

Prehab for Injury Free Running

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Runners have been told for years they need to cross train with other activities to avoid injury and improve their fitness. Often weight training is recommended though not many runners fully understand why and how this can help them. This article will explain how resistance training can keep you running injury free.

Running Muscles

Running doesn't require as much skill technique as some other sports such as pole vaulting. Yet it still requires many muscles to work together to produce efficient movement, sometimes for very long periods of time such as in running a marathon. The big muscles of the legs and hips are the ones mainly responsible for the forward motion. These are called the primary movers and include the glutes and hamstrings in the rear and quads and hip flexors in the front.

However, to run well and injury free requires the balanced and unified function of many muscles not only your legs. Muscles in the hips and trunk work to stabilize the pelvis and lower spine. The calves help with forward motion. The shoulders and back swing the arms to set the tempo as they move in time with the legs.

Lateral Subsystem

Researchers have grouped muscles into subsystems to simplify and explain movement. Of special concern to runners is the lateral sub-system which includes the muscles listed in the table below.

<i>Table 1: Muscles of the Lateral Subsystem</i>	
Muscle	Location
<i>Quadratus Lumborum (QL)</i>	<i>Attaching lower spine to pelvis</i>
<i>Gluteus Medius</i>	<i>On the rear of the hip</i>
<i>Tensor Fascia Latae (TFL)</i>	<i>On the front hip</i>
<i>Adductors</i>	<i>On the inner thigh</i>

The quadratus lumborum on one side of the body works with the opposing adductors, tensor fascia latae and glute medius to stabilize the pelvis and help control the femur (thigh bone) as you run (see Fig. 1). If the system is in balance you run without problems but when this system is out of balance it can lead to injury. Running increases your risk of unbalancing this system if precautions aren't taken.

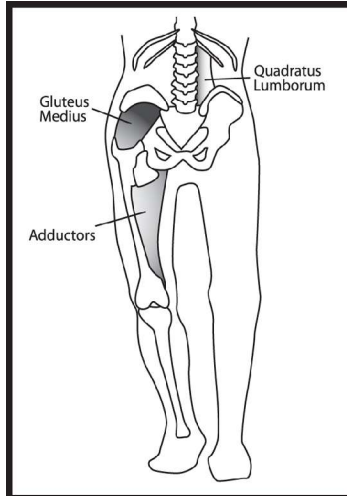


Fig. 1: Rear view of lateral sub-system (Source: Based from the PES manual by the National Academy of Sports Medicine)

Unbalanced Muscles

The lateral sub-system can become unbalanced due to overuse, weakness and/or improper loading of the muscles. In runners this can manifest itself in a number of injuries, one of the most common being illiotibial band syndrome. This is often caused by a weak glute medius muscle and consequently a tight illiotibial band, a band of fibrous tissue that runs down the outside of the thigh from the hip to the knee. The major symptom is a sharp pain on the outside of the knee when running or flexing the knee to a certain angle.

Many factors can be responsible for the glute medius dysfunction. These include a rapid increase in mileage or time spent running (overuse); too much speedwork (overuse); weakness in one of the prime movers (improper loading); running on a slanted surface (improper loading) and/or bad running technique (weakness and improper loading). Often a combination of two or more factors are at work.

The Solution, Prehab

To correct pronounced imbalances you need to strengthen the weak muscles, stretch and release the tight areas and teach the body to recruit the correct group of muscles in the proper sequence. A personalized routine of exercises designed by a qualified professional is recommended.

An even better solution is to listen to the old adage, “One ounce of prevention is worth a pound of cure.” Its best avoid muscle imbalances in the first place or correct them when the differences are minor. This is where resistance training can really help. A regular program of strengthening exercises, dynamic flexibility exercises and stretching will help keep your body in balance. Your resistance workouts are “prehab” or prehabilitation, preventative exercises that are done to avoid injury.

Resistance Exercise Guidelines

To properly balance your body you need to work your running muscles as well as your non-running muscles. Running is predominantly a forward movement so you should include exercises that work the two other planes of motion, lateral and rotational. Side lunges are a great example of a lateral exercise (Fig. 2). Oblique twists illustrate a rotational movement (Fig. 3).



Fig 2: Side lunge



Fig. 3: Oblique Twist

You should incorporate full body exercises, using the arms and legs at the same time and coordinating movement between the left and right sides. This will train your body to recruit muscles in a proper sequence and improve integration between the two sides. An example would be a forward lunge with an arm drive (Fig. 4).



Fig. 4: Forward lunge with arm drive

Don't neglect stabilization and balance training. This will train your neuromuscular system to better recruit stabilizer muscles. A one leg squat with a toe touch is a good stabilization and balance exercise (Fig. 5 & 6).



Fig. 5: One leg squat & toe touch - start



Fig. 6: One leg squat & toe touch - end

Plyometrics should also be included to develop power. These are jumping style exercises that involve fast, explosive movement such as squat jumps (Fig. 7 & 8).



Fig. 7: Squat jump - start



Fig. 8: Squat jump - end

Runners will benefit greatly from core stability exercises that specifically target the muscles of the hips and lower trunk including the abs and low back. Proper recruitment of these muscles is important since good stabilization of the pelvis is needed when running. The prone plank is one exercise that targets the core (Fig. 9).



Fig. 9: Prone plank

Small Time Investment, Big Returns

Don't worry about resistance training cutting into your running time. A well designed program can be completed in as little as 30 minutes, twice per week. It can be done in a gym or at home. Doing the workout in the gym gives you more tools to work with but you don't need a lot of fancy equipment. Your body weight and a little creativity can go a long way. By following a prehab program you can bring your muscles into balance and continue to run injury free.

Bio

Curb Ivanic is a Vancouver based strength & conditioning coach who holds a Master's degree in Exercise Science. He specializes in training endurance and outdoor sport athletes. Curb is an accomplished runner himself, racing distances from 10km to 50 km. He is a speaker, author and co-producer of the Sport Shape Up Running DVD's; see www.sportshapeup.com for more details or email him at curb@sportshapeup.com with any questions or comments.