

PRESS RELEASE

Results of ten years scientific swing studies

January 2010

Writer:

Raimo Kainulainen, Master of Science, Swing Researcher, "BalancePro"

Author of Book: "Easy Swing with correct Weight Shift"

raimo.kainulainen@swingia.com

Background

- Researching golf swing ten years with new measurement systems , focus in:
 - Swing balance
 - Weight shift
 - Hands accelerations and movements
 - Swing plane
 - Simplifying swing
- Measured lots of professionals and amateurs around the world – US, EU, Asia
- Developed new measurement systems in cooperation with partners
- Balance measurement data collected with Balance Perfect® System www.swingia.com .
Analysis program with sample shots can be downloaded free from the web pages.

Balance = Accuracy

It's easy to end up to this claim based on extensive measurements of amateur and professional players with a new measurement system.

About Swing Balance and Weight Shift

Importance of balance is agreed by all coaches and playing professionals. Balance makes 50% of a swing according to general opinion. Whatever the percentage, it is impossible to play at top level without a good balance.

Therefore it is quite surprising, how little information is available of balance and weight shift. There are very different opinions where the pressure point should locate at address position and how the weight should shift during the swing, but accurate instructions are missing. The reason is probably that good measurement systems have not been available for general use.

Also, feelings lie in golf swing. That's a very well known fact. Weight shifts very fast during downswing. It is impossible to feel exactly how the balance is at different swing positions. Very often even the professionals are surprised of the measurement results. Measured facts may be totally different than their own beliefs and feelings.

Theoretically, and also according to measurements, it is very difficult to be consistently accurate, if the balance is not stable during the swing.

Weight Distribution

According to classic swing teaching about 80% of weight should be shifted during the backswing to the trailing foot and at ball impact there should be about 70 – 80% on the front foot. Weight distribution percentage means how the total force against ground is distributed between right and left foot. In this way of expression the total is always 100%.

During a swing and especially close to the ball impact point, the total force against the ground changes strongly. In a very smooth swing the total force against the ground may be 120% of the body weight. Another type of swing may result up to 170% of the body weight.

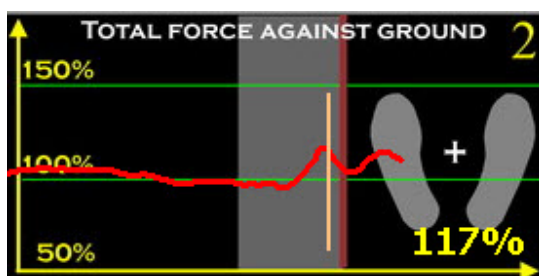


Image 1

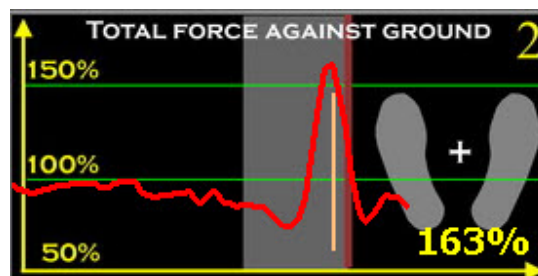


Image 2

Image 1 and 2 show two very different swings, displayed by the Balance Perfect®Program. The grey area illustrates the fast downswing part of the swing. Ball impact is at the right side of the grey area - marked with red vertical line.

The white vertical line points in both swings the maximum total force against the ground. In swing 1 the max value is 117% and in swing 2 163% respectively. As can be seen in the graphs, in swing 1 the player is very passive until close to the ball impact, but in swing 2 the player "lifts up" before the downswing and during the first part of the downswing, because the total force against the ground is under 100%, only 73% at the minimum. After ball impact the total force against ground drops rapidly

again down to 75%. In the analysis program all percentages can be seen at any point of the swing by dragging the pointer to different position.

As the weight distribution percentage may be the same in two very different swings, it is difficult to make any extensive conclusions based on the weight distribution percentages only.

Forces on Feet

As new measurement systems give also forces on both feet at every point of the swing, it is much more useful to evaluate the forces. The graphs show how the forces change during the swing. Too many unnecessary movements affect negatively on how the energy is used to accelerate the club head and in that way shorten the length of the shot. Most important is, however, that they destroy the chance to have a good consistency and accuracy. Unnecessary movements cannot be repeated exactly in the same way from shot to shot; therefore they should be eliminated completely.

