

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/DISCUSS 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.

Myers, J., Prakash, M., Froelicher, V. et al. (2002). Exercise capacity and mortality among men referred for exercise testing. The New England Journal of Medicine, 346, 793-801.

Kodama, S., Saito, K., Tanaka, S. et al. (2009). Cardiorespiratory fitness as a quantitative predictor of all-cause mortality and cardiovascular events in healthy men and women: A meta-analysis. Journal of the American Medical Association, 301(19), 2024-2035.

Roger, V.L., Jacobsen, S.J., Pellikka, P.A., et al. (1998). Prognostic value of treadmill exercise testing: a population-based study in Olmsted County, Minnesota. Circulation, 98:2836-2841.

Name: _____

Date: _____

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.

	Score
Level 1: Inactive or little activity other than usual daily activities.	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.	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.	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.	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.	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 ^a		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^b

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

Figure 1. Worksheet for estimating maximal MET levels of cardiorespiratory fitness from routinely collected clinical data. ^aBody mass index=(weight in lbs \times 703)/(height in inches)² or (weight in kilograms)/(height in meters)². ^bAdapted from the American Heart Association.^{45,46} MET, metabolic equivalent.