PHYSICAL WORKING CAPACITY AT FATIGUE THRESHOLD IS ASSOCIATED WITH MEASURES OF PHYSICAL FUNCTION IN OLDER ADULTS

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ABSTRACT

BACKGROUND: Physical function in older adults is often evaluated with measures of muscular strength, body composition, and circulating biomarkers, such as serum albumin and hemoglobin. The physical working capacity at fatigue threshold (PWCFT) test measures the ability to resist fatigue and has been associated with the health and functional capacity of older men and women. To the best of our knowledge, no one has examined the relationship between the PWCFT, to strength, body composition, and serum markers used to assess the physical health and nutritional status in older persons. PURPOSE: This study examined the relationship between the PWCFT, with common measures used to assess physical health in older persons. METHODS: Thirty-six healthy older men and women (age: 71.3±6.1 y; BMI: 27.9±5.2 kg·m−2) volunteered to participate in this study. After an 8 to 12 hour fast the participants had their blood drawn and lean soft tissue mass (LST) measured by Dual-energy X-ray absorptiometry (Lunar, GE). The participants then performed the PWCFT test, a discontinuous, cycle ergometry test utilizing EMG fatigue curves to identify the power output corresponding to the onset of fatigue. Additionally, maximal isometric grip strength (Grip) and sit-to-stand in 30 seconds (STS) were measured. RESULTS: Pearson’s correlation coefficient for PWCFT and other common measures of physical health and function are as follows: GRIP: r=.35; STS: r=.42; LST (kg): r=.33; Albumin (g/dL): r=.18. CONCLUSIONS: The PWCFT test demonstrated a significant but moderate relationship with all variables with the exception of hemoglobin. These data suggest that the PWCFT test may be related to physical health and nutritional status of older men and women in this study.

INTRODUCTION

To the best of our knowledge, no one has examined the relationship between the PWCFT, to strength, body composition, and serum markers used to assess the physical health and nutritional status in older persons. This study examined the relationship between the PWCFT, with common measures used to assess physical health in older persons.

METHODS

SUBJECTS: Thirty-six healthy older men and women (age: 71.3±6.1 y; BMI: 27.9±5.2 kg·m−2) volunteered to participate in this study. After an 8 to 12 hour fast the participants had their blood drawn and lean soft tissue mass (LST) measured by Dual-energy X-ray absorptiometry (Lunar, GE). The participants then performed the PWCFT test, a discontinuous, cycle ergometry test utilizing EMG fatigue curves to identify the power output corresponding to the onset of fatigue. Additionally, maximal isometric grip strength (Grip) and sit-to-stand in 30 seconds (STS) were measured. RESULTS: Pearson’s correlation coefficient for PWCFT and other common measures of physical health and function are as follows: GRIP: r=.35; STS: r=.42; LST (kg): r=.33; Albumin (g/dL): r=.18. CONCLUSIONS: The PWCFT test demonstrated a significant but moderate relationship with all variables with the exception of hemoglobin. These data suggest that the PWCFT test may be related to physical health and nutritional status of older men and women in this study.

RESULTS (CONT.)

The table below presents the correlation of PWCFT to various measures of physical function and albumin.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean ± SD</th>
<th>Pearson’s Correlation Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRIP (kg)</td>
<td>31.1±12.28</td>
<td>0.35*</td>
<td>0.04</td>
</tr>
<tr>
<td>STS (in 30 s)</td>
<td>14±4.26</td>
<td>0.33*</td>
<td>0.05</td>
</tr>
<tr>
<td>LST (kg)</td>
<td>47±11.63</td>
<td>0.36*</td>
<td>0.04</td>
</tr>
<tr>
<td>Albumin (g/dL)</td>
<td>4±0.23</td>
<td>0.18</td>
<td>0.29</td>
</tr>
</tbody>
</table>

SUMMARY & CONCLUSIONS

• The PWCFT test demonstrated a significant but moderate relationship with all variables with the exception of hemoglobin.

• These data suggest that the PWCFT test may be related to physical health and nutritional status of older men and women in this study.

PRACTICAL APPLICATIONS

• The salient features of the PWCFT test are the ease of measurement, submaximal effort requirement, non-invasiveness, and reliability for measuring resistance to fatigue.

• Because of the positive relationship observed between the PWCFT and measures of strength, function and muscle mass, perhaps a clinician or personal trainer should consider adding the PWCFT test as an additional method to monitor the effectiveness of an intervention (exercise or nutrition).

ACKNOWLEDGEMENTS

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