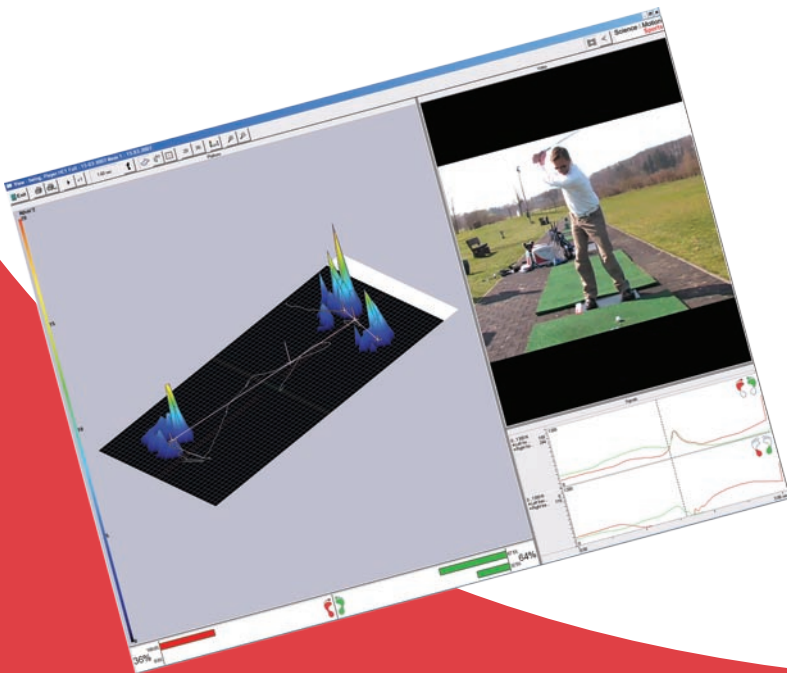
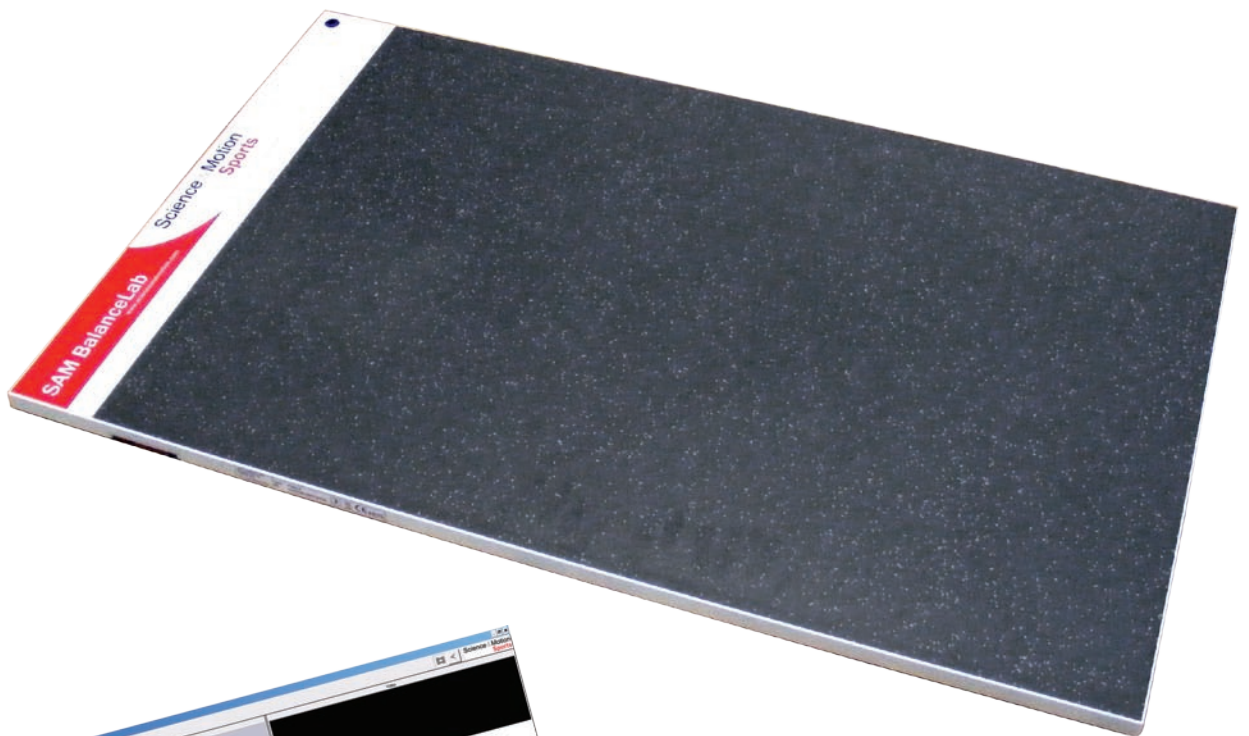




