



The power of weight transfer

In the first of a three-part series, Ramsay explains the correlation between distance and proper weight transfer in the golf swing.



An integral role of a golf-specific physiotherapist is the relationship with PGA golf coaches and biomechanical experts. I was recently in the United Kingdom looking for new developments and spent time discussing the correlation between distance and weight transfer in the golf swing. From a golf coach's perspective, weight transfer has a massive influence on how the game is taught. And from a physio's point of view, it influences how we train certain muscles to perform in the golf swing.

Ben Langdown is head of sports science with the British PGA based at The Belfry where he's worked with more than 50 current tour players and



How you transfer weight across your feet in the golf swing will affect your ball-striking.

many elite amateurs. Along with PGA professional David Fulcher, Langdown has conducted extensive research into centre of pressure (COP) displacement, which coaches may refer to as weight distribution and transfer. The compiled data suggests there is optimal centre of pressure patterns that we should be trying to achieve in the swing.

Langdown gave me an insight into COP displacement, explaining how footwork can be used to analyse a golf swing. It's particularly important if you suffer from arthritis or some form of foot/ankle injury because there's likely to be some type of compensation in your golf swing. That compensation is likely to lead to inefficiency with your weight transfer and therefore a loss of distance.

Centre of pressure is the term used to describe the point at which all of the ground reaction forces act. That is, the force of gravity acting upon the body's weight and how the body then acts when in contact with the ground.

For right-handers holding an iron at address, the ideal weight distribution should be evenly placed 50-50 through the balls of each foot. With a driver, however, approximately 40 per cent of weight distribution should be through the balls of the left foot and 60 per cent through the balls of the right foot.

Loading of the 'trail side' should increase until the top of the backswing so that between 75 and 85 per cent of pressure should be through the right foot. By impact, the centre of pressure should have transferred towards the balls of the left foot. Pressure through the left foot at impact should be 80 to 90 per cent.

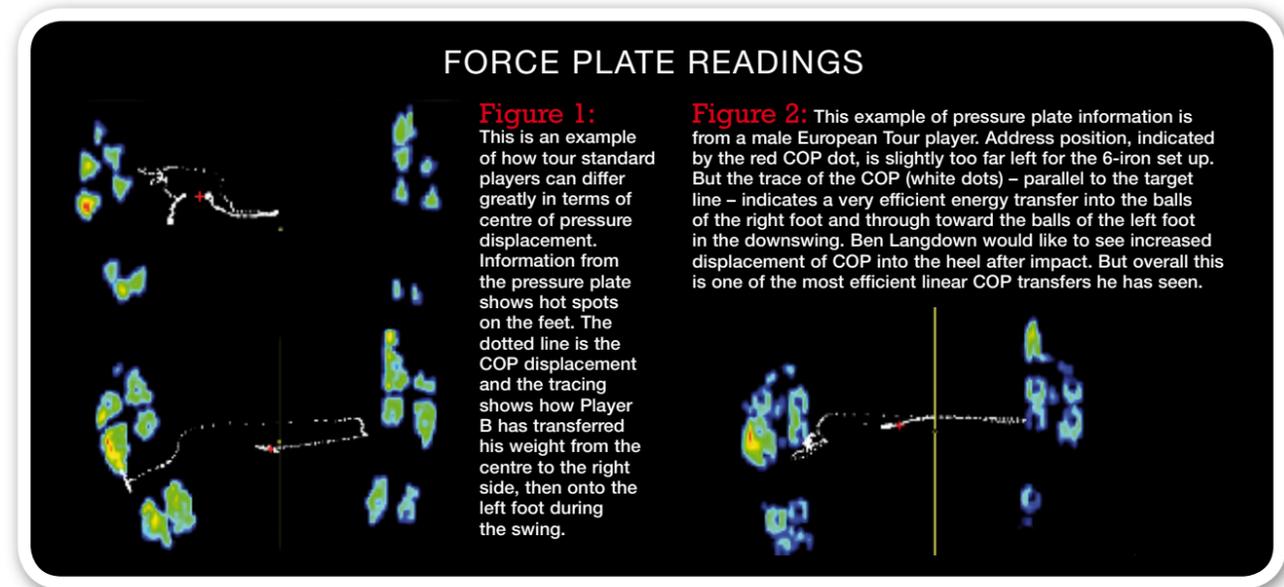
"The longer ball-strikers will utilise more of this centre of pressure displacement (weight transfer) than the shorter ball-strikers," Langdown says. "And therefore by impact their COP will be closer to the left foot or they will have transferred it over a greater distance from the right side."

