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THE RELATIONSHIP BETWEEN FLYWHEEL ROTATIONAL POWER AND GOLF SWING SPEED

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ABSTRACT

PURPOSE: This study examines the correlation between rotational power and maximum clubhead speeds during a golf swing. METHODS: 21 Participants (19 male and 3 female, 23.81 ± 7.55_years (age), 84.73 ± 27.33 kg, 177.16 ± 8.72 m) performed rotational sling exercises using a flywheel with 0.010 kg/m² and 0.025 kg/m² moments of inertia for 3 sets of 3 trials (9 total), in addition to 10 driver swings. Average concentric power for each repetition was measured by the flywheel (kpulley, Exxentric). Swing speed was measured by a commercial golf simulator (skytrak, GolfTec). The average of the best 3 flywheel trials (peak power) and driver swings (swing speed) were retained for linear regression analysis. RESULTS: Swing speed presented with significant positive relationships to average rotational power, with the 0.010 kg/m² moment of inertia predicting 41% of the variance in swing speed (swing speed = 0.106_(watts) + 86.67, R^2 = 0.41, $p<0.05$) and the 0.025 kg/m² moment of inertia predicting 27% of the variance in swing speed (swing speed = 0.093(watts) +92.75, R^2 = 0.27, $p<0.05$). CONCLUSION: These results suggest rotational power is a key factor in maximizing swing performance, especially against lighter moments of inertia. PRACTICAL APPLICATION: Future research could investigate targeted rotational training to enhance clubhead speed, a critical component of golf performance.
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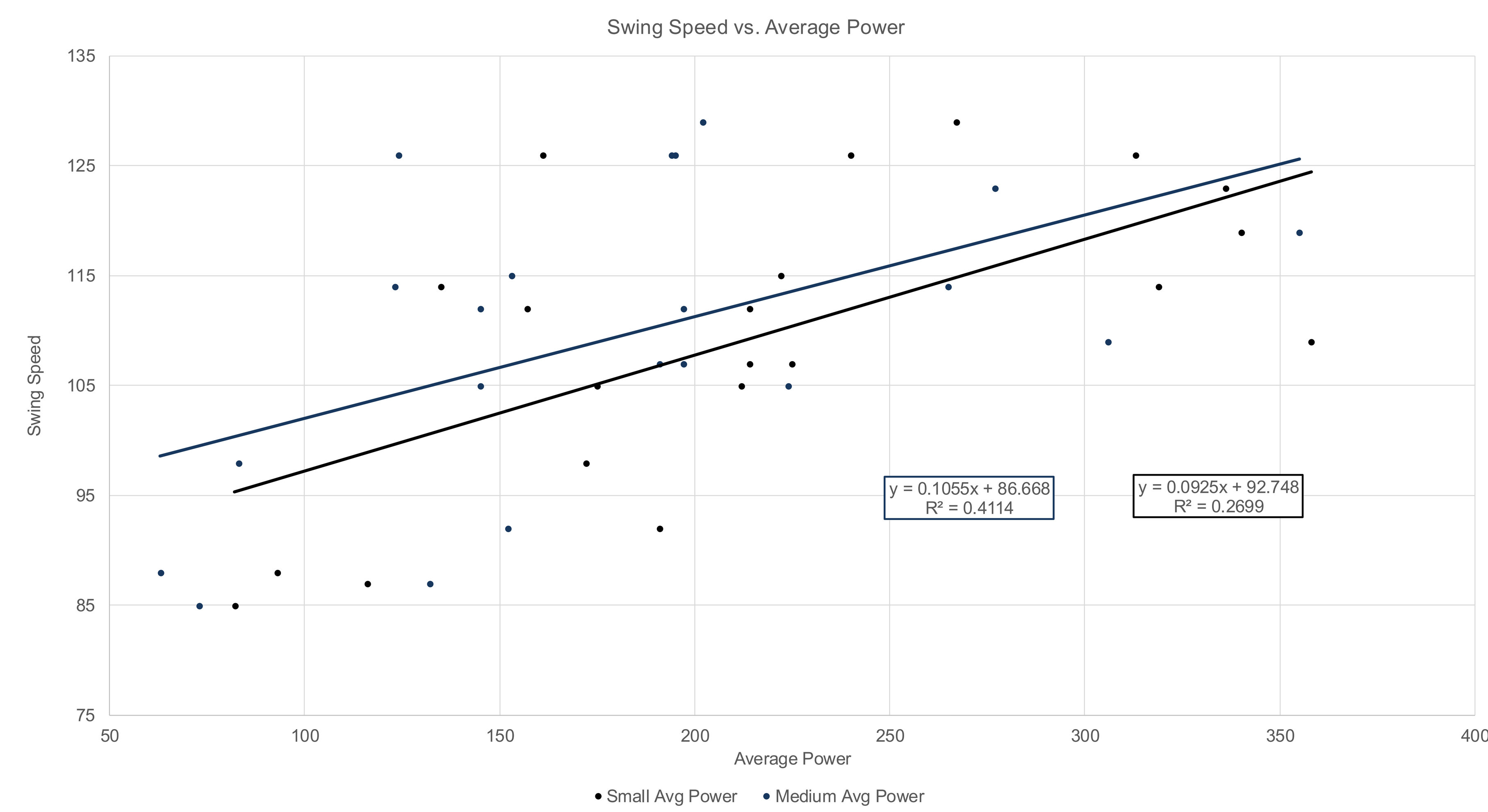
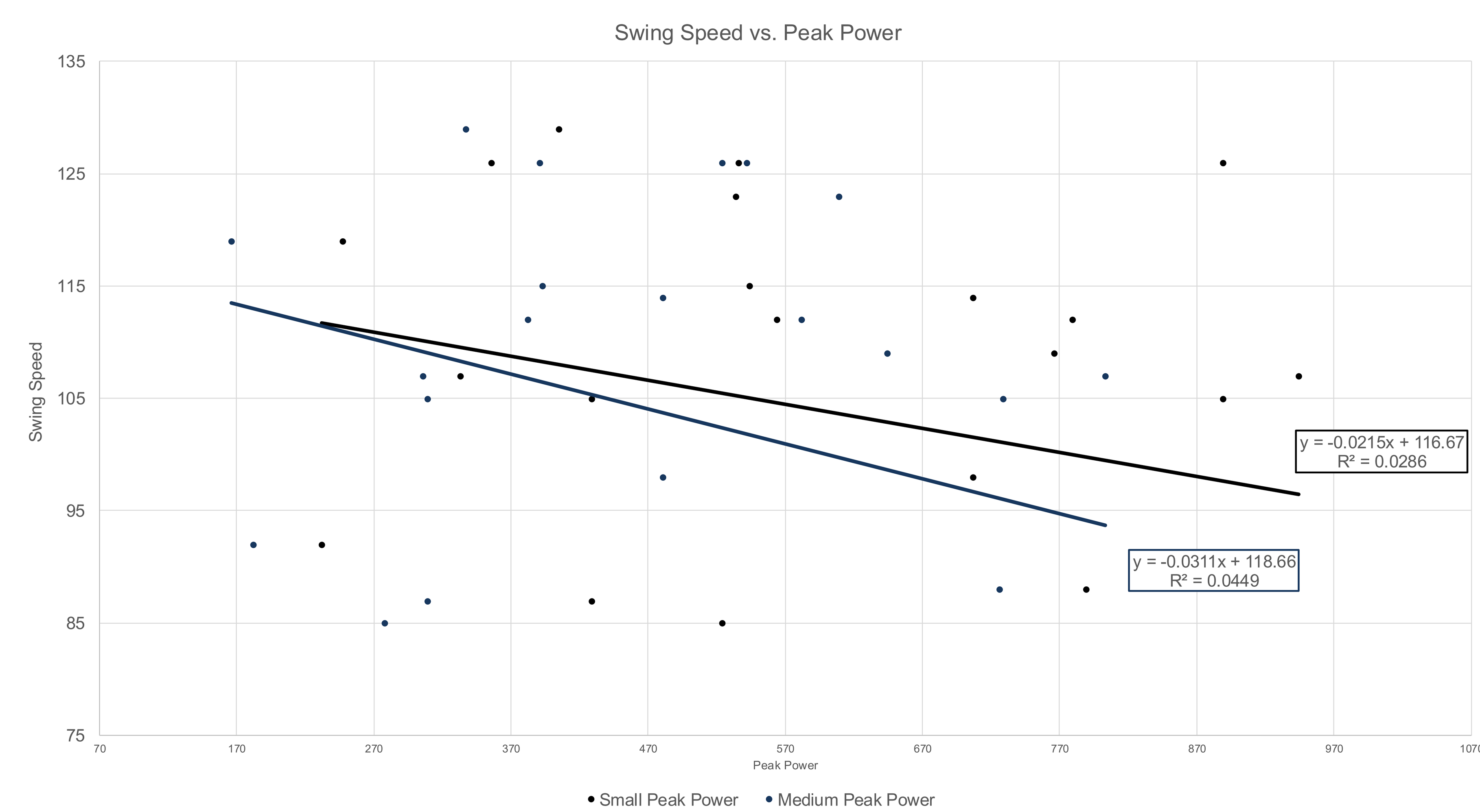
INTRODUCTION

