



TITLE

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SUPPORT LEG MECHANICS IN RUGBY PLACE KICKING

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Abstract

Introduction:

Place kicking is an important method of scoring points in Rugby Union. Research in soccer kicking identified the role of the support leg in achieving a fast ball velocity (Augustus et al., 2017). However, as successful place kicking places tighter accuracy constraints on the kicker, these findings may not be generalizable across football codes. Therefore, we investigated the role of support leg mechanics in rugby place kickers.

Methods:

33 experienced rugby kickers performed maximum range place kicks in a laboratory. Full body 3D kinematics were recorded (240 Hz) synchronously with ground reaction forces underneath the support foot (960 Hz). Joint mechanical flexion-extension time histories were calculated, and time-normalised from support foot contact (SFC) to ball contact. Kickers were grouped based on the estimated performance outcome of their best kick, if taken 32 m from the goal posts, and support leg mechanics were compared between the successful and less successful (inaccurate; short) groups using magnitude-based inferences and statistical parametric mapping.

Results & discussion:

Joint mechanical profiles of the ankle and knee joints were similar to those previously reported from other football codes. However, whilst a hip extensor moment was observed prior to ball contact, as in other codes, most kickers demonstrated both flexion and extension at the hip meaning there was a tendency for energy absorption during the final 75% of SFC, where energy generation has been reported in soccer kicking (Inoue et al., 2014). No substantial differences were observed between the successful and less successful kickers in the total positive or negative work done at each joint; however, when considering just the first positive hip extensor phase (i.e first 20% of SFC), inaccurate kickers performed substantially more work than the more successful kickers (ES: 0.95, 90% CI: 0.74).

Conclusions:

Our results demonstrate subtle differences in support leg hip mechanics of inaccurate and accurate rugby place kickers, both of which also differed from those reported for soccer kicks where a maximal ball velocity was prioritised (Inoue et al., 2014). As motion at the other support leg joints was broadly comparable, this suggests that hip joint motion may be important in achieving an accurate kick.

References:

Augustus, S et al. (2017). *J Sports Sci*, 35(1): 89-98

Inoue, K et al. (2014). *J Sports Sci*, 32(11): 1023-1032

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