Pedaling Perspectives: Unveiling The Impact of Active vs. Passive Cycling on Salivary Cortisol and Testosterone Levels in Healthy Adults

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Abstract:

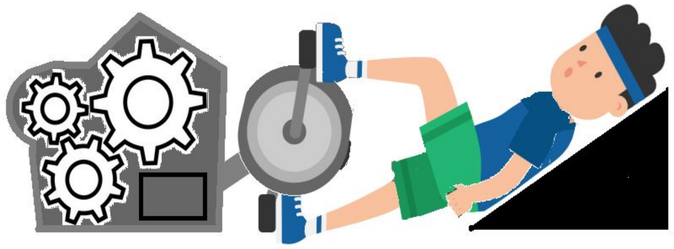
This novel study may provide evidence that passive cycling may be as beneficial as active concerning certain affective responses. **PURPOSE:** To compare the psychophysiological responses to motor-assisted (passive) cycling (PC) vs usual (active) cycling (AC). **METHODS:** Heart rate (HR), Rating of Perceived Exertion (RPE), and affect [Calmness, Tension, Energy, Tiredness, State Anxiety (SA)] were recorded in 30 participants (15 female; age 18-35 yrs) before, during and after each (PC, AC) 35-min cycling bout. Each session consisted of identically paced warm-ups (2.5-min@35 $r \cdot min^{-1}$), exercise bout (30-min@65 $r \cdot min^{-1}$), and cool-down (2.5-min@35 $r \cdot min^{-1}$) at a self-selected intensity of hard (15 RPE). **ANTICIPATED RESULTS:** Enjoyment will be greater following AC relative to PC. During AC, participants will have higher HR and a greater RPE score than PC. RPE will be greater at all times during AC. **CONCLUSION:** If passive cycling reduces cortisol and testosterone levels post-cycling, then health professionals may prescribe passive/low-intensity cycling exercise for individuals who can not physically perform a moderate/high-intensity cycling exercise, such as those with mobility impairments or debilitating mental health concerns.

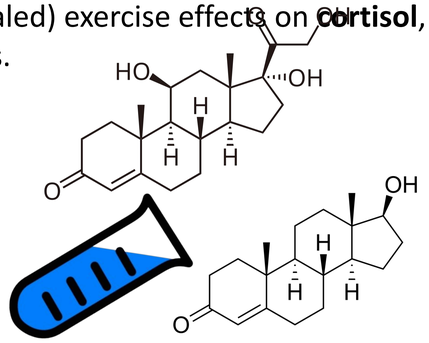
Background:

- Cortisol, a strong stress indicator, and testosterone have been shown to increase in both acute and chronic stress-inducing situations such as during physical activity.
- Limited research exists on how active and passive, motor-driven, cycling affects salivary cortisol and testosterone in a healthy population.
- As new evidence has shown that an increase in cortisol and testosterone levels is associated with increased cardiovascular risk, our findings may provide valuable evidence to help validate the benefits of passive cycling as a therapeutic measure.
- If passive cycling reduces cortisol levels post-exercise, then clinicians may prescribe passive/low-intensity exercise for individuals who cannot physically perform moderate/high-intensity exercise, such as stroke survivors and those with spinal cord injuries.

Aim:

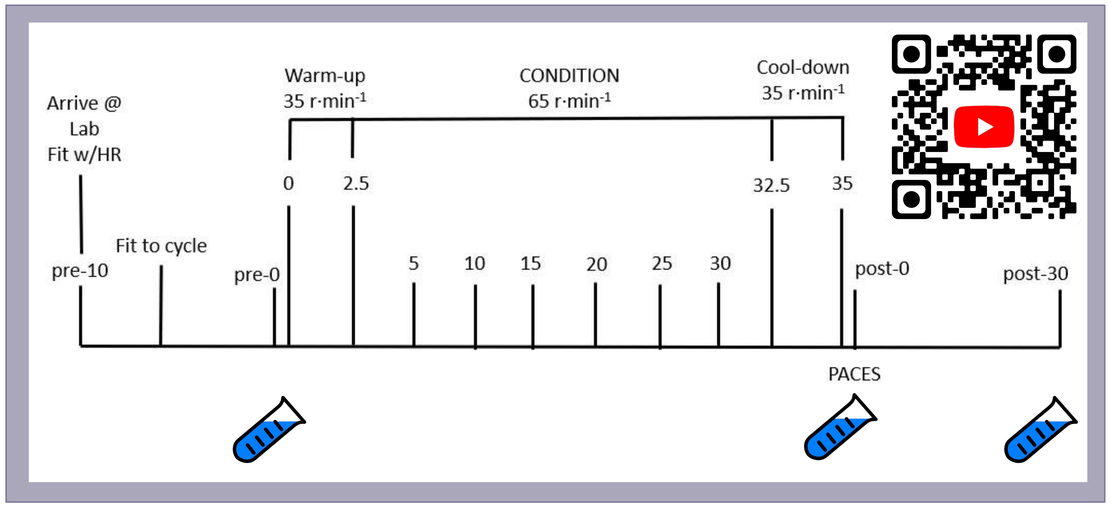
Investigate passive (motor-driven) vs. active (self-pedaled) exercise effects on **cortisol**, **testosterone**, and **enjoyment** in young, healthy adults.





Methods:

This within-subject study recruited (N=50) individuals (aged 18-25) to undergo acute bouts of active and passive cycling, randomized & counter-balanced, each lasting for 30 minutes. Participants pedaled a custom-built cycle ergometer at a predetermined resistance of 15 on rating of perceived exertion (RPE) on the 6-20 scale. Pedaling cadence was maintained around 65 revolutions per minute and water was provided up to 10 minutes before each saliva sample is collected. Salivary samples were collected immediately before, immediately after, and 30 minutes post-cycling. Participants naturally cycled and were not on any hormone-influencing medications or pregnant. The protocol included a 35-minute cycling session comprising a 2.5-minute warm-up, a 30-minute cycling bout at a predetermined resistance, and a 2.5-minute cooldown. Participant heart rate, rate of perceived exertion, and affective feelings (energy, tension, tiredness, calmness, and state anxiety) were collected and measured.



Results:

Paired t-tests revealed no significant difference in salivary cortisol and testosterone levels between the active and passive conditions ($p > 0.10$). The changes in hormones in response to active physical activity were not significantly different from those in passive physical activity, making passive physical activity a potential therapeutic intervention that yields similar physiological effects as active physical activity.

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