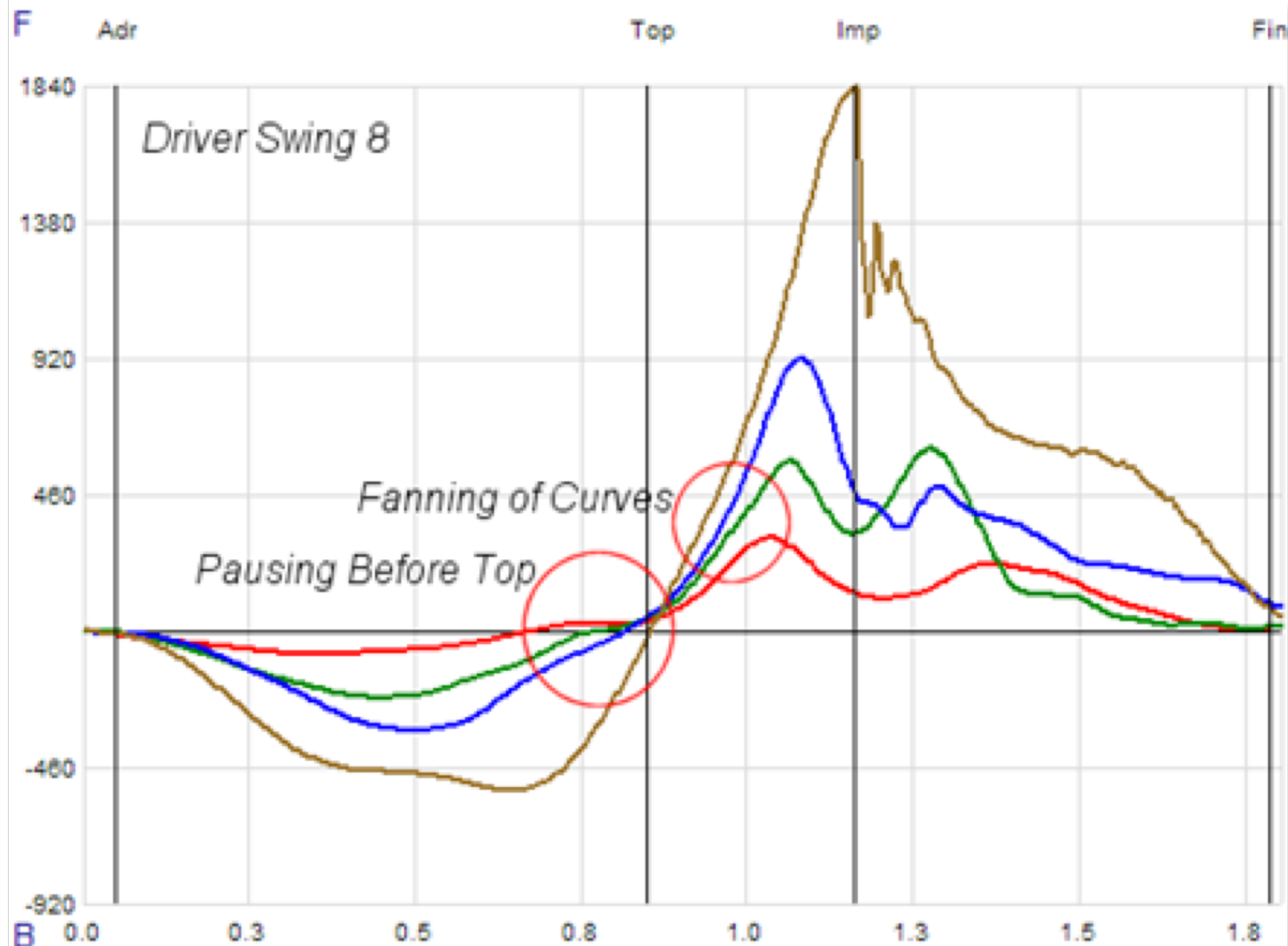


# Topics

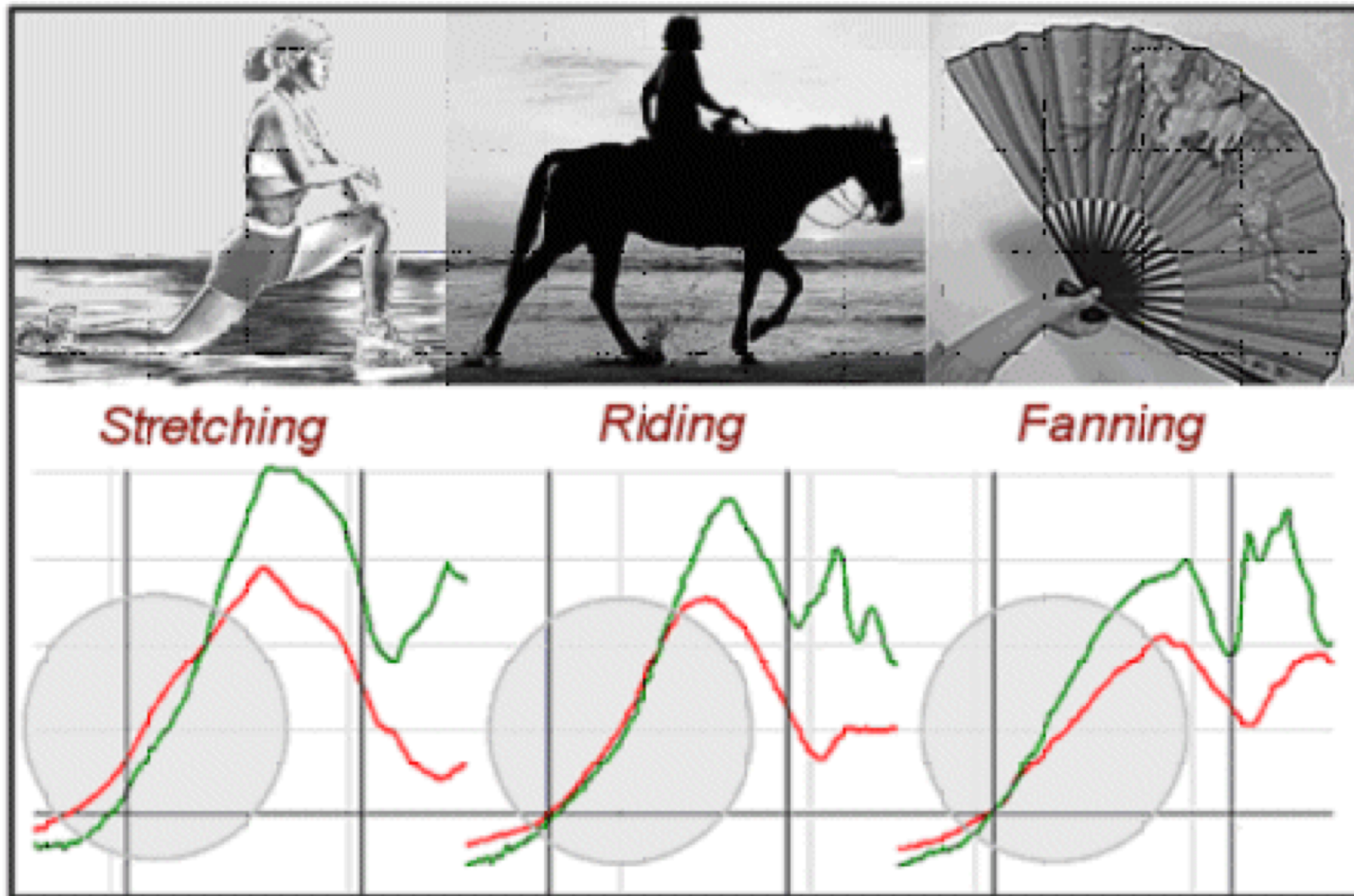
- 3D – Cast Pattern
- Anatomy – Hip
- Coaches Questions/Swing Discussions

What is a cast?

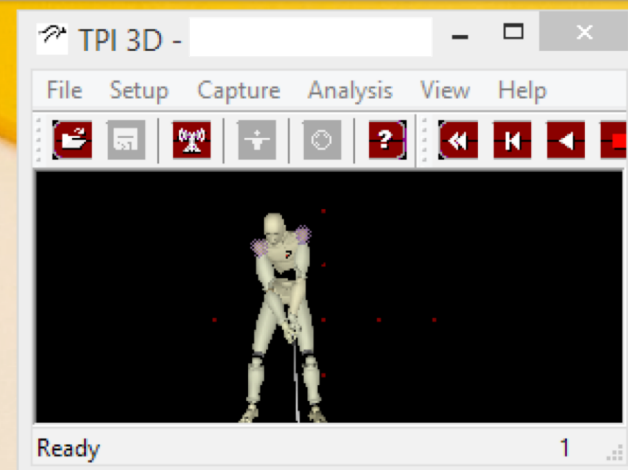
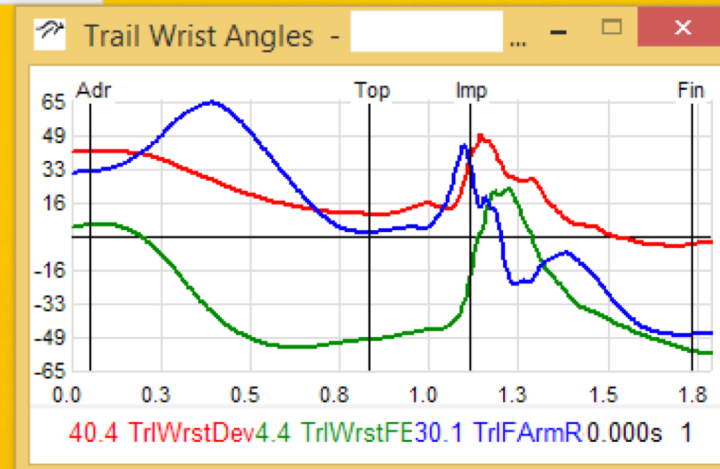
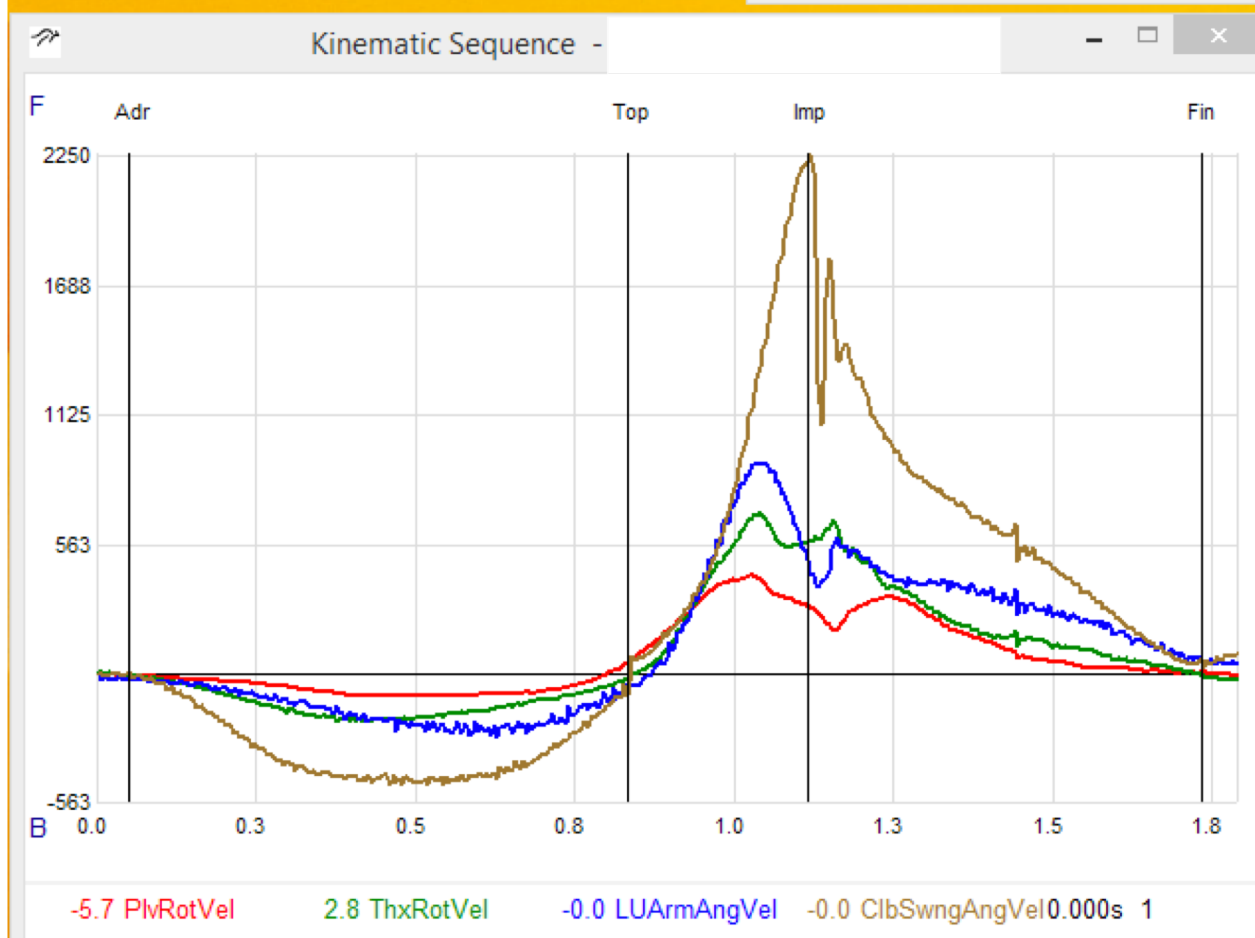
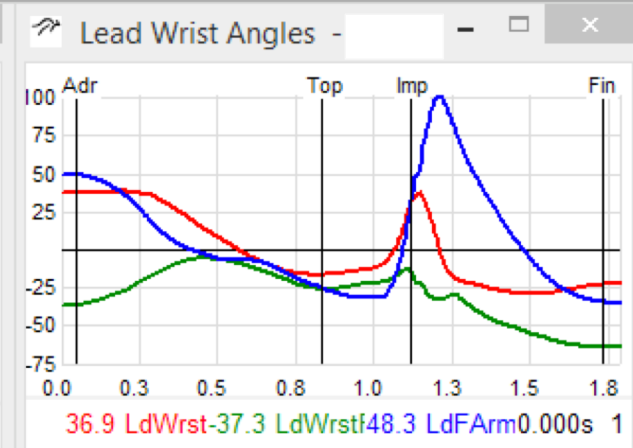
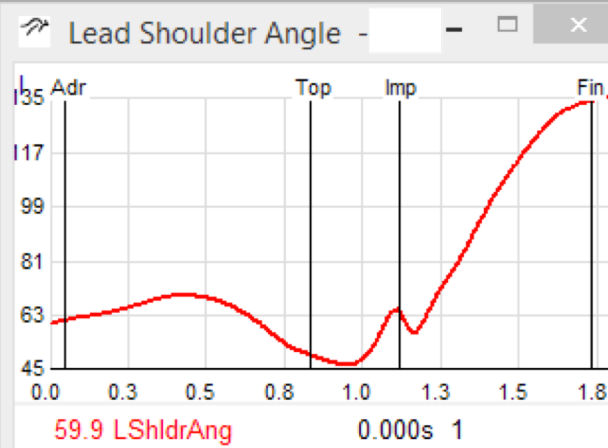
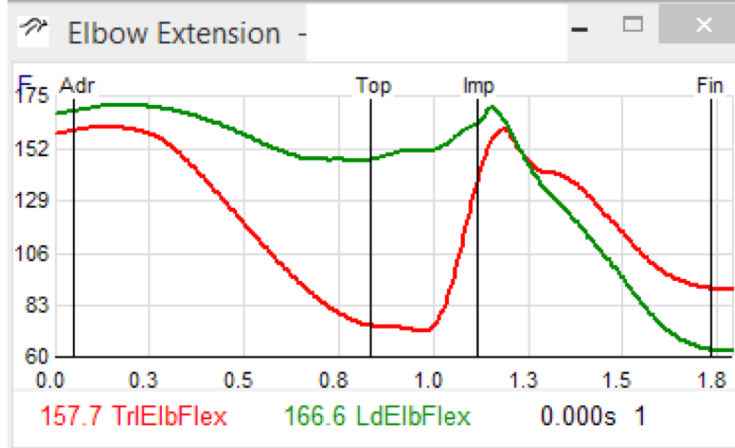