Comparing the two swings above, in swing 2 the player moves a lot during the backswing and also during the first half of the downswing. In swing 1 the player stands very balanced and has better changes to a good shot accuracy.



Image 3

The image 3 above is showing the weight shift graph of one teaching professional. The blue dot is the starting point of the swing measurement. The yellow graph shows how the pressure point against the ground moves during the swing. The red dot is the ball impact point. The green graph shows how the pressure point moves after the ball impact.

At turning point weight distribution on left foot is 71% and at ball impact 72% on the left foot. Looking at weight distribution only, conclusion would be that the swing is very smooth. However, when looking at real forces on both feet, the conclusion is totally different. At turning point there is 146% force on the left foot compared to address position. In other words, the force is 1.46 times the force at address position.

Similarly, at ball impact the force on the left foot is almost double compared to address position, 192%. This force on the left foot may rise really high in special swings. The highest that I have seen was 380%, by an English teaching professional – his weight distribution being quite normal. These examples

show that weight distribution, as it is expressed, is not enough. A good swing analysis should include also the forces, as they tell more about the style of the swing.

In the example of image 3, the graph also shows that just before the ball impact the player moves rapidly towards the left heel, as indicated by dark red arrow. This unnecessary move affects negatively on the shot consistency and accuracy, and was not recognized by the pro. These movements are so small and fast that it is impossible to see them without measurement. After analyzing the graph it became easy to interpret, what caused the unwanted move of the pressure point, and the problem could be fixed.

Balance, Balance and Balance

Balance is very important in a swing. "Mr. Accuracy", Calvin Peete, ten-time PGA tour driving accuracy champion says that three keys to straight driving are "Balance, Balance and Balance." Padraig Harrington stated in an interview that 99% of golfers lose their balance during swing.

What is the Balance in a swing? Good balance is a consequence of correct movements; directions, timings and accelerations without need to make corrective foot actions.

If the swing movements are correct, the swing can be stopped at any point without problems, still maintaining the balance. However, it is impossible to know without measurements, if the balance is really good, because the movements are very fast and the swing feelings lie.

How a good Balance looks in Graphs

Measurements of best professionals and most accurate players show that there are certain similarities in their weight shift and balance.

- Pressure point (weight) shifts straight to the right and to the left, no loops or curves.
- During backswing and during downswing the pressure point shifts along same straight line.
- During backswing there is only little shift between heels and toes.
- In general, the graphs are very smooth

Good balance also helps to hit longer. As power is not lost for unnecessary compensations trying to maintain the balance, it can be used fully to accelerate the club head, which means longer shots. At the same time shot consistency is better, which automatically leads to better accuracy.

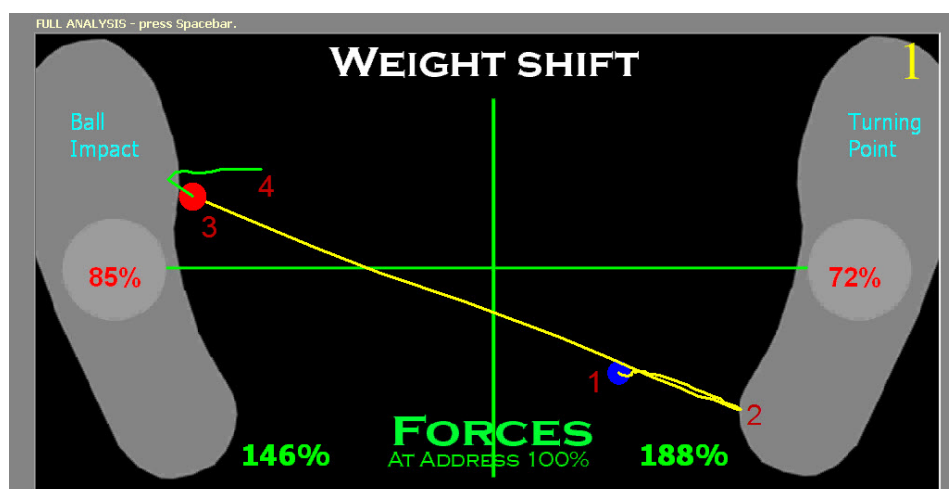


Image 4

Image 4 above shows a very accurate swing. This example is of a 12 years old junior, who had been hitting 18 hole-in-ones already. On golf course he is hitting straight only – very accurately. Making par is therefore easy to him.

