Move It or Lose It: Movement Training for Athletic Development

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Speed is the most sought after quality in athletics, yet it is also the most misunderstood. In sport, as the level of competition increases, so does the role of speed in determining success. Take a look back at your high school and college teams, and you'll likely recall that the best players were also the best athletes. This is true because of the strong correlation between quality and rate (speed) of movement and athletic success. So how do we increase speed? First we must first look at what speed is and what our training goals are.

What is Speed?
The formula for speed is simply distance divided by time, although it can also be defined as stride length times stride frequency. When it comes to sport, there are a number of different attributes of speed qualities for which one can train:

a. Acceleration – Rate at which speed is increased
b. Absolute Speed – Maximum velocity
c. Speed Endurance – Repeated high-speed efforts
d. Specific Speed – Speed specific to sport movement patterns.

Acceleration occurs from 0 to 30 meters and is highly dependent on relative strength (strength in proportion to bodyweight). Absolute speed is reached between 40 and 60 meters or 4 and 6 seconds, when moving in a straight line with perfect technique. This rarely occurs in sport without contact, change of direction or interference of some sort. Consequently, it is essential to know the specific demands of the sport to develop a plan for athletes to succeed.

Most sports require athletes to accelerate, decelerate, and change direction at high speeds with control. In terms of "speed training," these areas should be the focus of most performance programs. Improving these skills will be the "icing on the cake" if the rest of the program is fundamentally sound.

Movement Training
I like to get away from using the phrase "speed training" when discussing this particular topic. Yes, improving speed is one of our goals, but when you break it down our goal is to improve our athletes' movement skills. We are teaching them how to move in a biomechanically correct manner for optimal efficiency and improved performance. Therefore, when I use the phrase "movement training," I am discussing what most people call "speed, agility, or quickness training."

When it comes to movement training (or any training), it is important to understand that we are teaching the brain a movement pattern. The central nervous system calls upon the proper muscles based on the rate and the type of movement being performed, so when conducting movement training sessions, technique is imperative and quality rather than quantity must be emphasized. Also, when learning new movement skills it is important that the body is neurologically and physically fresh. It doesn't make sense to learn new motor skills in a fatigued state, because you will teach your body to perform them at less than optimal levels. The result may be performed with poor technique, slower speeds of movement, or altered synchronization

patterns, all of which will impede progress.

Movement training can be divided into two distinct and separate entities: linear movement and lateral movement. This is an interesting concept that I learned from Strength & Conditioning Coach Mike Boyle. Most people treat all "speed training" the same, without identifying specific goals for each session. By dividing movement training into two components, one allows for more directed focus during training sessions. Linear movement is focused on straight-ahead speed, while lateral movement is focused on change of direction skills, and side-to-side movement.

Linear and lateral movement days are usually alternated within the week, with movement training performed every other day. Movement training can be performed every day, but the total volume of work must be closely monitored if you are considering this option. Remember that fatigue must be minimized to ensure the development of quality movement patterns. If an athletes becomes fatigued, it should be as a result of conditioning and metabolic work, not movement training and neural work.

The organization of training sessions is another key factor affecting the quality of movement training. The following ideas on planning movement sessions come from movement specialist, Mark Verstegen. Sessions are performed in the following order:

1. Movement Preparation (warm-up)
2. Neural Development
3. Motor Programming
4. Energy System Development
5. Regeneration

The goal of movement preparation is to warm-up the body, elongate muscles actively, and to "turn on" neural switches. This is accomplished through continuous warm-ups, dynamic flexibility exercises, low-level plyometrics, and general coordination drills. The warm-up should also be specific to the routine of the day (i.e. perform a linear warm-up on a linear movement day, and a lateral warm-up on a lateral day). A linear warm-up targets the hip flexors, quadriceps, hamstrings, glutes and may consist of a variety of high knee drills, skips, bounds, and runs. A lateral warm-up targets the abductors and adductors to a greater extent and may consist of agility ladder drills, lateral shuffles, cariocas, and low intensity change of direction drills. The end goal is to prepare the body for the work that is going to follow.

Neural development incorporates plyometrics and other exercises geared toward increasing rate of force development and ultimately power. One should note that when performing plyometrics, one is targeting the ability of the CNS to enhance motor unit synchronization. Reducing force (deceleration) should be the first step in any plyometric program. Injuries primarily occur during the eccentric phase of muscle contraction, so deceleration-based training must be emphasized to minimize the chance of injuries. Always teach athletes to reduce force before emphasizing force production and minimizing ground contact time. Plyometrics should also be broken into linear and lateral components. Examples of linear plyometrics are squat jumps, broad jumps, vertical jumps, hurdle jumps, and box jumps. Both double and single leg plyometrics should be included in the program. Examples of lateral plyometrics are lateral bounds, heidens, ziz zag bounds, and lateral hurdle hops. I usually only perform single leg lateral plyometrics, because all sporting skills require change of direction laterally on one leg.

