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# Professional Development Cooperative

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## Practical Applications of Recent Sports Medicine Research Findings

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Happy New Year! This month's PDC article focuses on four recent research and review articles from the sports medicine literature related to the sport of soccer. Although the articles involve soccer the research results and recommendations from the authors of the papers have important practical implications for coaches of all sports. Let's review the four papers and evaluate the practical findings and recommendations reported by the authors.

**Article #1:** Physiological and Sport-Specific Skill Response of Olympic Youth Soccer Athletes, *Journal of Strength and Conditioning Research*, 2004, 18(2), 334-342.

Vanderford et al. studied 59 US Olympic Development Program (ODP) athletes that were randomly selected and grouped by age and game experience (3 groups coded as under 14, under 15, under 16). The athletes completed a battery of tests to measure aerobic power (VO<sub>2</sub> max), max heart rate, anaerobic threshold, anaerobic power/capacity, vertical squat jump, counter-movement jump, body composition, joint range of motion, and agility/sport specific skills. The authors found that the ODP athletes tested were similar to athletes in traditional field sports when compared by age except that the ODP athletes had lower values for anaerobic power and leg power. It was recommended that coaches and soccer associations develop age appropriate tests across the country to optimize athletic evaluation and development for soccer. **Take Home Message:** Based on this research the authors suggest that coaches should test and evaluate their athletes with age/gender appropriate tests that are sport-specific and the results from the tests can be used to work on developing the athletes' abilities over time. It would be helpful to begin to evaluate our athletes in the various UIL sports more uniformly so that coaches might be able to share their results statewide so that we can begin to understand what athletic abilities are required at various levels to perform safely and effectively in various sports.

**Article #2:** Changes in Exercise Performance and Hormonal Concentrations Over a Big Ten Soccer Season in Starters and Nonstarters, *Journal of Strength and Conditioning Research*, 2004, 18(2), 121-128.

Kraemer et al. studied 25 (11 starters, 14 nonstarters) NCAA Division 1 soccer players from Penn State University over an 11-week competitive season. They wanted to determine how the soccer players adapted to the effects of conditioning, practice, and high-level competition during an entire season. The authors tested the athletes for knee extension and flexion strength, maximal vertical jump, sprint speed (20 yards), body composition, and blood hormonal levels (testosterone-higher levels associated with improved performance and cortisol-high levels associated with overtraining). The authors found that players who start the season with low testosterone levels and that had high cortisol levels experienced decreases in performance (lower knee extension and flexion strength, maximal vertical jump, sprint speed (20 yards for starters and nonstarters) and increased body composition in nonstarters) during a competitive season. The authors recommend that players should have a planned program prior to the season that does not result in acute (short-term) overtraining (like can happen to young athletes trying to get in shape in 6-8 weeks over the summer before preseason training). **Take Home Message:** Based on the findings from the above study it appears that coaches need to be able to monitor their athletes to make sure that they are not overtrained at the beginning of preseason which can have a negative effect on their in-season performance. Since most coaches do not have the resources to test their athletes for blood hormonal levels for testosterone and cortisol they have to depend upon developing good working relationships with their athletes to get specific feedback about factors associated with overtraining. Some markers of overtraining include constant fatigue, weight loss, elevated resting heart, chronic muscle soreness, insomnia, mood changes (loss of vigor), etc.

**Article #3:** The Effect of In-Season, High Intensity Interval Training in Soccer Players, *Journal of Strength and Conditioning Research*, 2004, 18(3), 584-589.

Dupont et al. studied 22 professional soccer players to determine the effects of an in-season, high intensity interval training program. During two, 10-week periods



the athletes first focused their training on technical and tactical skills, games and matches as a control session. Then, the players participated in 10 weeks of high-intensity interval training (2 sessions per week) consisting of 12-15 runs lasting 15 seconds at 120% maximal aerobic speed (like the speed for a maximal two mile run). Interestingly, the team won 33.3% of their games during the control period and 77.8% of their games during the high-intensity training period. The authors found that the high intensity interval training improved maximal aerobic speed and decreased 40-meter sprint speed. The authors recommended that coaches can aim to improve physical fitness during the season, without causing overtraining. **Take Home Message:** Based on the findings from the above study it appears that coaches may be able to increase fitness during the season of competition whereas, they often focus on maintaining fitness during this time. Perhaps instead of focusing on increasing fitness to very high levels at the beginning of the season (which might cause overtraining, see article #2) they might be better off to develop baseline levels of fitness in the preseason and continue to improve fitness levels during the competition season.

**Article #4:** Creatine, Carbs, and Fluids: How Important in Soccer Nutrition? *Sports Science Exchange*, 2004, 17 (3), 1-6. Article available at [www.gssiweb.org](http://www.gssiweb.org)

In this article Donald Kirkendall reviews the research related to nutrition and soccer performance for the Gatorade Sports Science Institute. Dr. Kirkendall highlights 7 myths about soccer nutrition. The myths he explores are summarized as follows. Myth # 1 – What a soccer player eats does not affect their performance. If the player doesn't pay attention to what they eat they will perform poorer. Myth # 2 – It is more important to eat protein (associated

with tissue building) than carbs. Most players get plenty of protein in their diets but they need to also consume plenty of carbs (50-60% of diet) to maintain their energy levels. Myth # 3 – Drinking fluids during practice and matches is for sissies. Obviously, athletes who become dehydrated perform worse and increase their risk for heat cramps, heat exhaustion, and heat stroke. Soccer players need to consume fluids before, during, and after their practices and competitions. Myth # 4 - Water is the best fluid-replacement beverage. Water is better than nothing but research shows advantages to using sports drinks to optimize fluid replacement and recovery from high-intensity exercise. Myth # 5 – As long as one drinks when they are thirsty, they'll get plenty of fluids. It is best to match your fluid intake with your weight loss or gain during practice. If an athlete loses more than 1.5 % of their body weight during practice/games they need to drink more. If they gain weight they can drink less to match their needs. Myth # 6 – Creatine supplementation will make me perform better. There is no strong evidence that supports this statement. The sport of soccer has a high endurance component which can not be influenced positively with creatine use. Myth # 7 – It is okay to eat whatever one wants when the team travels and the team stops to eat at restaurants. Learn to make smart food choices even when you are recovering from competition because it is important to begin to get ready for the next practice and match. **Take Home Message:** It is important for coaches and athletic trainers to continually reinforce positive nutrition and fluid replenishment messages to their athletes because we all are regularly subjected to sports medicine myths that often impair performance rather than enhance it.

Look for PDC articles on pertinent athletic medicine issues each month in *Texas Coach Magazine*. Send your comments and ideas for articles to Tinker Murray (tm05@txstate.edu).

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just the first loser.*

*Dale Earnhardt*

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