

Sports science essay examples

[Health & Medicine](#), [Body](#)



Arsenal FC Physiological and Training Attributes

Introduction:

It is clear that Football is a high endurance sport that requires a lot of very quick sudden movements no matter the position being played. Whether one is the Goalkeeper, a Sweeper, or a Wing-back, there are certain physiological attributes that every football player must be able to maintain throughout their career, especially to play for a competitive club such as Arsenal.

These determinants include the cardio-respiratory strength of the athlete in terms of how long it takes the athlete to achieve a maximum heart rate as determined by their overall health, how long their body can maintain that rate without reaching critical blood-oxygen levels, and how long it takes the athlete to recover back to a competitive state afterwards, as stated by the National Institute of Health in an article by Tumilty D. (80-96). Other determinants include the strength, agility and endurance of muscle, tendon, and ligament sets such as the shins.

Over the years, this club, as well as many others, have developed training techniques to keep the player's skills up to par with the rest of the clubs. In this paper, I'll explain the various physiological attributes specific to football, and the training, as well as testing, that takes place to ensure that each athlete competes at their peak performance capabilities.

Specific Performance Determinants:

The duration of the soccer game without bonuses included is ninety (90) minutes long, split into two halves, making it one of the most taxing team sport games that exists. The average pro-player, depending on their time on

the field, will run 10-12 km per game; this doesn't take into consideration the other movements that the athlete will have to make. They will, for example, have to move forward to backward, side to side multiple times through the game, apply pressure to the ball to reach an intended velocity, and defend or tackle to maintain a passing area. There is a lot of stopping and starting frequently throughout each match, causing demand on the cardiovascular system, which directly, in turn, directs the amount of oxygen available to the blood. According to Stoelen (506), it is virtually impossible to quantify the amount of oxygen loss associated within any given period of soccer play due to unsteady movements throughout play.

What is known is what the human body can generally endure (505-6). In a 90 minute period, the pro-athletic human body can endure a steady blood oxygen level of 80% and still maintain maximum performance. Anywhere below this percentage, then this body will reach a threshold in which aerobic and anaerobic activity turn from being at the same rate, to lactate being produced at a level that makes the athlete unable to perform at the same levels as before.

In a landmark study by Ogushi in 1993 (120-123), special monitored mini-bags were attached to players as they played during both halves of the match. It was determined that blood oxygen levels as low as 49% in the first half and 47% in the second half during their most arduous 3 minute campaigns on the field. These bags were able to measure forward and backward motion, but failed to take into account side to side, jumping, and defending motions. These are still impressive numbers, even if underestimated (meaning these blood oxygen levels are probably even lower

during peak 3 minute intervals). To put this in context, a person who has been hospitalized typically will not be released until their blood oxygen levels remain steady at above 90% for 24 hours, according to a personal interview I conducted.

Equally impressive is the amount of time it takes for a football player to reach a maximum heart rate, which could be a big indication of why their respiratory system can handle the loss of so much oxygen at such a quick rate. Sporis, a Croatian sport athletic medicine analyst provided a chart (pg. 3) showing how long it took the average player (meaning of average age, health, and weight/fat content across 12 different clubs) to achieve their maximum heart rate. The result (with a difference of + or - 2 minutes) was twenty minutes among 270 players. In comparison, it typically takes a non-athlete only 4-6 minutes of heavy activity to achieve a maximum heart rate. Fortunately, this doesn't happen a lot due to the inevitable experience of an Arsenal player, who have developed muscles in such a way that they can handle a lot of lactate intake. Going back to Sporis' very thorough 7 page study, a skinfold test was applied to three specific areas using a standard caliper, height was measured in meters, and weight in kg, in order to determine how quickly lactate levels escalated in correlation to these three controls in various combinations. The muscle areas involved included the triceps, subscapularis, midaxilaris, anterior suprailiac, chest, abdomen, and thigh. The results were very interesting. There was a positive correlation between weight and body fat (typically among the defenders), height and body fat (attackers), and height and weight (midfielders and goalkeepers). There were more predictable results, a negative correlation between body

fat and maximum heart rate and a positive correlation between low lactate production and height and weight.

Other than the quantifiable results, there are the obvious muscle, tendon, and ligament areas that get taxed the most, depending on the position of the player. Briefly, in the legs, these are the shins, calves, quadriceps, and hamstrings; in the core, these are the multiple layers of lower back, hip, and abdomen muscles; in the neck muscles, including the primary flexor, the sternocleidomastoid (the muscles involved in heading the ball); finally, the (for the sake of this paper) countless number of muscles in your shoulders, arms and hands (Parrish, web article).

Training practices to develop performance determinants:

It should come as no surprise that these men of the football battlefield weren't born this way. Multiple training protocols are put in place to set, reach and maintain goals for prospective players for Arsenal. The training protocol, regardless of any club the player belongs to, consists of four basic categories, all of which are respectively classified in the order that I mentioned the above specific performance determinants: Aerobic workouts, anaerobic workouts, speed/agility drills, and weight training. This is all according to soccer-training-methods.com (for more specific training drills performed by the Arsenal FC, <http://www.professionalsoccercoaching.com/warm-up-drills/arsenal-warm-up-drill>).

In aerobic workouts, there are killer kilometer repeats (5, 10, 20 meters), lap runs, backtrackers, and fartleks (intervalled sprint/walks). In anaerobic workouts, there are shuttle runs (painful cone weaving repeats), beep tests (similar to farteks), Up and backs (going forward then backwards multiple

times), and ladder runs, which are very specifically intervalled distance sprints that are longer (usually at the longest, almost the entire length of the field).

Drills, as if the first two training techniques were not enough, are 20 meter sprints that start from different positions meant to train the tendons and ligaments. The starting positions are flat on stomach and hand on side, flat on stomach push-up position, sitting legs crossed, high knees, heels to glutes, jump squat, on knees, on back, jump up head one direction, then the next. Weight training is traditional professional weight lift maintenance based on position, with added core, ab, and jump techniques.

Conclusion:

Football is one of the most physically demanding sports, with very few others surpassing the agility and endurance needed to perform at a club/professional level. The determinants, particularly pertaining to the the cardio-respiratory system, are roughly twice as demanding as the livelihood of any one normal person in terms of what the player's body can handle in terms of maximum heart rate stress, blood oxygen levels and lactate production during a match. In addition to this, the body has to remain almost as flexible as a gymnast, as every muscle has the potential to be affected during any one game. Because of this, training is one of the most strenuous of all sports. Because of the lack of protective wear used by the soccer players, it is ultimately a team plan between the coaches, trainers and team players to ensure the safety of each football player, although some horrendous injuries have occurred on the field.

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