



Dr Rob Neal, PhD

3D Golf BioDynamics Swing Analysis

First Name:	Nat	Last Name:	Slyvester	Email:	nathaniel.sylvester@pga.org.uk
Date:	13-Dec-07	Test type:	Initial test		
Mass:	190 lbs	Height:	73 "	Handicap:	12

Summary

1. Nat, at set up your hips are closed (aiming left) and your left hip sits a little high.
2. In the backswing your weight loads into your right leg, this causes your head to move downwards and towards the ball. You may need to check your hip stability/mobility as this may be influencing the way you move.
3. As a result of this, on impact your upper body fails to rotate and your head gets ahead of the ball, causing the handpath to be on the outside during the downswing

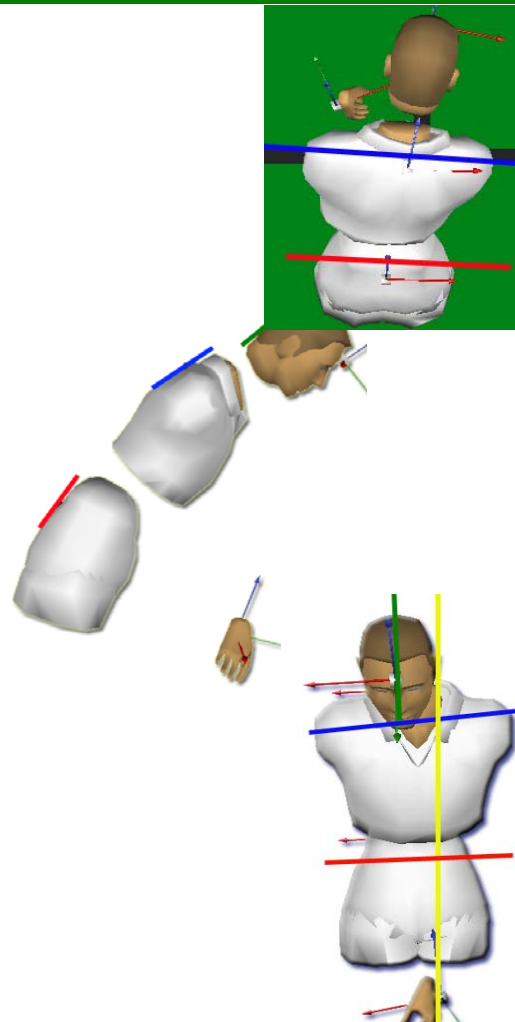
Setup Foundations

Alignment		
	Corridor	You
Hips	0 to 8°	-3 Closed
Shoulders	5 to 12°	3 Open

Green = within corridor
 Yellow = just outside corridor
 Red = well outside corridor

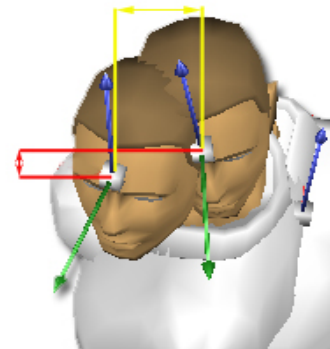
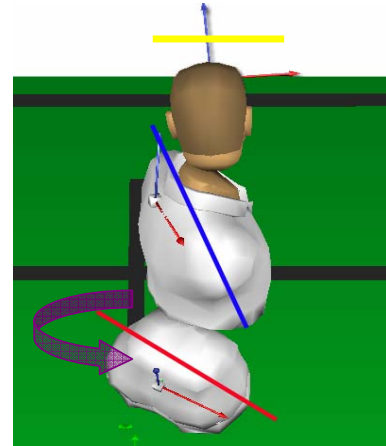
Bending		
	Corridor	You
Hips	12 to 20°	19 Forward
Shoulders	35 to 45°	41 Forward
Head	30 to 50°	60 Forward

Tilting		
	Corridor	You
Hips	0 to 3°	-1 Left
Shoulders	7 to 13°	7 Right
Head	0 to 10°	9 Right