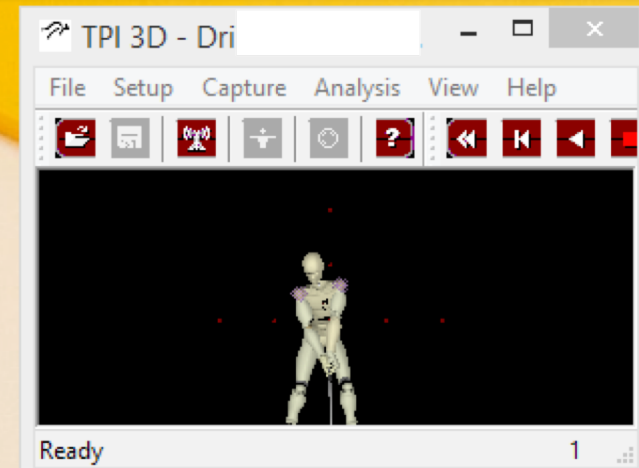
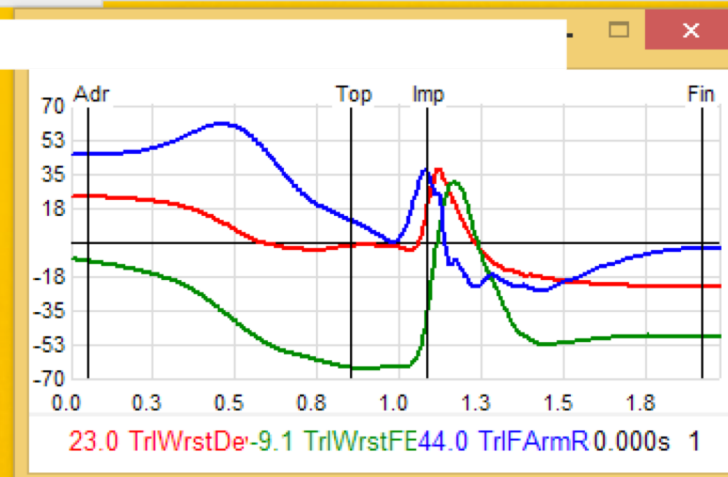
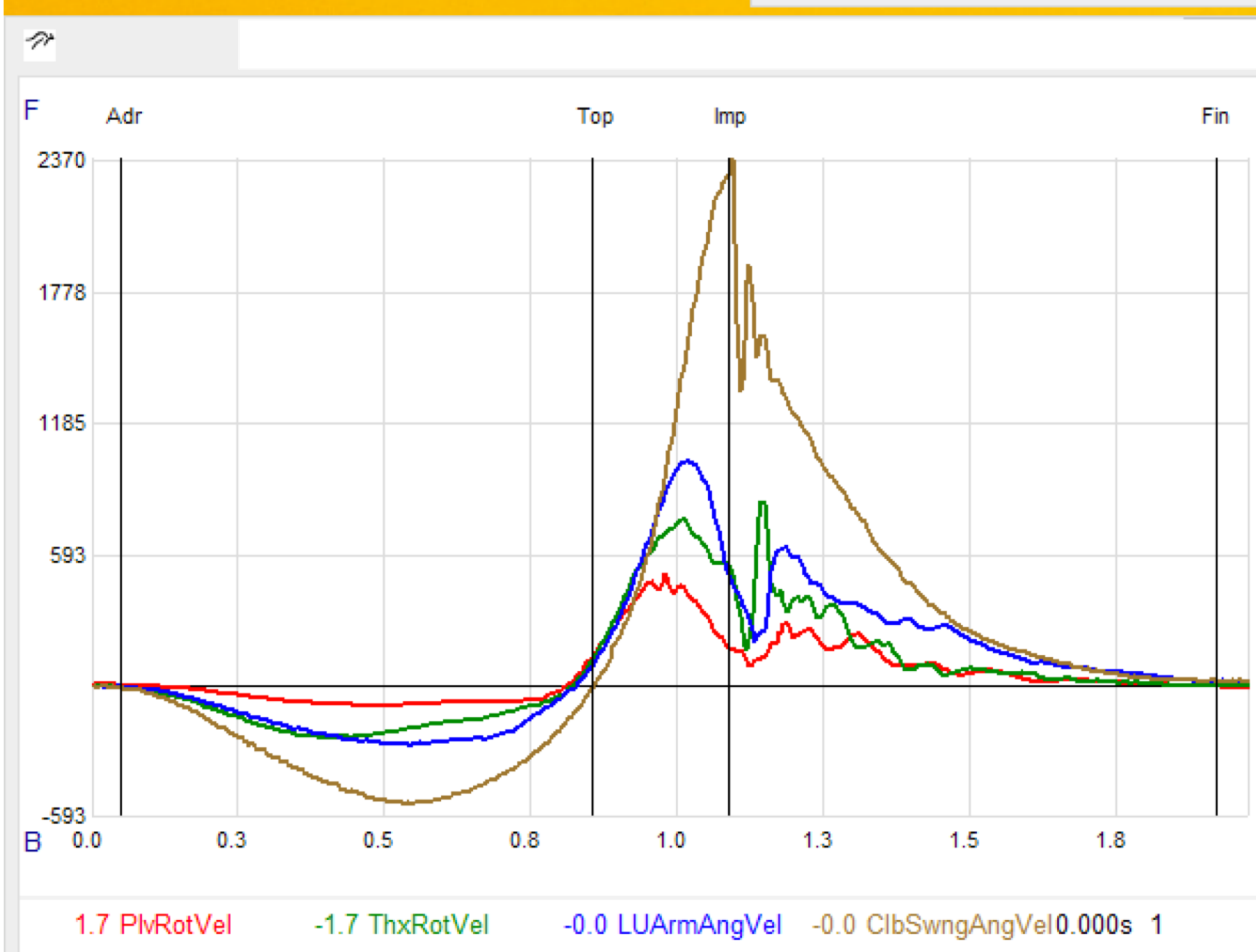
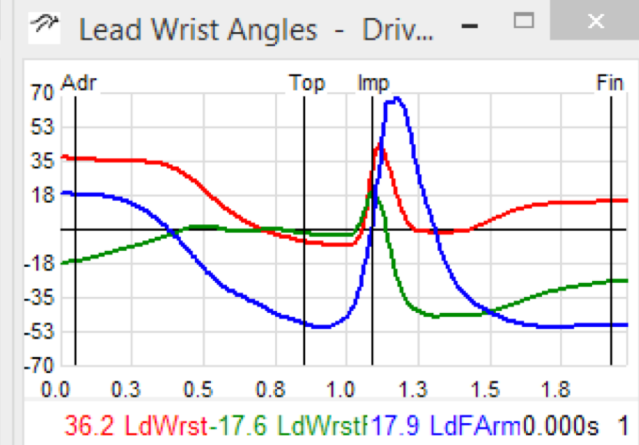
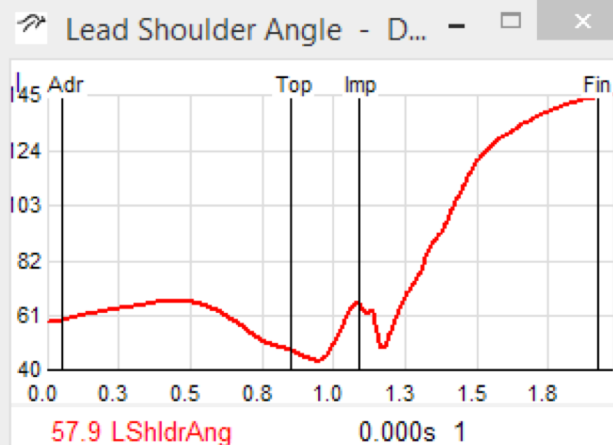
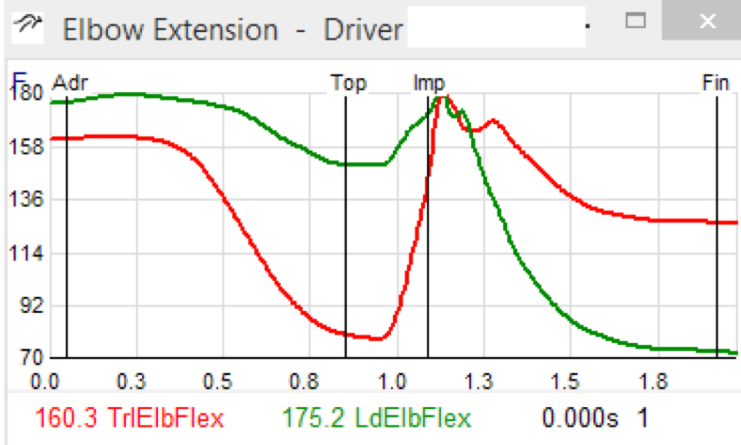


