

WEIGHT TRANSFER IN DIFFERENT GOLF SWING STYLES BASED ON SWING PLANE: A NONLINEAR DYNAMIC APPROACH

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INTRODUCTION: Weight transfer has been considered as one of the most important aspects of golf swing in golf coaching theories. Previous studies present conflicting and restricted findings on weight transfer. The purpose of this study was to determine if swing style influences weight transfer pattern by analyzing selected center-of-pressure parameters using the approximate entropy method.

METHOD: Ten professional golfers (handicap 1 or lower) participated in the study: four subjects classified as the one-plane group (mass: 177.8 ± 7.4 cm; height: 81.0 ± 14.9 kg; age: 28.3 ± 7.4 years) and six as the multi-plane group (177.5 ± 4.9 cm; 79.7 ± 6.5 kg; 42.0 ± 17.4 years) based on the trajectory of the club head (backswing top to end of follow-through). The combined center of pressure from two AMTI force platforms was collected at 100 Hz and select center-of-pressure parameters were compared among three different clubs (pitching wedge, 5 Iron, and driver) and between the swing styles.

RESULTS: The centre of pressure parameters for the swing style groups are presented in Table 1.

Table 1 Summary of the Center of Pressure Parameters

	One-Plane Group (n = 4)			Multi-Plane Group (n = 6)		
	PW	5 Iron	Driver	PW	5 Iron	Driver
ML sway (mm)	303.9 (40.2)	314.5 (42.7)	326.2 (56.7)	491.6 [§] (49.3)	471.6 [§] (52.3)	450.7 (69.4)
AP sway (mm)	85.9 (13.3)	121.2 [†] (12.6)	104.5 (11.5)	114.3 (16.3)	129.9 (15.37)	139.9 (14.1)
Sway Path Length (mm)	704.6 (77.7)	703.3 (78.5)	641.6 (91.2)	993.0 (95.1)	912.7 [§] (96.1)	859.2 (111.7)
Average COP Velocity (mm/s)	222.2 (36.5)	219.9 (39.4)	210.1 (38.8)	430.0 [§] (44.73)	403.4 [§] (48.3)	352.9 [§] (47.5)
Apen of ML COP	0.15 (0.02)	0.13 (0.03)	0.13 (0.03)	0.05 (0.02)	0.04 [§] (0.03)	0.08 (0.03)
Apen of AP COP	0.20 (0.03)	0.24 (0.03)	0.22 (0.02)	0.14 [§] (0.03)	0.12 (0.04)	0.08 [§] (0.02)

Data presented in mean (SD); [§] Significantly different from the matching one-plane group condition (p < .05); [†] Significantly different from the matching PW condition (p < .05); Abbreviations: ML – mediolateral, AP – anteroposterior, COP – center-of-pressure, PW – pitching wedge

DISCUSSION: Significant inter-group (swing style factor) differences (9 out of 18 conditions) were observed in several center-of-pressure parameters, particularly in the ML parameters, suggesting the influence of swing style on weight transfer during a golf swing. No significant inter-club difference, however, was observed in the centre-of-pressure parameters among the clubs except the AP sway between PW and 5 Iron. Different weight transfer strategies were observed between the swing styles: one-plane swing vs. multi-plane swing.