

## **WELLNESS UPDATE 2004, #3**

### **IMPROVING SPEED**

Speed is a critical component in every sport. While some aspects of speed are genetic, many can be developed and improved through training. **The following components are important when training for speed: strength & power, flexibility, muscle endurance, and technique.** If one of these components is neglected maximum speed cannot be attained. Significant improvements in speed are usually not seen until after at least six weeks of hard work. The exception to this may be if an athlete has serious bio mechanical problems which can be changed relatively quickly and easily.

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**Strength and Power** - leg and core (chest to knees) strength are essential to all athletic performance. **Many strength training experts believe 2/3 of the time spent strength training should be devoted to multiple-joint exercises which strengthen the area from the top of the chest to the knees and 1/3 of the exercise time should be spent on supplemental exercises.** If core and supplemental exercises are being done on the same day, the core exercises should be performed first before the larger muscles have become exhausted. Emphasis should be placed on each major muscle group to ensure balanced muscle development. *Possible core exercises include:* squats or hip sled, power cleans, sit-ups, bench press, incline press, hip flexors, and back arches. *Possible supplemental exercises include:* military press, tricep extension, leg curls, leg extensions, bicep curls, upright row, dips, and shoulder raises.

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**Flexibility** - flexibility of the hip, knee and ankle flexors and extensors, is extremely important in improving speed. Flexibility can be increased by properly warming up and stretching the muscles. **Before performing any stretching exercises, warm up first! Proper warm up increases muscle temperature and improves muscle elasticity which reduces the risk of injury.** It also helps increase circulation to the muscles, improves the speed at which muscles contract and reduces reaction time, thus improving athletic performance. The benefits of stretching warm muscles are decreased risk of injury, improved performance, and reduction of muscle soreness following exercise. Two common and effective methods of stretching are static stretching and proprioceptive neuromuscular facilitation (PNF). Static stretching is performed by placing the body into a position that stretches the muscles. That position is maintained for 20 - 60 seconds putting a constant, mild stretch on the muscles. As you hold the stretch, you may very well feel the muscles relax. The stretch can be repeated 5 - 10 times, if necessary.

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During PNF stretching one stretches the muscles for 5 - 10 seconds then they are mildly contracted (tightened) for 10 - 30 seconds. When this contraction phase is over, the stretch is continued for another 5 -15 seconds. This procedure of stretch - contract - stretch should be repeated 3 - 5 times before moving onto the next muscle group to be stretched. Maximum benefit is probably gained by doing general warm up exercises, stretching, then doing sport-specific warm up exercises.

After properly warming up & stretching, specific flexibility exercises may be done. Those exercises include, jogging with high knees, butt kicking, jogging with knees to chest, and doing the carioca with, or without, high knees.

**Muscle endurance** - training for speed involved teaching the muscles to contract and relax as quickly as possible. When a muscle becomes fatigued, the ability to contract and relax is hampered, thus decreasing performance. **Speed workouts should be conducted early in a workout while the athlete is fresh and rested.** Speed workouts performed later in a workout lead to poor technique and can increase the risk of injury.

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**Technique** - proper technique involves training the entire body and may be the most crucial factor in improving speed. The primary components of proper techniques are:

#### **Upper body**

- 1) **look straight ahead** and avoid tilting the head up or down, or from side to side,
- 2) the **elbows should be bent** at no less than a 60-degree angle when the arm is in front of the body and no more than a 140-degree angle when the arm is behind the body. The **forearm rotated so the thumb is up**,
- 3) **drive your arms back and forth** so the hands and forearms alternate moving in a vertical plane down and backward past the hips,
- 4) **keep the wrists relaxed** so when the hands reach the farthest most back and down position, the hand can follow through as though wielding a hammer,
- 5) **squeeze the arms close to the chest** so there is no space between the arms and upper body,
- 6) **pinch the shoulder blades together** to keep the upper back straight,
- 7) **slightly curve the lower back**.

#### **Lower Body**

- 1) the **outside of the forefoot, not the heel, should strike the ground first**,
- 2) the **lead foot should land on the ground slightly ahead of the athlete's center of gravity** (the front of the hips), with the foot dorsiflexed (pulled toward the shin),
- 3) the **athlete then pulls themselves over the lead foot** while plantar flexing (pointing the toes away from the shin) the foot,
- 4) **as the foot leaves the ground**, the athlete should flex the knee and pull the heel up toward the butt as quickly as possible,
- 5) **as the heel is brought up to the butt**, the entire leg should swing forward as though stepping over the opposite knee,
- 6) **once the foot "steps over the knee" the leg should be extended**,
- 7) **as the leg is extended the foot is driven to the ground for the next step**.

Stride length and frequency are also important to optimizing speed. Stride length is the distance a runner travels with each stride. Stride frequency is the number of foot contacts made in a specified time. **Speed will increase if an athlete is able to take longer strides comfortably while maintaining stride frequency, or vice versa.** The key is to find the ideal relationship between stride length and frequency.

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Questions and comments regarding improving speed or any other area of student-athlete wellness are welcomed and encouraged. They should be directed to Alan Beste, ATC, Administrative Assistant for the Iowa High School Athletic Association, PO Box 10, Boone, IA 50036. (515)432-2011, <abeste@iahsaa.org>

Sources: Cissik, John, M. MS, CSCS. "Technique and Speed Development for Running," NCSA Performance Training Journal, Volume 1, Number 8; Gambetta, Vern, MA. "Speeding Up," Training & Conditioning, December 2002, Guilford, Dave, Football & Track Coach Idaho Falls High School. "Add Speedwork to Your Training," American Running Association, <www.americanrunning.org>; Rose, Bob. "Basics of Speed Development," SportsCombine, <www.sportscombine.com