

Significance of the electromyographic analysis of the upper limb muscles of cricket bowlers: Recommendations from studies of overhead-throwing athletes

Abstract

The purpose of this study was twofold: (i) to review the existing literature on electromyographic (EMG) analysis of the upper limb muscles of present overhead-throwing (OT) athletes during throwing and of cricket bowlers (CBs) during cricket bowling (CB) and, (ii) to discuss the importance of and generate recommendations for the EMG assessment of the muscle activity of CBs with respect to previous studies of OT athletes. A literature search of the PubMed, Scopus and Google Scholar electronic databases was performed to identify relevant articles published up to December 2012. This search was performed to evaluate the following areas, (i) what are the upper limb muscles that should be evaluated during OT sports and cricket bowling? (ii) what types of EMG methodologies have been used? (iii) what are the anthropometric, performance and physical functional variables that are usually selected? and (iv) what recommendations can be made for the assessment of the muscle activity of CBs? The search identifies 32 publications on OT athletes and 4 on CBs. The results note the following conclusions: (i) there are relatively few CB-related papers that utilize EMG, particularly for the assessment of muscle activity and coordination, (ii) a total of 22 upper limb muscles were investigated using EMG (from both criteria), (iii) surface electrodes are used more frequently than needle electrodes, (iv) most of the article normalized and analyzed the EMG amplitudes than the frequency, and the data was more often analyzed through a descriptive statistical analysis and (v) the majority of the studies analyzed the right limb of physically normal (uninjured) male's both the amateur and professional athletes that were 20 to 29 years of age. Finally, the published evidence on CBs is inadequate to validate a sound recommendation for the assessment of the muscles of CBs using EMG. However, the studies on OT athletes do provide guidelines that can be used to analyze CBs. The overall conclusion of this review show that, further studies are needed to evaluate the efficacy of EMG for the assessment of the upper limb muscle of CBs to ultimately identify and prevent injury which is still a matter of discussion in the sports medicine community.

Keywords

Athletes; Bowler; Cricket bowling; Electromyography; Over-head throwing; Upper limb muscle