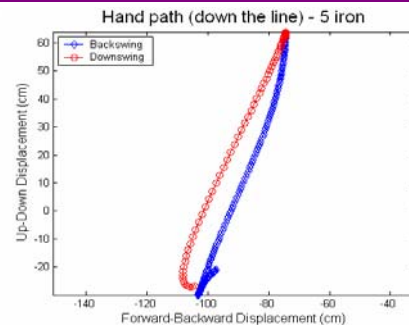
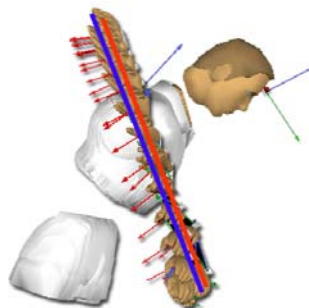
Backswing

Rotations		
	Corridor	You
Hip Turn	-40 to -52°	-48 Closed
Shoulder Turn	-85 to -95°	-93 Closed
X-Factor	-40 to -50°	-45 Closed
X-Factor Stretch	-10 to -25°	-7 Closed
Head Turn	-20 to -40°	-31 Closed
Stability		
	Corridor	You
Head sway (Address to top)	3 to 4½"	3.5 Away
Head lift (Address to top)	-1½ to ½"	-3.1 Down
Head thrust (Address to top)	-½ to ½"	1.9 Forward
Hip drop (Address to top)	-1½ to ½"	-2.3 Down
Hip sway (Address to top)	-1½ to -3"	-4.3 Toward



Ideal Hand Path

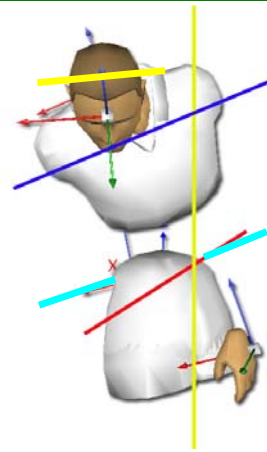
Your Hand Path



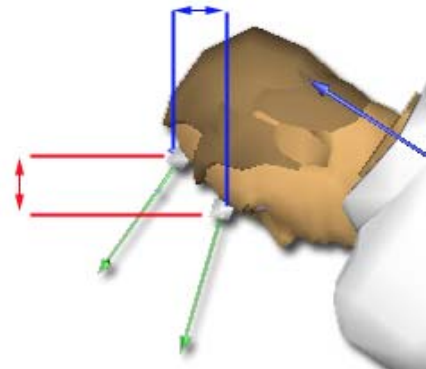
Blue = backswing Red = downswing

Downswing

Impact Zone			
	Corridor	You	
Hip Turn	25 to 45°	22	Open
Shoulder Turn	25 to 50°	8	Open
Head Turn	10 to 40°	-6	Closed
Hip Tilt	10 to 15°	2	Right



Spine Angle Control			
	Corridor	You	
Head drop (Top to impact)	-2½ to ½"	1.3	Up
Head thrust (Top to impact)	-½ to ½"	0.1	Backward
Head sway (Top to Impact)	2 to 4"	6.0	Toward
Hip sway (Top to impact)	-1 to -3"	-1.2	Toward

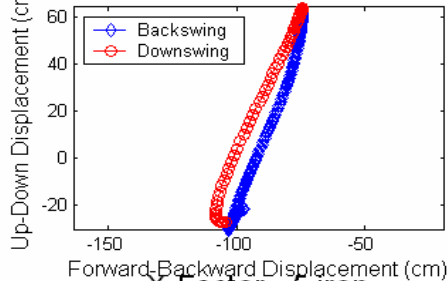


Body Speeds		
	Corridor	You
Hips	420 to 520 deg/s	433
Shoulders	620 to 710 deg/s	585
Hands	19.7 to 24.0 ft/s	21.8

