

A Case Study of Upper Limb Joint Torques in an Elite Male Tenpin Bowler

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In general, tenpin bowling is not considered to be highly physical sport and is regarded to present minimal injury risk. The arm swing which is an integral part of delivery was assumed to be gravity driven. This study aimed to investigate whether the bowling arm generated torque, and if so, what is the magnitude at each related joint. A high ranked national male bowler volunteer to participate in the study. To calculate torque values at the shoulder, elbow and wrist joint of the bowling arm, kinematic data was derived from 3D motion capture and was combined with measured anthropometric data. A simple planar mathematical model for a three-link kinematic chain of an arm was constructed based on Kane's vector-based approach model. Result indicated that torque were present at all three joints throughout the swing, dismissing the belief that the arm swing was gravity driven. High peak torque values were found, and comparable to the windmill pitch in softball, possibly indicating a high injury risk in the delivery phase of tenpin bowling.