A LONGITUDINAL ASSESSMENT OF KNOWN KINEMATIC PREDICTORS OF FAST BOWLING PERFORMANCE AT THE START AND END OF A CRICKET SEASON

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Introduction

The speed at which a cricket fast bowler releases the cricket ball is key to bowling performance. Various three dimensional kinematic variables describing body movement during the bowling delivery stride are known to be related to ball release speed in cricket fast bowling including: knee angles [Portus *et al*, 2004], shoulder angles [Wormgoor *et al*, 2010], trunk orientation [Roca *et al*, 2006] and ball release height [Bartlett *et al*, 1996]. Additionally, in contrast to the large number of cross sectional studies assessing the kinematic predictors of ball release speed, few studies have investigated the kinematic variables that predict fast bowling performance in a longitudinal manner. The aim of this study was to assess the ability of kinematic variables to predict ball release speed and bowling accuracy; and to do this in a longitudinal study, in order to test whether variables that initially predict fast bowling performance continue to do so at the end of a cricket season.

Methods

31 injury free, premier league (amateur) cricket fast bowlers over the age of 18 years were invited to participate in this study. Kinematic bowling analysis was done at the start and at the end of a cricket season. A standard marker set and established three dimensional kinematic methods were used to measure shoulder and pelvic rotation, angles of spinal vertebrae (L1, T7 and T10), as well as shoulder and knee joint angles at both front foot placement and ball release during the delivery stride, were quantified. All measurements were performed at the beginning of the cricket season and repeated 8 months later (after the season). Pearson's correlation was used to analyse relationships between kinematic data and ball release speed.

Results

Average ball release speed was 124.25km/hr (34.51m/s) and 125.23km/hr (34.79m/s) at the start and end of the season, respectively. A more extended knee angle ($r=0.40$; $p=0.04$), a larger arm to thorax angle ($r=0.50$; $p<0.01$), a more upright global trunk position ($r= -0.37$; $p=0.05$), more global trunk left lateral flexion ($r=0.36$; $p=0.05$), larger L1 ($r= -0.45$; $p=0.01$), T10 ($r= -0.47$; $p=0.01$), T7 ($r= -0.51$; $p<0.01$) segmental spinal lateral flexion and more global trunk left rotation ($r=0.41$; $p=0.02$) were positively correlated with higher ball release speeds at the start of the season. Only arm to thorax angle ($r=0.46$; $p=0.02$) remained a significant predictor of ball release speed after the season.

Discussion

The data presented in this study confirm the important contributory role that a number of known candidate kinematic variables play in the determination of fast bowling performance. Differences found before and after the cricket season may be due to refinement of the action of bowlers, resulting in less variation in the bowling action between bowlers, resulting in fewer positive correlations. It should be noted that many of the variables favouring increased performance identified in this study, have been associated with injury in cricket fast bowlers. Further research on the association between performance and injury is advocated.

References

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