From the starting point of measurement 1) the weight shifts straight to the right. From the turning point 2) during the downswing the pressure point moves straight to the ball impact position 3) and continues along the green line shortly in the same direction, until it turns back to the finishing point 4).

In this shot weight distribution is: 72% on the right foot at turning point and 85% on the left foot at ball impact.

The forces are respectively: 188% on the right foot at turning point and 146% on the left foot at ball impact.

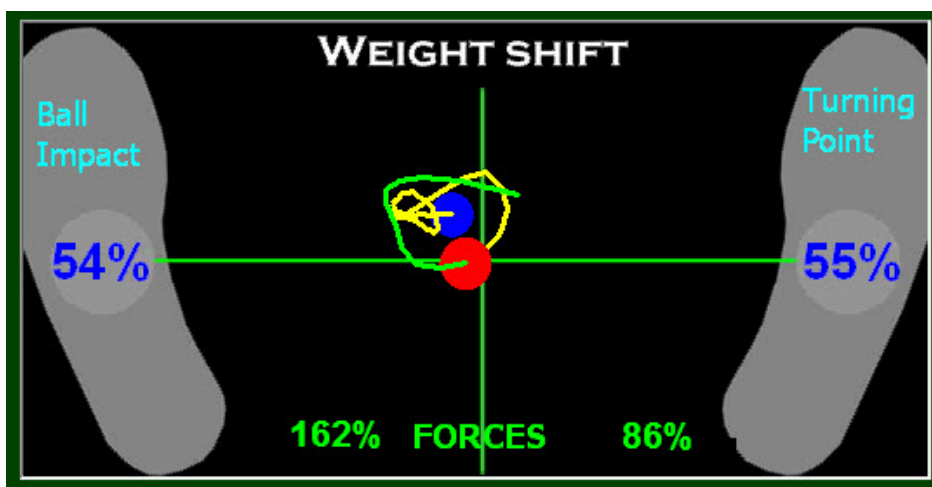


Image 5

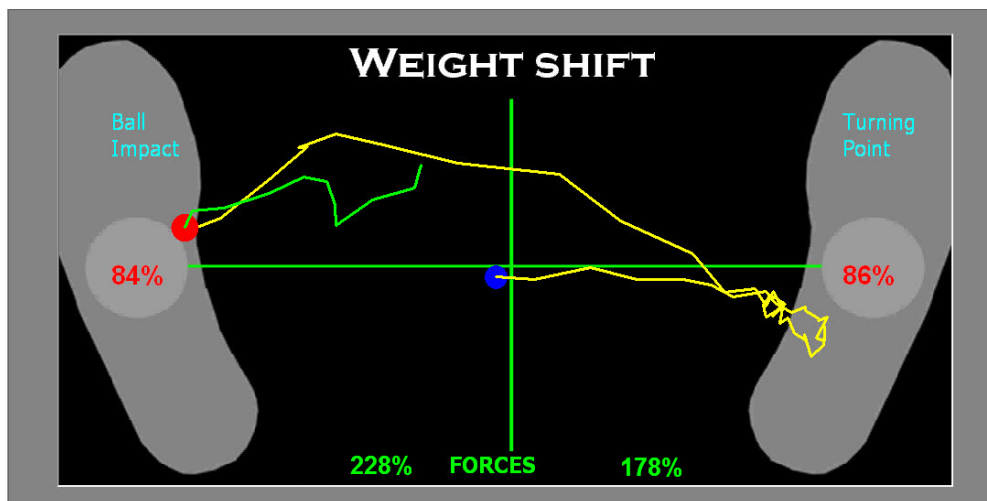
Image 5 above shows a bad shot where the pressure point is “circulating” irregularly to all directions. There are also movements to and from the ball, which cannot be good for accuracy. The pressure point (weight) stays all the time very central - almost no weight shift, weight distribution 55%/54%.