SAM BalanceLab

ultra high resolution force plate



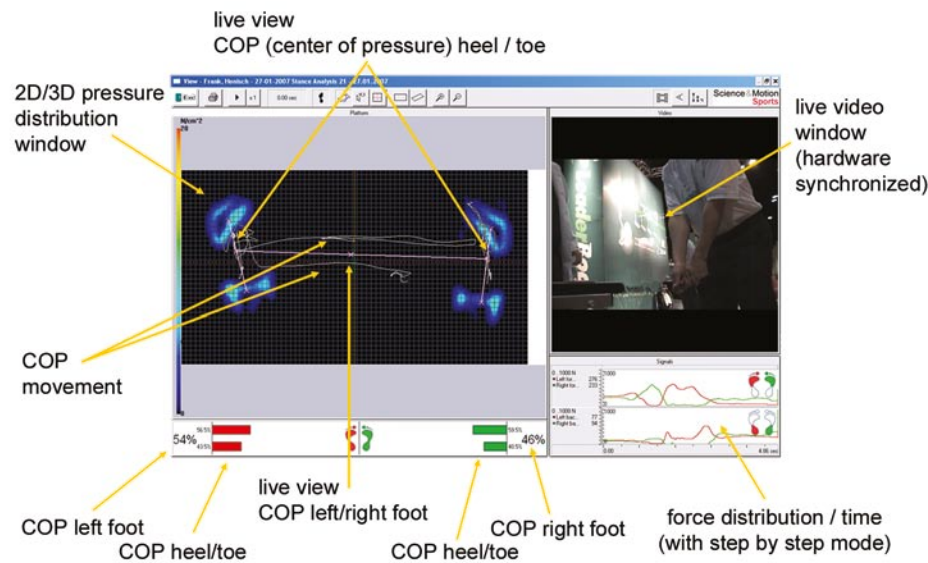
innovative golf technology

www.scienceandmotion.com

Improve your game with SAM BalanceLab

Product features:

- Realtime display of pressure distribution in 2D or 3D graphics
- Video recording module
- Center of pressure (COP) tracing
- COP display for left and right foot separated
- Ultra high resolution through 2560 single sensors
- Report printouts
- Synchronized playback of video and pressure data
- Medical proven technology



Technical data:

Width (measurement area)	20" (51 cm)
Length (measurement area)	32" (81 cm)
Total size (w/l/d)	24" x 38" x 0.83" (61x96x2 cm)
Number of sensors	2560
Sampling rate	100 - 120 Hz
Resolution	4 sensors per square inch
Force range	1 - 120 N/cm ²
Calibrated force range	up to 80 N/cm ²
PC interface	USB
Software	Windows XP / Vista / Windows 7

Science & Motion
Sports
innovative golf technology

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PHOTOGRAPHY BY HOWARD BOYLAN

BALANCE

GOLF'S INVISIBLE KEY

Technology is giving us a better understanding of how balance affects the golf swing. But how is it affecting yours? Find out now.

