

Abstract

► **Feltner, M.E. and J. Dapena. Three-dimensional interactions in a two-segment kinetic chain. Part 1: General model. *Int. J. Sport Biomech.* 5:403-419, 1989.**

The motion of a body segment is determined by joint torques and by the motions of the segments proximal or distal to it. This paper describes a three-dimensional model that was used to determine the effects of the shoulder and elbow joint torques and of the upper trunk and arm motions on the angular accelerations of the arm segments during baseball pitching. Equations were developed to fractionate the three-dimensional components of the angular acceleration vector of each segment into angular acceleration terms associated with the joint torques made on the segment, and into various "motion-dependent" angular acceleration terms associated with the kinematic variables of the arm segments. Analysis of the values of the various motion-dependent angular acceleration terms permitted the determination of their contributions to the motion of the segment. Although the model was developed to provide further understanding of the mechanics of the throwing arm during baseball pitching, it can be used to analyze any two-segment two-dimensional or three-dimensional motion.