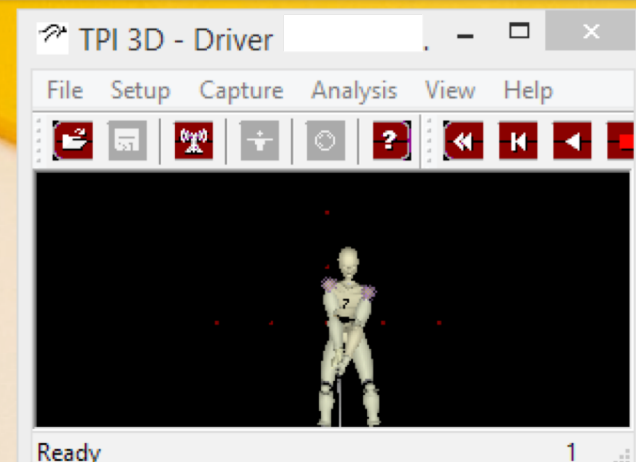
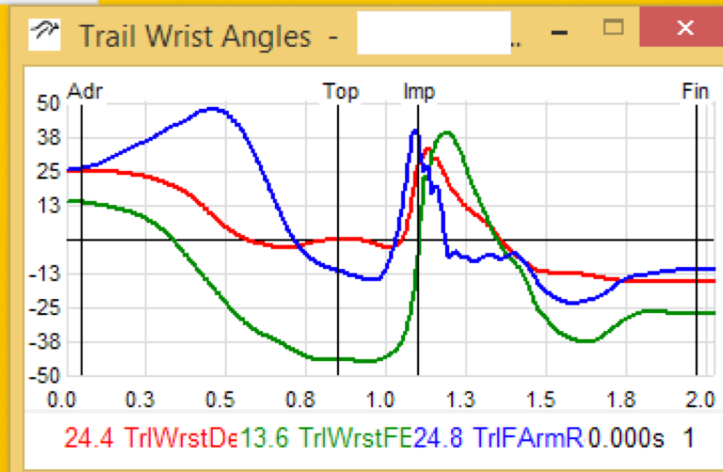
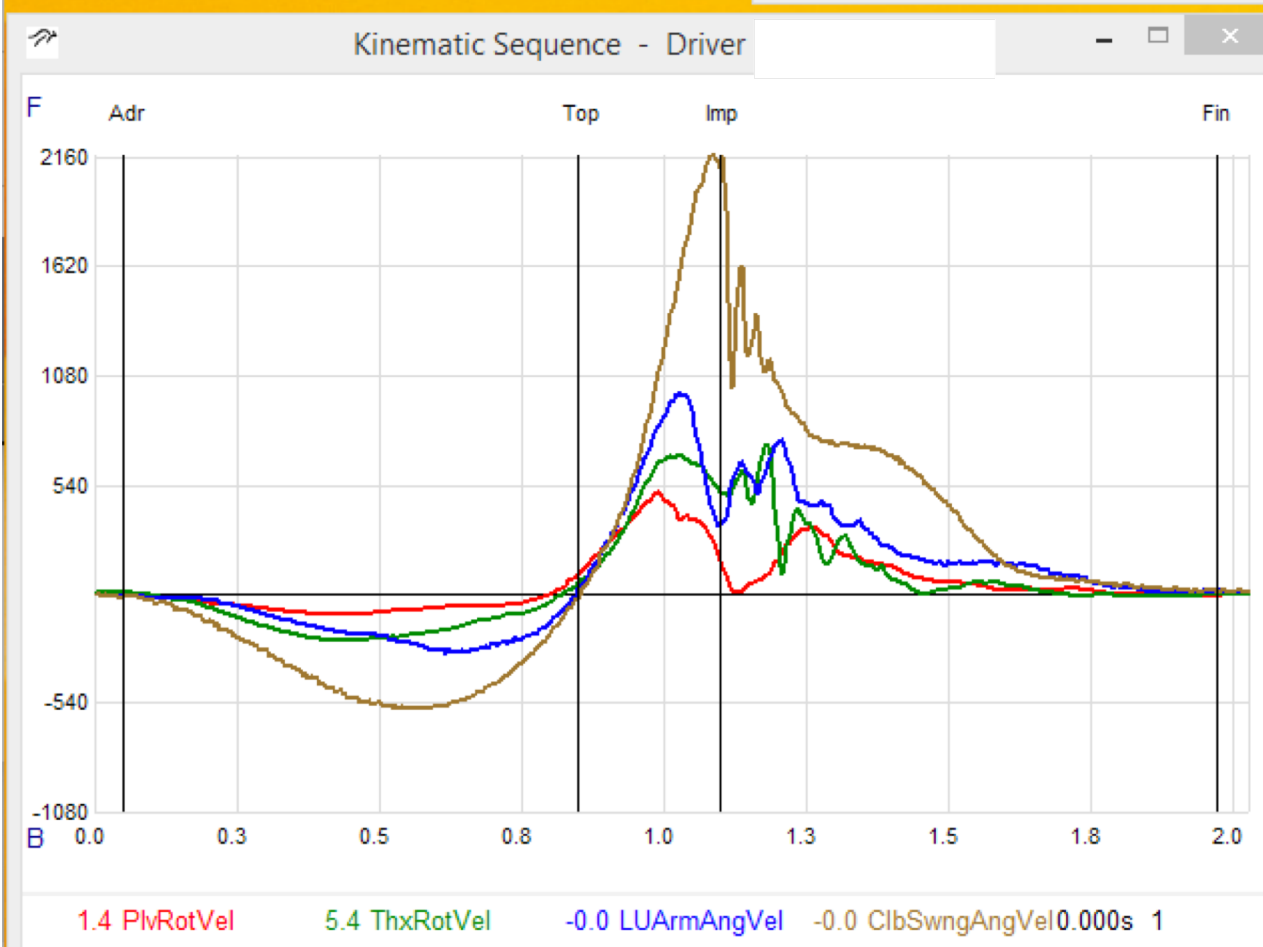
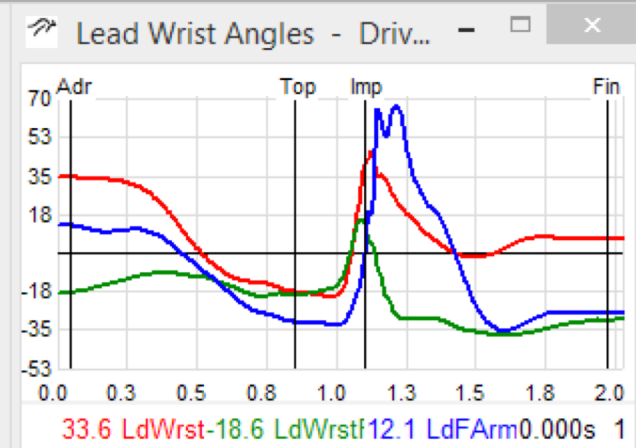
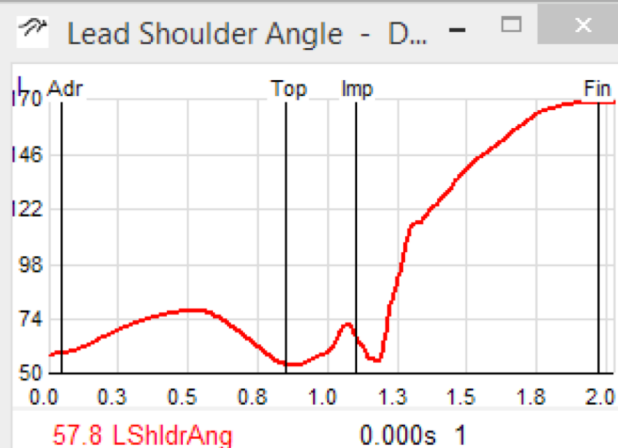
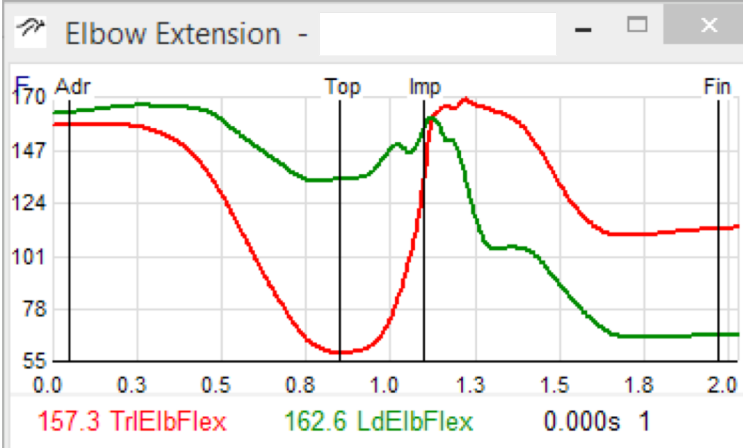
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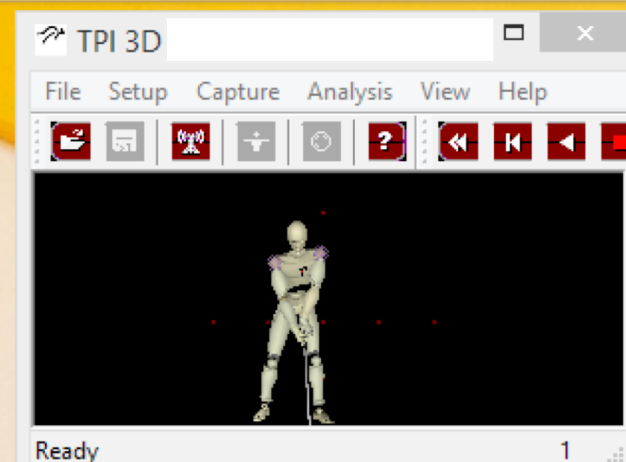
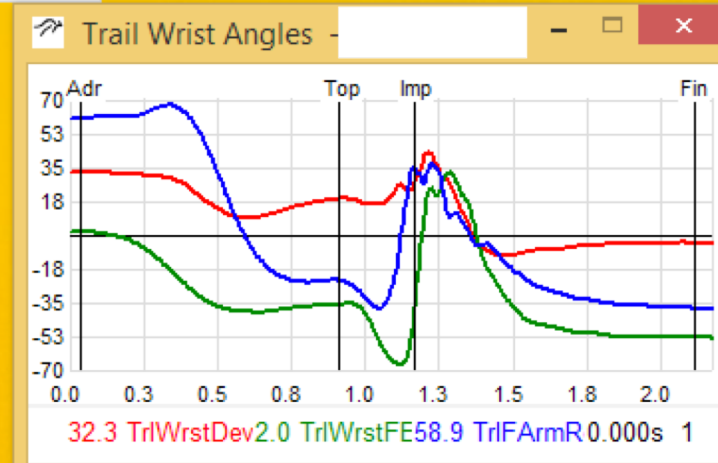
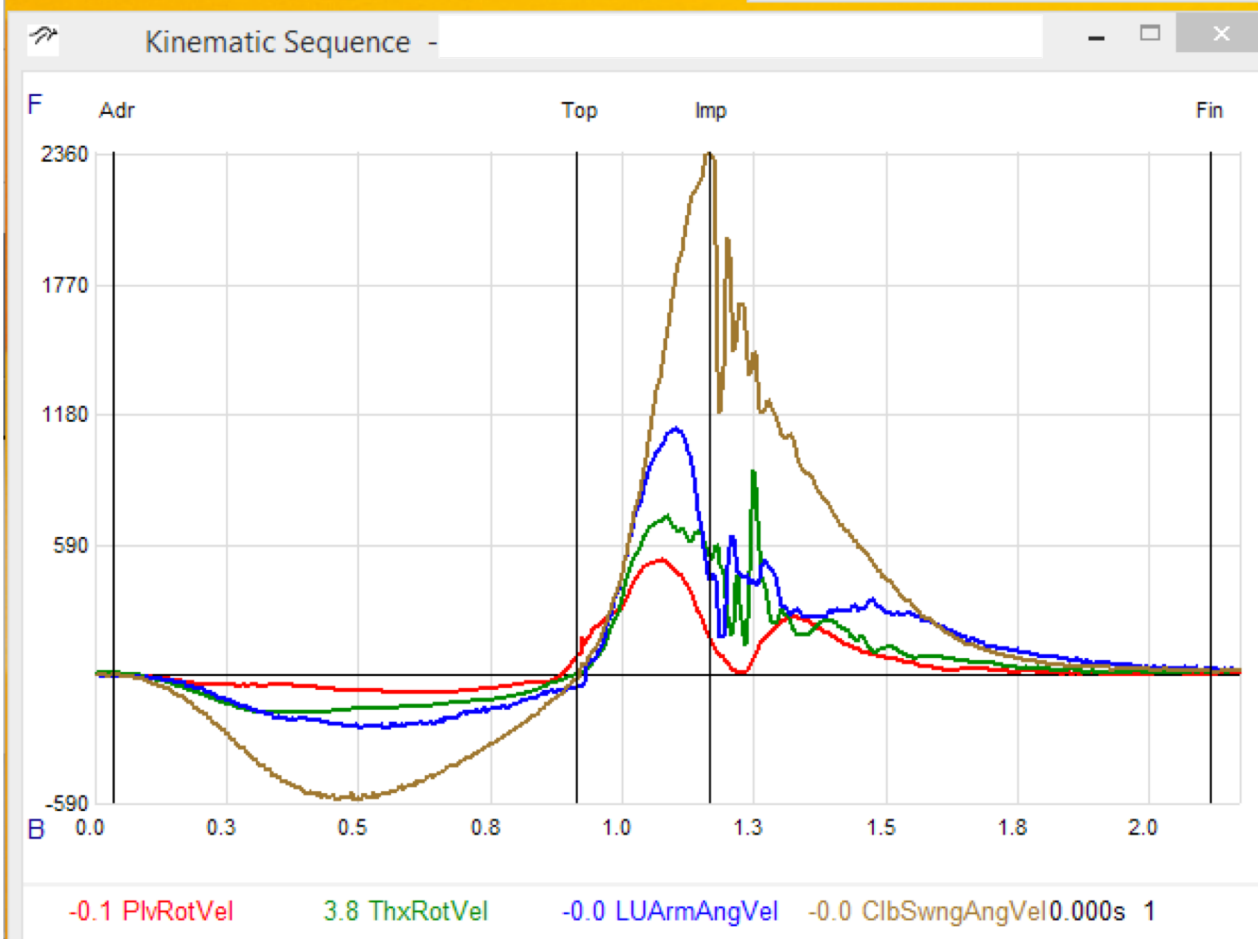
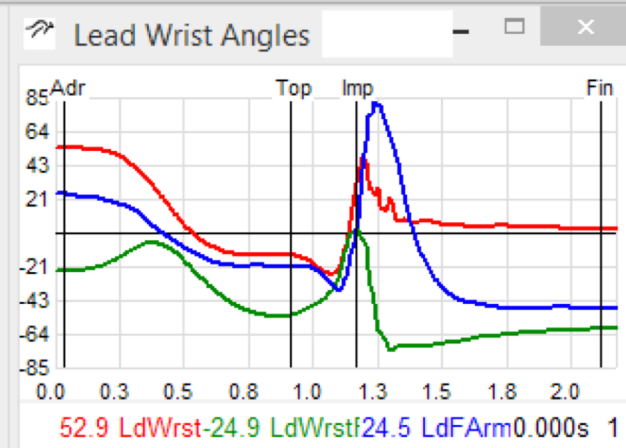
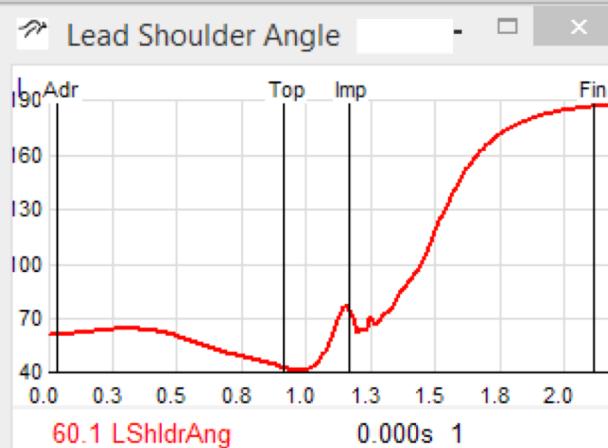
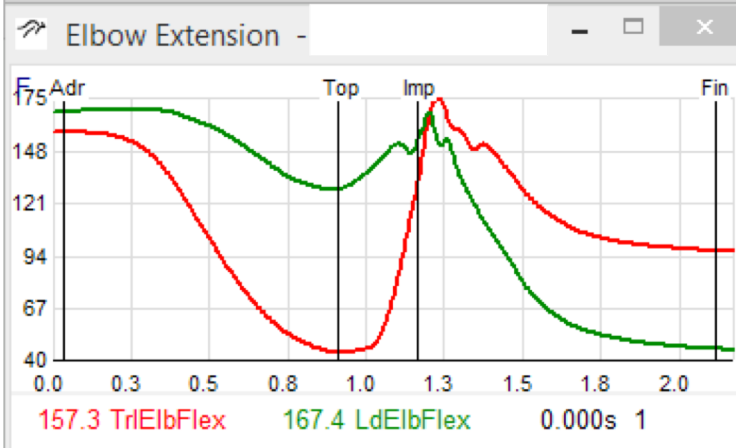


