

# Effects of Aerobic Training on Soccer Performance

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When planning an effective training program for soccer it is important to consider: aerobic fitness level, repeat sprint ability or RSA, speed, strength, power, agility and playing ability, etc. In this article I will only focus on the aerobic aspect of soccer. Trainers and coaches from all over world seem to have varying opinions on the topic of conditioning for soccer. Many believe that continuous running is the death to the speed of a soccer athlete. Others believe that it is best to do continuous running for soccer. While many others might think it appropriate to do shuttle running only. Whatever your philosophy, the key component to making your conditioning program effective is specificity. (To see an example of shuttle running created with CoachFX software go to or click on <http://www.elitesoccerconditioning.com/FitnessTraining/shuttleruns.htm>.)

Soccer is an intermittent sport consisting of sprints followed by periods of walking or jogging. Does specificity of training apply only to movement or also to the energy systems that contributes to the movement? The answer is that it applies to movement, muscles and energy systems. This means that if we do 3 mile continuous runs, which focus on the aerobic part of the equation, we are missing a couple key components, movement and muscles specific to soccer.

As mentioned previously trainers might spend day after day having their athletes do countless number of sprints to condition their athletes. Although there is a place and time for doing anaerobic work, we can't ignore the aerobic system in training.

The *Science of Soccer* (1) mentions 3 objectives of aerobic training:

- 1) Improve the capacity of the aerobic system. Thus a larger percentage of the energy required for intense exercise can be supplied aerobically, allowing a player to work at a higher exercise intensity for prolonged periods.
- 2) Improve the ability of the muscles to utilize fats during exercise. Thereby a larger portion of glycogen can be preserved and a player can exercise at higher intensities at the end of the game.
- 3) Improve the ability to recover after a period of high intensity exercise. As a result, a player requires less time to recover before being able to perform in a subsequent period of high-intensity exercise.

Aerobic training not only influences the endurance performance of an athlete but also the ability to repeatedly perform maximal exercise bouts. (1) This alone outside of tactical or ball work could contribute to more wins.

To improve your team's ability to win games you need to reduce team fatigue. Studies have shown a significant drop in distance covered from the first half to the second half, but this decrement should be minimized. Reilly and Thomas (1976) have shown an inverse relation between aerobic fitness and decrement in work rate. The players with the higher aerobic fitness level did not show a significant decrease in work rate. (1) This can be a huge advantage for teams that train the aerobic component. Many goals are scored in the final minutes of soccer games. If your team is in better condition, then your goals in the final minutes might go up.

It has also been shown that the higher the aerobic power the more distance can be covered in a game. (1) Smaros confirmed the relationship of aerobic power to distance covered in a game but went further to explain that the number of sprints attempted in a game is also correlated to aerobic power. (1) Victory also seems to correlate well with aerobic fitness.

Mognoni (1992) underlines the fact, that in the Hungarian league some years ago, the team with the higher average aerobic fitness level had a better finishing result. The team winning the league recorded an average value of 66.6 ml/kg/min, 2<sup>nd</sup> 3<sup>rd</sup> and 5<sup>th</sup> had 64.3, 63.3 and 58.1 ml/kg/min respectively. (2)

Victory may actually depend on your aerobic fitness levels. Jan Hoff and Jan Helgerud (3) have demonstrated through research that an improvement of 5-6 ml/kg/min in VO<sub>2</sub>max is followed by:

- 1) 1500-2000 meters more covered in a game
- 2) doubled number of sprints
- 3) 30% more involvements with the ball

Plan your aerobic training regimen so that you improve your aerobic fitness while maintaining or improving your speed. Doing countless number of hours a week running mile after mile will affect negatively your athlete's speed. Let me repeat that because it is one of the most important things to understand with training fitness in soccer. Continuous running for soccer could be the kiss of death to that athlete's speed. Remember, the body adapts to the stimulus put on it. So if you do long slow running your players muscles will adapt to long slow running. And your athlete's might be more susceptible to overuse injuries. An effective way to build aerobic fitness levels, in a soccer specific way, is to do Tempo runs. I will address specific methods, sets and reps for an overall fitness program in the future on the website.

As you put together your fitness program for your soccer athletes remember the goal is not aerobic power or increased Vo<sub>2</sub>max. The goal is to improve performance on the field. Performance on the field can be equated to your athlete's ability to be at the right place at the right time.

Aerobic fitness levels could be the difference between winning and losing if trained right. Never let conditioning be the reason you lose a game. Sometimes conditioning can actually be an extra tool to give you that extra point needed to win the championship.

- (1) Reilly T. & Williams M. (2003), *Science and Soccer*, USA, Routledge
- (2) Arcelli, E and Ferretti F., (1999) *Soccer Fitness Training*, USA, Reedswain.
- (3) Hoff, J and Helgerud, J., *Hoff-Helgerud Football endurance test*