Dynamic Chiropractic

MUSCULOSKELETAL PAIN

Lateral Hip-Pelvic Instability and Knee Problems

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It has been said the knee has "no place to hide." Functionally, its fate often is sealed by the foot or hip to which it is linked in the kinetic chain.[4] Knee forces have been characterized as "slaved" to the hip.[1] There are various sources of biomechanical overload for the knee.

One of the most common is medial collapse of the knee, secondary to either subtalar hyperpronation or frontal-plane hip instability (e.g., trendelenberg position of the pelvis).[7,18] A key factor in the lower-quarter kinetic-chain dysfunction is gluteus medius weakness.[23] Mascal, et al., have demonstrated that a pelvic drop and excessive knee valgus during a step-down task is indicative of contralateral gluteus medius weakness.[17] Ireland, et al., have shown this weakness is common in patients with knee pain.[9] Specifically, deficits of 26 percent in hip abduction strength and 36 percent hip external rotation strength were found. Thus, reducing injury rates relies on detecting and continually evaluating people with relatively large valgus motions.[18]

The female athlete is at greater risk than the male for season-ending knee injury.[21] In particular, females with increased dynamic valgus loads are at increased risk of ACL injury.[7] Females have a shorter duration of gluteus medius activation in stance, load-absorbing, phase during a cutting maneuver.[10]

A comparison of male and female healthy collegiate soccer players demonstrated that females experience increased frontal-plane moments and decreased sagittal-plane moments during early deceleration of side-stepping maneuvers.[25] This dysfunction in tissue sparing of the knee was termed an "at-risk" pattern in that frontal-plane support of the knee, which could overload the anterior cruciate ligament. It also was noted that females exhibited increased quadriceps activity and smaller net flexor moments, suggesting less sagittal-plane protection (i.e., increased tendency toward anterior tibial translation).

Since biomechanical overload of the knee is so common, the question of prevention arises. Children under seven years of age have been shown to have a predisposition to faulty motor control; in particular, hyperpronation in the foot and angle during gait.[2] It is suggested that prepubertal or early pubertal female athletes may benefit from biomechanical optimization by reducing their future lower-extremity injury risk.[8]

Rehabilitation

Neuromuscular training has been shown to improve performance and lower-extremity biomechanics in female athletes.[6,20,22] Hewett[5] has shown in female collegiate athletes that the introduction of supinatory training during plyometric squats prospectively reduced the incidence of

injury in the coming season. The four main components of this training are plyometric and movement, core strengthening and balance, resistance training and speed training.[20]

Gary Gray has pioneered exercises such as balance reaches incorporating the star matrix.[3,11-15,19,24] By balancing or supporting on one limb, while reaching at different angles with the other limb, tri-planer movement in the sagittal, frontal and transverse planes can be trained. By adding upper-quarter movements, functional activities involving pushing and pulling such as tennis, baseball, golf and bowling, can be facilitated.

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