Adventure isn’t hanging on a rope off the side of a mountain. Adventure is an attitude that we must apply to the day-to-day obstacles of life—facing new challenges, seizing new opportunities, testing our resources against the unknown, and in the process, discovering our own unique potential. —John Amatt (organizer and participant in Canada’s first successful expedition to the summit of Mount Everest)

FUNCTIONAL, INTEGRATED, AND SPORT-SPECIFIC TRAINING

Before we discuss how we can enhance our performance and prevent injury through crosstraining, let’s make sure we’re speaking the same language. The approach to crosstraining for endurance sports described in this book can be best described as functional, integrated, and sport-specific.

Functional training refers to a focus on improving function. In other words, a functional training program is concerned with trying to prepare an individual for specific physical demands. Such a program is in stark contrast to the type that most bodybuilders follow, which is more aesthetics driven. An example of functional training would be when a physical therapist prescribes exercises for
someone who is hurt on the job and is trying to return to work. The therapist would recommend movements that would help prepare muscles, joints, ligaments, and tendons for the forces and ranges of motion required by that individual’s occupation.

An integrated training approach is one that trains the nervous system to recruit various joint and trunk stabilizer muscles during movement. As the name implies, the goal is to train muscles in coordination with other muscles so that movement will be more efficient. For example, a single-leg squat could be described as an integrated exercise because it involves the recruitment of various stabilizers of the ankle, knee, hip, and trunk while at the same time strengthening the primary mover muscles of the knee and hip.

Sport-specific training simply refers to a training approach that will in some way benefit an individual’s ability in a particular sport. Sport-specific training can involve the attempt to simulate the movements of the sport such as a basketball player performing a vertical jump. However, sport-specific training can also refer to any strength, power, agility, coordination, stability, flexibility, and energy system training designed to enhance performance in a specific sport. For instance, if a football player wanted to make an interval workout as sport-specific as possible, he would exert himself at the same intensity and for the same duration as he does during a game. He would rest the same amount of time between efforts as occurs during the average huddle and total break in the action.

Integrated, functional, and sport-specific training involves multiplanar, multijoint, and multidimensional movements. This approach to crosstraining is dynamic, progressive, and systematic and continually challenges the nervous system. Training programs of this nature are varied on a regular basis in order to force the body to adapt to differing planes of motion, ranges of motion, type of resistance, body positions, intensities, tempos, durations, sets, repetitions, frequencies, and rest periods.
Functional, integrated, and sport-specific training are all interrelated and complement one another. All three approaches involve training movements as opposed to simply training muscles. In other words, muscles are trained in “integration” rather than isolation. Training muscles in isolation has been the traditional approach to crosstraining in many sports for several years. It’s difficult to truly train any muscle in complete isolation, but many of the fixed and stable machines you see in any gym have been designed to emphasize or target one or two major muscles. For instance, a leg extension machine attempts to “isolate” the quadriceps muscles of the upper leg. This machine is a great example of the more traditional approach to crosstraining as it’s designed to be very stable and requires that the exerciser be seated as she extends her legs against resistance. This results in little necessity for other muscles in the body to be recruited.

Let’s say you’re a soccer player and want to strengthen the quadriceps muscles to improve the force with which you kick the ball. The leg extension machine can definitely be useful in overloading the muscle by emphasizing this primary mover. However, your strength could be enhanced if during the strengthening exercise you could also train the stabilizers of the exercising leg as well as those of the trunk, ankle, knee, and hip of the opposite leg.

Consider that instead of sitting in a leg extension machine you stood on one leg and put an ankle strap on the opposite leg, which was attached to a cable that lifted a weight stack. As you extend the exercising leg, you contract not only the quadriceps muscles but also the stabilizing muscles of the ankle, knee, and hip of that leg. In addition, you force stabilizers of the trunk and opposite leg to be recruited in order to provide the exercising leg with a solid platform from which to produce force.

The less stable exercise is more functional in that you can move the exercising leg in a full range of motion that will prepare the joints, muscles, and connective tissue for the act of kicking. It also requires the nervous system to coordinate or integrate the recruitment of various stabilizer muscles used when you...
kick a soccer ball. Lastly, the less stable exercise is more sport-specific in that it more closely approximates and better prepares the body to kick a soccer ball with more force.

I will concede that the more stable leg extension machine can be a great tool to strengthen the quadriceps muscles, and because of its greater stability, it allows the exerciser to work under a higher resistance load. However, it is as important to train the stabilizers that will provide the platform for that kick to fire in the right amounts in concert with the primary movers.

If you can create a more stable platform, you can produce more force because a higher percentage of the muscle fiber of the primary movers can be dedicated to, in this case, kicking and a lower percentage to stabilizing. The less stable exercise also helps you prevent injury by training all of the stabilizers in the kicking motion to deal with rotational, gravitational, and lateral forces under a load.

I’m not proposing that the leg extension machine be totally cut out of the soccer player’s training program. I am merely saying that this athlete could also benefit greatly from incorporating some exercises that are more functional, integrated, and sport-specific. Perhaps some days the soccer player would begin her resistance training workouts by training movements, and as various stabilizers became fatigued, she could strengthen primary movers in relative isolation. For other workouts, the athlete could fatigue primary movers first and then challenge her nervous system to still stabilize her trunk and joints effectively.

So, what does all of this have to do with endurance sports? Functional, integrated, and sport-specific crosstraining can be even more effective and beneficial for athletes who perform the same movement for long periods of time. It’s vital that you prepare your body beyond the forces, stressors, and demands of your sport by performing movements other than those you repeat over and over again. This approach will result in your trunk and joints becoming more stable,
which in turn will increase efficiency and force production with every stride, pedal stroke, skate, or swimming stroke. Ultimately, this type of crosstraining will enhance performance and decrease your risk for injury.

**ENDURANCE SPORT INJURIES**

Endurance athletes experience numerous types of injuries. What follows are descriptions of some of the most common.

**Plantar Fasciitis**

The *plantar fascia* is a band of tough and fibrous tissue that runs from the heel to the toes on the bottom of the foot. *Plantar fasciitis* is a result of the plantar fascia becoming inflamed. Pain is felt in the arch of the foot, usually closer to the heel. This is a common overuse injury among endurance athletes and is related to poor biomechanics of the foot, weak muscles on the bottom of the foot, tight calf muscles, and ankle inflexibility.

**Ankle Sprains**

Numerous ligaments surround the ankle joint. An ankle sprain results when these ligaments become overstretched or torn. The most common cause of ankle sprains is rolling the foot inward when running on an uneven surface. When the sole of the foot is forced inward, body weight causes stress to the ligaments stabilizing the outside of the ankle joint. Ankle sprains are most common among athletes with poor ankle and knee biomechanics, ankle inflexibility, and ankle instability.

**Shin Splints**

The *tibialis anterior* is a muscle located on the front of the shin. Shin splints occur when the muscle fascia along the edge of the tibia becomes inflamed as a result of repeated stress. When this fascia becomes inflamed, pain is felt along