Hitting long Shots

How much weight shift is good to hit long shots? According to classic teaching and also when examining most of long drive champions, a strong weight shift is preferred. This opinion is based on an assumption that strong hip rotation is needed to create the power and club head speed for long shots. In my opinion, however, the most important factor, in addition to the delayed shot - the cocking, is the rotation speed of the shoulders.

The hip rotation doesn't always help to increase the club head speed – in fact it can be the opposite. A lot of energy is wasted to rotate the lower body fast. That energy could be used to rotate the shoulders faster. When the shoulders turn fast, the hands and the club must follow creating automatically a high club head speed and long shots. The rotation muscles around the waist are the most important in this theory.

Below, as an example, you can find very different swings of two European long drive champions, Janos Uotila 2007 and Antti Saleva 2009. The swing styles and weight shifts are totally different – almost opposite.



Janos Uotila, European Long Drive Champion 2007

Janos has lots of movement laterally in his swing. Weight distribution 86% / 84%. The forces 178% / 228%. The swing is very typical in long driving.



Antti Saleva, European Long Drive Champion 2009

Antti's swing is very special. At ball impact weight distribution on the left foot is only 57%. The weight continues to shift to the left foot after ball impact, like illustrated with the green line. Also the force on the left foot is only 132%. Antti's maximum total force against the ground during the swing is only 120%, also extremely low. The graph and the percentages tell that Antti's swing is based completely on fast rotation of upper body. Hips are very passive and only offer a solid fundament for the rotation of the shoulders.

At turning point Antti starts leaning forward and the pressure point moves towards toes. This is unnecessary. It reduces consistency, and he may waste power that could be used to accelerate the club head. By eliminating this movement his accuracy would apparently increase, even if Antti is already one of the most accurate hitters on the tour.

One more example: Mr. Matsumura has longest drives on Japanese PGA tour. His swing is similar to Antti's; at ball impact he has on left foot only 44%. He is rotating his shoulders so fast that 56% of the weight stays still on the right foot at ball impact.

Fault tolerant Swing

One target in my studies has been to find a "Fault Tolerant Swing". Fault tolerant swing is opposite to Fault Sensitive Swing, where small errors easily lead to bad shots. Fault sensitivity can be observed in competitions. Under pressure even best professionals can hit such bad shots that they would never hit on a driving range.

If a swing is Fault Tolerant, it means that small mistakes especially in rhythm and tempo do not lead to a disaster. In a fault tolerant swing components have been reduced to minimum. All movements follow the swing plane direction, meaning that minor changes in accelerations or tempo do not lead to changes in club position at different points of a swing.

Good swing balance leads automatically to a swing with better fault tolerance.

Success stories

Understanding and learning good balance helps to improve. In-to-out direction to the ball becomes natural. It will help to fix slice, which is one of the biggest problems to many golfers.

It is quite interesting to see, how after years, sometimes after tens of years of intensive coaching and learning even best professionals may find a totally new understanding of their swing with balance measurement. In my opinion this tells only that swing is very complicated. It is very difficult to the coaches to explain and transfer the small internal body feelings to their students. As the measurements show the truth, this immediate feedback will help students to understand. They can practice and correct their swings using the data, until right movements and timings have been found.

Janos Uotila, European Long Drive Champions, says in his blog: "Balance Plate is an unbelievable device. Five shots on the plate and I understood instantly what my coach has tried to explain to me many years. I fixed the timings and my shot accuracy improved immediately".

On amateur level the best improvement that I have seen was HCP dropping by twenty shots in three months. This player fixed his terrible slice and found a good accuracy for his approach shots. Everyone understands that precise approach shots are a key to good results.

Summary

Based on extensive studies and measurements of players at all levels, my conclusion is that amount of weight shift is not important. As the examples above also prove, it is possible to hit long shots with weight shift extremes; strong weight shift and almost no weight shift at all. Significant is the direction and timing of weight shift.

Most important is the good balance that can be achieved by correct swing movements only. It brings important benefits for free; good accuracy, fault tolerance and longer shots. Good balance helps at all skill levels – for professionals it is an absolute must. No balance, no money!