Balance is crucial to the success of any athletic movement, and the golf swing is no exception. But there's a problem with balance; you can't see it. That makes good balance hard to quantify, and even harder to coach. As a result, this vital part of golf technique has been undertaught and undervalued. But in 2003 a company called Science and Motion began to develop something called a Force Plate. It's basically a platform which can monitor foot pressure distribution through 2500 sensors. For the first time we could see how balance works – or doesn't work – in the golf

swing. And the results were startling.

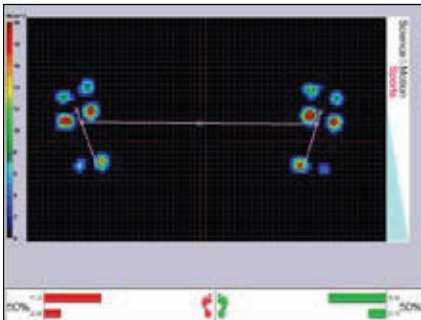
What became apparent is how profoundly poor balance affects a golfer's technique. Problems created by a third dimension of weight shift – forwards and backwards, from toe to heel – have become clearer; and stubborn swing flaws that defied effective coaching drills have been explained and banished overnight. Here, we will look at the most common balancing errors with the aid of some Force Plate graphics, and show how they compromise a consistent technique. I'll then go on to explain what good balance is, and how you can achieve it.



WEIGHT TOO FAR TOWARDS THE TOES



Your body is always seeking to balance itself. If you address the ball with your weight pushed forwards, your body will use the swing to compensate. At best, the compensation is a relatively controlled shift back into the right heel used by elite players. At worst, the body will make some drastic counter-balancing moves; the three most common are the spine straightening up, the right knee straightening and the club working inside its ideal path.



Traditional coaching has always advocated setting up with your weight pushed forwards, on to the balls of your feet. It may feel poised and springy, but Force Plate research has shown this weight distribution to cause problems once the swing begins.

EVEN GOOD PLAYERS DO THIS!

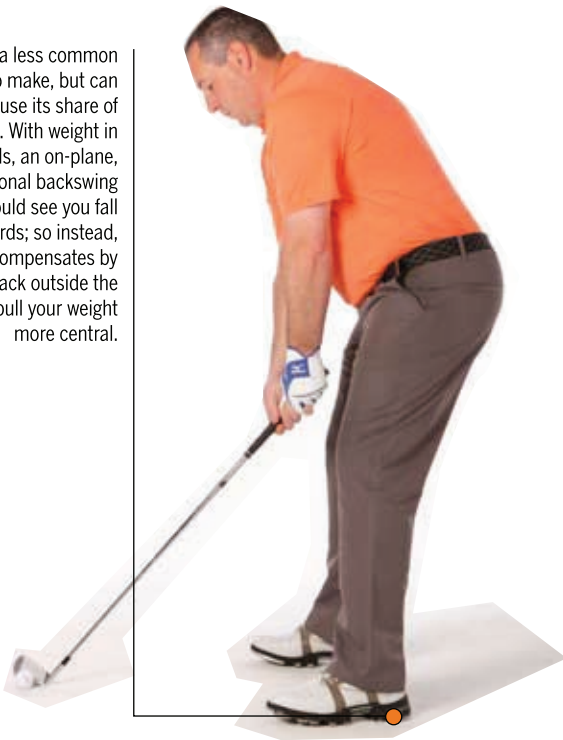
Plenty of Tour pros start with their weight forward, move it back into the right heel as the swing progresses, then go back forward on to the foot balls for impact and then back into the heels at the end. The fact that it's so prevalent has led to some people assuming that this is the best way to do it; however, a scientific approach from the world of biomechanics suggests these golfers are succeeding despite this complicated weight pattern, and not because of it; a mixture of talent and sheer hard work allows them to make it work. As we will see, there is a much simpler and more effective way to control balance in the golf swing.



