

The effects of high intensity interval training and aerobic exercise on testosterone and cortisol

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Introduction

- Aerobic exercise, but not high intensity interval training (HIIT), has been shown to increase testosterone
- Testosterone increases during mating, during aggressiveness, and after a competitive win
- Competition is a vigorous and physically demanding activity, similar to physical exercise
- Cortisol is increased by both Aerobic and HIIT exercise, with HIIT producing longer lasting effects
- Higher testosterone levels are linked to positive protective effects on age related disorders
- Dual hormone hypothesis: baseline levels of testosterone and cortisol jointly predict the testosterone response post-competition

Hypotheses:

H1: I expect a larger testosterone increase after HIIT exercise, compared to aerobic exercise.

H2: I expect a high basal salivary-cortisol to eliminate the exercise effects on testosterone.

References

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Anticipated Results

HIIT will increase testosterone greater than aerobic exercise

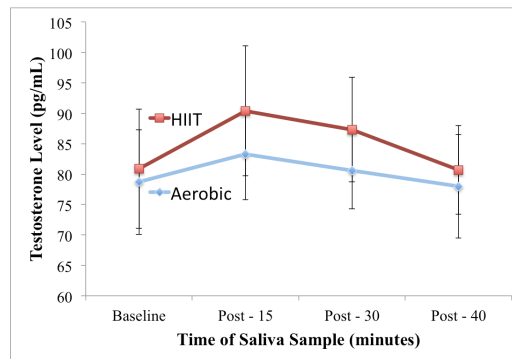


Figure 1. Testosterone ($M \pm SE$) for the HIIT exercise group and the aerobic exercise group at the four sample collections times. Area under the Curve statistics were calculated using this data.

HIIT work output = Aerobic work output through achieving target heart rate ranges

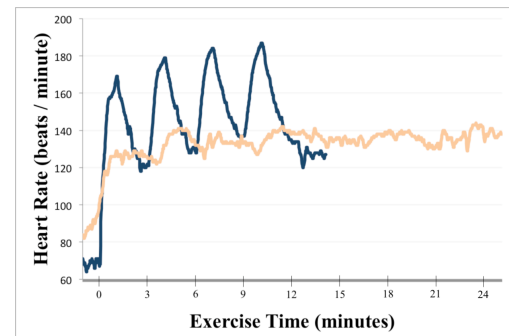
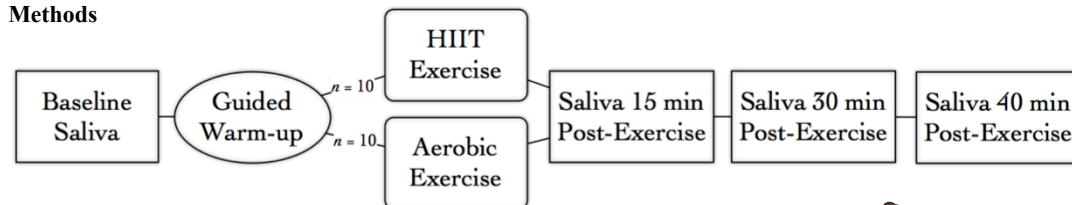


Figure 2. Heart rates collected from pilot participants. Aerobic target range = $65\% HR_{max} \leq HR \leq 75\% HR_{max}$ and HIIT target range = $HR \leq 85\% HR_{max}$

Area Under the Curve_{Ground} and Area Under the Curve_{Increase} statistics are awaiting salivary hormone level data

Methods



- Baseline saliva sample was collected following a 20 minute waiting period
- All samples were collected through passive drool
- **HIIT**: 4 cycles consisting of 1 minute high intensity exercised, followed by 2 minutes of active recovery
- **Aerobic**: 25 minutes of continuous moderate intensity exercise



Figure 3. Example of the stationary bike used during exercise.

Summary & Conclusions

- Both aerobic and high intensity interval training exercise increased testosterone
- HIIT may produce a significantly greater increase in testosterone
- Basal cortisol may have no impact on post-exercise testosterone levels
- Shorter, but higher intensity acute physical activity produces a greater increase in testosterone, immediately following completion
- Anxiety symptom reduction and protective effects for age related disorders can be achieved through more brief, high intensity exercise
- Due to increasing demands on one's schedule, shorter exercise sessions could prove a better therapeutic option for mental health symptom reduction, produced by less patient drop-out

Future Directions

- By increasing the sample size, the testosterone differences will become more distinct, providing increased significant evidence for HIIT
- The next step is to test the efficacy of a long term high intensity exercise program on anxiety symptom relief and positive protective effects on age related disorders
- Additionally with replication and a higher statistical power, gender differences should be analyzed as testosterone levels are gender specific. HIIT exercise could produce greater results for women than men, given women produce and require less testosterone

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