CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34286

Project Title

An Echocardiographic Assessment of an Athlete's and Non-Athlete's Heart

Abstract

Objectives/Goals

The objective of my project was to determine the comparison between an athletes heart and non-athletes heart using echocardiographic and electrocardiographic readings. I hypothesized that average increase in each subjects cardiac output would be 150-300% and that the athletes heart would be more efficient based on cardiac output.

Methods/Materials

The testing was done at a medical clinic supervised by a cardiologist and an echo-tech using an electrocardiogram and an echocardiogram. I recruited a minimum of 10 subjects in each category (athletes and non-athletes), and each subject submitted an informed consent. I recorded baseline vitals (blood pressure, height, and weight) for each subject. The baseline echocardiogram and electrocardiogram of the heart was performed. After each subject ran 9 minutes on the treadmill at Bruce protocol, the post exercise ECG and EKG was done.

Results

I recorded the baseline and post exercise blood pressure, heart rate, stroke volume, and cardiac output. To provide a more advanced and accurate analysis, I used standard deviation of the mean, and also a t-test (significance and p value). Overall, the athletes heart rate was lower at rest and at post exercise and the athletes stroke volume was larger at rest and at post exercise. The baseline cardiac output for athletes and non-athletes was 4096.9±1345.9 milliliters per minute and 3976.1±1610.5 milliliters per minute. The post exercise cardiac output for the athletes and non-athletes was 7953.9±2060 milliliters per minute and 7502.3±1805.6 ml per minute. The athletes cardiac output was higher at rest and with exercise and the average increase was 191.45%.

Conclusions/Discussion

I hypothesized that the athletes heart would be more efficient based on cardiac output, and that the average increase of cardiac output would be 150-300%. Heart rate was determined using the electrocardiogram and stroke volume using the echocardiogram. Using these calculations, I found the cardiac output with the formula HR*SV= CO. Finally, my project proves that if you are well conditioned and have a healthy life style, you have a more efficient heart than a less fit person. This can benefit the community by stating that if you get healthy, you also have a better heart function. It also encourages the community and students to get more active and have a better live style.

Summary Statement

I compared the cardiac heart function of athletes and non-athletes using echocardiographic views.

Help Received

I used Dr. Sundrani's medical clinic for testing. Echo-techs and Dr. Sundrani were supervising while running the echo's.