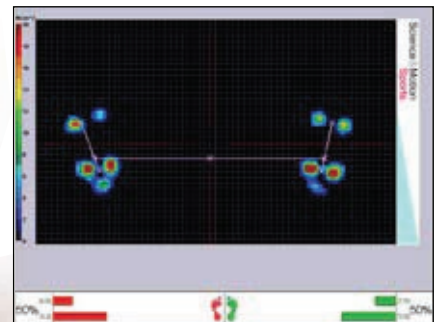
Things get worse as the downswing unfolds. At the top the weight is back in the heels, but by impact it must return to its set-up location, in the balls of the feet. During the downswing, your weight must re-route back from heels to toes. This tends to force the swing's energy out, towards the ball, when it should be channelled down the line. It throws the club outside the line and leaves the golfer on his toes at impact.

WEIGHT TOO FAR BACK IN THE HEELS

This is a less common error to make, but can still cause its share of problems. With weight in the heels, an on-plane, rotational backswing would see you fall backwards; so instead, the swing compensates by moving back outside the line to pull your weight more central.

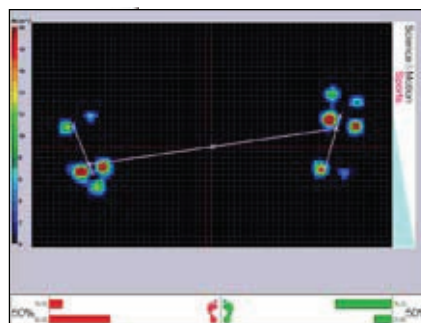


As the backswing develops the body moves in towards the ball. This weight pattern, which sees an upright backswing with the shaft laid off, is a common cause of a shank.



RIGHT TOE, LEFT HEEL

I recently worked with a good amateur who aimed well – feet, hips and shoulders dead square – but who still hit across the ball, out-to-in. He could not understand why this was happening. His Force Plate readings, however, gave him an instant answer; his weight favoured his right toe and left heel.



It is possible to aim well and still have your weight skewed like this. Unfortunately, while poor aim shows up instantly, twisted weight is invisible and almost impossible to diagnose without technology. Weight in the right toe and left heel affects your centre of gravity, and programs a swing that wants to work across the ball from out to in, promoting a slice, fade or pull. The opposite also applies; left toe/right heel weight distribution will tend to pull the club back inside the target line, promoting an in-to-out action.

THE IDEAL BALANCE – KEEP

1. TOE CURLER



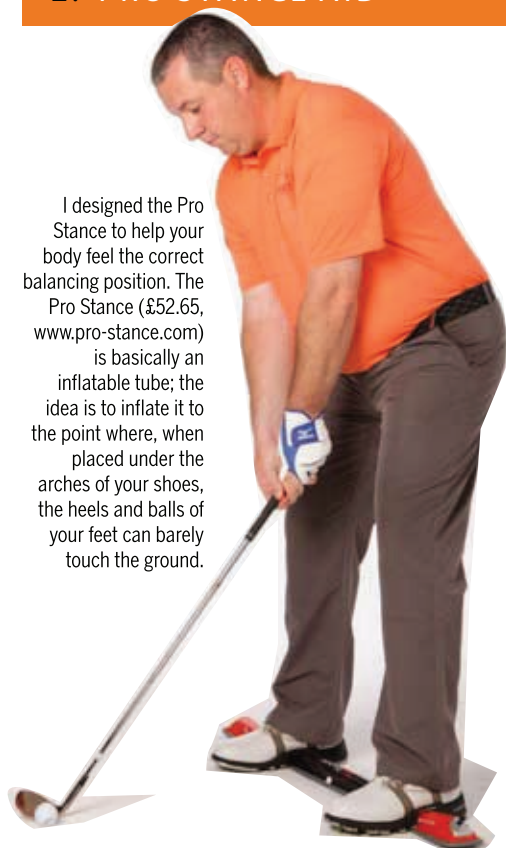
Take your shoes off, and address a ball. Curl your toes up so only your heels and balls touch the floor. Feel your weight is evenly spread across both, your centre of gravity directly above the arch of each foot.