# Pro Patterns

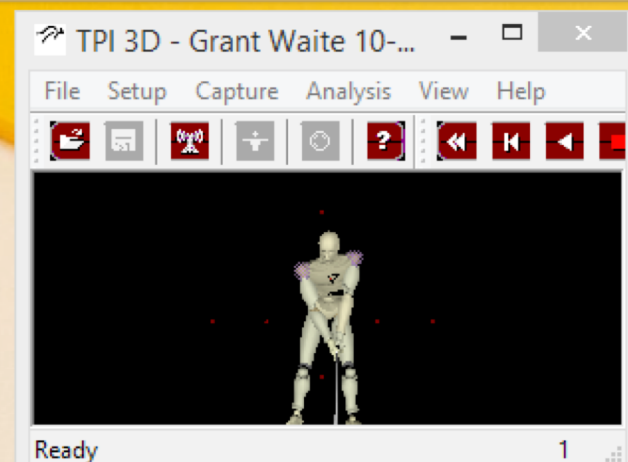
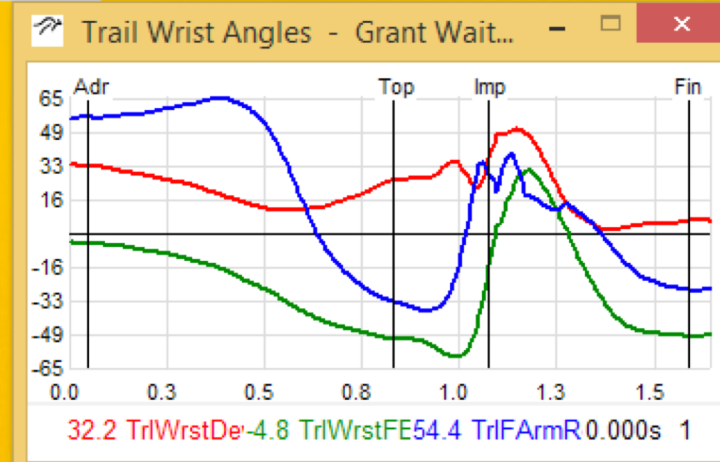
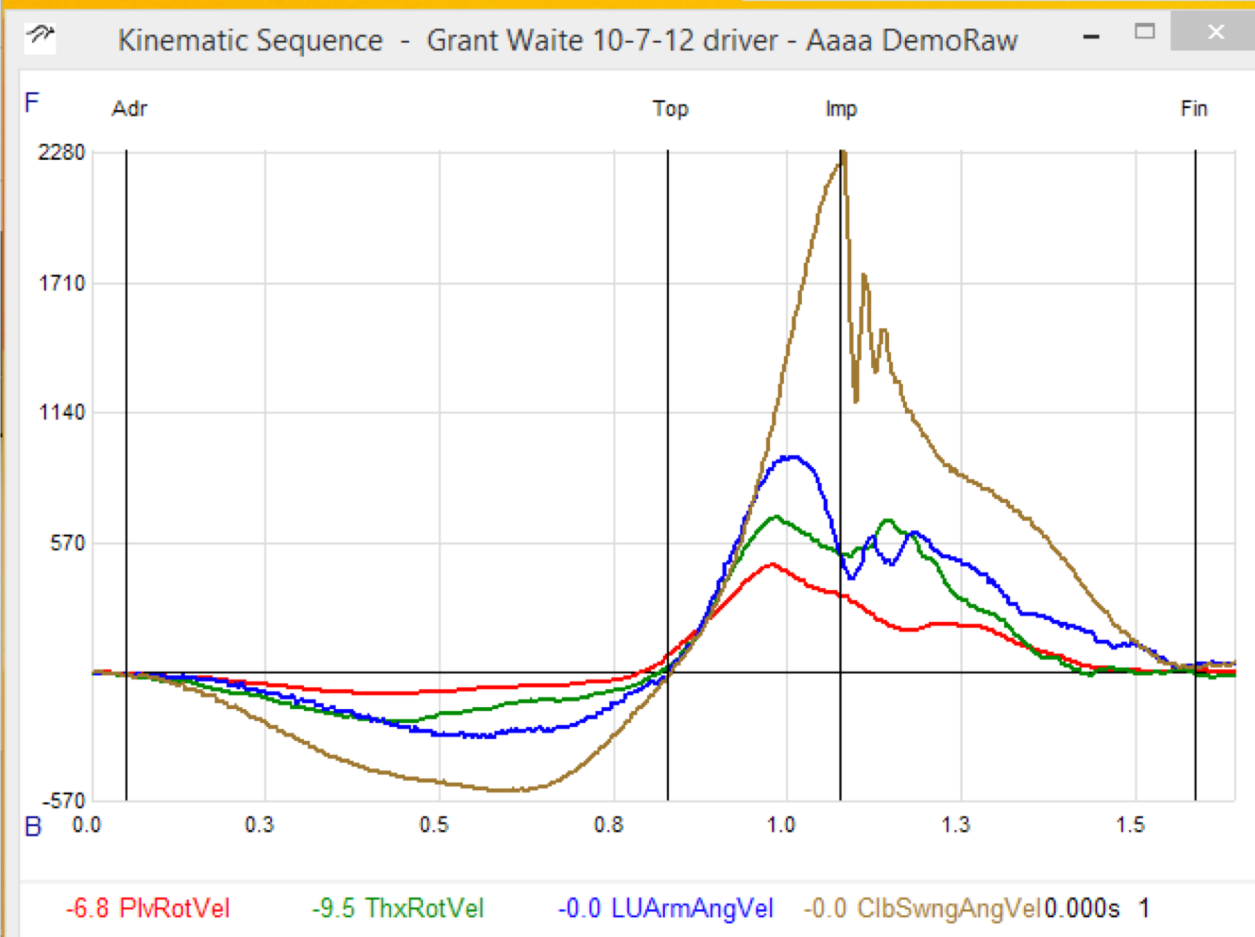
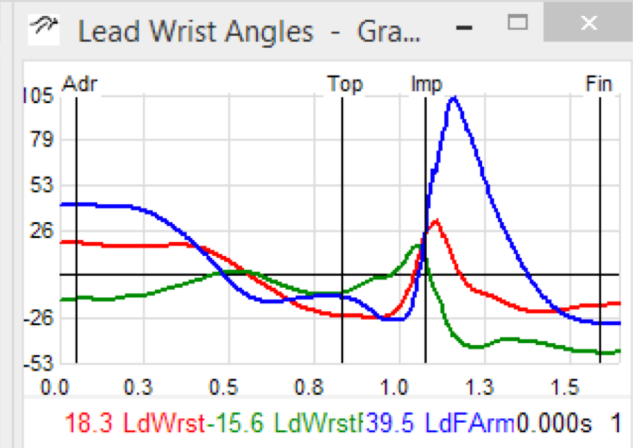
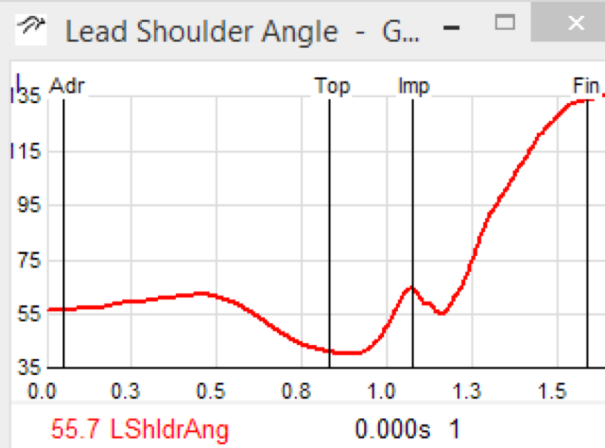
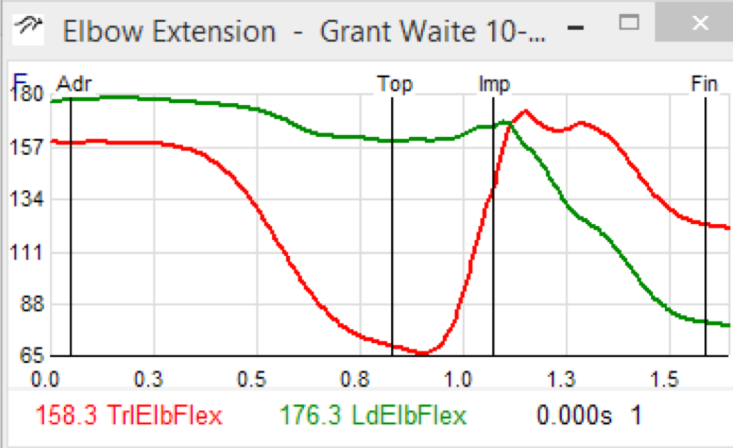






