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The Influence of Strength Level on Sport-Specific Skills Between Stronger and Weaker Professional Handball Players

Kyriacou-Rossi, A., Hadjicharalambous, M., Zaras, N.

University of Nicosia

INTRODUCTION:
Handball is a complex team-sport that requires high-level of physical abilities and sport-specific skills in order to attain success [1]. Handball players spend a large part of their training in resistance training programs in order to enhance strength-power and as a consequence performance in the field [2]. However, the role of muscle strength on handball specific skills and whether stronger players may have a greater performance compared to weaker players remains largely unclear. The purpose of the study was to investigate the influence of muscle strength on handball specific skills and to examine the correlation between strength and handball specific skills.
METHODS:
Twenty-one male professional handball players (height 1.81±0.08m; body mass 87.9±13.9kg), participated in the study. Experimental procedures were performed six weeks before the official initiation of the in-season period. Measurements included body composition, countermovement jump (CMJ), leg extension isometric peak torque (IPT) and rate of torque development (RTD), 0-20m linear sprint, T-Test agility, throwing velocity from 7 and 9 meters distance from the goal and one repetition maximum (1-RM) in bench press and squat. Players were separated into strong (SG) and weak (WG) groups according to their 1-RM strength in bench press and squat. T-Test was used to explore differences between SG and WG while r-Pearson correlation coefficient was used to investigate the relationship between variables. Statistical significance was set at $p \leq 0.05$.
RESULTS:
No significant difference was found for body composition between SG and WG ($p > 0.05$). However, SG had significantly higher CMJ height (21.5%, $p=0.002$), IPT (22.4%, $p=0.008$) and RTD relative to body mass from 0-100 to 0-250msec ($p < 0.05$) compared to WG. Moreover, SG had lower 0-20 linear sprint (-6.3%, $p=0.012$) and agility time-trial (-7.3% $p=0.001$), while throwing velocity from 7m and 9m was significant higher for SG compared to WG (7.4%, $p=0.011$ and 8.2%, $p=0.009$, respectively). When all players considered as one group, 1-RM strength and IPT were significantly correlated with fat free mass ($r=0.518$-0.774), CMJ power production ($r=0.649$-0.823) and throwing velocity ($r=0.639$-0.819). In addition, RTD was significantly correlated with CMJ power ($r=0.829$), fat free mass ($r=0.760$) and throwing velocity ($r=0.780$ and 0.835).
CONCLUSION:
The main finding of the study was that muscle strength has a significant influence in handball specific skills while stronger players may have a greater advantage in the field compared to their weaker counterparts. These results suggest that strength training should be a vital part for handball players as it leads to significant higher increases in performance.

REFERENCES
1. Wagner et al. Journal of Sports Science and Medicine, 13, 808-816, 2014.
2. Maroto-Izquierdo et al. Journal of Human Kinetics volume 60, 133-143, 2017.

Topic: **Training and Testing**

Presentation **Poster**