

The Effect of Skill Level on the Mechanics of a Golf Chip Shot

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ABSTRACT

INTRODUCTION: It is popularly believed that maintaining more weight on the front foot and reducing wrist action on the downswing are characteristics of a successful golf chip shot. Therefore, experienced golfers should utilize these strategies more than inexperienced golfers when performing this shot.

PURPOSE: To analyze the effect of skill level on weight shift and wrist action in a golf chip shot.

METHODS: Fourteen golfers (23.4 ± 5.81 yr, $1.77 \pm .073$ m, 72.1 ± 10.4 kg), seven inexperienced (little to no training in chipping) and seven experienced (at least 8 years of training), completed three chip shots each. Trials were performed on a force plate sampled at 200 Hz and filmed using a video camera operating at 60 Hz. Retroreflective tape was placed in eight locations and digitized in order to define wrist angle, stance width, and force plate location. Kinematic and kinetic measures were compared between groups and across three times (address, end of backswing, and ball contact) using 2x3 (group x time) mixed model ANOVA's. Independent t-tests were used to compare groups at specific instants in time when a significant interaction was found. **RESULTS:** A significant group x time interaction was found for wrist angle ($F(1,12) = 10.46$, $p = 0.001$) but not COP measures ($F(1,12) = 0.24$, $p = 0.79$). No difference in wrist angle between experienced and inexperienced golfers was observed at address ($145^\circ \pm 12.0^\circ$; $155^\circ \pm 9.11^\circ$, respectively; $t_{12} = 1.754$, $p = 0.105$) but experienced golfers' wrists were more cocked than inexperienced golfers at the end of the backswing ($94.9^\circ \pm 11.6^\circ$; $128^\circ \pm 18.1^\circ$; $t_{12} = 4.025$, $p = 0.002$). This difference persisted through ball contact ($135^\circ \pm 7.30^\circ$; $146^\circ \pm 10.0^\circ$; $t_{12} = 2.418$, $p = 0.032$). Center of pressure position, expressed relative to stance width, was not significantly different between groups at any time during the swing ($F(1,12) = 0.41$, $p = 0.54$). Experienced golfers did not shift their weight, defined as the difference in center of pressure position between the end of the backswing and end of follow-through, more than inexperienced golfers (0.189 ± 0.046 m; 0.247 ± 0.114 m; $t_{12} = 1.26$, $p = 0.231$). **CONCLUSION:** Experienced golfers cocked their wrist more on the backswing and maintained that wrist cock through impact, similar to what is often used as instructions by PGA teaching professionals. Experienced golfers also maintained more weight on their front foot and therefore shifted less weight forward on the downswing. This lack of movement in the center of pressure may have increased his/her stability during the shot, which has been shown to increase accuracy.

