O-011 Automatic analysis of football games using GPS on real time

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OBJECTIVE Global Positioning System (GPS) is a localization system designed by the United States Department of Defence in 1978 that allows knowing latitude, longitude and altitude. To a certain extent, soccer action implies using space in an intelligent way that can be tracked by describing players' positions on the pitch. This technology has been used in human movement studies as well for the study of human locomotion and cross-country skiing for instance. The main objective of this investigation was to test and ad hoc designed and developed application for real time recording of cinematic and physiological variables of team sports.

METHODS The participants were 6 professional football players of 2nd B division El Ejido FC who played a 60'game (30'+30') practice game. Each of the participants wore a FRWD F 500 GPS set consisting of a recording unit, a tape and a heart rate (HR) transmitter band. All data produced during play action (velocity, distance, HR and position) were taken every second and stored constantly on the recording unit.

RESULTS According to collected data we found significant differences in distance travelled in four of the six players whereas HR was different for all players monitored. As far as velocity was concerned, differences were only found for three participants (Table 1).

Table 1. Inter-subject analysis of the variables (Heart Rate, Speed and Distance p < 0.005).

	Right defender			Mid-R defender			Left defender		
	HR	S	D	HR	S	D	HR	S	D
Right defender	,000	**,074**	,000						
Left defender	,000	,000	,000	,000	,000	**,248**			
Left midfielder	,000	,001	,000	,000	**,024**	**,147**	,000	**,717**	,004

CONCLUSION GPS technology can be taken one step forward for coaching control if it is implemented with appropriate software like the one designed by us. By these means, we found significant differences between playing positions as referred in bibliography.

KEY WORDS Soccer, software, heart rate.

O-012 Turning movements performed during FA Premier League soccer matches

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OBJECTIVES Time-motion analysis studies have provided a breakdown of match time between different locomotive movements. However, such information does not indicate the agility demands of the given sport as turning during movement or the transition between movements have not been reported. Therefore, the purpose of the current investigation was to characterise the nature of turning performed during elite soccer competitions and investigate the transition of locomotive movements (LM).

METHODS The on-field activity of 55 FA Premier League soccer players was recorded from Sky Television's PlayerCam facility for approximately 15 minutes each. The purposeful movement within these observations (about 5 minutes per player) was analysed using the Bloomfield Movement Classification (Bloomfield et al., 2004) allowing LM, direction and intensity of movement to be recorded.

RESULTS A total of 26,613 movements were recorded and 5,115 of these were turning events. Table 1 shows the LM performed immediately before (BF) and after (AF) each turn. There were 21% of turns performed within the same LM and 79% during a transition. Chi square tests of independence were applied to the angle (≤90° or >90°), direction (left or right) and movement BF and AF each turn.

DISCUSSION The frequency profile of movements performed BF ($X^2_{2,24}=185.0$, $P < 0.001$) and AF ($X^2_{2,24}=69.6$, $P < 0.001$) turns were significantly influenced by angle with more turns of ≤90° BF or AF jogging and shuffling and more