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Development of Speed, Agility, and Quickness for the Female Soccer Athlete

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STUDIES HAVE SHOWN THAT female athletes are 2–3 times more likely than male athletes to sustain noncontact anterior cruciate ligament (ACL) injuries, especially in soccer and basketball programs (6). As one of the main ligaments in the knee capsule, the ACL stabilizes the knee and connects the back of the femur to the front of the tibia. ACL injuries usually occur when an athlete twists the knee beyond its normal range of motion while pivoting, cutting, twisting, jumping, or running. These injuries tend to increase in college, because the transition from high school to collegiate competition is more demanding. Upper level competition requires an increase in neuromuscular conditioning because the athlete's lateral, linear, and vertical movement must be more precise, explosive, and automatic.

Many female high school soccer athletes keep in shape by just taking part in their chosen sport. While this repetition of specific skills may make them better players, to be competitive at the college level they must become better athletes. Core strength, overall force production, stability, balance, lateral quickness, vertical power, and first-step reaction are all desirable athletic qualities that are integral to the game of soccer. These qualities may be increased through speed, agility, and quickness (SAQ) training. The inclusion of functional training that focuses on sport-specific drills and plyometrics that focus on improving explosiveness may assist in the overall athletic conditioning of female soccer players.

Using this type of training, a minimum of 3 workouts a week for 8–12 weeks will result in significant improvements in an athlete's performance, while programs as short as 4 weeks may also provide some performance increase (7). It is advisable for athletes to be currently involved in a strength-training program prior to implementing SAQ training. In addition, individuals with low skill levels (little to no experience) may require slower program progression and the use of higher volumes with lower intensities (1, 2).

This paper identifies a program that may help to condition the lower body of inexperienced female soccer athletes for the rigors of collegiate competition while decreasing their chances of an ACL injury. By implementing the use of SAQ, functional, and plyometric training principles, the low-skilled female soccer athlete may be better prepared for high-level play.

Speed

Speed is the rapidity of movement (1). Top speed is important for a player such as a midfielder who must cover long distances. To develop speed, one must increase stride length, stride frequency, and hand/arm action. Exercises that may assist in speed development are listed below.

High knees. Increase hip flexor strength and flexibility by running with knees rising to waist, with appropriate arm action (hand movement should be hip to shoulders).

Figure 1. **Resisted running (with partner).**

Glut kicker. Increases hamstring strength and flexibility by running with trailing leg kicking back to touch the buttocks, again using appropriate arm action.

Resisted running. Increases stride length and may be accomplished by uphill running outdoors or on an incline treadmill and through the use of a partner (Figure 1) or an elastic band (Figure 2).

Short high-speed sprints. Increases stride frequency and may be accomplished by towing with a sprint cord, treadmill sprints, and downhill running. Duration of each sprint should be between 5 and 10 seconds.

Agility

Agility is the ability to maintain and control correct body position

Figure 2. **Resisted running (with elastic band).**

Figure 3. **Step hurdles (lateral drill).**

while quickly changing direction through a series of movements (8). This may be required of forwards in order to maneuver around defensive players near the goal. Likewise, defensive players may benefit from these drills for the opposite reason. Exercises that improve agility, balance, and coordination are the following:

Agility ladder. The ladder can be positioned straight or at various angles for quick change of direction with fast foot movements.

Step hurdles. These drills help to develop a quick knee lift and step. They can be used for forward or lateral movements, again with fast foot movements (Figure 3).

Quickness

Quickness is the ability to read and react to a situation; it is a multidirectional skill that combines explosiveness, reactiveness, and acceleration (5). Goalies may specifically require responses that are initiated from a dead stop position. Exercises that provide the groundwork for improving foot quickness and reaction time are listed below.

Sidestrike box. The unskilled user should begin slowly, and then gradually increase foot speed while establishing a consistent rhythm. Used for multifunctional exercises that enhance power, balance, speed, and coordination in all directions (Figure 4).

