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Research article

**Movement Characteristics of Elite Tennis  
Players on Hard Courts with Respect to the  
Direction of Ground Strokes**Rafael Martínez-Gallego<sup>1</sup>, José F. Guzmán<sup>1</sup>, Nic James<sup>2</sup>, Janez Pers<sup>3</sup>,  
Jesús Ramón-Llin<sup>1</sup>, Goran Vuckovic<sup>4</sup>[Author Information](#)[Publish Date](#)[How to Cite](#)[Email link to this article](#)

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Previous studies of movement characteristics in tennis have considered the effect of playing surface but have assumed that playing strategies are simply determined by the surface as opposed to being under an individual's control. This study considered the selection of cross court or down the line ground strokes as being indicative of playing strategy and measured the outcome of playing these shots in terms of the opponent's movements. Matches (N = 8) at the 2011 ATP tournament 500 Valencia were recorded and analysed using SAGIT, a computer vision tracking system that allowed both players' movements to be tracked automatically, albeit with operator supervision. The data was split into (N = 188) games for analysis purposes and these lasted a median 174.24 seconds with active time (ball in play) a median proportion of 34.89% (IQR = 10.64%) of total time. During the active time losers of games tended to cover less distance (median = 80.17 m), move quicker (median = 1.38 m·s<sup>-1</sup>), spend more time in the defensive zones (median = 14.24 s) and less in the offensive zones (median = 44.74 s). These results suggested that game winners tended to dominate game losers, forcing them to exhibit behaviors typically associated with a defensive strategy. Defensive and offensive strategy are not well defined currently and future investigations should consider movements in relation to individual shots, in particular their velocities, at

the rally level and by different individuals to better understand successful performance.

**Key words:** Motion analysis, tactics, winners, losers, differences

#### Key Points

- During the active time losers of games covered less distance, moved quicker, spend more time in the defensive zones and less in the offensive zones.
- These results suggested that game winners tended to dominate game losers, forcing them to exhibit behaviors typically associated with a defensive strategy.
- There are no differences between the proportion of cross court shots and down the line shots played by game winners and game losers.
- Future research should consider individual shots at the rally level to better understand successful performance and ultimately strategy.

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