Our toes stop us falling over all day long, but they also mask bad balance. Remove their influence and you are forced to distribute your weight properly.

Make some half swings, without a ball, to gain an understanding of how the swing feels with weight properly balanced. Doing this with your eyes closed can enhance your perception of that feeling.



2. PRO STANCE AID



I designed the Pro Stance to help your body feel the correct balancing position. The Pro Stance (£52.65, www.pro-stance.com) is basically an inflatable tube; the idea is to inflate it to the point where, when placed under the arches of your shoes, the heels and balls of your feet can barely touch the ground.



With your feet only just touching the ground, your weight is very easily pitched back on to your heels or forwards into the toes, both at address and while you swing. You will instinctively work harder to balance yourself. The Pro Stance also works as a fault finder, showing you where your weight moves into your toes or heels during the swing.



Stand off the Pro Stance and make a few swings. That extra work you did to balance yourself on the tube now pays off; on firm ground and a level surface, finding your balance point becomes incredibly easy.

IT CENTRAL

The key to perfect balance is starting with your weight central – neither on toes or heels – and keeping it there throughout the swing. Here are three approaches that will help you.

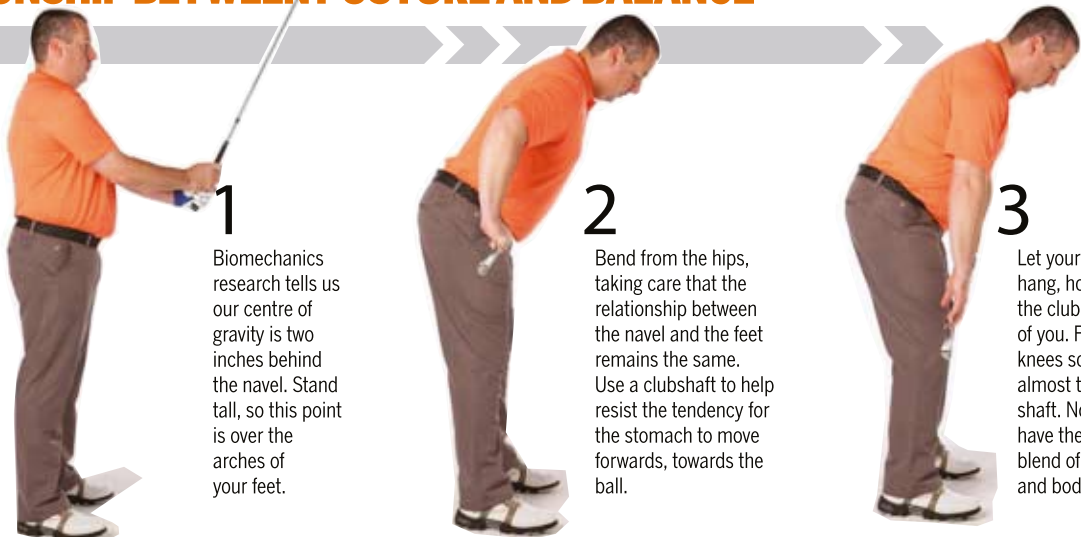
3. FOUR-WAY ROCKER



Quite simply rock forward on to your toes, back on to your heels, back on to your right foot and forward on to your left. From those four extremes, you'll find it easier to centralise your weight and centre of gravity. This an effective little tactic to use mid-round, if you start to feel imbalanced.

THE RELATIONSHIP BETWEEN POSTURE AND BALANCE

It's commonly thought that good posture means good balance. Yes, the two are related; but it's possible to have good posture without good balance. Posture is more about body angles, and they can be the same whether your weight is forward, central or back. Always form your posture from a position of balance:



1 Biomechanics research tells us our centre of gravity is two inches behind the navel. Stand tall, so this point is over the arches of your feet.