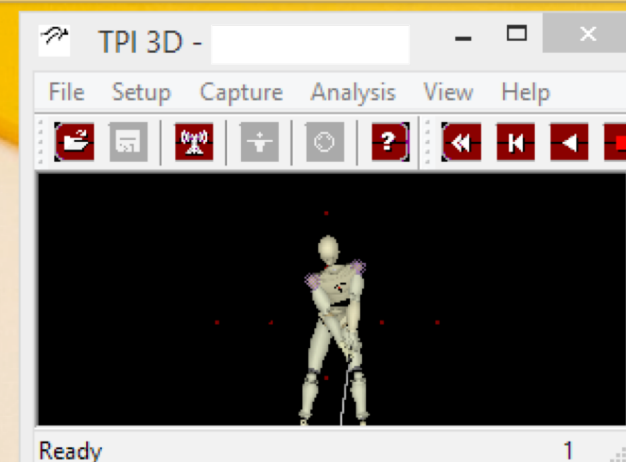
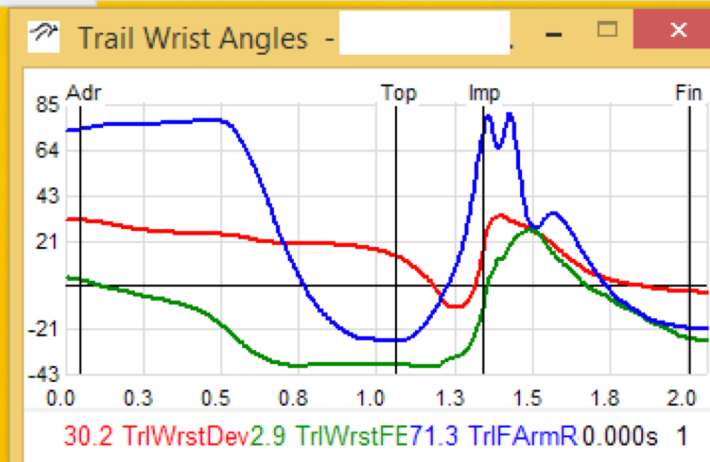
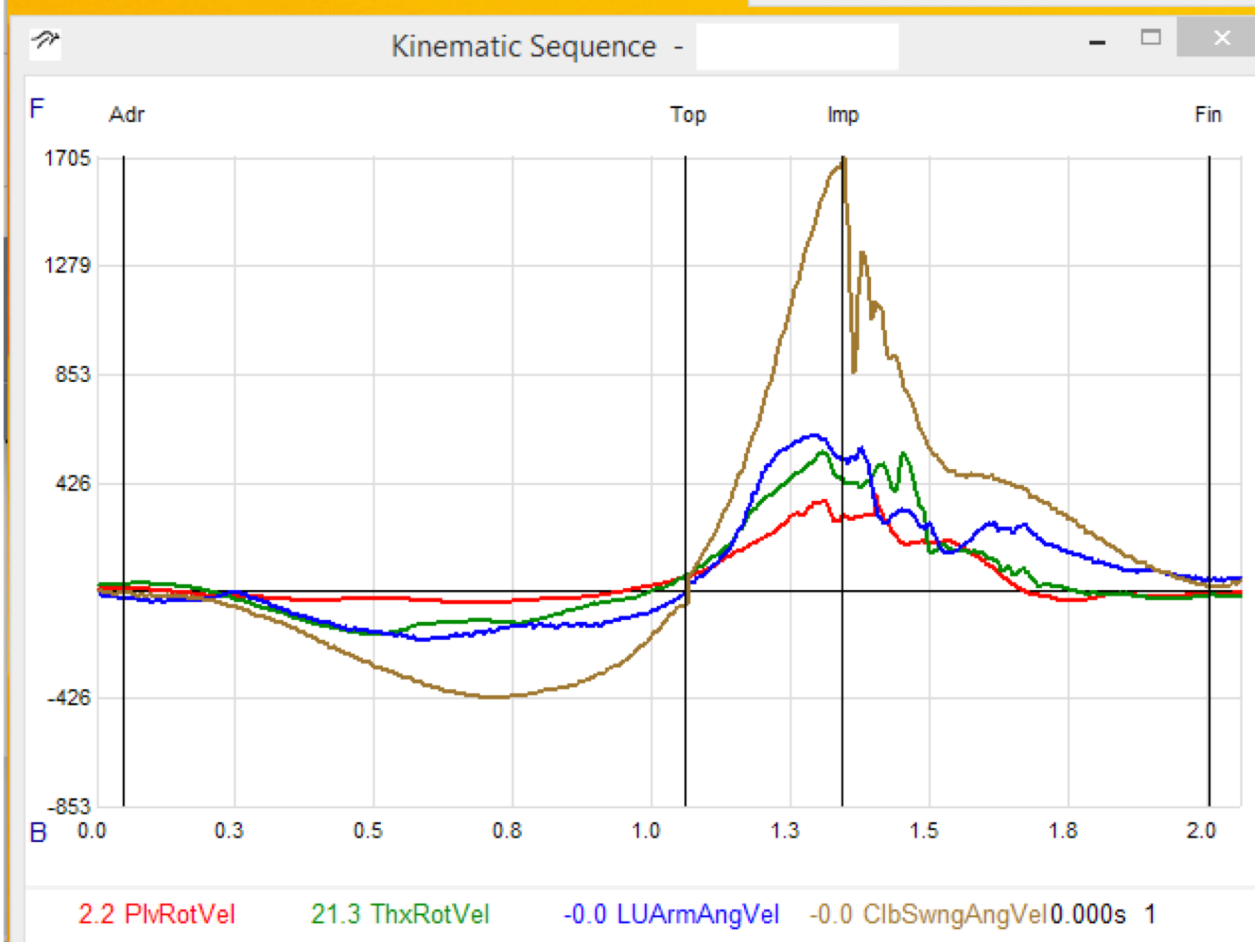
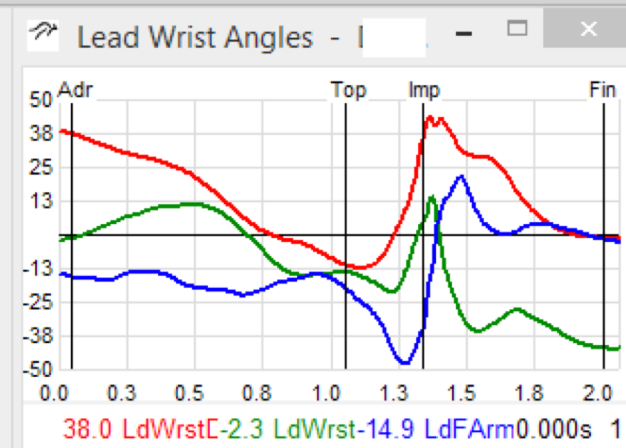
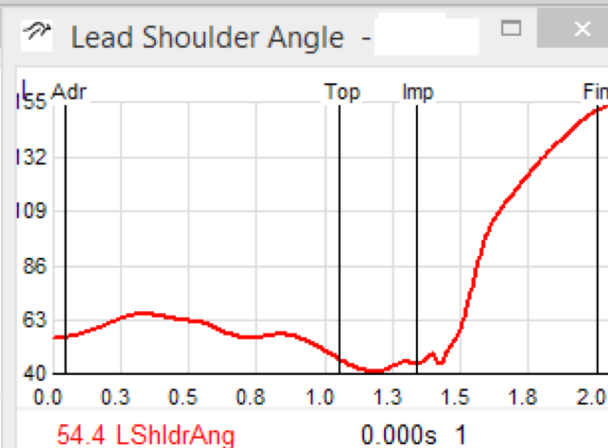
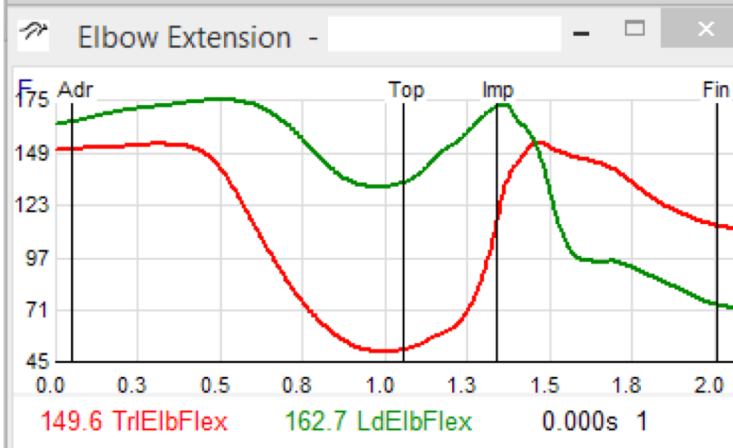


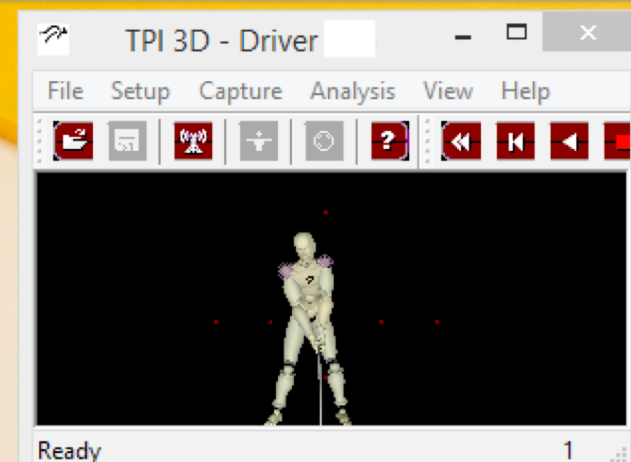
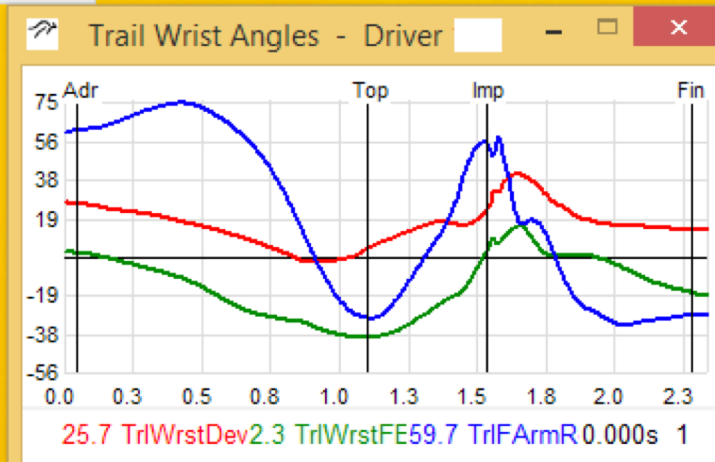
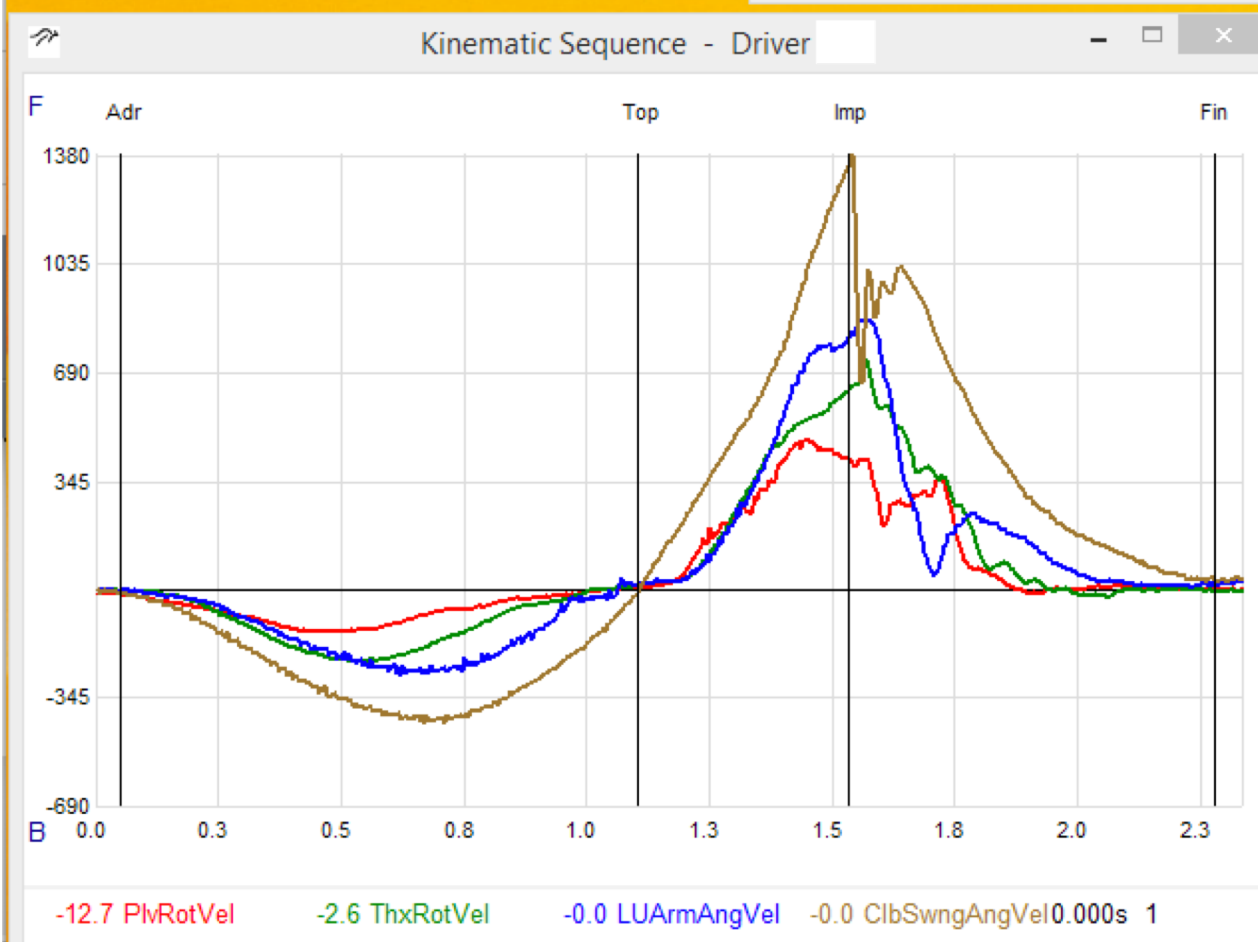
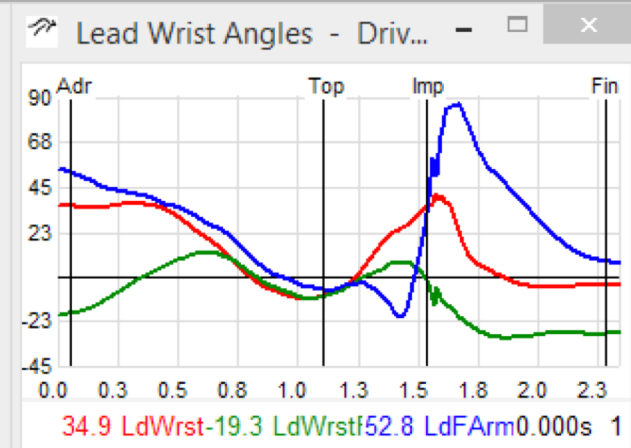
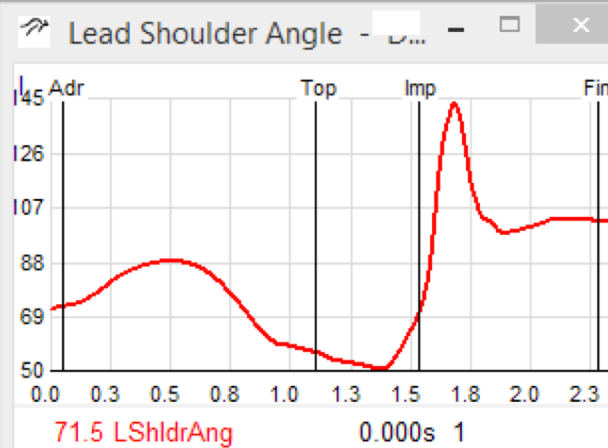
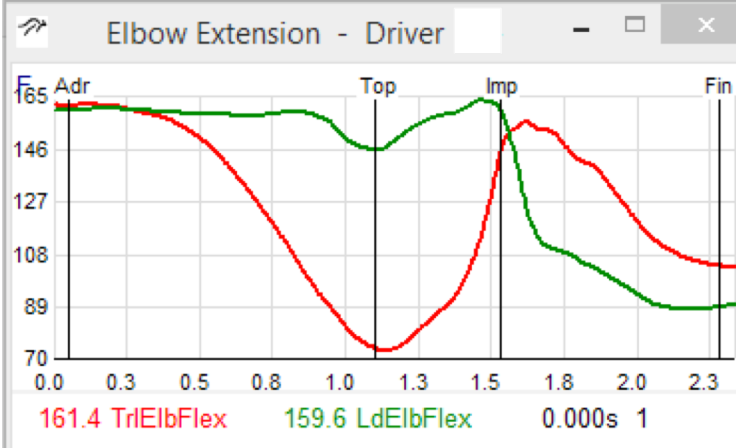






