GNYACSM Abstract

SmO2 Monitoring During a Novel Dryland Exercise to Identify Muscular Exhaustion: A Randomized Controlled Trial

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ABSTRACT

Muscular fatigue in competitive swimming often leads to a breakdown in form, causing less efficient movement patterns. During the recovery phase of butterfly stroke, this form breakdown is commonly observed across all levels of competition. **PURPOSE**: Given that this specific form breakdown occurs even at the highest levels of competition, a gap in current training protocols needs to be addressed. This study introduces a novel exercise designed to mimic the movement pattern and resistance profiles of the recovery portion of the butterfly stroke. Muscle oxygen saturation (SmO2) monitoring will be utilized to quantify muscular endurance and fatigue during this exercise. **METHODS**: Twelve Division-I competitive swimmers were recruited, paired, and randomly assigned to either the experimental or control group. Each subject swam a 100 yd butterfly sprint to determine their swim times (ST). Subjects completed two sets of this exercise to failure 3 times per week for 6 weeks, with the load incrementally increased once the subject surpassed 110% of their ST without reaching failure. Once per week, SmO2 measurements were obtained using Moxy monitors secured to the subject's posterior deltoid. **RESULTS**: This analysis is based on preliminary data collected from the experimental group. During the exercise, the difference between each reading averaged 7.10%(±10.6%), with a median of 4%. SmO2% decreased by an average of 46% at the point when muscular exhaustion was reached. The subsequent resaturation yielded an average increase of 61.7%. Given that these points also align with the observed moments of failure and recovery based on visual observation, the likelihood that these deviations are due to chance is exceedingly low ($z = 10.84$). **CONCLUSION**: Preliminary data suggests that there could be statistically significant evidence that using wearable technology to monitor SmO2 levels is a viable way to assess muscular fatigue.