

BIOMECHANICS OF GOAL-KICKING IN RUGBY LEAGUE

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Introduction

Goal-kicking in rugby league is an important component of winning games. However no work exists examining the biomechanics of this kick and only one study examining the union goal-kick. Two coaching points for the kick are to 'square up' the trunk to the target and to 'kick through the ball' by moving the whole body through the kick point. The aim of this study was to examine the technique of the rugby league goal-kick and to evaluate these two coaching points.

Methods

Four elite goal-kickers (age 24 ± 3 years, all had kicked in the national rugby league or in international rugby league senior games) were fitted with sixteen reflective markers on arm and leg joint centres, the kick foot and pelvis. Players then performed between five and 15 goal-kicks on their usual training ground from 40m in front of the goalposts. Three dimensional data of three kicks per player was obtained using a three-camera VICON MOTUS system (100Hz) from kick foot toe off until ball contact and end of follow through. 'Squaring' to the target was evaluated by the hip and trunk angle about the vertical axis at ball contact while centre of mass (CM) velocity in the direction of the kick at ball contact determined if players kicked 'through the ball' using the full body.

Results & Discussion

Table 1 reports technical parameters for the goalkicking group. All players moved their CM towards the target at and through ball contact indicating elite kickers do kick 'through the ball'. However, trunk orientation at ball contact was not 'square' to the target indicated by pelvis and shoulder angles viewed from overhead bringing this coaching cue into question. Linear summation of speed principles were evident for the hip, knee and ankle.

Table 1. Technical parameters for the rugby league goal-kick (at ball contact).

Parameter	Mean	s
Foot speed (m/s)	21	1
Ball speed (m/s)	27	3
Foot:Ball speed ratio	1.26	0.16
Knee angle (°)	145	14
Knee angular velocity (°/s)	1044	361
Pelvis angle (°)	21	7
Shoulder angle (°)	28	7
CM velocity (m/s)	2.6	0.4

Conclusion

Players kicked through the ball by moving their whole body through impact but did not exhibit the 'square at contact' coaching cue.

References

1. Bezodis, N. et al. (2002). Sp Biomech 6(2): 171-186.