2 Bend from the hips, taking care that the relationship between the navel and the feet remains the same. Use a clubshaft to help resist the tendency for the stomach to move forwards, towards the ball.

3 Let your arms hang, holding the club in front of you. Flex your knees so they almost touch the shaft. Now you have the perfect blend of balance and body angles.

BALANCE DURING THE SWING

Okay, so we know where your weight should be at set-up; but what about as the swing unfolds? One way to describe the swing is a rotational movement along a lateral axis. In

into the toes and heels. Biomechanics suggests moving your weight laterally like this is the path to achieving maximum consistency, power and accuracy.



ADDRESS

If you have a camcorder, ask a friend to video your swing from behind. Focus on the relationship between your belt buckle and feet at address; the buckle should be over the arches of your feet.



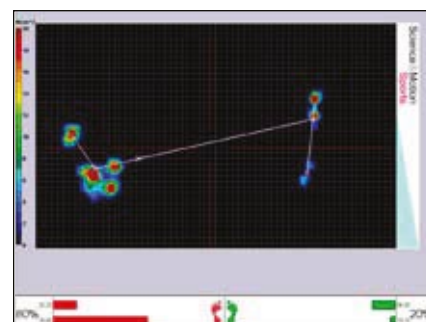
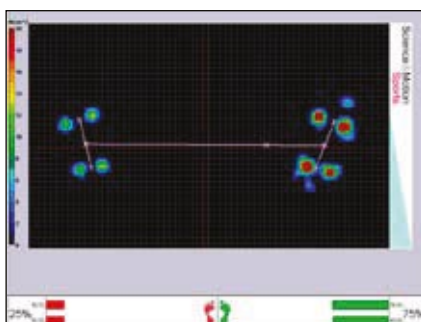
TOP

Check the relationship again at the top; the buckle should again be over the foot arches. Any movement forwards or backwards indicates there has been some compensatory rebalancing during the backswing; and that rebalancing is when you start to see changes in swing plane and position through correction and manipulation.



IMPACT

At impact, the buckle is still over the arches of the feet. The telltale impact sign of poor balance is straightening up, the belt buckle moving out towards the ball and your weight moving up on to your toes. Notice how with the correct balance, the right knee moves across towards the left knee and not out towards the ball.



BAD BALANCE

KENNY PERRY

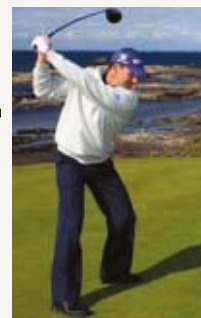
When Kenny Perry missed out in this year's Masters play-off, he announced: "I obviously don't have the mental capability to win a Major." I don't agree. Perry has phenomenal timing; but he also has dreadful balance in his swing. He starts on his toes, then stands up on the way back to rebalance, then drops back in through the ball, then stands up again. He has a harder task to perform, and under pressure it breaks down. Perry doesn't lack the bottle; he lacks the balance.



GOOD BALANCE

PADRAIG HARRINGTON

Padraig addresses the ball with the weight running right down through the middle of each foot, equally on the heels and toes. His weight moves under the arch of his right foot at the top, then back through the centre, briefly into his left heel approaching impact as the hips turn out of the way, and then back to the centre of the left foot. There is no forward-and-back movement; his weight moves parallel to the ball-to-target line. His centre of gravity hardly moves through the swing, so there is no need for compensation. It's the most efficient way for your swing to work.



STEWART CRAIG

PGA pro Stewart Craig has worked on golf swing balance and stability with biomechanics expert Paul Hurrian for the past eight years. His Pro Stance aid is now used by 70 Tour pros including Harrington, Paul McGinley and Rory McIlroy.