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Which Joint Angle Changes Have Most Influence on Dart Release Speed?

Absract
A three-segment angle-driven model of dart throwing was developed to observe which joint angle of the upper limbs has most influence on the dart release speed. A subject performing 10 dart throwing trials were recorded using a motion analysis system. Subsequently, the joint angle time histories of individual trial were put in into the simulation model. The model calculated resultant dart release speed for each recorded trial and each trial was matched accurately. Systematically substituting a constant value to each joint angle, and observing the changes on dart release speed indicated that dart release speed was most susceptible to forearm extension/flexion. During coaching or performance, attention should be focused on this joint angle because any changes could have a substantial effect on the dart release speed.

Keywords
Angle-driven model; Simulation; Sports biomechanics