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# Comparison of the 400 metre timed endurance surf paddle between elite competitive surfers, competitive surfers and recreational surfers

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# COMPARISON OF THE 400 METRE TIMED ENDURANCE SURF PADDLE BETWEEN ELITE COMPETITIVE SURFERS, COMPETITIVE SURFERS AND RECREATIONAL SURFERS

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## Purpose

Surf competitions demand the ability to out paddle opposition to gain an optimal position for wave take offs. Those who can out paddle a heat opponent, and catch waves at the most critical point when breaking are likely to maximize their scoring potential. Currently appropriate and valid testing protocols evaluating the physiological fitness of surfing athletes are not well established. The purpose of this study was to determine whether the testing procedure of a pool based, 400m endurance time trial is more appropriate (compared to egometry testing) given the nature of the sport, and provide a test that is a better discriminator of performance.

## Methods

### Experimental Approach

The study compared on-water measurement between surfers of varying competitive ability (elite, comp, recreational) to ascertain if tests could be used to discriminate differences in paddle and physiological characteristics of surfers. The 400m paddle times and average aerobic speed of elite adult surfers i) World Championship Tour (WCT) (n=2, 29.3 yrs. ± 1.34), ii) World Qualifying Series (WQS) (n=12, 22.1 yrs. ± 3.09), elite junior surfers iii) National selection team (n=10, 16.5 yrs. ± 1.02), competitive surfers iv) competitive club board riders, (n=11, 25.6 yrs. ± 5.84), and v) junior high school competitors, (n=7, 16.1 yrs. ± 1.23) and vi) recreational surfers (n=17, 32.6 yrs. ± 6.8) were compared.

### Procedures

The timed 400m endurance paddle test was based over a 20m up and back course, with two buoys placed 2.5m in from each end of the pool to provide the distance. Subjects lie prone on their surfboard and paddle the 10 laps (up and back) as fast as possible. Total time was recorded and average aerobic speed was derived by dividing the distance covered by the total time.

### Statistical Analysis

To determine whether any significant differences were present between the groups a one-way analysis of variance was performed. A significant main difference was found. A LSD post-hoc test was used to identify individual statistical differences.

## Results

### 400m Endurance Paddle:

The 400m paddle times of recreational surfers were significantly slower than all other groups (WCT;  $p=0.004$ , WQS;  $p<0.001$ , Junior National Selection;  $p<0.001$ , Competitive adult club board-riders;  $p=0.001$ , Junior high school competitors;  $p=0.001$ ). Significant differences were also identified between the competitive adult club board-riders and both the WQS ( $p=0.019$ ) and Junior National Selection surfers ( $p=0.037$ ).

### Maximal Aerobic Speed:

Significant differences were identified for average aerobic speed between recreational surfers and WCT ( $p<0.001$ ), WQS ( $p<0.001$ ), Junior National Selection ( $p<0.001$ ), Competitive adult club board-riders ( $p<0.001$ ), and Junior high school competitors ( $p<0.001$ ). Additionally, significant differences were observed between the competitive adult club board-riders and; WCT ( $p=0.046$ ), WQS ( $p<0.001$ ), Junior National Selection ( $p<0.001$ ).

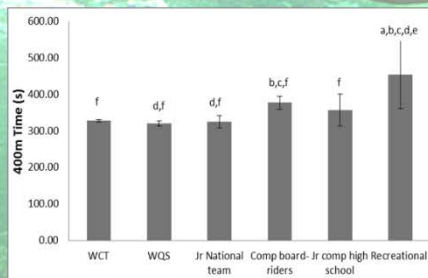


Figure 1: 400m mean paddle times of surfers from varying competitive ability

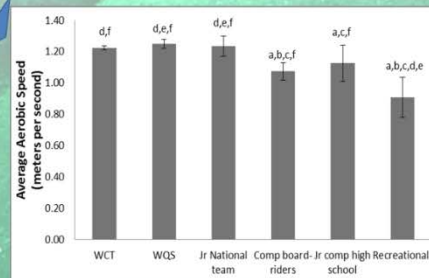


Figure 2: Mean average aerobic paddle speed of surfers from varying competitive ability

Significant differences ( $p<0.05$ ) between groups:  
 a=WCT, b=WQS, c=Jr National team, d=Comp club board-riders, e=Jr Comp high school, f=Recreational

## Conclusions

The 400m endurance surf paddle test is a reliable test, proving discriminatory performance measures that can be easily recorded and replicated in the pool. The 400 meter paddling times, and the maximal aerobic speeds are significantly better from those who are of a higher level of performance than those lower, and of the recreational level. Therefore, indicating that aerobic muscular endurance is superior in those athletes of a higher level of competitiveness. Given that out paddling your opponent to a wave/gaining priority and withstanding the demands of constant paddling are of utmost importance, training that enhances upper body muscular endurance and power should be implemented in a competitive surfer's training program.