Motor programming training involves teaching proper linear and lateral movement mechanics. It is vital to reinforce correct mechanics to ensure a solid motor pattern is ingrained in the athlete. Many coaches are aware of advanced linear and lateral movement drills (e.g. sleds, chutes, towing), but simple drills emphasizing posture, arm action, and leg action (e.g. PAL system, Vern Gambetta), must form the base of a solid movement program. Further, coaches should demand correct mechanics to ensure quality development. Remember, if you put garbage information into the body, you get garbage out; the body remembers what it learns. If you go through drills too fast and with poor technique, that's what the body will

remember. Then, in an athletic situation when you need to express that pattern, it will do you no good at all. Motor programming can be summed up with this quote:

"FARMERS PATH TURNS INTO ROAD TO TOWN, TURNS INTO GRAVEL ROAD, TURNS INTO SUPERHIGHWAY."

Going over both linear and lateral movement is beyond the scope of this article and will be covered in the future. Keep an eye for part 2 in the near future.

Energy system development is the conditioning section of the training session. This is the time when body composition and fitness goals are the focus. When looking to increase work capacity for performance, it is important to look at how you are conditioning your body. I am a firm believer in the adage, "Train fast to be fast, train slow to be slow." Conditioning must be performed with explosive movements that a) emphasize sport skills and b) train the energy systems used in sport. Since most sports require athletes to perform explosive, coordinated movements under conditions of fatigue, conditioning should consist of applicable activities. I do not have my athletes perform very much long distance, aerobic work. I use it occasionally for recovery purposes, but the majority of our conditioning is anaerobic, and consists of tempo runs (runs at 75-85%), shuttle runs, slideboard intervals, bike intervals, medicine ball throws, or games. Everything is interval in nature, because intervals imitate sport. This type of conditioning is much more challenging, but it yields better results in terms of performance and aesthetics.

Regeneration is the final portion of a training session, as recovery is vital after intense training. During training, we break down the body and provide a stimulus for improvement, so one must understand that the recovery period allows the body to adapt to the stimulus and rise to a higher level of fitness. The goals of the regeneration period are the exact opposites of those of the movement preparation period; we want to quiet or calm the nervous system and return the body to homeostasis. Various types of static stretching, yoga, myofascial release, or massage should be utilized during this time period. Foam rollers and massage sticks are inexpensive tools to promote recovery. Post workout nutrition is also very important and needs to be a priority if you truly want to meet your athletic goals.

Putting it all together
Movement training should be conducted year-round, but in different volumes. The majority of work should be done in the off-season when more time can be devoted to increasing overall athleticism. Movement training should be used sparingly during the in-season phase because athletes are performing the most functional and specific types of movement work in their practice sessions. However, movement training can be implemented into pre-practice or pre-game warm-up routines to increase physiological and neurological functions.

A sample linear movement training session would look like this:

Warm-up:	Continuous Warm-up
Plyometric:	Long Jump w/ Stick 3x5 Single Leg Line Hop w/ Stick 3x5 ea
Speed:	Seated Arm Action 2x10 sec Wall March 2x5 ea Lean Fall Run 2x10 yds ea leg Pushup Starts 2x10 yds ea leg
Conditioning:	110 yd Tempos x10 (:20-:40) 75%

Some sample splits demonstrating how you can incorporate movement training into your program:

Option # 1

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Movement Type	Linear	Lateral	Off	Linear	Lateral	Off	Off
Weight Training	Lower Body	Upper Body	Off	Lower Body	Upper Body	Off	Off

Option #2 – Great for summer programs

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Movement Type	Off	Linear	Off	Lateral	Off	Linear	Off
Weight Training	Total Body	Off	Total Body	Off	Total Body	Off	Off

Option #3 – Great for during the school year with off-season programs

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Movement Type	Off	Linear	Off	Lateral	Off	Off	Off
Weight Training	Total Body	Off	Total Body	Off	Total Body	Off	Off

Don't feel limited by these suggestions. These are options that I have seen work for me and others that I know, but you have to make sure that everything fits into the context of the goals of your program. Movement training is a very important aspect of training and can provide that missing link to any program if implemented correctly.

 References:

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