

The Effects of Impact Forces and Kinematics of Two Different Stance Position at Straight Punch Techniques in Boxing

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Abstract : The aim of the study was to compare the effects of impact forces and some kinematic parameters with two different straight punch stance positions in boxing. 9 elite boxing athletes from the Turkish National Team (mean age \pm SD 19.33 \pm 2.11 years, mean height 174.22 \pm 3.79 cm, mean weight 66.0 \pm 6.62 kg) participated in this study as voluntarily. Boxing athletes performed one trial in straight punch technique for each two different stance positions (orthodox and southpaw stances) at sandbag. The trials were recorded at a frequency of 120Hz using eight synchronized high-speed cameras (Oqus 7+), which were placed, approximately at right- angles to one another. The three-dimensional motion analysis was performed with a Motion Capture System (Qualisys, Sweden). Data was transferred to Windows-based data acquisition software, which was QTM (Qualisys Track Manager). 11 segment models were used for determination of the kinematic variables (Calf, leg, punch, upperarm, lowerarm, trunk). Also, the sandbag was marked for calculation of the impact forces. Wand calibration method (with T stick) was used for field calibration. The mean velocity and acceleration of the punch; mean acceleration of the sandbag and angles of the trunk, shoulder, hip and knee were calculated. Stance differences' data were compared with Wilcoxon test for using SPSS 20.0 program. According to the results, there were statistically significant differences found in trunk angle on the sagittal plane (yz) ($p < 0.05$). There was a significant difference also found in sandbag acceleration and impact forces between stance positions ($p < 0.05$). Boxing athletes achieved more impact forces and accelerations in orthodox stance position. It is recommended that to use an orthodox stance instead of southpaw stance in straight punch technique especially for creating more impact forces.

Keywords : boxing, impact force, kinematics, straight punch, orthodox, southpaw

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