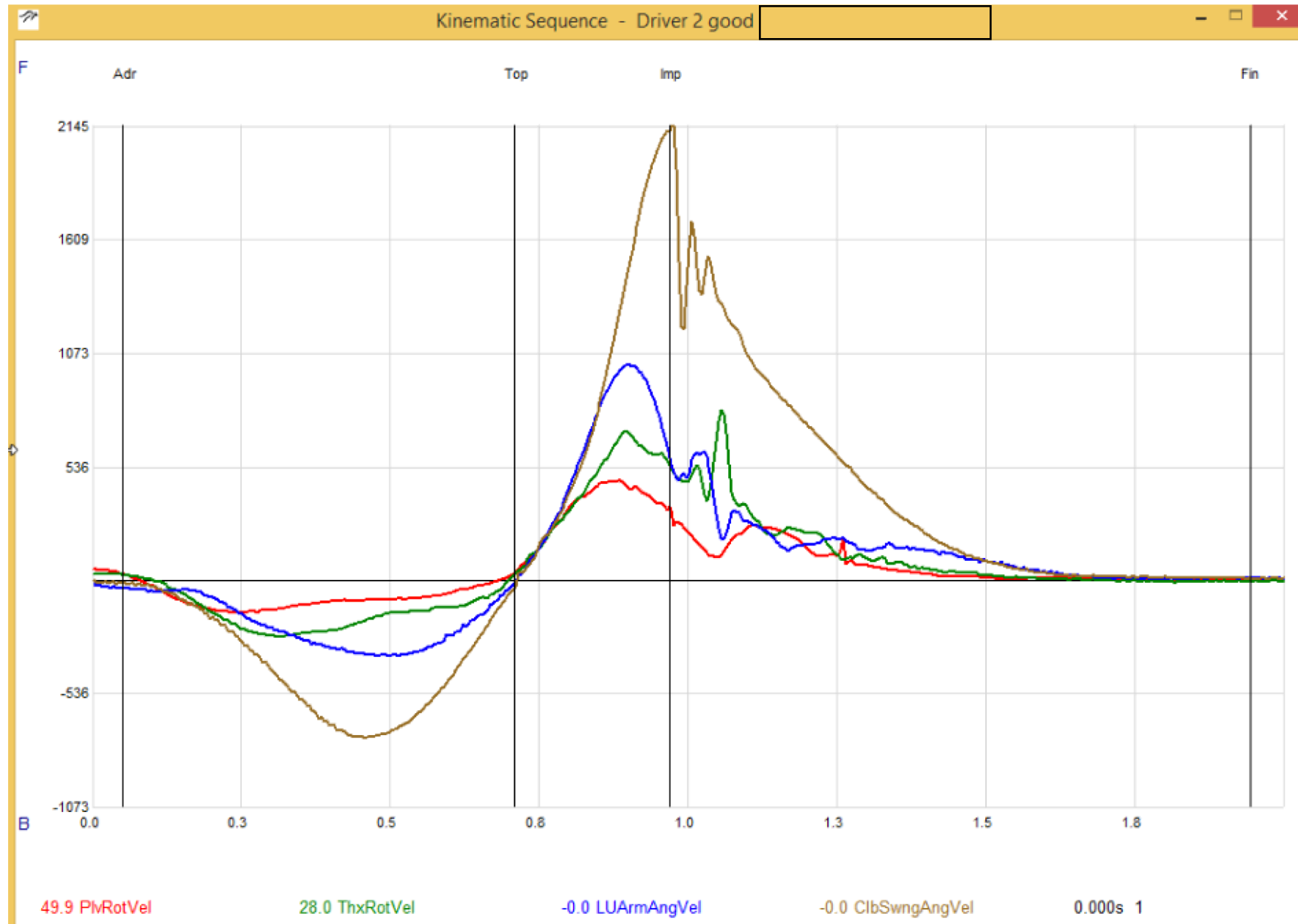
# Amateur Cast Patterns



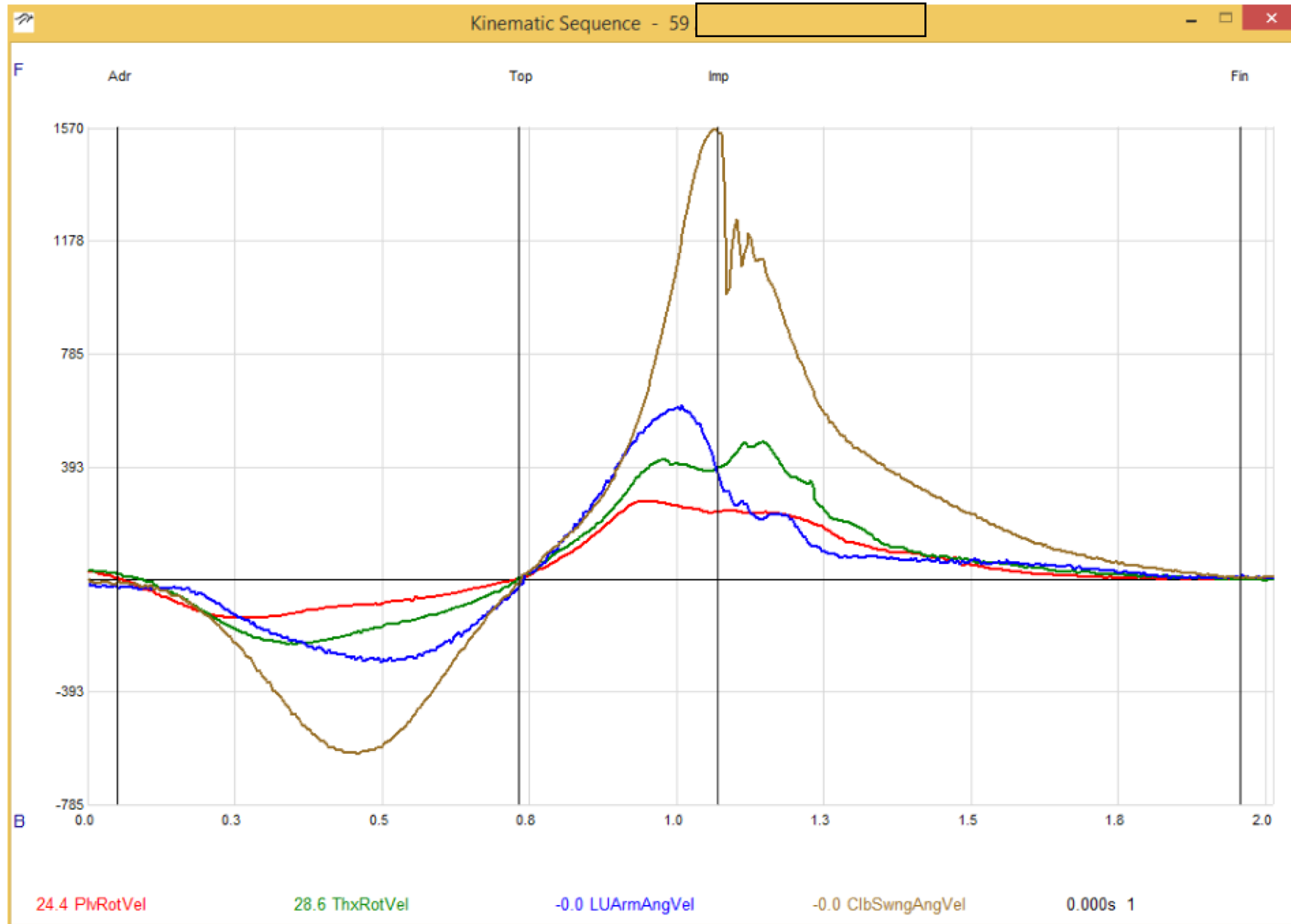


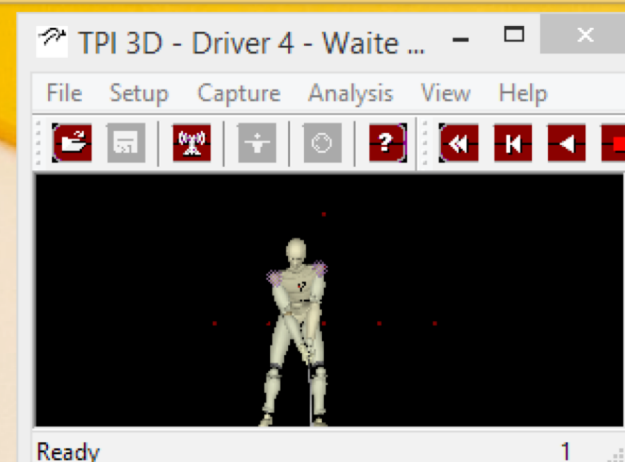
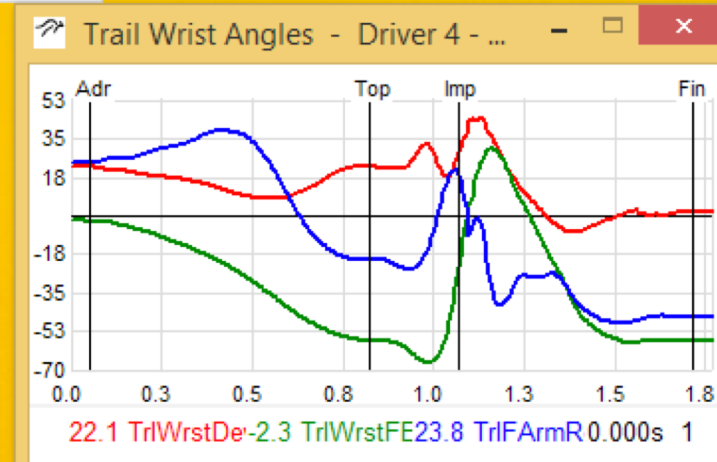
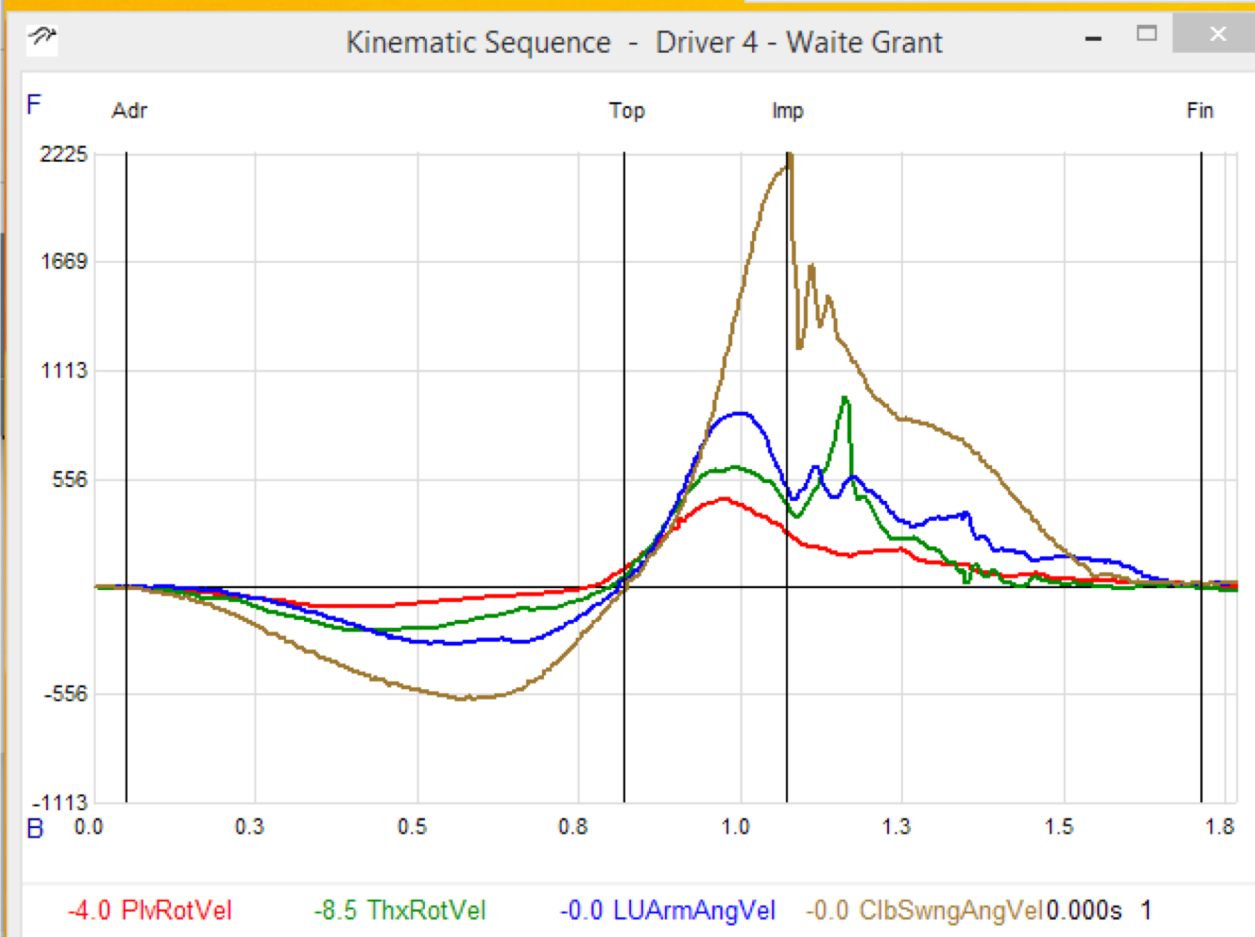
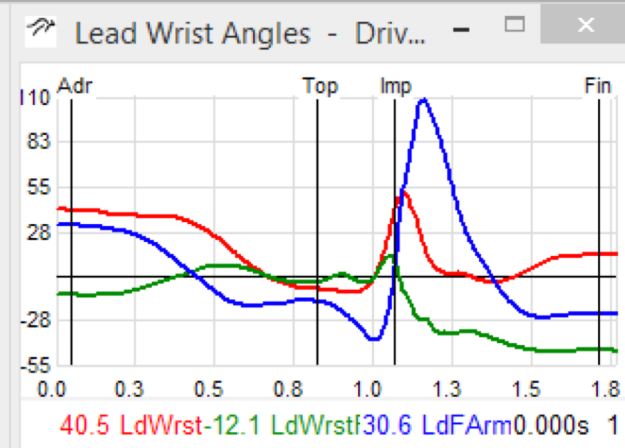
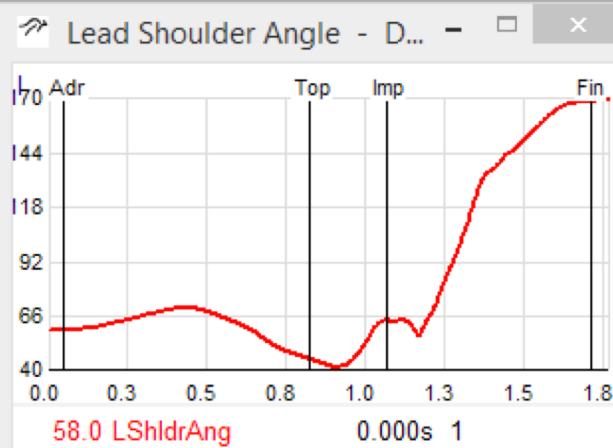
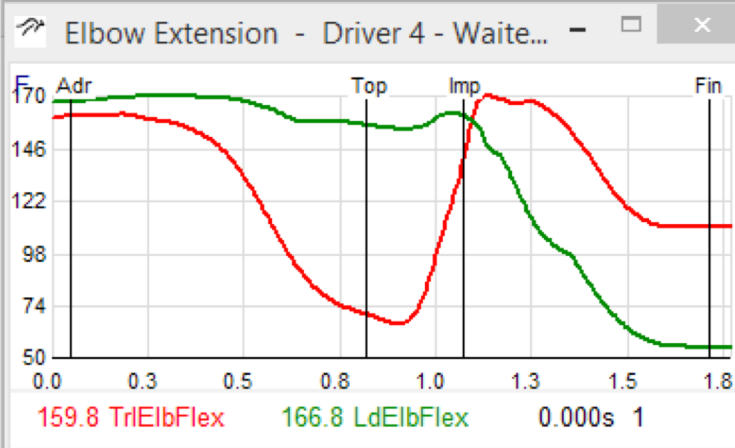
Pros Diver vs short iron

