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Abstract

The peak match speed of soccer players: a 20 second analysis

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To assess peak speeds, usually assess players capacity to quickly accelerate and achieve/maintain a maximal speed in 30 m distance (Altmann et al., 2019). During these tests, players often start from stationary positions, reacting to a sound signal (Haff & Triplett, 2016). However, one may question these test procedures since peak speeds achieved during tests generally exceed peak speeds registered during matches (Buchheit et al., 2021; Djaoui et al., 2017). Additionally, during matches, soccer players usually perform leading sprints (those where players achieved the sprint threshold [> 25.2 km/h)] while entering the high-speed running category [19.8-25.2 km/h] in the previous 0.5 seconds than explosive sprints (those where players reached the sprint threshold without entering the high-speed running category in the previous 0.5 seconds) (di Salvo et al., 2009). This research aimed to characterize match peak speeds, during a 20-second time window (10 seconds immediately before and after the match peak speed), in soccer

matches. Twenty elite soccer players were monitored with GNSS devices during six soccer matches from the Brazilian first division. For each player during each match, speeds were collected at 0.1-second intervals (10 Hz) from 10 seconds before and 10 seconds after the match peak speed. Speeds (mean ± SD) were calculated for speeds at each 0.1-second intervals and intra-individual speed differences were compared at every second of the 20 seconds window using paired mean differences. Effect sizes (ES) were established as trivial (<0.2), small (0.2<0.6), moderate (0.6<1.2), large (1.2<2.0), very large (2.0<4.0) and huge (>4.0) with 90% confidence intervals. Match peak speeds ranged from 29.11 km/h to 31.64 km/h. Speeds registered 10 seconds before and 10 seconds after the match peak speed ranged from 5.11 km/h to 9.21 km/h and 6.90 km/h to 7.65 km/h respectively (Figure 1).

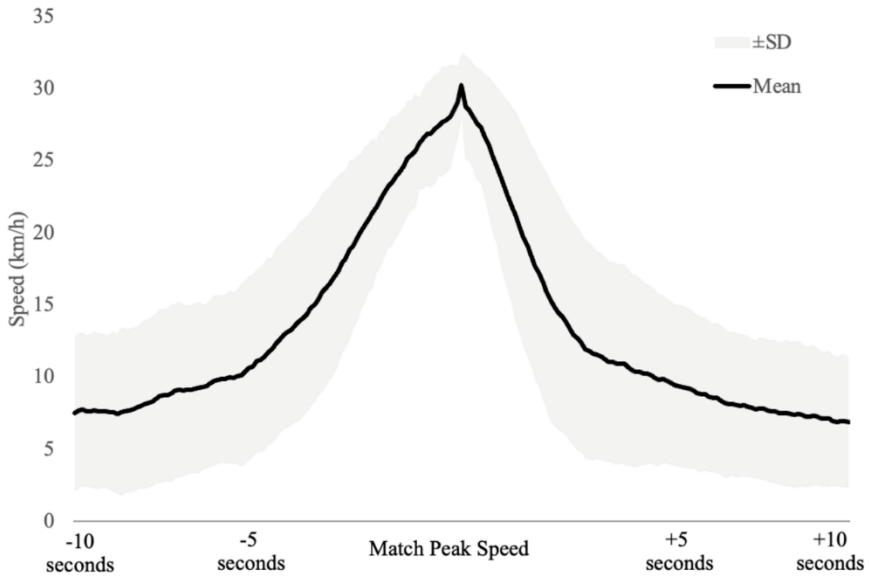

Figure 1. Individual registered speeds (km/h) during the 20 second window (10 seconds before and 10 seconds after the match peak speed). Speed decreases faster (smaller SD) than the previous increase.

Speed increased (acceleration) moderately (ES: 0.68 [0.64, 0.72]) 4 seconds before the match peak speed and decreased (deceleration) moderately (ES: -0.73 [-0.77, -0.69]) 3 seconds after the maximal effort (Figure 2).

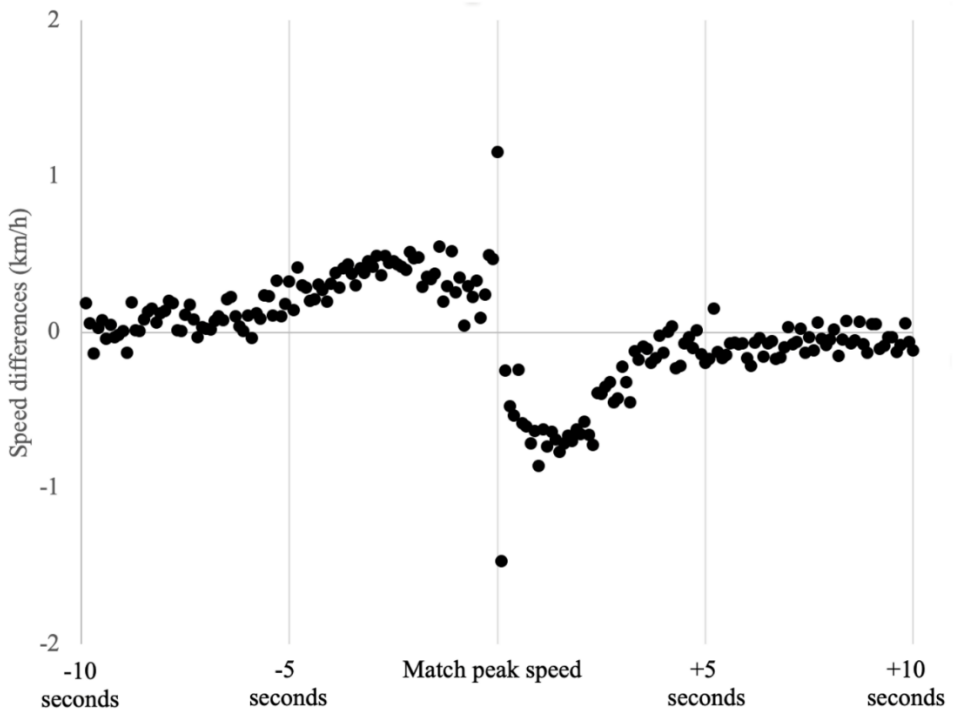

Figure 2. Speed changes for every 0.1 seconds within the 20 second timeline (10 seconds before and after the match peak speed). Speed changes near 0 km/h probably represent speed fluctuations, which occurred mainly between 10 to 5 seconds prior and 4 to 10 seconds after the match peak speed (unclear or small effect sizes). Speed changes above 1 km/h occurred only 4 seconds before (acceleration) and 3 after (deceleration) the match peak speed (moderate effect sizes).

Match peak speeds were achieved from leading starts, which questions the current sprint test procedures. After the match's peak speed, players decelerate quicker than they accelerate but without reaching a full stop. Nevertheless, preparing players for intense decelerations should not be disregarded. Field tests and training sessions should provide a stimulus similar to what is observed during competition.