Big 12 on 3D

S-Posture and C-Posture at Address

Look at Pelvis and Thorax Forward Bend and Spine Flexion/Extension at the address position.

Parameter	Units	Avg	S D	Range
Pelvis Bend at Adr	deg	20	6	14 to 26 (Fwd)
Thorax Bend at Adr	deg	34	6	28 to 40 (Fwd)
Spine Flex/Ext at Adr	deg	14	7	7 to 21 (Fwd)

S-Posture is high pelvis forward bend (above 26 deg) and low thorax forward bend (below 28 deg). Note that "flat back" would be spine flex near 0 deg; S-Posture would be negative (i.e. extension).

C-Posture low pelvis forward bend and high thorax forward bend, or a spine flex that is higher than 21 deg.

Spine Axis Fwd Tilt (Loss of Posture)

Parameter	Units	Avg	S D	Range
Spine Axis Fwd Tilt at Address	deg	28	4	22 to 32 Fwd
Spine Axis Fwd Tilt at Top	deg	28	4	22 to 32 Fwd
Spine Axis Fwd Tilt at Impact	deg	23	5	18 to 28 Fwd

Notice that spine axis tilt is the same at address as it is at top. Spine axis is maintained. If this angle decreases below 22 deg fwd then the golfer is coming out of posture. This goes along with flat shoulder plane.

Flat Shoulder Plane (Loss of Posture)

Parameter	Units	Avg	S D	Range
Thorax Side Bend at Top	deg	34	6	28 to 40 (Lead)
Thorax Side Bend at Impact	deg	32	5	27 to 37 (Trail)

Flat shoulders at top of backswing, thorax side bend is less than 28 deg to the lead side.
Flat shoulders at impact, thorax side bend is less than 27 deg to the trail side

Early Extension (Loss of Posture)

Parameter	Units	Avg	S D	Range
Pelvis Thrust at Impact	in	1	1	0 to 2 (Fwd)

At impact a pelvis thrust of more than 2 inches is excessive and considered loss of posture. It is okay to thrust more backwards than 0.

Over the Top

Currently there is not really a measurement for this. The best way to see it is to show it with the 3D robot in multiple mode and a down the line view. Watch to see if the club line on the downswing is over the top of the club line on the backswing.

Sway and Slide

Parameter	Units	Avg	S D	Range
Pelvis Sway at Top	in	0	1	1A to 1T
Pelvis Sway at Imp (Slide)	in	4	1.5	2.5T to 5.5T

Excessive sway is if they move more than 1 inch away from the target at top of backswing. Note some pro golfers move toward the target during the backswing e.g. "Stack and Tilt". Sway at top is easy to set biofeedback tones on, especially with the new "live zeroing" feature.
Excessive slide is when they are more than 5.5 inches toward the target at impact. Slide tones are also easy to set but you may want to give a little bit more leeway.

Hanging Back

Parameter	Units	Avg	S D	Range
Pelvis Sway at Imp (Slide)	in	4	1.5	2.5T to 5.5T
Pelvis Sway at Imp (Slide)	in	4	1.5	2.5T to 5.5T

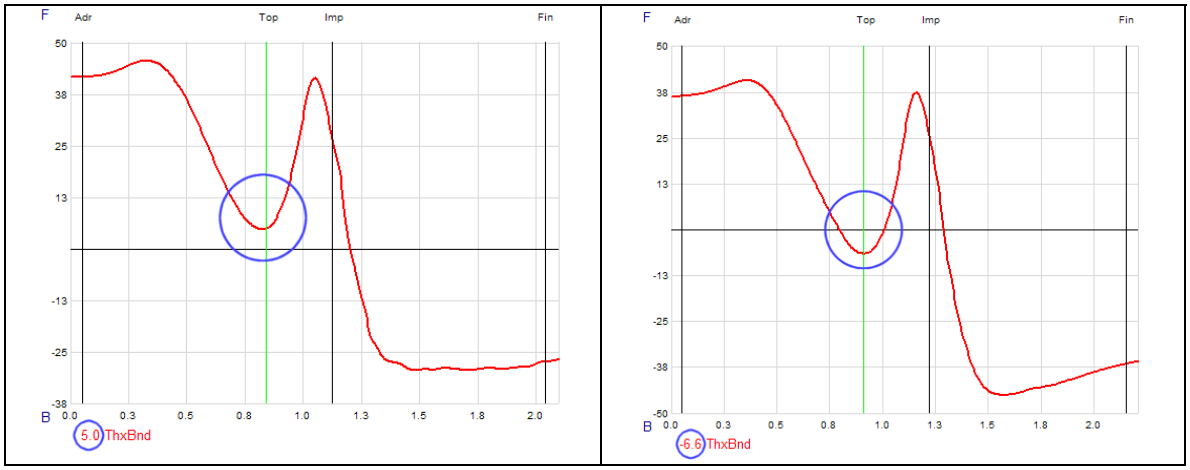
Hanging back would be if they are less than 2.5 inches toward the target at impact. Probably should also look at the thorax value too. Also look at shape of curve

Reverse Spine Angle

This is actually a backward bend of the thorax at the top.

Parameter	Units	Avg	S D	Range
Thorax Bend at Top	deg	2	6	4 Bck to 8 Fwd

Interestingly here in order to have a low range of 4 degrees back, some of the pros have a reverse spine angle! That doesn't mean you should encourage it. You should set your ranges from 0 to 8 Forward.



Casting / Early Release

Parameter	Units	Avg	S D	Range
Arm at 30 deg pre-impact	deg	101	7	94 to 108

Look at the Wrist Link page of the report.
For biofeedback it is best to set a value at the top and if the wrists begin to open immediately then the tone will sound. Look at wrist set angle curve to pick the appropriate values

Look at shape of Wrist Set-Release Curve

Chicken Winging

Parameter	Units	Avg	S D	Range
Lead Elbow Flex/Ext at HF	deg	160	7	153 to 167

Look at Lead Elbow Bend Angle at the HF (Half Follow Through) point. If it is much less than 153 degrees then "chicken winging" is occurring, i.e. the elbow is more bent the smaller the angle.

Scooping

Parameter	Units	Avg	S D	Range

Shaft Lean at Impact	deg	12.5	4.5	17F to 8F

Look at the Wrist Link page of the report.
Shaft lean is expressed as the handle forward or backward of the club head, so forward (F) is a strong impact position and back (B) is a weak “scooping” position. So anything from 8F to 0 is not great, but anything from 0 to values with a B, these are definitely scooping.

Notes

Experiment with real-time numbers
Do biofeedback and real-time numbers simultaneously
Set positive and negative tones

Other Faults in 3D

Bent Lead Arm at Top

Reverse Pivot

Pelvis Thorax Under/Over Rotation at Top

Pelvis Thorax Under Rotated at Impact

Poor X-Factor

Kinematic Sequence Check List