Lateral/side stepper. Improves

Figure 4. **Sidestrike box.**

lateral speed and quickness by strengthening the hip, hamstrings, and groin muscles. This is accomplished via an elastic band connected to both ankles. Used for lateral walks, runs, or shuffles (Figure 5).

Dot drills. This involves jumping around a dicelike 5-point pattern, moving quickly from dot to dot. It improves foot quickness and reaction time while strengthening the ankle and calf.

These drills should be performed before any other training in order to decrease early muscle fatigue. As the athlete masters these drills, on-field cone, box, and shadow drills should be used to increase the level of difficulty while providing gamelike situations.

Functional Training

This type of exercise involves acceleration, deceleration, and stabilization during multidirectional movement in all 3 planes (sagittal, frontal, and transverse), and must be proprioceptively challenging (1, 3). Concentration will be on functionally training the hamstrings (muscles important to the stabilization of the knee joint), with weight-bearing exercises that work the legs, knees, and hips

Figure 5. Side stepper (shuffle drill).

Figure 6. Lateral crossover step-up.

Figure 7. Rotational lunge and reach.

unilaterally. Exercises that are designed to work the abdominal muscles (major stabilizers in all 3 planes) are also important, because the abdominals work together to eccentrically decelerate trunk extension, rotation, and side bending. Examples of exercises that functionally train the hamstrings and abdominals are the following:

High step-up. Step up onto a box high enough so that the thigh is parallel to the ground when the foot is up on the box in the starting position. All weight should be on the exercising leg (leg on the box). While extending up through the hip with the exercising leg, the nonexercising leg remains passive.

Lateral crossover step-up. Step up onto a box and drive the trail leg across the midline of the body while rotating the hips. The head and shoulders should be kept square, and the hips should be pointed in the direction you want to go (Figure 6).

Rotational lunge and reach. These are multidirectional lunges onto 1 leg while reaching forward with the hands and rotating the hips and torso. After the chest touches the thigh, immediately push back up to the starting position and repeat with the opposite leg (Figure 7).

Medicine ball chop. Start this exercise in the stride position with 1 foot in front of the other. With the weight of the body and ball over the back leg, chop down to the opposite side; as the hip rotates down and in, shift the weight of the body and ball forward onto the front leg. Return to the starting position while shifting the weight back to the rear leg.

Overhead throw. Simulate a 2-hand overhead throw using a weighted ball. This drill is sport specific and it increases upper body strength, which is of primary importance for female athletes.

Plyometrics

Plyometrics are the rapid deceleration of a mass followed immediately by rapid acceleration of the mass in the opposite direction (i.e., an eccentric muscle action followed immediately by a concentric action). Plyometric training has shown significant effects on knee stabilization and prevention of serious knee injury in female athletes (4). Although factors such as age, body weight, strength ratio, experience, and participation in a current speed or strength training program are to be considered, low- to moderate-level plyometrics can easily be accomplished by varying the volume and intensity of the exercises (1, 2). Some low- to moderate-intensity exercises are shown below.

Skipping/ankle hops. Skip with a jump rope or perform low ankle hops forward, backward, and side-to-side.

Side-to-side box shuffle. Begin with 1 foot on top of a 12 inch box, then jump up and over to the other side of the box, landing with the opposite foot on top of the box.

Lateral box jumps. Using a single box (or a row of 2–4 boxes) 12 inches high, jump onto the box and back to the ground on the other side. This can be done as a single or continuous movement across a line of boxes.

Lateral cone hops. Begin on the left foot, then jump sideways over a cone, landing on both feet, followed immediately by jumping over another cone and landing on the right foot. This drill should be repeated continuously in both directions without pausing.

