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Lower Limb Kinematic Assessment to Predict Water Polo Performance

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Water polo requires leg muscle biosequencing that is different from weight bearing sports. The kinematics and forcefulness for each player could be optimized for different positions and help predict player success. Comparing vertical jump with kinematic biosequencing, and comparing each with athletic performance, may enhance training assessments. **PURPOSE:** To test the effect of vertical jump and Sparta Science force plate technology outputs on in-season performance of women's water polo players. **METHODS:** 14 Division 1 women's water polo players were evaluated during two consecutive seasons: 2015-2016 and 2016-2017. Statistics tabulated for each season were: Games played, shots, goals, shooting percentage, assists, steals, exclusions (EX), and exclusions drawn (DEX). All players were tested for vertical jump once a week during conditioning prior to resistance training using Sparta force plate and proprietary outputs, which calculated "Load" (rate of eccentric force), "Explode" (power generation during concentric force output), and "Drive" (neural impulse on timing and range of motion). Linear regression tested Sparta data on in-season performance outcomes. **RESULTS:** Athletes weighed 70.2 ± 8.6 kg, had a vertical jump of 30.7 ± 4.3 cm and Sparta Load of 45.4 ± 6.2, Explode of 34.8 ± 4.1, and Drive of 65.3 ± 10.0. On average, throughout each season, the athletes played 29.5 ± 6.3 games, took 92.7 ± 61.5 shots, scored 31.3 ± 8.1% of shots taken, had 24.3 ± 12.5 steals, and 16.4 ± 14.4 assists. Vertical jump predicted a higher shooting percentage (β=0.010; $p<0.001$), more steals (β=0.820; $p=0.043$), fewer assists (β=-1.324; $p=0.005$), and fewer EX (β=-1.466; $p<0.001$). Load predicted a lower shooting percentage (β=-0.003; $p=0.001$) and more EX (β=0.284; $p<0.001$) and DEX (β=0.219; $p=0.002$). Explode predicted a higher shooting percentage (β=0.003; $p=0.009$), more steals (β=0.642; $p<0.001$), and lower EX (β=-0.454; $p<0.001$). Drive predicted a higher shooting percentage (β=0.002; $p<0.001$), fewer assists (β=-0.221; $p=0.007$), lower EX (β=-0.099; $p=0.017$), and higher DEX (β=0.107; $p=0.017$). **CONCLUSION:** These findings indicate that both vertical jump and force plate biosequencing data may be useful predictors of water polo performance and could be employed to identify athletic capacities that need improvement.

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