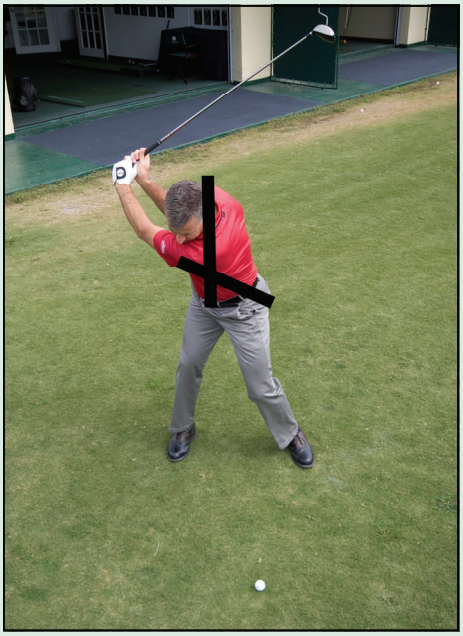
X-Factor Ranges of PGA Tour Players



Robert J Neal, PhD

Introduction

It has been documented previously that the amount of coil obtained between the upper torso and the pelvis, termed the X-Factor, is correlated with driving distance and is a characteristic of an efficient and powerful golf swing (McLean, 1992). In a more recent publication, Cheetham et al. (2000) note that whilst the X-Factor at the top of the backswing is an important variable and correlates moderately with driving distance, the amount of increase in the X-Factor during transition, the X-Factor Stretch, is even more important and correlates more strongly with driving distance than the X-Factor at the top of the backswing. The purpose of this report was to measure a number of PGA Tour professional golfers to test the efficacy of these notions.

Method

Ten professional golfers who were playing at the Doral Ford Open Championship in 2004 volunteered to participate in the study. Three-dimensional kinematic data were collected as they hit both a driver and a five-iron using a magnetic tracking system that recorded data at 240 Hz. Five swings from each of these two clubs were collected. Sensors were placed on the club, left hand, head, upper torso and pelvis and these data were subsequently analysed using custom software to determine the following variables:

1. X-Factor$_{top}$ – the difference between the pelvic and upper torso rotations at the top of the backswing.
2. X-Factor$_{max}$ – the maximum difference between the pelvic and upper torso rotations that occurred at any time during the swing.
3. X-Factor Stretch – the difference between the X-Factor$_{max}$ and the X-Factor$_{top}$.

Results

Table 1 highlights the key variables that were measured for this study, including the averages. Correlations between the three X-Factor variables and driving distance were also calculated but all showed only weak relationships ($r < 0.25$).

Table 1. Driving distance, and X-Factor variables calculated in this study.

Name	Driving distance	$X\text{-}Fact_{top}$	$X\text{-}Fact_{max}$	$X\text{-}Fact_{stretch}$
Rod Pampling	291.8	47	47	10
Steve Allan	291.3	46	46	27
Carlos Franco	289.6	39	39	16
John Senden	287.2	33	33	24
Hunter Mahan	287.1	47	47	8
Per-Ulrik Johans-son	283.8	47	47	19
Brian Gay	281.3	44	44	10
DJ Brigman	280.8	55	55	17
Angel Cabrera	300.1	48	48	24
Brad Faxon	266.1	45	45	19
Mean		**45.1**	**62.5**	**17.4**

Discussion and Conclusions

The mean data give us a good starting point to select values that aspiring golfers need to achieve on these variables if they are likely to be able to compete with the best golfers in the world. On the basis of these data alone we can neither confirm nor refute previous work on the relationship between driving distance and “coil” in the golf swing. Increased sample sizes along with actual shot distances are necessary to strengthen the conclusions that can be drawn. One important reason for increased sample size is that correlations amongst homogenous samples are bound to be poor because of the small variability. For example, the range of driving distances is relatively small (30 yds) and the range in the X-Factor variables is very small too.