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Motion capture based assessment of athletic injury risk

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Objective: In this paper, we present a novel low cost computer-vision athletic movement assessment (overhead squat). The aim of the study was to investigate the reliability of a low cost markerless motion capture system (Capture) against an industry gold standard (Vicon).

Rationale: Overhead squat is commonly used to detect asymmetry and immobility during functional movement. Research has shown the overhead squat to be the most discriminant task of the Functional Movement Screen (FMS) i.e. an individual's ability on the overhead squat is indicative of their overall FMS score and thus injury risk status. Unfortunately, to date, the overhead squat movement has typically relied on subjective, observation based assessment. We suggest that objective and automated assessment of the overhead squat movement could provide a more practical tool for coaches to identify the intricate movement parameters associated with increased injury risk (i.e. knee valgus/varus, trunk flexion, hip translation in the sagittal plane).

Results: The findings suggest that low-cost markerless motion capture has potential to provide an objective method for assessing lower limb squat mechanics and trunk control in an applied sports setting. Furthermore, the outcome of the study warrants the need for future research to examine more fully the potential implications of the use of low-cost markerless motion capture in the evaluation of dynamic movement for injury prevention.

Biography

Susan Giblin specialised in Neuromotor Assessment, completed her MSc at the University of Edinburgh and undertaking Doctoral research at the Institute of Coaching and Performance at the University of Central Lancashire. She has worked in a research and development capacity with Kitman Labs Ltd. and published her work in reputed international journals.

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