

repeated measures. Statistical significance was set at $P < 0.05$.

The overall distance covered was mean 10.72, $s = 0.99$ km. Significantly greater distances ($P < 0.05$) were covered in the first compared to the second half for jogging (mean 2.17, $s = 0.34$ vs. mean 2.05, $s = 0.32$ km), running (mean 0.88, $s = 0.24$ vs. mean 0.83, $s = 0.22$ km) and high-speed running (mean 0.35, $s = 0.12$ vs. mean 0.33, $s = 0.11$ km). The distance covered in high-intensity running was 18% lower in the last 15 min of the first half and 24% lower in the last 15 min of the second half ($P < 0.01$) than in the first 15 min period of the game (mean 0.39, $s = 0.13$ and mean 0.37, $s = 0.12$ vs. mean 0.47, $s = 0.14$ km). The average recovery time between discrete high-intensity bouts during match-play was mean 72.3, $s = 23.7$ s. Recovery times during the second half were 15% longer ($P < 0.01$) than during the first half of the match (mean 67.2, $s = 22.5$ vs. mean 77.4, $s = 24.8$ s). Furthermore, average recovery time was 28% longer ($P < 0.01$) during the last 15 min of the game compared to the first 15 min of the game (mean 82.7, $s = 25.7$ vs. mean 64.5, $s = 20.3$).

The results suggest that players become fatigued during various stages and particularly towards the end of the game. The current findings provide information about the high-intensity activity patterns of a large sample of elite soccer players.

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Heart rate and technical responses to variation in pitch dimension and surface in “three-a-side” youth soccer drills

H. Folgado¹, R. Duarte¹, L. Laranjo¹, J. Sampaio², & O. Fernandes¹

¹University of Évora and ²University of Trás-os-Montes e Alto Douro, Portugal

Small-sided soccer games allow increasing players specific practice time eliciting simultaneously physical and technical aspects within a major tactical involvement. Youth players' performance in “three-a-side” drills are used very often without knowing their real impact. Thus, the aim of the current study was to identify heart rate and technical responses to variation in pitch dimension (30 × 20 m; 20 × 15 m) and surface (grass; rough sand) in “three-a-side” drills performed by youth players (age 9.9 ± 0.64).

Each drill condition lasted for 15 min, with a 6-min period of active recovery. Heart rate was evaluated through heart rate reserve (HRR). Technical analysis was validated by a group of experts and consisted of quantifying the following variables:

number and ratio of right and wrong passes, average number of ball contacts for each team's ball possession, number of in and off goal shoots, goals, shooting efficiency, number of passes by shooting play and 1 × 1 situations. Results were analysed through a 2 × 2 repeated measures ANOVA.

In the grass pitch, teams' exhibited in the 30 × 20 m pitch a higher HRR (132 ± 5 and 126 ± 4) and a higher ratio of right passes (0.72 ± 0.01 and 0.60 ± 0.03). In the rough sand pitch, significant differences were found, with higher values for the 30 × 20 pitch, for number (49.5 ± 0.7 and 39.0 ± 2.8) and ratio (0.67 ± 0.00 and 0.57 ± 0.02) of right passes, average number of ball contacts (2.1 ± 0.08 and 1.8 ± 0.02) and HRR (129 ± 5 and 124 ± 4). In the 30 × 20 m pitch, significant differences were found for ratio of right passes, with higher value in the grass (0.72 ± 0.01 and 0.67 ± 0.00), and HRR, also with higher values for the grass (134 ± 4 and 129 ± 5). In the 20 × 15 m pitch, significant differences were found only in HRR, with higher values for the grass field (128 ± 4 and 124 ± 4).

Coaches should be aware that modifying pitches dimension and surface influences drill physiological and technical impact. Therefore, these results help coaches to better plan and direct youth soccer drills and controlling quantity and quality in practices.

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Heart rate and RPE responses to variations in Futsal specific drills

R. Duarte¹, J. Sampaio², N. Batalha¹, V. Maças², & C. Abrantes²

¹University of Évora and ²University of Trás-os-Montes e Alto Douro, Portugal

Sport specific drills with variations are constantly used in Futsal practices. However, the knowledge about how these variations influence drill intensity is very insufficient. Therefore, this study aimed to measure the effects of these variations intensity in three Futsal exercises by the elicited percentage of maximal heart rate (HRmax%) and ratings of perceived exertion (RPE).

The studied sample was constituted by 11 players from a Portuguese First Division team (mean age 25.7 ± 4.2 years). The “pivot's game” was used to test the effect of the field dimensions and was played over the entire pitch on three quarters of the pitch and on half-pitch. The “half-pitch game” was employed to test the effect of players' numerical relations and was played in 4 × 4, 3 × 3, and 2 × 2. The “Swedish bench game” was played under the conditions of free