

Running Head: Training Cross Country Athletes

TRAINING TO THE STRENGTHS OF INDIVIDUAL CROSS COUNTRY ATHLETES

BY:
MS. ANDRIA R. NUSSEY

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Stuart Kantor
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There are a variety of athlete types that can be incredibly successful in the sport of cross country. Essentially, there are three types of runners: strength/power athletes, who excel at the mid-distance races during the track season; endurance athletes who excel at the longer distance races during the track season; and the all-purpose athlete will usually fall somewhere in between, and, based upon experience and preference can be grouped with either endurance type runners and strength power runners (Gardiner, 2011). The category that a runner falls into is based upon genetic ability and training background. Genetically, each runner is born with a unique ratio of slow twitch muscle fibers to fast twitch muscle fibers (Davidson, 2011). A greater proportion of slow twitch fibers will provide the runner with a predisposition to good muscle endurance, while a greater proportion of fast twitch fibers will provide the runner with a predisposition to greater running power and strength. However, research has not shown that muscle fiber ratios can be the single and most accurate predictor of running success; there are too many other variables involved. Other than genetic predisposition, the athlete's quality of preparation and training is the key in an athlete's success as a distance athlete (Coe, Martin, 1997).

Obviously, it is important to differentiate between endurance inclined athletes and strength/power athletes. Endurance runners will excel during the track season in races like the 3 kilometer, 5 kilometer, and 10 kilometer. The strength and power runners will excel at races like the 1500 meter, 800 meter, and even the 400 meter (Duester, Leech, & Newsholme 1994) . Not only do these runners differentiate in muscle fiber ratio, they will also vary in physical build and body composition. The endurance runner will most likely be more slightly built with a longer, leaner shape. The strength power runner will be more likely to have a more muscular appearance, and in some cases be more compact. Height will vary in both areas. A good distance coach should take the time to determine each runner's natural disposition and find the type of training to which the athlete's body responds best. Because of muscle fiber ratio, body weight, and build differences, strength/power

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athletes commonly respond better to workouts designed with fewer repetitions at a higher intensity. Also, because of the same factors, an endurance type athlete would respond better to more repetitions at a lower intensity (Coe, 1997). These endurance athletes will require a greater amount of time to recover from speed work or track work, while the strength power athletes will have more difficulty recovering from a long run.

During the regular collegiate cross country season, race distance is 5 kilometers for the women's teams and 8 kilometers for the men's teams. As the season comes to a close and the post-season conference and regional meets take place, the distance will increase to 6 kilometers for the women and 10 kilometers for the men. Clearly, any athlete must train extensively to reach peak performance at this distance and intensity. For a 5 kilometer run, it is estimated that aerobic metabolism is responsible for 87.5% of energy needs. For 10 kilometers, it is estimated that aerobic metabolism is responsible for up to 97% of energy needs; the remaining percentages of energy needs are filled by the anaerobic fuel system (Duester, 1994). The aerobic abilities can be developed and improved repeated runs of at least 3-5 minutes duration at the athlete's maximum oxygen uptake (Gardiner, 2010). According to *Daniel's Running Formula*, maximum oxygen uptake can be determined by the running speed that an athlete can sustain for twelve minutes. Therefore, either type of athlete may train to improve his aerobic capacity with longer, slower interval runs; mile repeats, and long-runs. An athlete predisposed to greater endurance will excel at these types of workouts. Athletes may train to improve anaerobic capacity by causing the body to exceed what the maximum oxygen uptake can supply with shorter intervals at a faster pace, hill runs, and resistance training. An athlete who is genetically predisposed to strength and power will likely excel at these workouts.

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The mid-distance runner's strength is a strong kick as well as the ability to surge during a race and possibly navigate hills and obstacles more powerfully. A strength/power runner can afford to blend into the pack throughout the race and move up during the last 800m with a strong kick. 5,000m and 10,000m endurance athletes have the ability to keep up a strong pace over long distances. This makes them strong runners. However, the main weakness of this type of runner is less of a kick at the end of a race and less power when it comes to navigating hills and difficult terrain. A distance coach must keep this in mind when developing training plans (Coe, 1997). Whether off-season, pre-season, or in-season, for best results, the training plan should play to the athlete's strengths, while still working to improve the athlete's weaknesses.

Another important topic when developing training plans to suit different types of cross country runners is mileage. The amount of miles middle distance runners should run weekly has been a subject of dispute amongst coaches and athletes for a very long time. Mileage should be based, not only upon runner's age, but also experience and strength. Mileage should also be balanced with speed workouts and resistance training. Being balanced means not requiring athletes to run more mileage when rest is needed. Some runners have had success running less mileage, while others have had success running more (Newton, 1998). The collegiate coach should consider that strength/power athletes may not have the same distance background as the seasoned 5k/10k runners. This is when the coach may need to get feedback from the well-seasoned, mature runners on the team in order to determine when more rest is needed versus more mileage (Gabriel, G., personal communication, June 17, 2011). However, despite the disagreement on amount coaches agree that mileage is a necessity in training all distance runners. In addition to this sample workout schedule, it would be beneficial for all athletes to get some extra mileage 1-3 times per week. Athletes should be required to run 20-30 minutes in the morning together a couple times a week at an easy pace just to get in some extra mileage (Newton, 1998).

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***Figure 1.0 comparison of a sample workout schedule. See attached page 7.**

Obviously, as a coach, it is important to differentiate between endurance-inclined athletes and strength/power-inclined athletes. Endurance runners will excel during the track season in races like the 3k, 5k, and 10k, while strength/ power runners will excel at races like the 1500m, 800m, and even the 400m. However, these differences will not exclude an athlete from being an excellent distance runner. Because of the natural genetic predisposition and the physical factors the cross country coach should consider modifying the training to better suit the particular athletes involved. This strategy will help in promoting peak performance while preventing mental and physical burnout.

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References

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Figure 1.0 comparison of a sample workout schedule.

Day	Female Strength Inclined Athlete	Female Endurance Inclined Athlete	Male Strength Inclined Athlete	Male Endurance Inclined Athlete
Monday	Interval work 10x400s at race pace 60 second jog for rest; 3 minute walking rest; 8x200s at surging pace; walk 100m in between	interval work (20X400s at race pace 60 second jog for rest)	Interval work 10x400s at race pace 60 second jog for rest; 3 minute walking rest; 8x200s at surging pace; walk 100m in between	at race pace 60 second jog for rest)
Tuesday	distance work (4-5 miles at a moderate hard pace and 10x100m grass strides	distance work (6-8 miles moderate hard pace)	distance work (6-8 miles at a moderate hard pace and 10x100m grass strides	distance work (8-10 miles moderate hard pace)
Wednesday	3xmile repeats followed by 3x800m with 3 minutes rest	4mile steady state distance followed by 6x800 at race pace 200-400m jog in between for rest	4xmile repeats followed by 4x800m with 3 minutes rest	6 mile steady state distance followed by 6x800 at race pace 200-400m jog in between for rest
Thursday	40-50 minute run	65-115min distance run	40-50 minute run	65-115min distance run
Friday	Easy distance run (run the course) a few strides and stretching	Easy distance run (run the course) a few strides and stretching	Easy distance run (run the course) a few strides and stretching	Easy distance run (run the course) a few strides and stretching
Saturday	Compete	Compete	Compete	Compete
Sunday	long easy run and stretching	Light jog/stretching	long easy run and stretching	Light jog/stretching

*note: this sample workout schedule has been compiled from examples from (Duester, 1994) (Haines and Johnson, 1984) (Gabriel, G., personal communication, June 17, 2011).