RUGBY PLACEKICKING MECHANICS TO INFORM COACHING STRATEGIES AND ENHANCE PERFORMANCE

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Introduction

Placekicking success discriminates winning from losing teams in elite Rugby Union[1] and account for ~45% of points in international matches[2]. Clearly, improving placekicking success can impact match outcomes and should be a key focus in rugby skills coaching. Current coaching practices mainly rely on practical experience, other sports, or non-elite Rugby Union players tested in laboratories. These studies provide limited real-world guidance. Our aim was to determine biomechanical variables that discriminate good and bad placekicking attempts in an ecologically valid environment.

Methods

Three competitive male placekickers performed 10 kicks outdoors, 35 meters from the goalposts. 3D data were collected at 300 Hz using Qualisys AB motion capture. Coach and player perceptions and placekick outcomes were used to define the three best and three worst kicks for each placekicker. Differences between the best and worst kicks were examined using standardised effect sizes (ES).

Results

Seven variables meaningfully and consistently differentiated the best from worst placekicks in all players ('core variables', Fig. 1). In the best kicks, resultant and forward centre of mass speed were slower at ball contact, but maintained better through contact; the kicking leg reached greater knee flexion during swing and was more flexed at the hip and knee at ball contact; and the trunk was less rotated outwards relative to the kicking direction.

Twenty-seven variables were consistently linked to better kicking outcomes, with a large ES in at least one player ('meaningful variables', Fig. 1). These variables indicted that the best kicks had: less sideways ball spin, speed, and direction; greater change in vertical and sideways foot speed during ball contact; a more "C" than "J" footpath; larger shoulder-to-hip separation; and less ankle motion in swing.

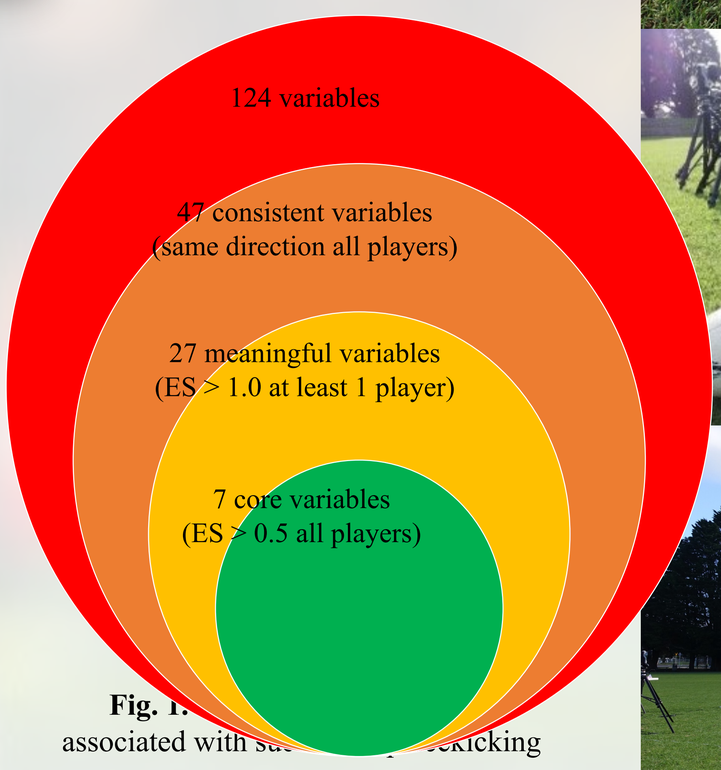

Fig. 1. [illegible] associated with successful placekicking

Conclusion

This exploratory study identified biomechanical variables that discriminated the best from the worst placekicks in competitive rugby players. The identified differences can guide coaching of placekicking at a group level in absence of individual data. The variables and coaching cues that appear important in promoting successful placekicks include controlling centre of mass approach and follow-through speed, enhancing knee flexion and axial rotation range, being on-top of the ball at ball contact, swooping across the ball with the foot, and minimizing ball sideways movements.

References

1. Lim et al., Int J Perform Anal Sport. 2009;9(3):354-367.
2. Quarrie and Hopkins, J Sci Med Sport. 2015;18(2):195-198.

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