



# **Drill Sergeant:**

## Guidance to Enhance your Training

### **Endurance**

## **Building a Better Runner**

*Submitted by Michael J. Smith, Kansas State University, Assistant Track and Field Coach*

*One of the central tenets of the USATF Coaches Education Endurance curriculum is to provide coaches with training “ingredients” and allow them to develop their own recipes for training their athletes. We all coach in different environments. Differences in climate, topography, urbanization, and training age all contribute to the training environment and affect the relative mix of ingredients in the training recipe. What works in one environment, may not work in another. However, there are common themes. Central among these is the concept of the inclusion of some sort of strength training to one degree or another, in the training plan for endurance athletes.*

*My current philosophy regarding strength training and the endurance events has evolved over time. As a young high school coach (William Penn Charter School in Philadelphia, PA; Skyline High School, Oakland, CA) I found the majority of the kids with whom I worked were one dimensional. They possessed stamina but were not athletic. That is to say, they were deficient in areas of strength, speed, skill, and suppleness. Furthermore, they were almost always untrained, and thus their capacity for work was very low. When I moved on to Kansas State University, I encountered a more talented runner but one that was still deficient across the spectrum of athleticism and again, largely untrained. There have been exceptions to this trend, but on the whole I have come to expect certain athletic deficiencies and very low work capacities from the majority of my newcomers. At K-State, I have been fortunate to study under Cliff Rovelto who is a recognized expert in the jumps and multi-events. He introduced me to the concept of athleticism and its importance in all events in track and field. He trains his high jumpers to be better athletes under the premise that if they are stronger, faster, more flexible, and more coordinated they can jump higher. Given the apparent deficiencies of the distance runners that I was encountering, it was obvious to me that I needed to train more than the energy systems in order to maximize their endurance capabilities. I began to experiment with a training program that had an increased emphasis on strength training.*

*I have found that models of training for endurance runners vary in scope but invariably incorporate the elements of speed, stamina, suppleness, skill, and strength. Stamina and speed are arguably the two most important of these elements to be addressed in the training of endurance athletes; this is not in dispute. However, in order to maximize the training of stamina and speed, one must first create and maintain a physical platform from which to support the work volumes associated with appropriate and successful endurance training. The creation of this physical platform will aid in injury prevention, increase work capacity, and contribute to improvements in the efficiency of running. To put it simply, if the energy cost of running can be reduced by improving balance, force production, range of motion, posture, and muscular endurance, the runner can be more economical. This is, “running economy”. Theoretically, if “running economy” improves, performance gains will follow. Thus, the incorporation of physical strength into the training program has to be prioritized.*

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*The essential function of a platform is support. The term physical platform in an athletic context describes the human body's ability to support work. A stronger distance runner is better able to tolerate more mileage and greater intensity in training i.e. their work capacity increases. Strength in this context is not synonymous with bulk or large increases in mass. Initial changes in strength are due to improvements in the neuromuscular pathways. Hypertrophy is, however, a natural result of muscular endurance training but the resultant gains in muscle mass are appropriate gains and will aid in performance. Muscle is added where muscle is needed. In fact, distance runners often need to be stronger just to train appropriately. Distance running by nature is physically very demanding. If we except the caveat that changes at the metabolic level happen more quickly than changes at the cellular level, then it is imperative that coaches address the relative strength of the athletes so that they can tolerate increases in metabolic work. It is easy to identify the improvements in the energy systems of endurance athletes. Injuries however, often occur when our metabolic ambition outpaces our cellular preparation. Tendons, ligaments, muscles, fascia, and bones are subject to great stresses from running and must be prepared to support the workload. It is not uncommon for endurance athletes and coaches to encounter shin splints, patella tendonitis, ankle sprains, plantar fascia pain, IT band tightness etc. These maladies need to be mitigated. Coaches should assume that the potential for injury exists and be pro-active. Running is, of course, a specific form of strength training but it is often not enough. We need to build a stronger, more athletic runner. This entails a more comprehensive strength training program including general strength, preventive strength, and core strength.*

*The logical starting point for a comprehensive strength training program for distance runners is the first point of contact with the ground. Given that the foot is the first point of contact in running, it follows that a strong foot, or a "trained" foot, is better than a weak/untrained foot. For cross country runners that often train on uneven surfaces, it makes sense to prepare the foot to tolerate uneven terrain characteristic of the sport. Conversely, for the cross country runner that often trains on pavement or other hard surfaces, it is critical that soft tissue be conditioned to support the greater forces associated with training on the harder surface. A summer program that includes preventive strength routines such as walking in the sand (sand routine), barefoot grass running, and balance routines will accomplish the task of injury prevention. Moreover, simple routines that improve the overall strength of the foot can reduce the energy cost associated with force absorption at ground contact and concurrently improve force application. This can improve the efficiency of the runner and enhance "running economy". There must also be an emphasis on strengthening the other areas of the kinetic chain.*

*Forces from ground contact invariably travel up the kinetic chain and summate in the core. Therefore, core strength must be improved so as to absorb those forces and maintain postural integrity. The core encompasses the hip girdle, the abdominal muscles and the back. A strong core will allow the athlete to maintain posture and thus be in a better mechanical position to strike the ground. Core strength should be considered in a 3 dimensional manner. That is to say, abdominal exercises should not be the only prescription for core routines. The core needs to be strengthened through all three planes of motion: frontal, sagittal, and transverse. Hip routines, abdominal routines, and back routines are all necessary ingredients in the building of the endurance athlete's physical platform. Some good examples of routines designed to improve core strength and posture (pedestal), flexibility and range of motion (back exercises), balance (language routine) or work capacity (Dryer) are demonstrated in a DVD (**Building a Better Runner: Building from the Ground Up**) that I recently completed with Jay Johnson (University of Colorado) and can be found at [Runningdvds.com](http://Runningdvds.com).*

*There are many ways to implement strength routines and exercises into the training program. It is possible, and in some cases recommended, that endurance athletes engage in 1-3 hours of general strength work per week. Younger more developmental athletes should begin with very basic routines focusing on core strength and injury prevention. This will aid in their overall development and serve to increase work capacity. More advanced athletes (collegiate) should be completing anywhere from 1000-3000 core exercises per week, completing injury prevention routines several times per week, and engaging*

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in appropriate functional strength routines 4-5 days per week. There are a number of ways to incorporate these protocols. Preventive routines can be implemented as part of the warm-up, included in lifting regimens, or put into a post-training circuit. Balance routines can also be placed in the warm-up, in a lifting regimen, and as a post-training routine. Circuit training is often very useful after hard aerobic/anaerobic training due to the restorative nature of this type of work. Core work is very productive if implemented after aerobic training or in association with morning strength protocols. Strength exercises can also be added to dynamic warm-ups (Tempo Warm-up). Coaches should individualize the introduction of strength training based on the specific needs of the athletes. Before adding strength training to a training protocol however, I would first make the following point: There is no secret to this type of work. It is work. It takes time. If you are willing to add a few simple, yet demanding routines to your training program, your athletes stand to benefit.

Below are some photos of the Pedestal Routine that you will find on the **Building a Better Runner: Building from the Ground Up** DVD that was mentioned previously in this article.

**Prone Elbow Stand, Single Leg Raise:**



**Supine Elbow Stand, Single Leg Raise:**

