ABSTRACT

A BIOMECHANICAL ANALYSIS OF FATIGUE COMPENSTATION IN SKILLED BASKETBALL JUMP SHOOTERS

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Since first used in the 1940’s, the jump shot has become the most potent and utilized means of scoring in the game of basketball. In today's game, effective jump shooters should be able to shoot accurately from long range, especially when fatigued. Therefore, the purpose of this study was to examine the jump shots of skilled performers and to assess how they compensated to fatigue over the course of a game in the effort to maintain accuracy.

Eight male collegiate and former collegiate basketball players served as the subjects for the study. Ten jump shots for each subject were videotaped prior to the onset of fatigue (pre-fatigue) and after the onset of fatigue (post-fatigue). To induce fatigue, the subjects played a forty-minute, regulation, collegiate-rules game consisting of two twenty-minute halves.

One pre-fatigue and one post-fatigue jump shot were selected per subject to be analyzed with the Peak Performance system. The trials were selected on the basis of success and what seemed to be the most consistent for each individual. Once each trial was digitized, random errors were removed with a Butterworth filter with an optimal cut off
frequency ranging from 2-8 Hz for the various data arrays. Statistical analyses were performed with paired t-tests and the following were significantly ($p<.15$) different:

1. Jump height, maximum upward velocity of the COG, and knee angle and ball height at maximum upward velocity were decreased in post-fatigue jumps.

2. Height of release and horizontal velocity at projection were decreased and vertical velocity of projection and angle of projection were increased in the post-fatigue shots.

3. Angle of the shoulder at release and maximum angular velocity of the elbow were increased in the post-fatigue shots.

In sum, to compensate for the loss of height on the jump, the players pushed the ball in a more upward direction with greater involvement of the elbow.