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The Influence of Grip Size on Driver Clubhead Delivery

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Purpose: In the golf community, there are conflicting thoughts about the effect of grip size on clubhead delivery. Some believe that grips should be chosen "strictly so golfers can obtain more comfort in holding on to the club"[1]. Others believe that thinner grips aid in releasing the club (promoting more draw-biased and leftward shots) and thicker grips prevent or delay the release.[2] This paper uses a two-part experimental study in order to better understand how different grip sizes influence swing dynamics and driver clubhead delivery. A robust understanding of the effect of grip size could improve club fitting philosophy.

Methods: An initial experiment using 3 drivers with different PING 5L grip sizes (-1/16", 0", and 1/16"± relative to standard), in which the drivers were swing weight matched (D3) while allowing total club weight to increase (307.7 g, 318.1 g and 340.0 g respectively) was conducted. This approach is representative of what typically occurs in the field when clubs are built with different grips. A sample of 18 right-handed golfers (handicap 7.2 ± 5.7) were recorded hitting 8 shots with each club. Ball launch conditions were measured using a foresight GC2 camera system, while the delivery of each club was recorded using an 8-camera Vicon motion capture system (T40S cameras) operating at 720 fps. The impact location, face angle and club path were calculated using a five-point numerical extrapolation. Using the same data collection method, a second experiment was run using the same three grips, while controlling for both swing weight (D4.8) and total club weight (346.8 g). For the second experiment, a sample of 18 right-handed golfers (handicap 4.9 ± 4.1) were recorded hitting 8 shots with each club. Both studies used a standard driver length of 45.25". Statistical analysis was performed in R (version 3.4.1). One-way repeated measures analyses of variance (ANOVA) were conducted on each dependent variable of interest (e.g., closure rate). The within-participants independent variable (grip size) had three levels: -1/16", 0" and 1/16" relative to standard. If the assumption of sphericity was not met, as determined using Mauchly's Test, then Greenhouse-Giesser corrections were applied. When significant values were determined, Bonferroni post hoc tests, with adjustments to control for Type I error, were used to determine where significant differences existed between conditions. Statistical significance was set at $\alpha \leq 0.05$ for all tests.

Results: The first experiment showed that, without controlling for club weight, a larger grip correlates with a club face that is more open to path ($F(2, 34) = 18.2$, $p < .001$), a lower impact location ($F(2, 34) = 8.0$, $p = .005$) and a slower closure rate ($F(2, 34) = 7.1$, $p = .003$). For all three variables, the thinnest grip showed statistically significant differences from the thickest grip (Figures 1a, c and e). However, when matching total weight when the grip size increases, these effects do not occur; face angle relative to path ($F(2, 34) = 0.9$, $p = .42$), closure rate ($F(2, 34) = 1.2$, $p = .31$) and vertical impact location ($F(2, 34) = 1.1$, $p = .34$) all hold relatively constant. For these three variables, there were no statistically significant differences between the thinnest and thickest grip (Figures 1b, d and f). In terms of ball flight, the differences in clubhead delivery for the first test between the thickest and thinnest grip led to further right shot bend for the thickest grip (7.1 yds, $p < .001$), further right offline carry (8.8 yds, $p < .001$) and more total spin (294.1 rpm, $p < .001$). When total club weight was controlled the differences were insignificant for shot bend (2.1 yds, $p = .40$), offline carry (3.7 yds, $p = .17$) and total spin (74.4 rpm, $p = .35$).

