Core strength training and its effects on cardiorespiratory functions in young adult males

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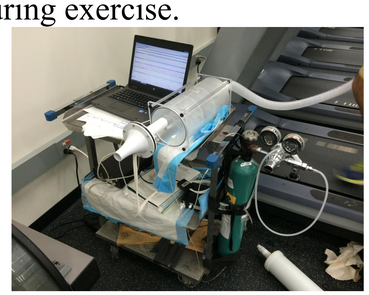
I. Abstract

- Athletes are always striving to make gains in muscular strength and also in aerobic exercise capacities.
- **Hypothesis:** An increase in core strength would cause an increase in cardiorespiratory performance.
- Subjects had their core strength and cardiorespiratory parameters assessed at rest and during exercise both prior to and also post participation in a core strength training program.

II. Introduction

- Core muscle groups including abdominal muscles, back muscles, and oblique muscles are known to be highly important in generating power for physical activity (Pierce et al., 2007).
- A study conducted in 2010 suggests that abdominal exercises also improve the functions of the diaphragm, and thereby also increase respiratory functions (Strongoli 2010).
- **Prediction:** If the subjects show an increase in core muscular strength, then I propose that I will also see an increase in the overall performance of the heart and the respiratory system both at rest and during exercise.



III. Methods

- In this study, I examined the effects of a core strength training program on cardiorespiratory functions in 4 young adult male subjects ages 20-22 who each completed an informed consent form.
- Relative core strength was determined by comparing number of crunches executed on a crunch machine at a personal 65% 1 RM (Repetition Maximum) before and after the training program.
- The program lasted for approximately 3 weeks.
- I used an Iworx GA300 gas analyzer paired with Labscribe software to take measurements of Relative Oxygen Consumption ($V0_2$), Relative $C0_2$ production ($VC0_2$), and Respiratory Exchange Ratio (RER) both before core strength training and after training and both at rest and at 80% Age Predicted Maximum Heart Rate (APMHR).
- Resting Heart Rate (RHR) was also taken using the radial pulse method.

IV. Results

- Core strength performance improved but cardiorespiratory parameters were unaffected

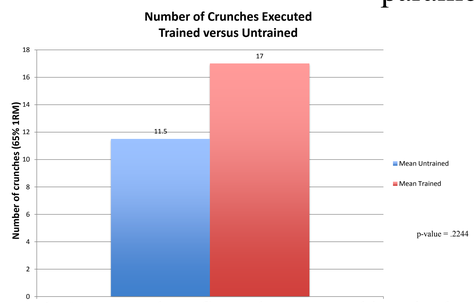


Figure 1. Mean number of crunches executed in trained versus untrained subjects. P =.2244 Not statistically significant.

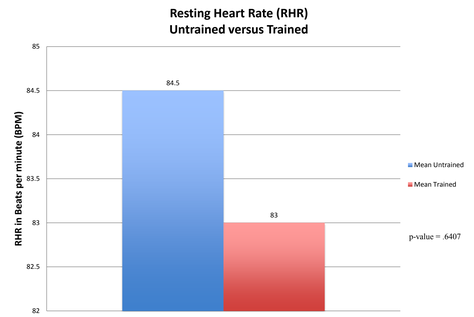


Figure 2. Resting Heart Rate in trained versus untrained subjects. P = .6407 Not statistically significant.

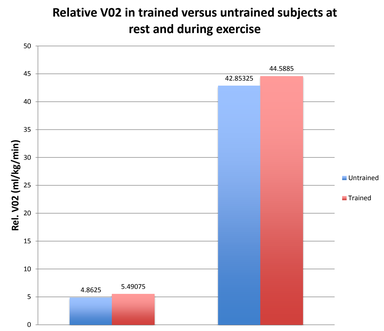


Figure 3. Rel. V02 in trained versus untrained subjects both at rest and during exercise. Two-Way ANOVA with repeated measures: p = .877 for training and p = .746 for both training and exercise. Not statistically significant.

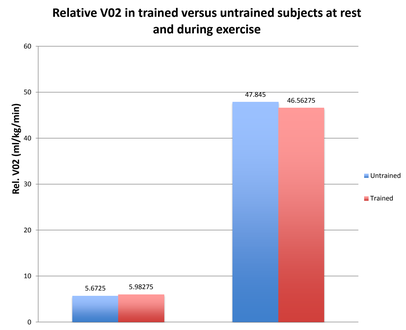


Figure 4. Rel. VC02 in trained versus untrained subjects both at rest and during exercise. Two-Way ANOVA with repeated measures: p = .603 for training and p = .722 for both training and exercise. Not statistically significant.

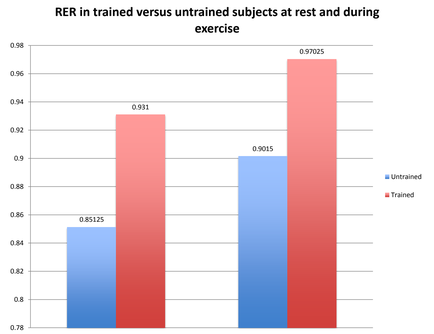


Figure 5. RER in trained versus untrained subjects both at rest and during exercise. Two-Way ANOVA with repeated measures: p = .424 for training p = .586 for exercise and p = .885 for both training and exercise. Not statistically significant.

V. Interpretations

- After analysis, the data did not indicate statistically significant parallel improvements in core strength performance and measured cardiorespiratory parameters.
- Possible concerns included small number of subjects used, percent compliance of completing the training program, and external concerns such as changes in physical activity.

VI. Conclusion

- Core strength training does not seem to have a large impact on cardiorespiratory parameters.
- I still need to complete 5 more trials, so it is possible that I will find new results.

VII. References

- Pierce, Patricia, Randall Nichols, and Susan Herman. Core for the classroom. *Strategies: A Journal For Physical And Sport Educators* 20.6 (2007): 23-28. *ERIC*. Web. 1 Dec. 2013.
- Strongoli, L., Gomez, C., and Coast, J. The effect of core exercises on transdiaphragmatic pressure. *Journal Of Sports Science & Medicine* 9.2 (2010): 270-274. *OmniFile Full Text Select (H.W. Wilson)*. Web. 1 Dec. 2013.