CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)

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Project Number

S1112

Project Title

The Effect of Body Mass Index, Leg Length, and VO2 Max on Ergometer Scores in Males and Females

Abstract

Objectives/Goals

The goal of the experiment was to be able to determine what certain body types or characters set an individual up for rowing ergometer success.

Methods/Materials

A consent form was given to 15 males and 15 females from the Marin Rowing Association, ranging from ages 14-17 years old, in order to have them perform a 4000 meter ergometer test. Prior to testing, each subject was measured for height (in centimeters), weight (in lbs.), and leg length (in cm). An online body mass index calculator was used to determine each individual's BMI. VO2 max was taken from the size of the individual and their corresponding erg results. After the subjects finished the 4k, their time and watts were recorded. Each independent variable and result was run through descriptive and inferential analysis to determine accuracy and significance.

Results

The descriptive statistics show a correlation between BMI and VO2 levels and not leg length but when run through t-tests, the inferential statistics show that there is no correlation between either BMI and leg length. There is a linear correlation with VO2 max, however it was discovered that this data was invalid for further analysis (see conclusion/discussion). In both males and females for BMI and leg length, the t-calc value was larger smaller than that of the t-critical value, which indicates that there is not any statistical significance between the variables and the results. The t-tests did show that these results were accurate and reliable.

Conclusions/Discussion

From this data it was concluded that Body Mass Index and leg length do not have any statistical significance on ergometer scores in males or females. VO2 max was not viable to draw conclusions from due to an error in the experimental design. BMI, most likely did not correlate with ergometer scores because this experiment tested fit athletes racing at a collegiate level, hence many of the subjects had similar low BMIs. Leg length did not correlate to a better erg score (the higher the watts, the better the score) because, although leg length gives one a longer stroke, it does not necessarily bring more power and increased wattage. VO2 Max had to be discarded due to a flaw in the design. Due to time, coaching, and availability constraints I had to use a race test formula to calculate each individual's VO2 max, therefore it was ensured that they would directly correlate.

Summary Statement

This experiment was intended to draw connections and predict successes between BMI, leg length, and VO2 max on ergometer scores in males and females.

Help Received

My science teacher proofed by experimental design before I performed it.