So what is the ideal centre of pressure trace? Well, it starts in the centre of a right-hander's stance for an iron, moving into the balls of the right foot in the loading phase of the backswing. Then as weight shift occurs, the COP should move in a linear fashion towards the balls of the left foot, past the centre of the stance before impact and then quickly into the left heel post impact in order to finish the swing in a balanced manner. (Figure 2 illustrates this very well.)

"Many coaches would suggest a weight transfer of right heel to left toe is the best downswing weight transfer. This is not the case from the

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extensive data collection from tour players," Langdown says. "It also makes sense to transfer the centre of pressure parallel to the target line instead of at an angle where energy is effectively being wasted."

In theory, clubhead speed is generated from the start of the downswing until the point at which the club is parallel to the floor. This is where the greatest downward vertical forces are achieved. Again, longer ball-strikers are physically able to create up to 160 per cent of their total body weight in vertical pressure through this point in the swing.

A coach should see different percentages of total body weight at the key phases of the swing. For instance, 100 per cent at address, 80 per cent at top of the backswing and 160 per cent in the delivery phase of the downswing. Impact will depend on each individual's swing, but a guide is about 70 to 85 per cent. Total body weight should return to 100 per cent at the end of the swing.

According to Langdown, there is direct correlation between distance and weight transfer. It is quantifiable based on research conducted on many players of all abilities (from tour to novice).

"The player who maintains their centre of pressure towards the centre of their stance would not strike the ball as far as players (of the same build and weight) who utilise the width of their stance and displace their centre of pressure into the right side at the top of the backswing, thus allowing a full displacement of their centre of pressure in the downswing (weight transfer)."

A player who limits 'trail side' loading only allows weight transfer across half the stance width, therefore limiting the energy that can be produced in the downswing. A golfer with great upper body strength may be able to get away with this, says Langdown, however players with a slight build will suffer from a loss of distance.

Biomechanical observations with COP traces

As Langdown explained during the swing of a right-handed golfer, the COP should trace from the centre of the stance to the balls of the right foot, then to the balls of the left foot. Three-dimensional biomechanical expert Ryan Lumsden says footplate readings can be used to show how a golfer's swing isn't as efficient because he's sequencing the body incorrectly. However, he recommends a full biomechanical analysis for a better picture of swing tendencies.

If a golfer has good dynamic postural control, it will help eliminate compensations within the swing that can affect the COP traces. Subsequently, it's important for a golf coach and physiotherapist to check the person's physical limitations that may affect technique. For example, if the golfer can't perform a deep squat, it may lead to him extending early or thrusting towards the ball in the downswing. A golf-specific physiotherapist can recommend a series of exercises to improve dynamic posture and strengthen the 'Christmas tree' muscles that are essential in the golf swing.

A biomechanical expert such as Langdown or Lumsden can predict from COP traces that a right-handed golfer's left foot is 'spinning' or 'jumping' out of the way before and after contact. This could suggest functional limitations, like tightness in the hips or a form of ankle immobility. Or, it could indicate another pre-existing injury. Again, a golf coach and physiotherapist should be consulted.

To find out how to obtain a three-dimensional biomechanical analysis of your swing, contact Ramsay McMaster on 0407 432 282 or e-mail golfphysio@ozemail.com.au

NEXT MONTH: Ramsay shares some important facts about footwear and orthotics. (For instance, how shoelaces are tied can influence the way you swing.) In the March issue, he'll detail golf-specific drills that will enhance weight transfer in the golf swing.