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# THE RELATIONSHIP BETWEEN GOLF SWING SPEED AND JUMP HEIGHT DURING COUNTERMOVEMENT AND DROP JUMPS

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## ABSTRACT

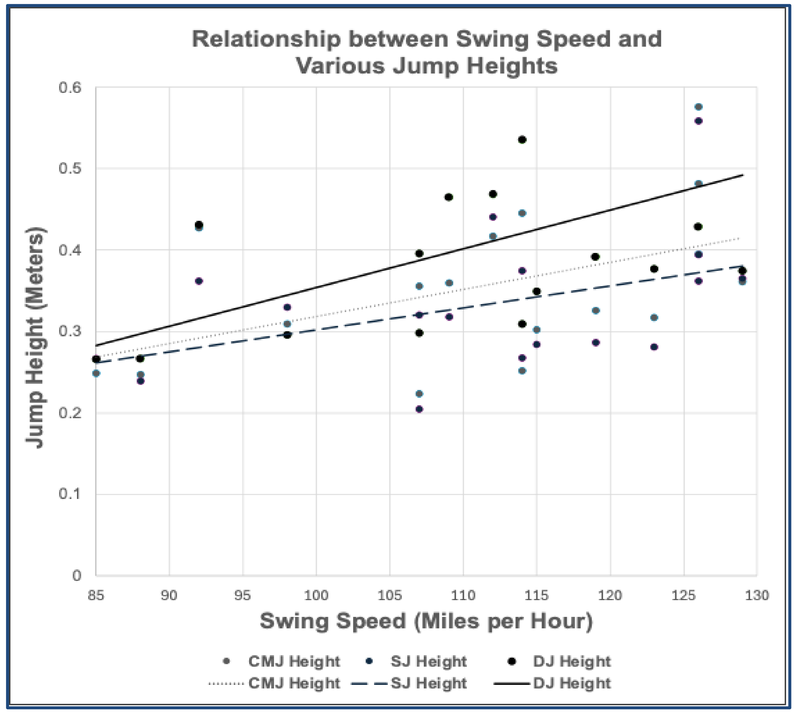
**PURPOSE**: This study examines the relationship between golf swing speed and jump height during countermovement and drops jumps. **METHODS**: 17 participants, including 15 males (age=25.4 ± 8.42 years, height=177.97 ± 6.69 cm, weight=89.64 ± 27.83 kg) and 2 females (age=18.5 ± 0.71 years, height=161.5 ± 2.12 cm, weight=49.22 ± 2.89 kg) performed three trials each of a countermovement, squat, and drop jump (0.61m), in addition to 10 driver swings. Vertical ground reaction force (vGRF) data were collected from bilateral force plates (4060-07, Bertec, Columbus, Ohio) at 2000 Hz. Swing speed data were measured by a commercial golf simulator (SKYTRAK, GolfTec, Englewood, Colorado). vGRF data was exported to matlab for analysis. Jump height from countermovement and squat jumpers was calculated from takeoff velocity by the double integration method. Jump height from the drop jump was calculated from time in the air (jump height = $0.5*9.81*(t/2)^2$). The peak jump height trial and the average of the 3 fastest swing speeds were retained for correlation analysis. **RESULTS**: The correlation between the various jump heights with swing speed is displayed in figure 1. The countermovement jump height showed a moderate positive correlation with swing speed (R = 0.484, p = 0.049), indicating statistical significance. there was no significant relationship between swing speed and squat jump height (p>0.05). The drop jump (DJ) height demonstrated the strongest correlation with swing speed (R = 0.567, p = 0.018), showing statistical significance. **CONCLUSION:** Drop jump height showed the strongest correlation with swing speed, suggesting that stretch-shortening cycle performance, as opposed to concentric performance alone, should be targeted during training for competitive athletes. **PRACTICAL APPLICATION:** These findings suggest that explosive lower-body power, particularly in reactive jump movements, may be a key factor in golf swing speed and could be targeted in training programs to enhance performance.
**ACKNOWLEDGEMENTS:** none

## INTRODUCTION

This study examines the relationship between golf swing speed and jump height during countermovement and drops jumps. Explosive lower-body power has been identified as a key component in generating high swing speeds in golf, but the specific jump types that best reflect this power are not well understood. Therefore, this study aimed to compare the relationships between golf swing speed and jump height across three different jump types: countermovement, squat, and drop jumps.

## METHODS

17 participants, including 15 males (age=25.4 ± 8.42 years, height=177.97 ± 6.69 cm, weight=89.64 ± 27.83 kg) and 2 females (age=18.5 ± 0.71 years, height=161.5 ± 2.12 cm, weight=49.22 ± 2.89 kg) performed three trials each of a countermovement, squat, and drop jump (0.61m), in addition to 10 driver swings. Vertical ground reaction force (vGRF) data were collected from bilateral force plates (4060-07, Bertec, Columbus, Ohio) at 2000 Hz. Swing speed data were measured by a commercial golf simulator (SKYTRAK, GolfTec, Englewood, Colorado). vGRF data was exported to matlab for analysis. Jump height from countermovement and squat jumpers was calculated from takeoff velocity by the double integration method. Jump height from the drop jump was calculated from time in the air (jump height = $0.5*9.81*(t/2)^2$). The peak jump height trial and the average of the 3 fastest swing speeds were retained for correlation analysis.




| Jump Type | Correlation (R) | p-value |
|---|---|---|
| Squat Jump (SJ) | 0.441 | 0.076 |
| Countermovement Jump (CMJ) | 0.484 | 0.049* |
| Drop Jump (DJ) | 0.567 | 0.018* |

## RESULTS

The correlation between the various jump heights with swing speed is displayed in figure 1. The countermovement jump height showed a moderate positive correlation with swing speed (R = 0.484, p = 0.049), indicating statistical significance. there was no significant relationship between swing speed and squat jump height (p>0.05). The drop jump (DJ) height demonstrated the strongest correlation with swing speed (R = 0.567, p = 0.018), showing statistical significance.

## DISCUSSION

These findings suggest that jump height is most strongly associated with swing speed when the stretch-shortening cycle is utilized. While both the countermovement and drop jumps rely on this cycle, the drop jump—requiring greater reactive strength—showed the strongest relationship with golf swing speed. In contrast, squat jump height, which isolates concentric force production, did not significantly correlate with swing performance. This suggests that the ability to quickly absorb and redirect force during rapid ground contact plays a more critical role in swing speed than concentric strength alone. Therefore, targeting reactive power may provide the most specific benefit to improving swing performance.

## PRACTICAL APPLICATIONS

The strong relationship between drop jump height and swing speed highlights the importance of reactive strength for golfers aiming to improve performance. Plyometric exercises such as drop jumps may better replicate the demands of a powerful golf swing compared to slower or concentric-only movements. Practitioners should consider incorporating these reactive drills into training programs to enhance lower-body explosiveness. Additionally, drop jumps may serve as an efficient field test for monitoring golf-specific power development over time.

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