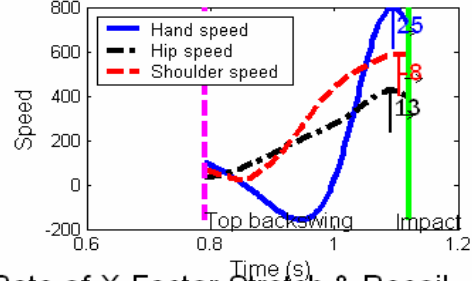
Timing Sequence (order that peak speeds occur in downswing)			
	Hips	Shoulders	Hands
Ideal	1	2	3
5-iron	1	3	2
Driver	0	0	0

Dynamics

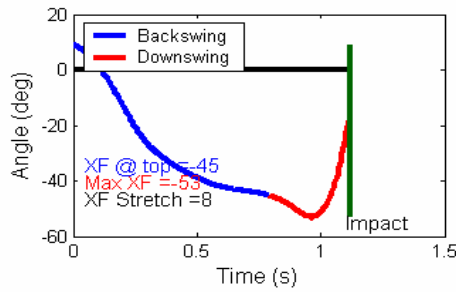
Hand path (down the line) - 5 iron



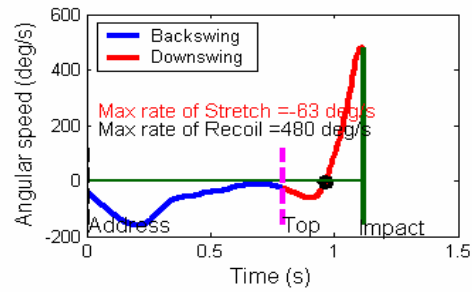
Timing Sequence - 5 iron



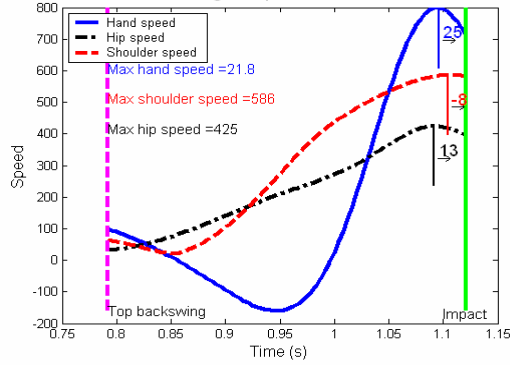
X-Factor - 5 iron



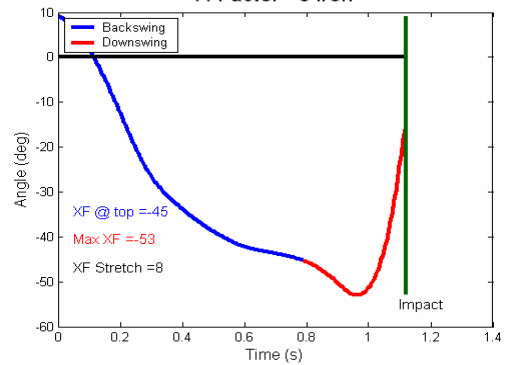
Rate of X-Factor Stretch & Recoil - 5 iron



Timing Sequence - 5 iron



X-Factor - 5 iron





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The findings (to be read in conjunction with information above by Total Golf Analysis's Mark Bull. *NB Nat is a left-hander.*

SETUP FOUNDATIONS

Alignment

As we go through the report we see at address Nat's hips are aligned slightly closed (minus three degrees) but his upper body shoulders (three degrees open) is actually very good.

Bending

In posture, the figures are showing how much forward bend he has.

Nat's posture is typical of someone who spends much of their day either sitting or driving and exhibits a 'pokey chin'.

Tilting

Tilting is the side bend of the body.

It is of concern here that Nat's left hip sits extremely high at address; remember, he is left handed, therefore we would expect his left hip to sit slightly lower than his right. As a result of this his torso tilts towards the target.

As we will see the consequence of this is that his weight loads into his right leg.

Backswing

During the backswing, readings are taken to measure the body's rotations and stability.

Rotations measured are hip turn, shoulder turn, head turn, X-factor (numerical difference between hip and shoulder turn) and X-factor stretch (the amount that this differential increases/decreases by in transition).