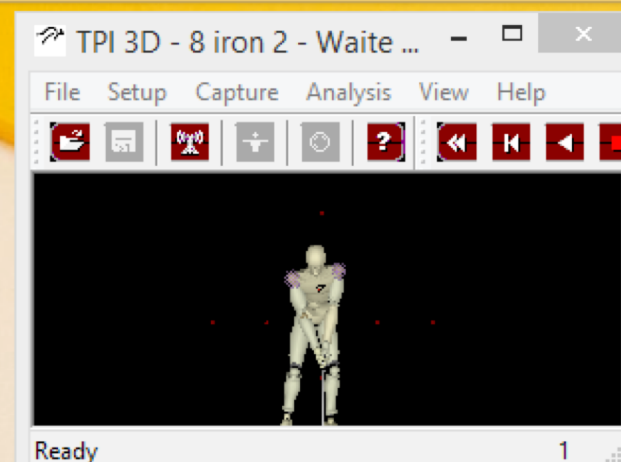
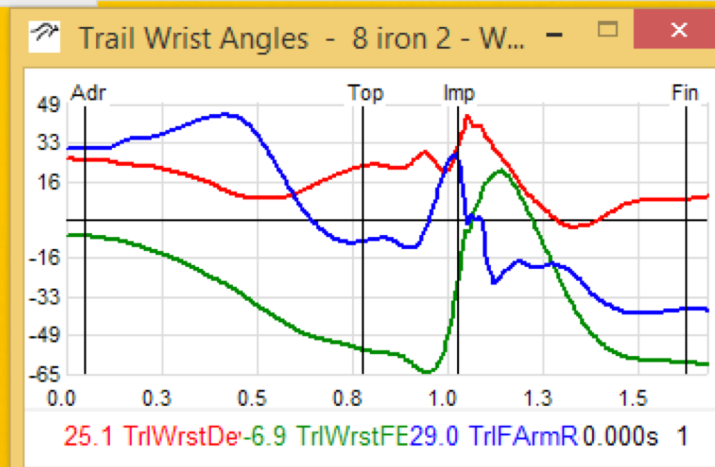
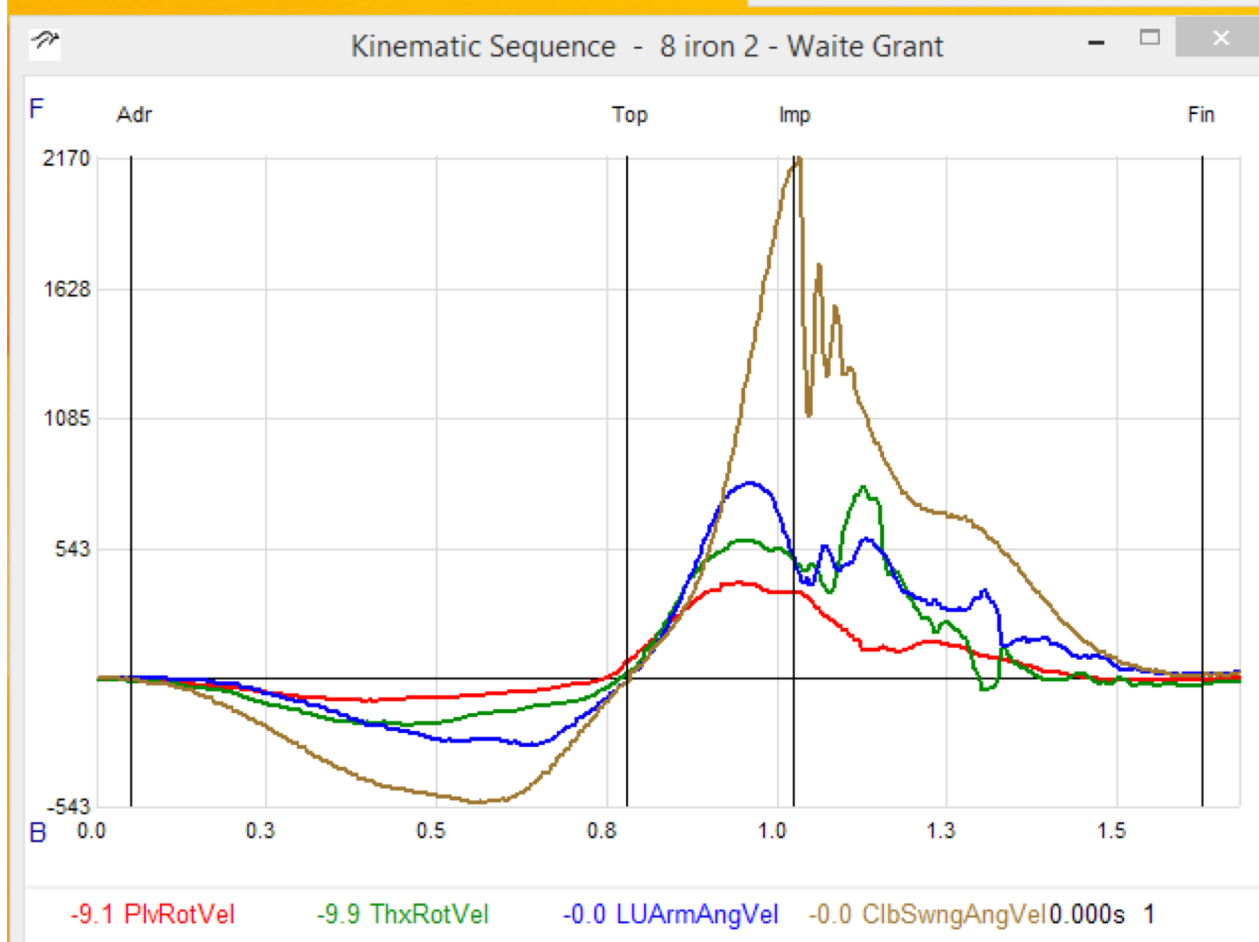
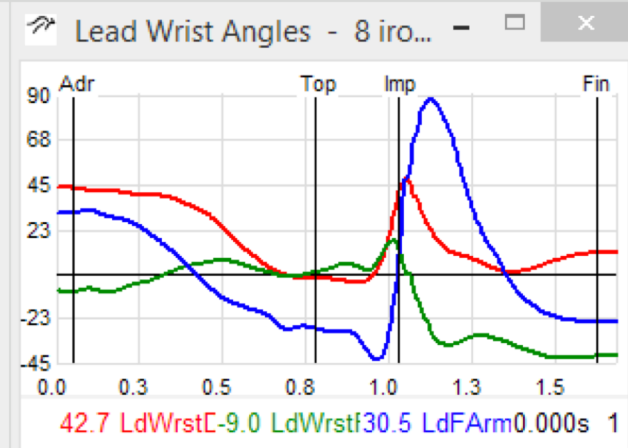
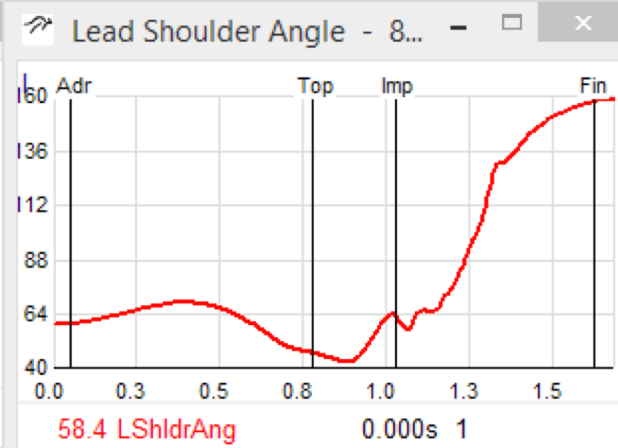
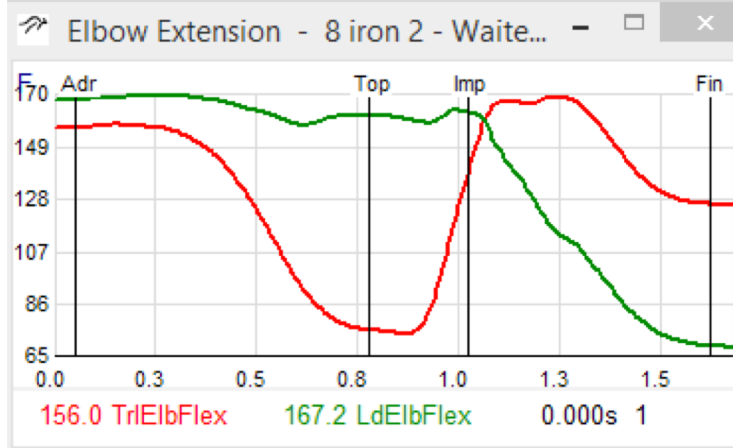
# Driver vs Iron Kinematic Sequence



