

I. Definitions

A. Muscular Strength- The maximum amount of force a muscle can exert against resistance in a single effort at a specific velocity. Muscular strength is most often tested for the lower body with the back squat. The upper body is tested most often with the bench press.

B. Muscular Power- The product of force generated and the speed of movement. In other words, power is strength with a speed component. Lower body power is tested with the vertical and/or horizontal (broad) jump. It is possible to be strong and not powerful, but it is not possible to have great power without being strong first. Building strength is the foundation of speed and power. Speed and power often determine the victor in most athletic contests.

C. Plyometrics- Type of training designed to produce fast, powerful movements, and improve the functions of the nervous system, generally for the purpose of improving performance in sports. Sprinting, jumping, and throwing are all forms of plyometric activities. Young children do plyometric activities. Plyometric training should be performed while the athletes are fresh. Either right after speed training or after the active warm up. Plyometrics should only be performed 2-3x's a week max. A 4:1 or 5:1 rest/work ratio should be used.

II. Speed Training

Speed training must be performed when the athletes are fresh, at the beginning of a practice, just after the active warm-up. All speed drills should be brief in nature, 10 seconds max or less. A 4:1 to 6:1 rest/work ratio should be used with speed drills. Quite frankly, the fastest athletes push more force against the ground yet spend less time with their feet in contact with the ground than their slower counterparts.

Speed is usually broken down into three subtasks: 1.) the start, which takes the form of a (2) point, (3) point, or (4) point position. 2.) acceleration, which is generally referred to as the first 8 to 10 strides. Most athletes attain close to 75% of their total maximum running speed within the first 10 yards. Fast acceleration requires arm and leg drive, pushing the ground down and behind the body. The body should remain in a straight line (that is, no flexing at the hips, rounding the back, etc.) 3.) Maximum velocity running occurs for elite sprinters @ between 45-55 yards. For younger athletes, max velocity will occur somewhere between 15-25 yards. Maximum velocity running requires running in a "relaxed" state, with arms kept at approximately a 90° bend. The arm swing should emanate from the shoulders, and coaches should emphasize the "back swing." Hands should be held open, not clenched. The hands should swing approximately from chin to cheek (as in buttock cheek). Arms should approach the mid line of the body in the front, but never cross over the mid line. Keeping arms totally on the side of the body is incorrect as well. For max velocity running emphasize a quick heel recovery and then "step-over" the opposite knee. Do not teach athletes to "reach-out" or lunge forward.

III. Hierarchy of Training

1. Speed
2. Power
3. Agilities
4. Strength
5. Metabolic Conditioning

IV. Movement Preparation/ Active Warm-up

A. Static Stretches – Slow and constant stretch that is held at the end of the range of motion (ROM) without movement for 30 seconds.

1. Use at the end of practice or competition
2. Use caution; do not stretch too intensely at first.
3. Will increase flexibility for athletes in a variety of sports.
4. Over 40 studies have shown that static stretches can ↓ muscular power by 15% for up to 30 minutes. This is why we recommend that you do not use static stretches just prior to football or cheerleading activities.

B. Dynamic Stretches- Type of functionally based stretching that uses sport-specific movements to prepare the body for activity.

1. Dynamic stretching should be used during warm-up.
 - a. Promotes temperature-related benefits of a general warm-up, unlike static stretching which may reduce temperature.
 - b. Multiple joints can be integrated into a single stretch.

Active Warm-up

The active warm-up that we like to use has three main components to it: 1.) Muscle Activation (which are movements like jumping jacks, mountain climbers or any other calisthenics) 2.) Dynamic Mobility (which is similar to a “traditional” static stretch, but it is only held for 1-2 seconds); examples of dynamic mobility movements are lunges, inchworm, etc. 4.) Technique (during the technique phase we emphasize things like marches, skips, hops, jumps, etc.)
As with all modes of training, an active warm-up should proceed from slow→ fast and from simple→ complex.

The following is a beginners sample active warm-up. Again this is only a template for the active warm-up...it must be dynamic in nature and should be “coached” at all times to assure that proper form is used on all movements. The active warm-up should be between 6-12 minutes in duration. A good active warm-up should have the athletes not knowing when the actual warm-up ends and the practice and/or training begins.

Muscle Activation	Jumping Jacks (10x)	Mountain Climbers (10x)	Arm Circles (10x forward/10x backward)	Wind Mills (10x)
Dynamic Mobility	Toe Walk/Heel Walk	Traveling Quad Stretch	Front Lunge in Place	Inchworm
Technique	Front March	Back March	Lateral March	Skip for Height