supporting and nourishing the tendons. The Kidney essence/*jing* supports and nourishes the bones and marrow according to the Five-Element correspondence.

Bi Syndromes Related to the Knee

Typical physiological manifestations for diagnosis include two specific types of excess and deficiency categories. Excess conditions create obstructions within the channels, whereas the deficient condition represents pre-existing conditions of *zang/fu* organ deficiency. These excess conditions ultimately lead to blood and *qi* stagnation, creating pain, whereas deficiency conditions are created from an internal *zang/fu* organ pre-existing deficiency within *qi*/blood/yin/yang, which is unable to support or nourish the joints and muscles due to lifestyle.

Wandering <i>Bi</i>	Painful <i>Bi</i>	Fixed <i>Bi</i>
Wind presents as a yang pathogenic factor	Cold presents as stagnation	Damp presents as yin pathogenic factor
Wandering pain	Contraction with severe pain	Damp accumulation and stagnation
Constantly changing movement	Pain alleviated by warmth	Flowing downward
Dispersion and upward movement		Heaviness

Acupuncture can assist with mild to severe cases, and should focus on *ah shi* points. However, if it is too painful, use the contralateral point instead. This will counterbalance any local stagnation in the area. Local points to be used include UB40 and *xiyuan*. Other points used are LV8 (*he sea point* LV), ST34 (*xi cleft point* ST), ST35 (*lateral xi yuan point*), and SP10 (regulates, nourishes and sedates the blood). Added points specific to *bi* syndromes include wandering *bi* LV3 and GB34 sedating. For painful *bi*, add ST42 and SJ4 (moxa). For fixed *bi*, add SP6, SP9, SJ6 and UB20.

During the rehabilitation phase, *tieh ta* can be used among many other medical herbal formulas that move *qi* and blood stagnation. Within the second week of rehabilitation, blood palace can be used for invigorating the blood. Within the third to fourth week, use *du hou ji sheng tang* to release external pathogens, tonify Liver/Kidney *qi* and tonify the blood, in order to prevent chronic wind/cold/damp invasion. There are many patent remedies available for use. The concept is not to use protocol treatments, but to think through, using the Oriental medicine philosophy.

Another factor is patient follow-through when implementing therapeutic exercises with ACL

reconstructions with physical therapists and/or chiropractors, athletic trainers and kinesiotherapists. One can integrate acupuncture within the process to assist in patient range of motion, pain, and keeping the *qi* moving, preventing stagnation for a more specific, successful and enhanced recovery.

Conclusion

By adding an Eastern diagnostic perspective within the sports medicine team, acupuncturists can be very effective within rehabilitation, and focus on preventative measures that take into account *zang/fu* organ deficiency and other patterns of differentiation, according to TCM. The acupuncturist can identify and counterbalance TCM patterns, and collaborate with sports rehabilitation specialists as to the modified exercises that balance hams/quads balance and Q-angle differences, by anticipating weaknesses in order to strengthen beforehand during the "off" season. This is a huge component that is currently absent from the physical therapy/rehabilitation; strength and conditioning; athletic training; and performance specialization components. It takes collaboration of all components, in order to see the athlete as a whole. That collaboration should include an acupuncturist as an asset within all of these specializations.

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