The Varying Physiological Demands of Out Positions in Soccer

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Soccer is a sport characterized by intermittent bouts of high intensity activity occurring throughout the duration of a 90-minute match. Players rely on energy supplied by both the aerobic and anaerobic pathways due to the varying intensities displayed throughout the game. A recent study analyzing top-level Danish soccer players determined that on average, a player will spend approximately 20% of the match standing, 40% of the match walking, 17% jogging, 17% running, 1.5% sprinting and the remaining time completing other movements such as skipping, jumping, or diving (4). In addition, Rienzi et al. (7) found that on average, a player will complete 19 high intensity sprints throughout a game occurring once every 4-5 minutes in the FA Premier League. Using this information, it is possible to, as Boyle suggests, create the most optimal conditioning program by replicating the intensity patterns that are observed during a match of soccer (3). A training program that utilizes high intensity interval training at similar work to rest ratios would allow players to maintain speed and endurance throughout a game.

In addition to examining the overall average physiological demands on an athlete during a soccer match, studies have been completed to compare and contrast the different movements and intensities of players in the defense, midfield, and striker position. Bloomfield & O'Donoghue (2) concluded that there is a significant difference in the time spent sprinting, running, shuffling, skipping, and standing between positions. Understanding the different physiological demands allows coaches to emphasis different components of training for players in each position, therefore allowing the player to optimize performance based on the demands of the position.

Not surprisingly, Bloomfield & O'Donoghue (2) found that strikers or forwards performed the greatest number of maximal sprints and spent the most time engaged in high intensity performance. Although strikers spent the most amount of time in high-intensity action, players in this position performed significantly fewer movements lasting longer than 15-seconds in comparison to defenders and midfielders. It was also observed, that strikers may need to be the most physically strong due to the amount of high intensity contact that occurs as the player is running for the ball and making offensive plays. Strikers were also observed to be in an increased number of game situations in which they needed to jump and head the ball to gain offensive advantage. Furthermore, due to their offensive role on the team, strikers were found to have to stop, change direction, and slow quickly while working at a high intensity. These movements produce a large amount of shearing forces on the lower limbs, which may put players in this position at a greater risk of injury. A preventive program is strongly recommended for players in this position. Midfielders act as the link between the defenders and the forwards and therefore were found to be engaged in low to moderate intensity activity more frequently and for longer durations, and spent more time in motion than their defense and striker teammates (2). This data suggests that longer distance interval training for midfielder would be of great value.

Defenders were observed to spend less time running and sprinting, but more time moving in the backward direction (2). Similarly to the offensive strikers, the need for defenders to be strong and agile in order to
compete with the offending players was evident. It was also observed that strikers and defenders are more likely to fall and get back up, which suggests additional physiological demands of these positions and the necessity of agility training.

Overall, various studies (1, 2, 5, 6, 7) have displayed the necessity of some type of interval training regime for soccer players, however, Bloomfield et al. have made it clear that due to the varying physiological demands on the players of different position, different distance and intensities would be necessary in order to properly address the specific requirements of each position. In addition, as the defenders and forward players complete a greater number of small agile movements, players of these positions would benefit from an emphasis on agility and speed training (2). Finally, as the defenders spend a significantly greater amount of time travelling in the backward direction, backward movement training and strength in the supporting muscles is of great importance to allow for increased performance and injury reduction.

Resources:

More Soccer, and Soccer specific exercises can be found at the home of PTS Soccer at www.performancetrainingsystems.net/PTS_Soccer.php