BIOMECHANICS

28 BIOMECHANICAL ANALYSIS OF THE JUMP SERVE IN MEN’S VOLLEYBALL

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Background The most used serve technique in men’s top volleyball is jump serve (JS). The efficiency of JS is related to the ball velocity (BV) of the serve. BVs have increased lately and thus a biomechanical analysis of JS was justified to investigate which elements have the biggest influence to BV of JS.

Setting and participants Six players of the Finnish men’s national volleyball team (23.40±2.28 years, 196.50±1.52 cm, 90.67±1.63 kg) served as subjects.

Methods 3D-motion analysis (100 Hz) was made from two of the each player’s JSs (the fastest (FS) and one slower serve (SS)). T test for paired samples was used to compare the velocities of FS and SS. Analysis of variance was applied to compare JSs in which the velocity was over 30 m/s (+30S) and under 30 m/s (−30S). The relationships between motion analysis variables and BV in all JSs were examined using Pearson’s correlation coefficient.

Results The most essential variables in which statistically significant differences between FS and SS and velocities +30S and −30S were found were: the position of the ball and the centre of gravity of the body at the time of the ball contact, the minimum angle and the maximal angle velocity of the thigh-trunk joint, the maximal forward velocities of the shoulder, elbow and wrist joints of the hitting hand and forward velocities of the elbow and wrist joints and middle finger at the time of the ball contact. The same variables correlated significantly with BV.

Conclusions These findings suggest that in JS a successful throw is crucial in achieving higher BVs. Furthermore good power production abilities in the core, shoulder and arm and optimal function of the kinetic chain are important elements. The mobility of the hip joint and the thoracic vertebrae are also important factors in achieving high BVs.