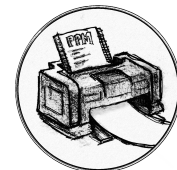




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The Influence of Fatiguing Exercise on Power Output

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Physical fatigue impairs performance during high power, short duration activities. As technological developments permit new methods of measuring this effect, it is important to validate existing paradigms. **PURPOSE:** To determine if kinetic measurements from vertical jump (VJ) tests are influenced by fatigue based on explosive power outputs. **METHODS:** A sample of athletes (9 men, 26 women) from a Division I NCAA sports program completed testing. To establish baseline VJ kinetics, athletes performed a controlled warm-up and then completed 6 jumps on a SpartaTrac force plate, each separated by 15s rest. Sparta software computed 3 outputs: Load, Explode, and Drive. After baseline VJ calculation, all athletes performed an anaerobic fatigue protocol on a mechanically-braked cycle ergometer: 3 sprints lasting 15s separated by 10s rest. Peak and mean power were recorded from the cycle trials. Subjects then repeated the VJ protocol. This pattern was repeated until 6 sets of VJ were recorded. Repeated measures ANOVA tested differences between successive VJ performances. **RESULTS:** Male athletes were 20.8 ± 1.5 years old, weighed 175.8 ± 14.0 lbs, had a baseline VJ of 46.9 ± 3.6 cm, Load of 53.6 ± 13.3 , Explode of 49.4 ± 6.6 , and Drive of 49.4 ± 11.9 . Female athletes were 20.2 ± 1.2 years old, weighed 142.3 ± 13.2 lbs, had a baseline VJ of 32.7 ± 4.3 cm, Load of 49.8 ± 46.1 , Explode of 40.7 ± 8.0 , and Drive of 63.1 ± 49.7 . The only differences between men and women were weight ($p < 0.001$), VJ ($p < 0.001$), and Explode ($p = 0.006$). ANOVA found VJ height to decrease between baseline and trial 2 ($p < 0.001$); there was no difference between men and women ($p = 0.210$); between trials 2 and 6, VJ height was consistent ($p > 0.400$). Load was not affected by the fatigue protocol across the total sample ($p = 0.418$) or by sex ($p = 0.239$). Explode was not affected by fatigue across the sample ($p = 0.233$) or by sex ($p = 0.406$). Drive was affected by fatigue ($p = 0.040$), decreasing in successive trials; there was no interaction with sex ($p = 0.742$). **CONCLUSION:** VJ is more sensitive to fatigue than SpartaTrac force plate calculations. An initial fatiguing insult was sufficient to compromise performance, whereas accumulated fatigue did not have an additive effect. Drive was the only variable in SpartaTrac outputs that was affected by fatigue.