Program Design

The exercises, intensity, volume, and progression of the program will vary depending on the skill of the individual, but athletes tend to improve performance when competition is involved. We try to divide the team into training groups

Table 1
Typical Training Session (Low Skill), Weeks 1–4

Monday:
Speed Drills
- High-knees/glut kicker: 2–3 sets for each workout 15–25 yds for each set
- Resisted running: 3–6 reps for each workout 15–30 sec duration each rep
- *Incline running: 3–6 sets, medium speed/high grade 20–30 sec each set
- *Short high speed sprints: 3–6 sets, over speed/level grade 5–10 sec each set

(* = Treadmill)
Agility/Quickness Drills
- Agility ladder: 2–4 drills, 2–4 sets of each drill
- Step hurdles: 1 forward and 1 lateral drill 2–3 sets of each drill
- Sidestrike box: 2–4 drills, 2–3 sets for each drill
- Lateral/side-stepper: 1–2 drills, 2–4 sets each drill
- Dot drills: 1–2 drills, 2–4 sets of each drill

Wednesday:
Functional Training
- High step-up: 2–4 sets/8–15 reps
- Lateral crossover step-up: 2–4 sets/8–15 reps
- Rotational lunge and reach: 2–4 sets/8 reps
- Medicine ball chop: 2–4 sets/8–12 reps
- Overhead throw: 3 sets/8–12 reps

Friday:
Plyometrics
- Skipping/ankle hops: 15 reps/2 sets(forward/backward, side-to-side)
- Side-to-side box shuffle: 10 reps/2 sets
- Lateral box jumps: 6–8 reps/2 sets
- Lateral cone hops: 6–8 reps/2 sets

(Exercise, intensity and volume change every 2 weeks)

of 2–4 players in the off and preseason, while training as a team (sport-specific/strength training) during the season. Our off/preseason regime also includes box, line, shuffle, and cone drills in sand to help build hip strength and explosion. Our program works with progression on the SAID (specific adaptations to imposed demands) principle, 3–4 times a week, more on 1 day and less on the next (1).

The program described in Table 1 is the beginning of an intensive 3-day workweek, and proper warm-up and cool-down is advised. Training variations will differ according to the length of the program, and the ability, skill, or aggressiveness of the athlete. Progression is applied to the volume of work accomplished, and intensity and volume must be appropriate when shifting from one phase of periodization to another. If time is not a factor, strength training principles and Olympic-style lifts may also be utilized.

Conclusion

Training protocols for females are not different from males, since female training programs have improved dramatically over the years. However, females tend to participate in sports at a later age, and their lack of training years inhibit them in executing skills such as twisting, jumping, and pivoting as efficiently as males. Coaches are just now acknowledging the need for proper training that will help their female athletes execute skills safely and to prepare them for the demands of collegiate competition. The program described here should assist the field practitioner in setting up a beginning SAQ course for female athletes concerned with training in order to reach a higher level of competition. ▲

References

1. Baechle, T.R. (ed.). *Essentials of Strength Training and Conditioning*. Champaign, IL: Human Kinetics, 1994.
2. Chu, D. *Jumping into Plyometrics*. Champaign, IL: Human Kinetics, 1992.
3. Gambetta, V. *Functional Leg Exercises: Legs, Legs, Legs* (Video). 1998.
4. Hewett, T.E., A.L. Stroupe, T.A. Nance, and F.R. Noyes. Plyometric training in female athletes: Decreased impact forces and increased hamstring torques. *Am. J. of Sports Med.* 24(6):765–773. 1996.
5. Moreno, E. Developing quickness, part II. *Strength and Cond.* 17(1):38–39. 1995.
6. Rochman, S. Gender inequity. *Training & Cond.* 6(5):10–20. 1996.
7. Roozen, M. Setting up a month-long summer running, agility, and weight camp. *Strength and Cond.* 17(3):57–61. 1995.
8. Twist, P.W., and D. Benicky. Conditioning lateral movements for multisport athletes: Practical strength and quickness drills. *Strength and Cond.* 17(6):43–51. 1995.