*TACSM Abstract*

# Cardiorespiratory Coordination Among Intermediate and Novice Female Collegiate Rowers

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ABSTRACT

Elite rowers present high levels of cardiorespiratory performance. Rowers' on-water performance can be predicted by a cardiopulmonary exercise test (CPET) and related measured parameters such as maximum oxygen uptake test (VO2max), ventilation (VE), heart rate (HR), expired fraction of oxygen (FeO2) and carbon dioxide (FeCO2). However, such testing provides little information about the non-linear dynamic interactions during rowing and the qualitative synergetic reconfigurations between cardiovascular and respiratory systems to adjust to the individual rowing performance. Cardiorespiratory coordination (CRC) has been proposed as a method to measure the co-variation among cardiorespiratory variables during a CPET. **PURPOSE:** To measure and compare the CRC through principal components analysis (PCA) between intermediate (9) and novice (9) rowers. **METHODS:** Eighteen females, members of NCAA Division II team, participated based on their off-water performance on 6000 m time trial and training status (i.e., Intermediate vs, Novice) in a discontinuous incremental rowing ergometer test to exhaustion. A variety of cardiorespiratory values were recorded. VE, HR, FeO2, and FeCO2 values during the last two stages before volitional fatigue between intermediate and novice rowers were analyzed by PCA on SPSS vs28. The number of principal components (PCs) and the first PC eigenvalues were computed for each group. **RESULTS:** While 67% of participants in the intermediate group showed one PC, only 22% of the novice group displayed 1 single PC. The formation of an additional PC in N rowers was the result of the shift of FeCO2 from the PC1 cluster of variables. **CONCLUSION:** Intermediate rowers showed a trend towards lower number of PCs compared to novice rowers, reflecting a higher degree of CRC. These findings point toward a higher efficiency of cardiorespiratory function in intermediate rowers, potentially as a result of improved bicarbonate buffering efficiency during high-intensity exercise. Intermediate rowers presented better gas exchange and relied less on ventilation for a given oxygen consumption. CRC appears as a complementary measure to assess aerobic fitness as well as cardiorespiratory interactions and their response to exercise in rowing may be useful to coaches, athletes and other stakeholders.