



### *Sports Conditioning*

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Sports such as soccer, baseball/softball, basketball, volleyball, tennis, and football involve high intensity movements interspaced with periods of light activity or rest. The energy requirements for these athletes are very specific. The body needs to provide energy quickly to perform powerful actions such as short sprints, jumping, and throwing.

The body has three major energy systems, which all differ in the quantity and rate of energy they provide. The energy systems work together during the course of a game/match to produce smooth efficient movements. The phosphagen system produces energy at the onset of exercise and is extremely important during high intensity movements, however it can only provide enough energy for less than 10 seconds (then it becomes depleted). The glycolytic system is the major contributor during activity of 20 seconds to 2-3 minute range. Glycolysis begins to take over when the phosphagen system becomes depleted. Lastly, the oxidative system (aerobic system) can provide vast amounts of energy but it takes time for this energy system to be fully activated (it cannot provide sufficient energy quick enough for short duration/high intensity activities).

Analyzing the pace of the game and the energy requirements provides a clear picture about what type of training would be most appropriate for each athlete/sport. Instead of simply monitoring the total duration of the match, analyze the number of high, medium and low intensity movements throughout the entire match (also account for rest periods). This information will give coaches a lot of information on how to design a conditioning program for athletes based on different intensities of their sport. Conditioning programs should involve high intensity sprints (along with other high intensity movements such as shuffles, jumps, throws, backpedals, etc.) with periods of low activity or rest. Unless a coach is training a cross-country

athlete or long distance track and field athlete, move away from the traditional long distance (aerobic training) approach. Aerobic training will bring about training adaptations to the oxidative system, but actually may negatively affect the phosphagen and glycolytic systems.

Each individual energy system can adapt to training. The amount of energy stores in the body, the breakdown of energy, and the resynthesis of energy are positively influenced with proper training. However, only the energy systems that are targeted (during training) will adapt. This does not mean you have to train a different energy system everyday. In fact, high intensity intervals (sprints with rest periods built into the workout) will positively influence all three energy systems and it is sport specific.

Bottom Line – If coaches are having their athletes do long distance aerobic activity all the time, yet they play a sport that requires short bursts of high intensity movement, coaches are doing a disservice to their athletes. For example, many baseball, softball, tennis, basketball, football, and volleyball coaches use the mile(s) run as a standard test. Using the mile run as a test makes sense only because it is easy to administer and measures fitness over a training cycle. However, be cautious about testing athletes in the mile because they will try to train to improve for the test. If athletes take this approach they are not training the appropriate energy systems for their sport (they are only doing it for testing purposes). If coaches want their athletes to be the best at low intensity, long duration activities continue running mile after mile. On the other hand, if the sport requires athletes to be fast and explosive repeatedly throughout the game I would recommend high intensity sprinting (interval training).