



IS THERE A RELATIONSHIP BETWEEN ESTIMATED 1-RM FOR THE HEX-BAR DEADLIFT AND COUNTERMOVEMENT JUMP METRICS IN ROTC MALES?



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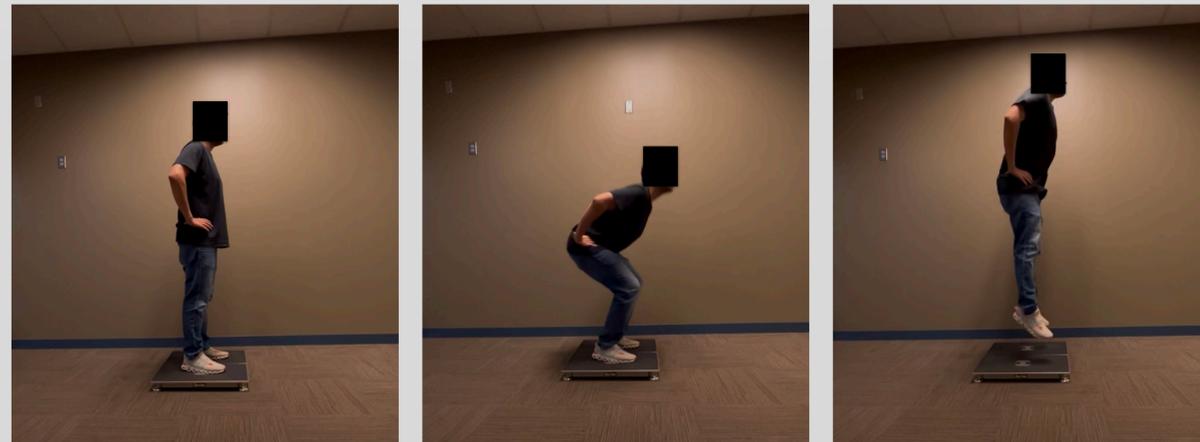
INTRODUCTION

Maximum strength and power are common characteristics that are needed for a variety of athletic movements. While these movements may be directly tied to sport, tactical fitness (military) relies on similar characteristics as well. For example, when assessing the Army Combat Fitness Test (ACFT), the first event that is measured is the Hex-Bar Deadlift, (HDL) in which soldiers perform three repetitions at a weight they hope to successfully complete. Two total attempts are allowed, and the highest completed weight is used for scoring. Based upon strength values, theoretically, the stronger one is, the greater power they can produce, however, directly measuring power from the lower extremity in the ACFT test is not assessed. PURPOSE: The purpose of this study was to see if a predicted one repetitions maximum (1-RM) from the submaximal 3-RM Hex-Bar Deadlift (HDL) and strength ratio (1-RM ÷ body mass) (HDL_Ratio) could correlate with the average propulsive power (AP) peak propulsive power (PP) average relative propulsive power (ARPP) and peak relative propulsive power (PRPP) during a countermovement jump (CMJ) with male collegiate ROTC students.



METHODS

Twenty healthy college ROTC males (age = 20.35 ± 1.90 years, height 176.84 cm ± 7.63 cm, mass 79.92 kg ± 10.00 kg) volunteered to participate in the study. Any upper or lower extremity injuries resulted in exclusion from the study. A wireless uniaxial dual force plate system sampling at 1,000 Hz was used to measure CMJ performance. Each participant performed two-three CMJ's, keeping their hands on their hips the entire time, fifteen-thirty seconds of rest were allowed in between attempts. All jumping attempts are included per participant for analysis (average per person per variable). A diagnostic ACFT assessment was performed within 14-21 days post CMJ performance day (due to weather). Maximum strength (1-RM) was calculated from the 3-repetition maximum (weight ÷ (% 1-RM ÷ 100)) from the cadets 3-RM HDL. A Spearman's Rho correlation was used and an alpha of 0.05 was used for level of significance.



ROTC Male Correlation of Hexbar Deadlift Maximum Strength with Absolute and Relative Power from a Countermovement Jump

| | HDL 1-RM | HDL_Ratio | Avg. Power | Pk Power | Avg. Rel. Pk Power | Pk. Rel. Pk Power |
|---------------------|----------|-----------|------------|----------|--------------------|-------------------|
| HDL 1-RM | 1 | 0.914** | 0.524* | 0.496* | 0.528* | 0.565** |
| HDL_Ratio | 0.914** | 1 | 0.337 | 0.269* | 0.528* | 0.577** |
| Avg. Power | 0.524* | 0.337 | 1 | 0.916** | 0.853** | 0.814** |
| Pk. Power | 0.496* | 0.269 | 0.916** | 1 | 0.738** | 0.752** |
| Avg. Rel. Pk. Power | 0.528* | 0.528* | 0.853** | 0.738** | 1 | 0.941** |
| Pk. Rel. Pk Power | 0.565** | 0.577** | 0.814** | 0.752** | 0.941** | 1 |

* Correlation level at 0.05, ** Correlation level at 0.01

RESULTS

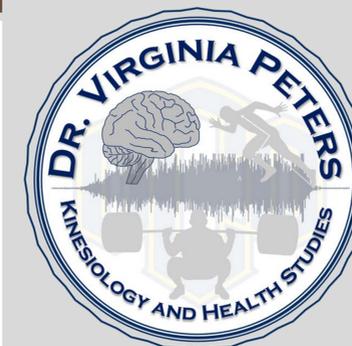
HDL estimated 1-RM was positively correlated with HDL_Ratio (r=0.91, p<0.001), AP (r=0.52, p=0.018) PP (r=0.50, p=0.026) ARPP (r =0.53, p =0.017), and PRPP (r=0.57, p=0.010). For HDL_Ratio, a significant correlation was observed for ARPP (r=0.53, p=0.017) and PRPP (r=0.58, p=0.008), however, no correlations were seen for AP and PP (r=0.27-0.34, p=0.146-.251).

CONCLUSIONS

The present study observed significant correlations with estimated 1-RM for all strength and CMJ variables (absolute and relative), while HDL_Ratio had significant correlations with only relative CMJ variables.

PRACTICAL APPLICATIONS

The present findings suggest lower extremity strength when estimated from a 3-repetition HDL, positively correlates with jumping power metrics. Future ACFT testing may want to also assess CMJ performance, or other lower-extremity dominant assessments to see if such relationships also exist.



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