Training for Speed in Soccer – Necessity and Training

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Sprinting skills of soccer players is becoming of vital importance as the game and the players are becoming faster (Haugen et al, 2014; Wallace & Norton, 2014) and the amount of sprinting required within a game is ever increasing (Andrzejewski, et al. 2013; Di Salvo et al, 2010). Straight line acceleration and sprinting speed seems to be more important than speed in change of direction tasks. Bloomfield et al (2008) demonstrated that changes of direction within sprinting velocities rarely occur; rather players are more likely to be jogging or shuffling preceding braking and change of direction movements.

Sprinting in soccer is performed in varying contexts over varying distances and with varying starting situations (Bradley et al, 2009; Di Salvo et al, 2010; Andrzejewski, et al, 2013; Andrzejewski, et al, 2015). This directed study gave evidence to the importance of the attainment of speed in soccer, without the observable interest in perfect mechanics within that attainment. This may be due to a generalised but widely held belief that running mechanics whether on a track or on a field should not be too dissimilar (Petrone et al, 2006; Jeffreys, 2013). It can be demonstrated however that the mechanics of running within these two contexts requires different training, most significantly in the first few acceleratory steps.

It may be that the starting position of a sprint in soccer more closely reflects the position of the track sprinter at the 15m mark. At this point velocity is higher, the athlete is more upright and ground contact time is shorter (0.07 – 0.09s) (Bosch & Klomp, 2005; Lockie et al, 2013). It is important for coaches to concentrate on improving ground force efficiency through good technique with short ground contact times (Lockie et al, 2011). This can best be achieved by implementing exercises to develop the strength of the athlete and the application of that strength into the ground.

Strength - Positive sprint performance in professional soccer players is highly correlated with maximal strength (Baker, 2014; Turner & Stewart, 2014). It is therefore recommended that coaches devote time to developing player's maximum strength; starting strength and power utilising evidence based protocols. The implication for coaching practice may therefore be in the selection of time efficient exercises and drills that are most specific to the positions of players within the game of soccer, and that provide the largest transfer into on-field success (Halil, 2008). In 2013, Morin demonstrated that a world class sprinter produces larger horizontal ground reaction forces when in high speed running and when the body is mainly vertical. They do this through the utilisation of very strong gluteal and hamstring muscles (hip extensors). Soccer players on the other hand tend to have overly developed knee extensor and hip flexor musculature (Morin, 2013). From a coaches perspective a much more balanced approach needs to be applied to the development of maximal strength between the anterior and posterior chains of soccer players.

Training a combination of heavy resistance training and power training within the general preparatory and specific preparatory phases will give players the competitive edge. Implementing resistance training exercises that not only replicate the triple extension of the hips, knees and ankles during acceleration (variations of squats, lunges and deadlifts), but also exercises such as Romanian deadlifts, Glute-Ham raises and Hip thrusts to develop hip extensor capabilities are crucial to success. To develop maximal strength, using a load of

greater than 80% of the players one repetition maximum for 6 or less repetitions, is recommended (Baker, 2014; Turner & Stewart, 2014).

Elastic Qualities – In order to transfer musculoskeletal strength to on-field speed performance, it is imperative that the soccer coach includes drills which increase the elastic properties of the players (Hansen, 2014). Elastic capacities of athletes are normally trained through a series of training modalities including: Plyometrics, Olympic style lifting and Medicine ball work. Evidence exists which demonstrates that increasing the athletes utilisation of the stretch shortening cycle can decrease an athletes ground contact time during both sprinting and whilst running at a sub-maximal level (Arampatzis et al, 2001). When making decisions regarding elastic strength protocols, coaches should consider the technical proficiency of players in selected exercises. Allowing only proficient lifters to utilise Olympic lifts such as cleans, pulls and jerks, will decrease the risk of injury to players and maximise results from any investment in training time (Baker, 2014). Medicine ball work which includes explosive jumps upon release of the ball, are an effective and easy way to implement explosive training into a field based training session (Hansen, 2014). When programming, six repetitions for five sets is effective for any elastic or power based exercise.

Flexibility and Mobility - Track sprinters come out of starting blocks at a low 45-50 degree angle as this is most advantageous in generating thrust (Schmolinsky, 2000; Bradshaw et al, 2006). To replicate this, soccer players lean forward in their first few acceleratory steps however this lean usually commences at the hip, rather than starting at the foot as compared to the track athlete. Full extension of the hip, knee and ankle behind the centre of mass is required for maximum force application of the accelerating athlete. Acceleration requires strength, power, coordination and elasticity (Hansen, 2014). Assessing soccer players mechanics during acceleration demonstrates that they rarely achieve full hip extension (Williams, 2015; Guyett, 2015). Reasons for this are numerous and include: tight hip flexors; inefficient pelvic girdle mobility and poor tissue integrity. Improvements in hip mobility via proprioceptive neuromuscular facilitation, have demonstrated increased responses from the stretch shortening cycle (Hindle et al, 2012). Important considerations for soccer coaches therefore include methods to enhance hip flexor and quadriceps flexibility as well as pelvic girdle mobility (Pinske, et al, 2012; Caplan et al, 2009). This can be achieved through the inclusion of dynamic range of motion exercises as well as both static and proprioceptive neuromuscular facilitation (PNF) stretching. These three will promote flexibility and positively impact running mechanics (Bosch & Klomp, 2005; Caplan et al, 2009; Schleip & Muller, 2012; Carte & Greenwood, 2015). Once this is achieved, programming drills that involve falling starts and rolling starts (Jeffreys, 2013; Hansen, 2014) that are characterised by a straight line forward lean, will enhance a soccer players acceleratory performance.

Posture - Posture and stability of the player is important in optimising force transfer to the ground and eliminating energy leaks (Petrone, et al, 2006; Jeffreys, 2013; Turner & Stewart; 2014). A focus on posture and stability of the player through the coaching of wall marches and switches (Patel, 2010; Hansen, 2014), will enable soccer players to maintain a straight line from head to heel in the end push phase (toe off position) of acceleratory steps. This in turn would increase the amount of force applied to the ground to generate speed (Turner & Perry, 2014; Lockie et al, 2011).

Conclusion

It is well documented that speed is critical to success in the modern game of soccer (Bradley et al, 2009; Andrzejewski et al, 2013; Jeffreys, 2013; Haugen et al, 2014; Turner & Stewart, 2014). Starting strength and a rapid rate of force development are required for explosive horizontal propulsion and rapid first step velocity (Smirniotou, et al. 2008; Spinks et al, 2007; Sheppard, 2003). It is important for soccer players to be able to break away from the opposition in order to take possession of the ball. A high expertise in dribbling and ball control is of no use to the player if they are always outrun and are limited in possession. Therefore it is recommended that coaches carefully plan periodised training programs for soccer players that include: strength training, power training, flexibility and mobility strategies as well as posture and stability work. This will ensure that corrective mechanics coaching in acceleration and sprinting will permit the maximum athletic potential of the player to be achieved.

Further Readings & References

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