VO₂max Paper Assignment: Sports Physiology 10 pts of total grade Due April 21

TITLE: Entitle your report Maximal Aerobic Capacity Tests Project with your name

INTRODUCTION (5.0 pts): ANSWER/DISCUS THE FOLLOWING QUESTION IN A THOROUGH INTRO. How is maximal aerobic capacity related to cardiovascular disease risk reduction? Please explain how having a higher VO₂max translates to having enhanced cardioprotection. Please cite at least 2 scientific references in this discussion (see below for suggestions). Make sure you show the full references at end of the article. The introduction should be 7-10 sentences.

METHODS (2.0 pts): Briefly describe how you completed the four VO₂max tests.

RESULTS and DISCUSSION (3.0 pts): Create a BAR Graph comparing your actual VO₂max in the Lab with the 1.5 mile run/walk, Rockport Walk, and Jurca et al Equation. Next, compare and contrast the results you attained using your actual VO₂max in the lab as the ‘Gold’ standard.

REFERENCES: List all references that were cited (as shown below).

Complete the following VO₂max tests for this project.
A) Actual VO₂max in the Lab

B) 1.5 mile run/walk: Run/Walk 1.5 miles fast as you can and use the following variables for your estimation of VO₂max. Body weight in Kg; time in minutes to run 1.5 miles (Note convert seconds to minutes; so if your time is 12 min and 30 seconds, then 30/60 is 0.5 min and your time is 12.5 minutes; heart rate in bpm at end of the 1.5 miles; For gender substitute 1 if you are a male and 0 if you are a female. Here is the equation

\[
\text{VO}_2\text{max} = 100.16 + 7.3(\text{Gender}) - 0.164(\text{Body weight in kg}) - 1.273(\text{time in min}) - 0.1563(\text{Heart rate in beats/min})
\]

C) Rockport Walk
1) Use a one-mile flat course or treadmill that can give you one mile covered
2) Walk as briskly as you can
3) Immediately after you finish one mile take a 15-second pulse (multiply by 4 to get beats per minute)
4) Calculate your Estimated VO₂max

\[
\text{VO}_2\text{max} = 132.853 - 0.0769(\text{your weight in lbs}) - 0.3877(\text{age in years}) + 6.315(\text{gender}) - 3.2649(\text{time in minutes to walk mile}) - 0.1565(\text{heart rate in beats/min})
\]
(Remember to convert seconds to minute so the time reads like this example: 12.35 min)

D) Jurca et al. (2005) Equation: Estimating your VO₂Max without performing an Exercise Test: Jurca et al Equation. NOTE: once you get your estimated MET value multiply by 3.5 to get your VO₂Max in ml/kg/min

Use Step 1 and Step 2 (next page) to get your estimated VO₂max without performing an exercise test. Reminder, BMI is weight in kg divided by height in meters squared.

Suggested resources on VO₂max and cardiovascular disease risk reduction for INTRO.


**STEP 1**

**Physical activity score:** Choose one activity category that best describes your usual pattern of daily physical activities, including activities related to house and family care, transportation, occupation, exercise and wellness, and leisure or recreational purposes.

Level 1: Inactive or little activity other than usual daily activities.  
Score: 0.00

Level 2: Regularly (≥5 d/wk) participate in physical activities requiring low levels of exertion that result in slight increases in breathing and heart rate for at least 10 minutes at a time.  
Score: 0.32

Level 3: Participate in aerobic exercises such as brisk walking, jogging or running, cycling, swimming, or vigorous sports at a comfortable pace or other activities requiring similar levels of exertion for 20 to 60 minutes per week.  
Score: 1.06

Level 4: Participate in aerobic exercises such as brisk walking, jogging or running at a comfortable pace, or other activities requiring similar levels of exertion for 1 to 3 hours per week.  
Score: 1.76

Level 5: Participate in aerobic exercises such as brisk walking, jogging or running at a comfortable pace, or other activities requiring similar levels of exertion for over 3 hours per week.  
Score: 3.03

**STEP 2**

**Estimate MET level of cardiorespiratory fitness**

Enter 0 for women or 1 for men  
[ ] x 2.77 = [ ] minus

Enter age in years  
[ ] x 0.10 = [ ] minus

Enter body mass index  
[ ] x 0.17 = [ ] minus

Enter resting heart rate  
[ ] x 0.03 = [ ] plus

Enter physical activity score from step 1  
[ ] x 1.00 = [ ] plus

Constant  
18.07

Estimated MET value  
[ ]

**Clinical relevance of selected maximal MET levels of cardiorespiratory fitness**

<table>
<thead>
<tr>
<th>METs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 METs</td>
<td>Resting metabolic rate; sitting quietly in a chair</td>
</tr>
<tr>
<td>&lt;3 METs</td>
<td>Severely limited functional capacity; a criteria for placement on a heart transplant list</td>
</tr>
<tr>
<td>3–5 METs</td>
<td>Poor prognosis in coronary patients; highly deconditioned individual</td>
</tr>
<tr>
<td>10 METs</td>
<td>Good prognosis in coronary patients on medical therapy; approximate maximal capacity expected in regularly active middle-aged men and women</td>
</tr>
<tr>
<td>13 METs</td>
<td>Excellent prognosis regardless of disease status</td>
</tr>
<tr>
<td>18 METs</td>
<td>Elite endurance athletes</td>
</tr>
<tr>
<td>20 METs</td>
<td>World-class athletes</td>
</tr>
</tbody>
</table>

**Figure 1.** Worksheet for estimating maximal MET levels of cardiorespiratory fitness from routinely collected clinical data.  
*Body mass index=(weight in lbs × 705)/(height in inches)² or (weight in kilograms)/(height in meters)².*  
*Adapted from the American Heart Association.*

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