

Hip and Pelvic Injuries in Runners

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Runners are particularly at risk for the development of injuries to the hip and pelvic regions. These problems are most frequently secondary to chronic, repetitive microtrauma. It's important to identify the underlying functional biomechanical deficits in the kinetic chain that cause these types of injuries.

Efforts at treatment and rehabilitation are more likely to be successful when the focus is on restoring balanced function in the kinetic chain, rather than simply reducing the pain and inflammation in the irritated tissues. For example, the usual treatment of iliotibial band syndrome is a stretching protocol that is frequently unsuccessful in long-term improvement of symptoms. A more effective approach for hip and pelvic injuries in runners will include the evaluation of the functional biomechanics of the lower extremities, including imbalances of muscle strength and coordination, along with asymmetry of stance and gait.¹

Common Muscle Imbalances in Runners

A recent study by Niemuth, et al., tested recreational runners with lower extremity injuries and compared them to a control group of uninjured runners.² The researchers evaluated 30 runners with an overuse injury and 30 randomly selected uninjured volunteers from a distance-running club. Using hand-held dynamometers, the researchers tested the strength of the six major muscle groups around the upper leg and hip. They found no significant side-to-side differences in hip group-muscle strength in the control group of uninjured runners.

Among the injured runners, testing identified problems in the injured-side hip abductor and flexor muscle groups, which were significantly weaker than the muscles on the noninjured side. They also found the injured-side hip adductor muscle group to be significantly stronger than the hip adductors on the uninjured side. There was no evidence that leg dominance (preferred leg) or duration of symptoms was a contributing factor to the muscle imbalances.

These investigators identified an association between strength imbalances in the hip abductor, flexor and adductor muscles, and lower-extremity overuse injuries in runners. They concluded, "The addition of strengthening exercises to specifically identified weak hip muscles may offer better treatment results in patients with running injuries." Therefore, an important evidence-based component of the treatment of hip and pelvic problems in runners is the use of exercise training to strengthen the weak muscles around the hip and to improve muscular balance.

Rehab Recommendations

Since the hip functions as part of a closed kinetic chain during most daily and sports activities, weight-bearing exercises that require the co-contraction of accessory and stabilizing muscles can be very effective. However, open-chain exercises (done with the foot and lower leg freely moving) are most

helpful in the early stages of hip rehab, to reduce the stress on the surrounding muscles. Open-chain exercising can be started very early with a symptomatic hip, since it doesn't have to bear the weight of the body. The easiest method is to perform hip abduction and flexion against the resistance of elastic tubing.

Weight-bearing strengthening exercises, with the foot on the floor, should be included when a runner is preparing to return to full activity. Examples of closed-chain exercises for the hip include partial squats, lunges, and step-ups or stair climbing. Initially, body weight will be sufficient. Resistance can be increased progressively with the use of hand weights or a weight bar.

A closed-chain exercise available at many gyms is the leg press machine; however, this machine does not retrain the co-contraction of accessory hip support muscles as fully as weight-bearing exercises do.

It also is important for runners (whether recreational or competitive) to regain the fine neurological control necessary for accurate hip and pelvic movements. Stimuli from articular and muscle mechanoreceptors must be modulated with efferent responses to maintain "dynamic joint stability."³ Therefore, patients should spend five to 10 minutes each day standing on one leg with the eyes closed, standing on a mini-trampoline or using a rocker board.

Elastic Tubing Rehabilitation

As chiropractors, we understand that it is especially important to regain full neurological coordination of the surrounding muscles and connective tissues, since that is the true source of joint stability. An important component in addressing these needs is the frequent use of exercise tubing. This can now be accomplished at home, without substantial supervision.

Traditionally, expensive machinery that isolated the muscles (and even controlled the speed of movement - "isokinetics") was thought to be necessary. More recently, elastic tubing has been found to be a safe and effective method of providing progressive resistance exercises.⁴ Exercise tubing allows patients to exercise in a weight-bearing, functional position that is more effective, less expensive, and has the additional benefit of being easier for most patients.

In addition to being more focused and practical, upright exercising trains and strengthens the joints to perform better in everyday activities. Runners in particular like the idea of doing exercises that clearly prepare them for better function during their preferred physical exercise activity.

Dynamic Progressive Resistance

Elastic tubing provides a unique form of isotonic (dynamic) exercise. The actual amount of resistance varies significantly with the amount of stretch applied to the tubing.⁵ This property is used most effectively by starting a patient exercising with some initial slack in the tubing, thereby ensuring relatively low resistance. As the patient improves, the exercise is performed with no slack, increasing the resistance gradually and safely.

Eventually, the exercise effort is progressed to starting with some "pre-stretch" in order to stimulate and activate a more widespread neurological response to the exercise movement. In this way, most patients are able to advance through their entire joint rehab program with just one piece of exercise tubing, rather than having to purchase several different levels.

Foot and Ankle Biomechanics

The feet, ankles, knees and hips all must be in proper alignment during the repetitive striding performed during running. A retrospective study by Busseuil, et al., looked back at the foot biomechanics of runners who reported recent foot and leg overuse problems, and compared them to a control group of uninjured runners.⁶ The researchers wanted to determine whether excessive pronation (measured while weight-bearing) correlated with the likelihood of developing various types of "overload" sports injuries. Specifically, the researchers looked at runners who had needed treatment for iliotibial band syndrome, Achilles tendinitis, stress fracture of the tibia, tibial periostitis and plantar fasciitis.

The investigators found a significant correlation: Athletes with more pronation had a much greater likelihood of having sustained one of the overuse athletic injuries. They also found that the amount of pronation seen in the static weight-bearing footprint was more predictive than the footprint obtained during running. This reinforces the value of checking the alignment of our running patients' feet in the mid-stance position.

Conclusion

Dynamic resistance training with elastic tubing is very nonthreatening and has even been used successfully in home-based exercise programs for older adults.⁷ Since setup is easy to learn and requires little manual dexterity, it can be used by patients with no gym or weightlifting experience.⁸ Appropriate and progressive rehab programs should be started early in the treatment of all runners with hip and pelvic problems, both acute and chronic.

References

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