Rotations

Nat's hip and shoulder turns are sound.

It is important to understand that we measure the top of the backswing as when the hips stop turning as this allows us to measure the amount of 'lead out' of the lower body in the extremely important transitional phase.

The resultant X factor stretch being created by the continued turn of the torso away from the target and the initiation of the lower body shifting and turning towards the target is a key indicator of how much power is likely to be created in the downswing.



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In Nat's case there is only on average seven degrees of increased stretch in transition against a Tour player who would create around 16 or 17 degrees in addition to an acceptable stretch (differential) in their backswing.

Stability

The ability to rotate while maintaining stability throughout is vital. We are looking for the root cause of any inefficiency and in many cases instability is it.

Many of Nat's problems here are due to the fact that his hips are closed and his left hip sits high at address.

As we can see his hips drop 2.5 inches in the backswing and his weight loads excessively into his "lead leg" in a classic lower body reverse shift, this is measured by the pelvic sensor which in Nat's case moves 4.3" towards the target and around 2.5" downwards in his backswing; which is around 2" too much sway towards the target. This is inevitable due to the orientation of his pelvis at address, however must be improved if Nat is to improve the efficiency of his swing.

If we can align the pelvis correctly then he should be able to achieve more stability in his lower body in his backswing creating more efficient loading into his 'trail' leg.

Stability in the lower body is vital, as is stability in the trunk. We can see in the report that Nat's head moves off the ball well in his backswing (which is sound) however drops 3.1" and thrusts 1.9" towards the ball.

This lack of trunk and pelvic stability in rotation could be a result of many things and should be investigated further.

Impact

At impact we see his shoulder and hips are now in a slightly open position (22 degrees and 8 degrees). His head is still in a closed position (minus figure).

This 'head fight' is unfortunately very common and significantly compromises Nat's ability to 'open' efficiently through impact. We would like to see his torso and hips better matched at this time with a differential of only one or two degrees.

As hips shift and turn in his downswing he should achieve around 10 degrees of tilt (due to the fact that they are bent forward and turning). In Nat's case he only achieves around 2 degrees which is inefficient and places his lower back at risk of injury; especially in combination with the large torso/hip rotational differential. This tilt value is the angle of the pelvis (left/right) at the point of impact. This would be like looking at the angle of Nat's belt at this point.

Spine Angle Control

The spine angle control measurements at impact are taken from the top of the backswing to impact.

In Nat's case his head raises 1.3 inches and moves 6 inches towards the target.



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There's no real lateral shift of his lower body in the downswing but that's very hard to do if you're already loaded on your "lead" leg in the backswing. There is no reverse pivot as he tends to pivot right and stay right in the down swing.

The body is under-worked, and he's relying on the "feel" in his hands to control his ball flight.

Body Speeds & Timing Sequence

The last two boxes are body speeds and timing sequence in the downswing.

Importantly, hip and shoulder speeds are measured in degrees per second (angular velocity) as they rotate and the hand speed in feet per second (linear velocity) as they travel in relation to the target line (x-axis).

Nat's speeds are quite good, although the shoulder speed is a little slow; this is due to the fact that his body has not been able to rotate sufficiently through impact.

The timing sequence 1, 3, 2 (hips, hands, shoulders) is the order that the various body sections reach their peak speed.

The correct sequence should be hips, shoulders, hands 1, 2, 3. Hope you are still with me.

The graphs at the bottom are for the coaches mainly, this shows the inner workings of the swing and the swings dynamics etc.

SUMMARY

At set up, Nat's hips are aligned slightly closed and his shoulders are slightly open. His head sits too far forward, his left hip sits a little high and his spine sits a little too vertical.

During the backswing, his body rotations are very sound; however his weight loads into his right leg, the head moves towards the ball and drops excessively.

At impact his body is under rotated, his hips have failed to shift and tilt, the head raises slightly and moves too far ahead of the ball.

The effect this has is that his hand path is too much on the outside on the downswing.

For more information visit www.totalgolfanalysis.co.uk