

# Muscular Balance, Core Stability and Injury Prevention

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Endurance athletes do sustain some acute injuries, such as ankle sprains and fractures, but most injuries can be classified as “overuse.” An overuse injury can be defined as any injury of the musculoskeletal system that results from the combined fatigue effect over a period of time beyond the capabilities of the body to regenerate itself. The most common overuse injury attributed to running that we see is iliotibial band pain. Other common overuse injuries include stress fractures, medial tibial stress (shin splints), patellar tendinosis, plantar fasciitis, and Achilles tendinosis.

Just as every sport is different and requires specific training, each injury requires a specific treatment plan tailored at restoring proper function of the tissue and the athlete. Although every athlete will need their own program based on their individual dysfunctions, one thing that remains constant in rehabilitation is that a stable core and strong foundation of muscular balance is essential for success. Weakness or lack of sufficient coordination in core musculature can lead to less efficient movements, compensatory movement patterns, strain, overuse and ultimately injury.

Although there is no single universally accepted definition of core stability, a general definition of core is the ability to control the position and motion of the trunk over the pelvis and leg to allow optimum production, transfer and control of force and motion to the end segments of the kinetic chain. This is pivotal for efficient biomechanical function to maximize force generation and minimize joint loads in all types of activities ranging from running to cycling. A good example of “core dysfunction” is weak hip muscles and resulting alteration of hip/trunk position at foot strike while running. This is a common finding associated with knee injury. Alterations in hip muscle activity are associated with increased hip “drop” and hip flexion positions which increase knee loads in activities requiring body weight acceptance. Recent studies have looked at core stability parameters and found that weakness in hip external rotation is correlated with incidence of knee injury. Based on these associations, most rehabilitation and conditioning programs for the knee now emphasize core stabilization.

There are thousands of core exercise to choose from, so where does the athlete start? Exercise programs need to be specific for the sport and the athlete. The goal of training should be specified and the exercise prescription has to match your needs. A long-term successful outcome and prevention of injury are more

likely if the focus of training is on restoration of function, rather than a specific tissue or injury. A proper gait analysis and movement screen by a health professional specializing in your sport can help point out areas of dysfunction and start you on the road to recovery and prevention.

Remember, the ultimate goal of core stabilization is to train “movements” and “positions” rather than muscles. Exercises are most effective when they mirror the demands of the athlete’s sport. When the system works efficiently, the result is appropriate distribution of forces, optimal control and efficiency of movements, adequate absorption of ground reaction forces, and absence of excessive compression, translation or shearing forces on the joints of the kinetic chain.

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