

3773 Board #90 May 30 8:00 AM - 9:30 AM

**Audience Presence Prolongs Maintenance Of Peak Power In Maximal Anaerobic Activity**

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(No relationships reported)

Sport participation commonly occurs in front of an audience. It is important to know if the presence of that audience influences the force profile of the performer.

**PURPOSE:** To examine the influence of spectator presence on power output in a short-duration, high-intensity activity.

**METHODS:** We tested 15 men and 28 women, ages 18-25, on a 30-second Wingate cycle ergometer test. All subjects were tested twice, separated by 72 hours. During one trial, performance took place in front of the test administrator; during the other trial, the administrator was accompanied by an audience. Spectators observed but did not interact with the subjects. Testing conditions (e.g., time of day, instructions provided, and verbal encouragement) were identical in the two trials. The order of tests was assigned in a counter-balanced design. Mixed ANOVA with repeated measures was used to compare peak power (PP), duration of peak power (DPP), and mean power (MP) between the two trials overall and by sex.

**RESULTS:** Subjects were 20.4 ± 1.4 years of age; across all testing, PP 1.7 ± 1.3 w/kg, DPP was 2.6 ± 3.5 seconds, and mean power was 1.2 ± 0.3 w/kg. There was no effect of test order on performance (p=0.199). Similarly, there was no effect of audience presence on PP (p=0.348) or an interaction effect with sex (p=0.406). There was an increase in MP in the audience trial; subjects were 0.1 w/kg higher, corresponding to a 6.5% increase (p=0.003; 95% CI: 0.03 to 0.13 w/kg). There was no interaction effect with sex (p=0.416). The increase in MP was the result of an increase in DPP, which was 1.6 seconds longer in the audience trial, corresponding to a 91.6% increase (p=0.002; 95% CI: 0.61 to 2.49 seconds). There was no interaction effect with sex (p=0.418).

**CONCLUSIONS:** The presence of an audience influenced power output on the Wingate test. Although peak power was unaffected, the duration peak power was maintained nearly doubled, indicating endurance at peak performance may be sensitive to arousal.

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**Combined Driving: Task-specific Position Impacts Grip Strength Of Equestrian Athletes**

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Equivalent to a human triathlon, combined driving is an equestrian sport designed to test ability to navigate horses and carriage during three phases. Drivers control up to four horses at a time relying heavily on hand strength.

**PURPOSE:** to 1) establish baseline data on grip strength and endurance of combined drivers in standing and task-specific positions; and 2) compare grip values to normative data by driver age.

**METHODS:** Drivers were included if medically cleared to actively compete, and free from current injury. Fifty-one combined drivers (9 males, 42 females) ages 21-78 participated during two nationally recognized events. All drivers were right hand dominant. 63% of drivers were over 50 y/o. 22% of drivers reported having arthritis in their hands/wrists. Drivers completed a demographics and sport-specific survey, and three grip tests in two positions: standing and task-specific (sitting). Measures included peak values and endurance. Peak grip was recorded into four categories based on normative values.

**RESULTS:** Females with more than 30 yrs of driving experience had higher strength in the non-dominant hand (p=0.0345). There was a significant difference between strength based on position for both sexes (Table 1). Over 45% of females were stronger than normative data for both dominant and non-dominant hand, while only 22% of males fell in the stronger category. Female drivers average hand grip strength was 1.25 times greater than the normative population. The endurance for all subjects was significantly higher for the right hand (p=0.002).

**CONCLUSIONS:** This study is the first to establish standing and task-specific grip strength in combined drivers. Female drivers over 50 y/o demonstrated greater hand strength in their non-dominant hand, suggesting continuous use of hands for driving promotes strengthening muscle and maintaining hand function regardless of reported arthritis. Results demonstrated equestrian driving is beneficial to hand grip strength.

Table 1. Average peak grip strength while standing and sitting by sex.

	Average Standing Peak - Right (kg)	Average Standing Peak - Left (kg)	Average Sitting Peak - Right (kg)	Average Sitting Peak - Left (kg)
Males	43 ± 5.1	44 ± 6.9	38 ± 7.5 <sup>b</sup>	36 ± 9.3 <sup>b</sup>
Females	32 ± 6.5 <sup>a</sup>	30 ± 6.2 <sup>a</sup>	25 ± 8.3 <sup>a,b</sup>	23 ± 8.1 <sup>a,b</sup>

Note: Values are displayed as mean ± SD.

<sup>a</sup>denotes significant difference (p<.05) between right and left

<sup>b</sup>denotes significant difference (p<.05) between sitting and standing

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**Differences In Player Metrics Between Lacrosse Games And Practices**

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(No relationships reported)

Lacrosse participation in the United States has rapidly increased in recent years, however there is minimal research related to the sport. Existing research has mainly utilized laboratory-based testing procedures. There is a need to understand the physiological demands of players during live play to assist coaches with the training and conditioning necessary for improved player performance.

**PURPOSE:** To compare player metrics of high school male lacrosse players during games and practices.

**METHODS:** A team heart rate monitoring system with an internal global positioning system and gyroscope was used to record internal player metrics (heart rate [HR], calories) and external player metrics (duration, distance, speed, sprints). Participants in the study consisted of 13 male high school club lacrosse players (16.2 ± 1.5 yr; 175.3 ± 7.7 cm; 69.9 ± 13.6 kg). Subjects were monitored during two practices (130.9 ± 5.2 minutes) and one game (39.58 min). Differences in player metrics were compared by session, as well as by position: attack, midfield, defense, and face-off-get-off (FOGO). Game and practice data were compared utilizing paired samples *t*-tests, while individual position metrics were analyzed by independent sample *t*-tests. A standard *p* ≤ .05 was used to determine significance for the analyses. Effect sizes (*r*) were also calculated for each comparison.

**RESULTS:** Significant differences and large effect sizes were found for average HR, total calories, and caloric expenditure (*t* ≥ 4.2, *p* ≤ .003, *r* ≥ .590). Significant differences and large effect sizes were also found for duration, total distance covered, and number of sprints between game and practice sessions (*t* ≥ 2.32, *p* ≤ .049, *r* ≥ .253). Positional comparisons identified significant differences and large effect sizes between midfield and FOGO positions for maximum HR (*t* = 2.411, *p* = .028, *r* = .525) and number of sprints (*t* = 3.242, *p* = .005, *r* = .745).