While clubhead speed is a well-known contributor to golf performance, fewer studies have explored how rotational power against various resistances relate to swing speed. Therefore, the purpose of this study is to examine the relationship between rotational power and maximum clubhead speed using flywheel resistance across two different inertia loads.





METHODS

21 Participants (19 male and 3 female, 23.81 ± 7.55 years (age), 84.73 ± 27.33 kg, 177.16 ± 8.72 m) performed rotational sling exercises using a flywheel with 0.010 kg/m² and 0.025 kg/m² moments of inertia for 3 sets of 3 trials (9 total), in addition to 10 driver swings. Average and peak concentric power for each repetition was measured by the flywheel (kpulley, Exxentric). Swing speed was measured by a commercial golf simulator (skytrak, GolfTec). The average of the best 3 flywheel trials (peak power) and driver swings (swing speed) were retained for linear regression analysis.

RESULTS

Swing speed presented with significant positive relationships to average rotational power, with the 0.010 kg/m² moment of inertia predicting 41% of the variance in swing speed (swing speed = 0.106_(watts) + 86.67, R^2 = 0.41, $p<0.05$) and the 0.025 kg/m² moment of inertia predicting 27% of the variance in swing speed (swing speed = 0.093(watts) +92.75, R^2 = 0.27, $p<0.05$). The regressions for swing speed with respect to peak rotational power were not significant.

CONCLUSION

These results suggest that average rotational power is a moderate predictor of swing speed under lighter moments of inertia. The stronger relationship at 0.010 kg/m² indicates that high-velocity, low-resistance rotational training may better transfer to swing performance. In contrast, the reduced predictive strength at 0.025 kg/m² may reflect less velocity-specific carryover.

PRACTICAL APPLICATION

Average rotational power should be a primary measure for rotational performance and training. Future research could investigate velocity-specific rotational training to enhance clubhead speed, a critical component of golf performance.

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