Correlation between Strength, Counter-Movement Jump, Med-Ball Throws, and Stroke Velocity in Collegiate Tennis Players: A Pilot Study

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Category: Masters

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ABSTRACT

The correlation between physical performance variables for tennis has been done by other studies in junior tennis players. The purpose of our study was to analyze performance and correlation of physical performance factors in collegiate tennis players. **PURPOSE**: The purpose of the study was to establish a relationship between isokinetic strength, counter-movement jump (CMJ), med-ball throws, and stroke velocity (StV) for ground strokes (backhand and forehand) and serve in collegiate tennis players. **METHODS**: A cross-sectional study was conducted, where two healthy tennis players (age: 18 year, training age: training age: 11 ± 0.7 years, height: 179.5 ± 7.7cm, UTR: 10.97 ± 0.063) participated in the study. The data collection was done during off-season and within a 2 weeks' time period over two separate sessions. The two sessions were: 1) laboratory and 2) on-court. During the laboratory session: anthropometric data (Height, weight, chronological age, training age) was collected along with 1) two trials and 6 total measurements of Isokinetic strength in 8 different movements on Biodex System 3 dynamometer and 2) three counter-movement jumps for height (CMJ.H) on AMTI force platform. During the on-court session: 1) Velocity for six serves (S. StV), six forehand stroke (F. StV), and six double backhand stroke (B.StV) and 2) three trials for three medicine ball throw (MBT) types: overhead (O.MBT), forehand (F.MBT), and backhand (B.MBT) were collected. **RESULTS**: For the correlation statistics, multiple attempts recorded for each variable were used and matched for number of trials with other variables. The correlation statistics was done between the three strokes and all other variables. For the serve, high significant negative correlations were found between O.MBT (Mean ± standard deviation = 6.875 ± 0.877) and B.MBT (9.183 ± 0.914) ($r = -0.76$, $p = 0.05$; $r = -0.82$, $p = 0.05$), respectively. For forehand stroke, very high positive significant correlation was seen between IsokWrF peak torque (7.493 ± 0.763), IsokWrE peak torque (7.307 ± 1.494), IsokWrE average torque (6.920 ± 1.128) ($r = 0.82$, $p = 0.05$; $r = 0.81$, $p = 0.05$; $r = 0.81$, $p = 0.05$), respectively, and very high negative significant correlation was seen between O.MBT (6.875 ± 0.877) ($r = -0.86$, $p = 0.05$) with a moderate correlation between CMJ.H (0.329 ± 0.042) ($r = 0.79$, $p = 0.05$). For Backhand stroke, very high significant positive correlation was found between IsokIR peak torque (52.475 ± 3.997) ($r = 0.82$; $p = 0.05$) and very high negative significant correlation was seen between O. MBT (6.875 ± 0.877) ($r = 0.93$; $p = 0.05$) with a moderate correlation between CMJ.H (0.329 ± 0.042) ($r = 0.76$, $p = 0.05$). **CONCLUSION**: The isokinetic movements that mimic on-court movements seems to correlate in terms of strength. Med-ball throws such as overhead and backhand can be used during testing sessions since they positively correlate with stroke velocity. The results of the study can be used to analyze performance and inter-correlation between different variables. Further data are needed to corroborate these finding.