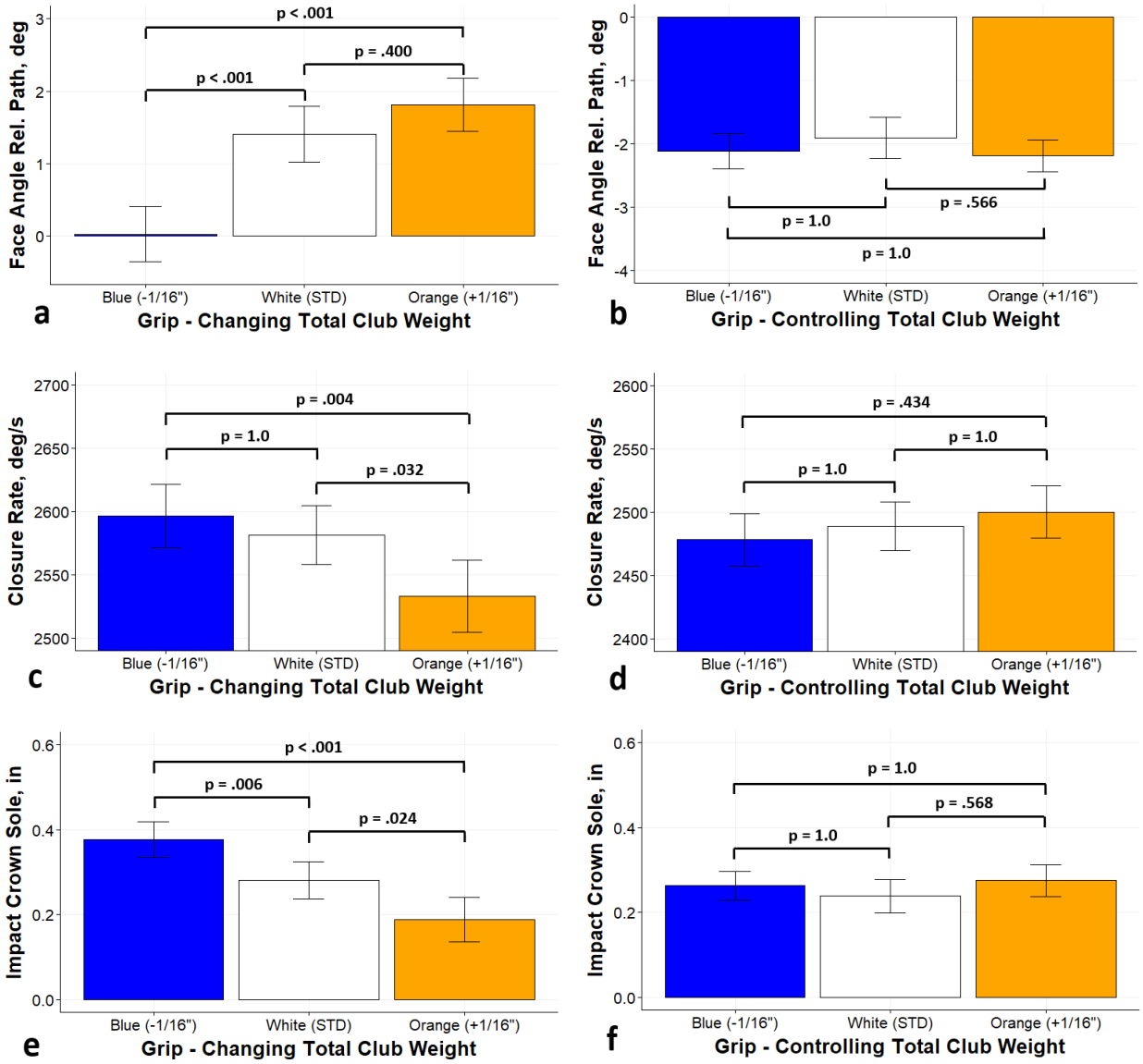

Figure 1 – The graphs above show average values for each grip size. (a and b) Face angle relative to path. (c and d) Closure rate. (e and f) Impact crown sole. P-values correspond to Bonferroni adjusted comparisons at which $p < .05$ was considered statistically significant. Error bars represent 95% within-participant confidence intervals.

Discussion/Practical Application: The results from these two experiments suggest that grip size alone is not responsible for significant changes in clubhead delivery. If a difference in grip size also results in a difference in club mass properties (total weight in this study), changes in clubhead delivery may be observed. Therefore, if a player requests a thinner or thicker grip, it is advisable to account for the change in mass properties when possible if a change in clubhead delivery is not desired.

References:

1. Wishon, Tom. (2006). *Common Sense Clubfitting*, 331-332.
2. Maltby, Ralph. (1990). *Golf Club Design, Fitting, Alteration and Repair*, 619.