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Review of energy systems used during middle distance running, taken from:

Duffield et al. (2005) **Energy system contribution to 1500m and 3000m track running.** Journal of Sports Sciences. 23 (10) 993 - 1002.

During the last 20 years, training schedules for endurance sports have changed a great deal, reflecting the trends and thoughts at that time. Marathon running is an aerobic sport, which means that the majority of energy produced is done so by using oxygen to break down fuel sources, namely fat and carbohydrate. To prepare adequately for a marathon, it is important to ensure that the majority of your training is long and aerobic. However, for the athlete running 10k, or perhaps even 5k events, is there less emphasis on such aerobic development?

Training for 5k generally involves a great deal of 'speedwork' and 5000m runners tend to spend less time 'knocking out' the miles than their marathon counterparts. This is based upon the belief that the anaerobic system plays a greater role in energy production during short races. Athletes running 5k should be more concerned with running above their 'lactate threshold' and completing swift 200m and 400m interval sessions, right ?

Peter Snell set world records for 800m and the mile, from regular 100 mile training weeks. Coached by Lydiard, he generally followed a marathon type programme and began speedwork 6 weeks prior to a championship event. Today, there are few marathon runners completing 100 miles per week, let alone 800m runners !!

Duffield et al (2005) decided to study in greater depth the energy requirements of middle distance runners, to help coaches better prescribe training schedules. Runners completed 2 time trials over 1500m and 3000m outdoors. Up until this point, much of the energy provision research had been done on the treadmill, but Duffield took the athletes onto the track to gather data. The table below shows the percentage contribution of the aerobic and anaerobic systems during both time trials, for males and females. Measurements presented are based upon accumulated lactate levels.

	1500m	3000m
Males	81% Aerobic / 19% Anaerobic	93% Aerobic / 7% Anaerobic
Females	82% Aerobic / 18% Anaerobic	92% Aerobic / 8% Anaerobic

The table shows that for the 3000m time trial, an event less than 2 miles, 92-93% of the energy is produced aerobically. Even more surprising, during the 1500m event (less than 1 mile !!), 81-82% of the energy is derived from aerobic sources. What does this mean for the coach and athlete ? Maybe Peter Snell was a little extreme, but he certainly trained the correct system.

In practical terms, this information stresses the need to aerobic development. An efficient cardiovascular system, aerobic development of muscle fibres and a dense network of muscle capillaries are not only required for the marathon, but also for events as short as the 1500m. Whilst interval training is beneficial, the development of a sound aerobic base beforehand is crucial. Many runners are drawn into speedwork and fast intervals too soon, it is important to remember that even 5k events require sustained running for 15-20 minutes. Coaches need to question whether 200m / 400m repeats are justifiable for all athletes, especially those racing 10k or above.

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