FUNCTIONAL TRAINING FOR SPORTS

Superior conditioning for today’s athlete

Michael Boyle
Crossover Bound

This is a lateral drill in which the power is generated from an aggressive push by the front leg in a crossover step (see figure 10.10).

Figure 10.10  Crossover bound.

Cross-Behind Bound

The cross-behind bound is a lateral drill in which the emphasis is placed on the adductor group as the force producers. Although the drill will look much like the previous drill, the work is not done by the crossover leg but by the leg that is behind. This is an aggressive adduction movement.

Plyometrics and ACL Injury Prevention

Anterior cruciate ligament (ACL) tears (in the knee) are approaching near epidemic level in the sports world. Some estimates are as high as 100,000 torn ACLs per year. According to a 2001 lecture by Mike Clark, more than 30,000 of these ACL tears are believed to occur in young women who participate in sports such as soccer, basketball, and field hockey. These staggering numbers alone justify addressing ACL injury prevention in any program designed for female athletes.

A number of physical therapy and athletic training groups have begun to sell or promote programs designed for ACL injury prevention. Some are good; some are drastic oversimplifications. A sound ACL injury prevention program needs to focus on two things:

1. Single-leg strength (see chapters 6 and 7)
2. Landing and deceleration skills (described in this chapter)
Most ACL injuries occur when an athlete who is too weak attempts to land or change direction. Many studies point to female physiological predisposing characteristics such as hip structure, knee structure, or menstrual changes, but these are factors that cannot be controlled by any mortal. Coaches, athletes, therapists, or trainers cannot change the bone structure of the athlete or attempt to keep them out of competitive situations at critical points during the menstrual cycle.

The Serenity Prayer sums up one approach to ACL injury prevention:

God grant me the serenity to accept the things I cannot change,
the courage to change the things I can,
and the wisdom to know the difference.

We can obsess about why female athletes get ACL injuries more often than male athletes, but time and energy is better devoted to the things we can change. Coaches and trainers can wring their hands about the physiological predisposition of young women to ACL tears, but this will not change the facts. Girls and young women are playing sports in increasing numbers and at higher levels. What can be controlled is the development of single-leg strength, both concentric and eccentric, and landing skills, through strength training and a proper plyometric program. Plyometric training is of particular importance, but a plyometric program must be properly planned and taught. Poorly taught or poorly progressed plyometric exercises can result in patellofemoral joint problems, another area of particular concern for young female athletes. A plyometric program should always begin with the phase 1 exercises described earlier. Many of the techniques presented throughout this book are in themselves the building blocks of an ACL injury prevention program. Single-leg strength exercises, a proper plyometric program, and a conditioning program that emphasizes changes of direction go a long way toward the prevention of ACL injuries.

The development of strength cannot be overemphasized for young female athletes. They should work through the single-leg strength progression in chapter 6, from split squat to one-leg box squat, progressing to the next level only when they’ve mastered the previous one. Most young female athletes need weeks or even months to progress to the one-leg squat.

While young athletes are developing concentric single-leg strength through strength training, they should simultaneously be developing eccentric strength and landing skills through plyometric training. It is critical that plyometric training be properly taught and that all progression be based on competence. The four-phase progressive plyometric program described in this chapter is perfect for an ACL prevention or rehabilitation program because the initial nine weeks gradually introduce the stresses of jumping and, more important, the stresses of landing. Many plyometrics experts caution against beginning a plyometric program until the athlete has developed a high level of leg strength, but if their guidelines are followed, young athletes would never gain the benefits of plyometric training and would miss out on the vital landing skills training that the phase 1 plyometrics provide. Beginning athletes can start with beginning level plyometrics on day 1. Falling into the trap of “strength base first” only delays measures that can prevent ACL tears.

The design of the program for ACL injury prevention is simple (table 10.1). Upper-body exercises are omitted from this example but should be included if time permits. With three workouts per week, week 1 has two linear plyometric days and two days in which the athlete performs two single-leg hip and knee extension exercises. In week 2 the program is reversed to give two lateral plyometric days and two days
### Table 10.1

**SAMPLE THREE-DAY ACL INJURY PREVENTION PROGRAM**

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Week 1</th>
<th>Day 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear plyometric box jump 3 × 5</td>
<td>Lateral plyometric Heiden and stick 3 × 5 each leg</td>
<td>Linear plyometric box jump 3 × 5</td>
</tr>
<tr>
<td>Split squat 3 × 8</td>
<td>Step-up 3 × 8 each leg</td>
<td>Split squat 3 × 8</td>
</tr>
<tr>
<td>Lateral squat 3 × 8</td>
<td>One-leg SLDL 3 × 8</td>
<td>Lateral squat 3 × 8</td>
</tr>
<tr>
<td>Cook hip lift 3 × 8</td>
<td>Hyperextension 3 × 8</td>
<td>Cook hip lift 3 × 8</td>
</tr>
</tbody>
</table>

**Day 1**

- Lateral plyometric Heiden and stick 3 × 5 each leg
- Step-up 3 × 8 each leg
- One-leg SLDL 3 × 8
- Cook hip lift 3 × 8

**Day 2**

- Lateral plyometric box jump 3 × 5
- Split squat 3 × 8
- Lateral squat 3 × 8
- Hyperextension 3 × 8

**Week 1**

- Lateral plyometric box jump 3 × 5
- Split squat 3 × 8
- One-leg SLDL 3 × 8
- Hyperextension 3 × 8

**Week 2**

- Lateral plyometric box jump 3 × 5
- Split squat 3 × 8
- Lateral squat 3 × 8
- Hyperextension 3 × 8

A progressive plyometric program is one way to improve power output. The sequence in this chapter allows you to safely improve speed, horizontal jumping ability, and vertical jumping ability while decreasing injury potential. The key is to follow the sequence and not skip steps. There is no shortcut to improvement, only shortcuts to injury. Plyometrics is only one of the three methods proposed for improving power. Plyometrics, medicine-ball throws (chapter 8), and Olympic lifting (chapter 11) can be successfully combined to produce great gains in power production.

Remember that more is not better. Do not exceed the recommended number of jumps or the recommended number of training days per week. Plyometrics can safely be done up to four days a week if the program is followed as described. Two linear days and two lateral days, each preceded by the corresponding warm-up (chapter 5), will not result in overuse injury if this program is followed. Athletes seeking to safely increase speed, vertical jump, overall power, or simply to prevent injury can benefit from the plyometric progressions in this chapter.