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Research article



Kinematic Determinants of Early Acceleration in Field Sport Athletes

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ABSTRACT

Acceleration performance is important for field sport athletes that require a high level of repeat sprint ability. Although acceleration is widely trained for, there is little evidence outlining which kinematic factors delineate between good and poor acceleration. The aim of this study was to investigate the kinematic differences between individuals with fast and slow acceleration. Twenty field sport athletes were tested for sprint ability over the first three steps of a 15m sprint. Subjects were filmed at high speed to determine a range of lower body kinematic measures. For data analysis, subjects were then divided into relatively fast ($n = 10$) and slow ($n = 10$) groups based on their horizontal velocity. Groups were then compared across kinematic measures, including stride length and frequency, to determine whether they accounted for observed differences in sprint velocity. The results showed the fast group had significantly lower (~ 11 -13%) left and right foot contact times ($p < .05$), and an increased stride frequency ($\sim 9\%$), as compared to the slow group. Knee extension was also significantly different between groups ($p < .05$). There was no difference found in stride length. It was concluded that those subjects who are relatively fast in early acceleration achieve this through reduced ground contact times resulting in an improved stride frequency. Training for improved acceleration should be directed towards using coaching instructions and drills that specifically train such movement adaptations.

Key words: Sprint performance, first step quickness, running speed

Key Points

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