Associations of Upper Body Power Tests and Upper and Lower Body Power in ROTC Cadets

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INTRODUCTION

Physical fitness is an important attribute for Army ROTC cadets to possess. The Army ROTC currently assesses fitness with the Army Physical Fitness Test (APFT), consisting of body composition, a two mile run, and a 1-minute maximum sit-up and push-up test. The APFT does not include tests of power performance, which are typically a part of regular physical training and a factor during military field experiences. Therefore, assessing power may be beneficial in the overall evaluation of ROTC cadets. With limited research on power measures in cadets, the aim of this study was to assess the relationship between upper and lower body power in ROTC cadets and to identify valid and reliable power measures for future ROTC testing.

METHODS

ROTC cadets were invited to participate in a battery of fitness tests performed over two separate days. The testing consisted of a Wingate test, a VO2max treadmill test, three separate power tests (seated medicine ball throw (MB), vertical jump (VJ), and 1 RM push-up (PU)), along with height, weight, and body composition. A total of 79 cadets (20 females and 59 males) completed all the tests, with each cadet randomly assigned to test day (Day 1: MB, PU; VO2: Day 2: Wingate, VJ). The PU test consisted of three separate quick and forceful pushes performed on an AMTI apparatus. The VJ consisted of three separate double leg counter-movement vertical jumps on the AMTI force plate (W/kg). Participants were asked to perform each test with maximal volitional effort and acceleration. Each attempt was recorded with the best score on each test retained for use in further analysis. Pearson product-moment correlations were calculated to assess the relationship between the MB, PU, and VJ. All analyses were conducted using PASW statistics version 18, with alpha set < .05. RESULTS

Table 1. Correlations among variables for Females

<table>
<thead>
<tr>
<th>Variable</th>
<th>Vertical Jump</th>
<th>Push Up</th>
<th>Medicine Ball</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females n=20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical Jump</td>
<td>----</td>
<td>352</td>
<td>.45*</td>
</tr>
<tr>
<td>Push Up</td>
<td>----</td>
<td></td>
<td>.51*</td>
</tr>
</tbody>
</table>

Table 2. Correlations among variables for Males

<table>
<thead>
<tr>
<th>Variable</th>
<th>Vertical Jump</th>
<th>Push Up</th>
<th>Medicine Ball</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males n=59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical Jump</td>
<td>----</td>
<td>305</td>
<td>.48*</td>
</tr>
<tr>
<td>Push Up</td>
<td>----</td>
<td></td>
<td>.19</td>
</tr>
</tbody>
</table>

CONCLUSIONS and APPLICATIONS

ROTC cadets often perform power training as part of the usual physical training; however, this aspect of training is not formally assessed. In addition, there is limited evidence of the best tests to measure power, especially upper body power. Shim, Bailey, & Westings (2001) used a "limed" bench press test against an isokinetic bench press station and found high correlations between the two tests. Mayhew, Bemben & Rohrs, (1991, 1992), used a seated shot put throw against a bench press machine using an infrared timer and found moderate correlations between the two measures in their cohort of wrestlers. Our study found mixed results on measures of upper body power using the MB and PU tests. A significant relationship was found between the two upper body tests in females, but not in males. However, Harris et al. (2011) found significant correlations between a seated medicine ball throw from a chair and a force plate measure of upper body power in older adults.

CONCLUSIONS and APPLICATIONS

- Include power testing in future ROTC fitness testing
- Include upper body power measures in fitness testing
- Functional testing is an important component of fitness testing, especially in military training
- MB is an easy upper body test to administer and is a common measure of upper body power
- Future testing to determine validity of upper body power measures

REFERENCES