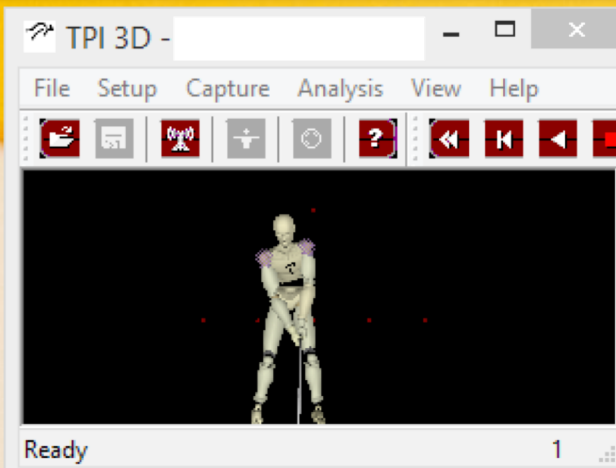
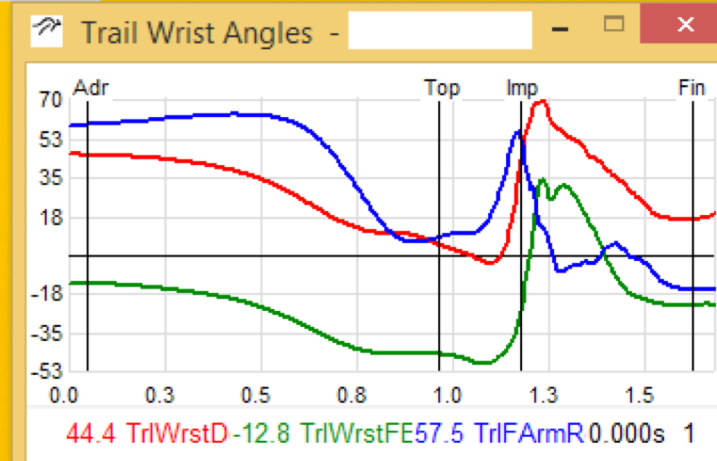
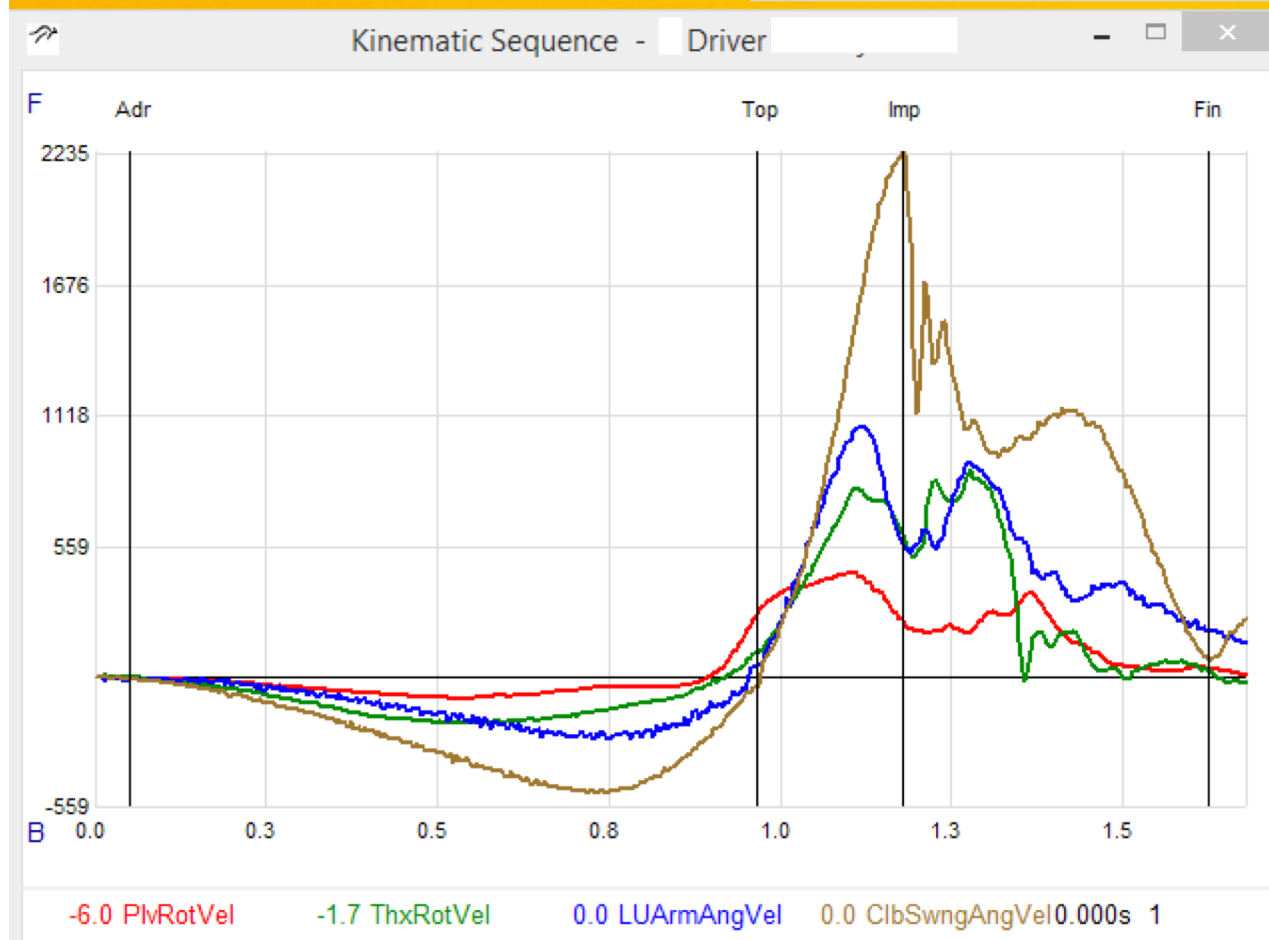
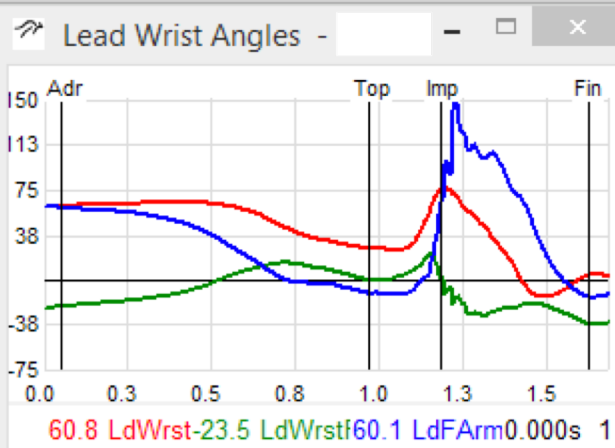
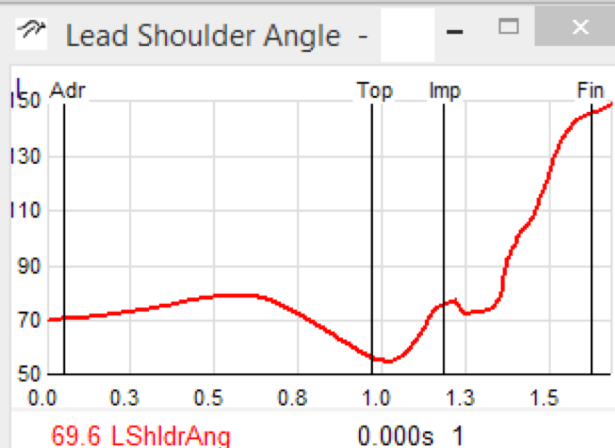
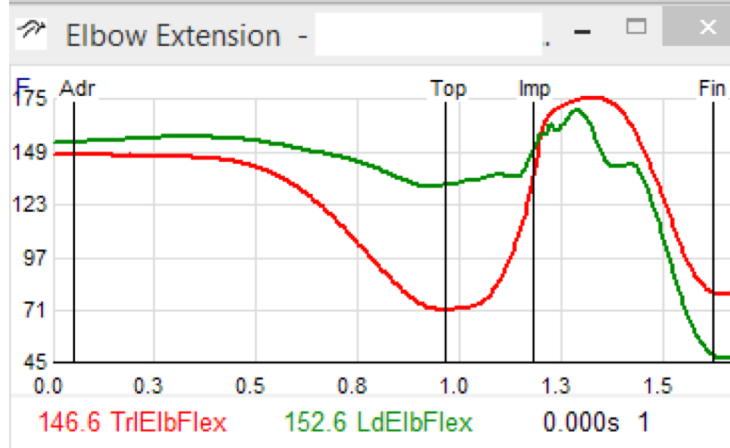
# Driver vs Iron Kinematic Sequence

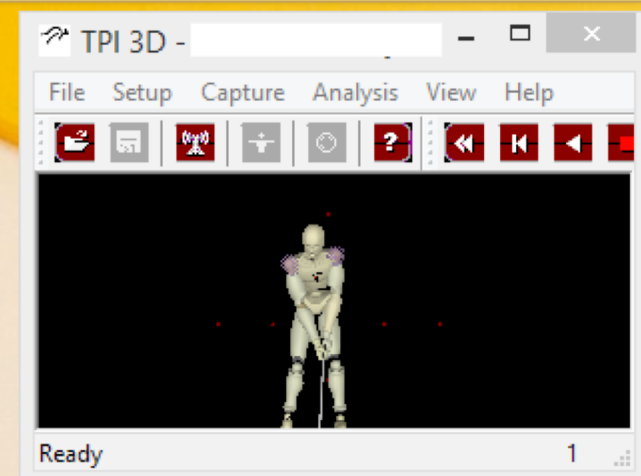
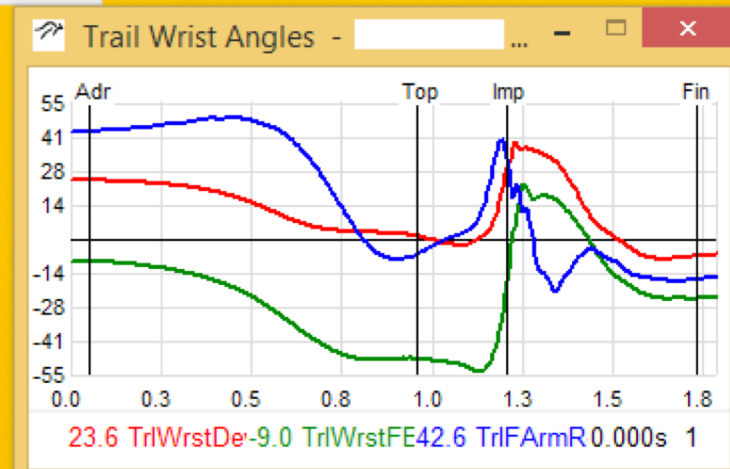
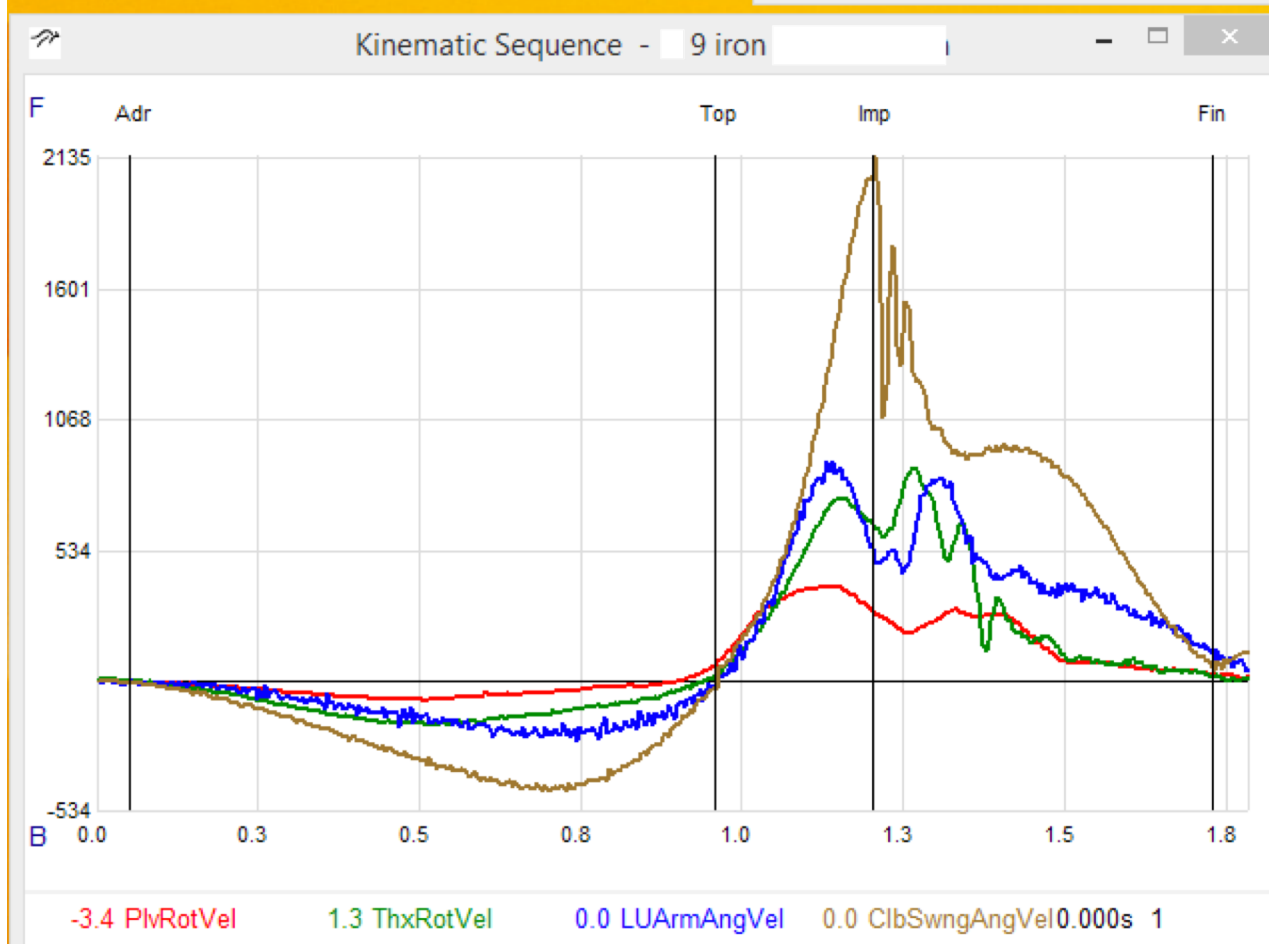
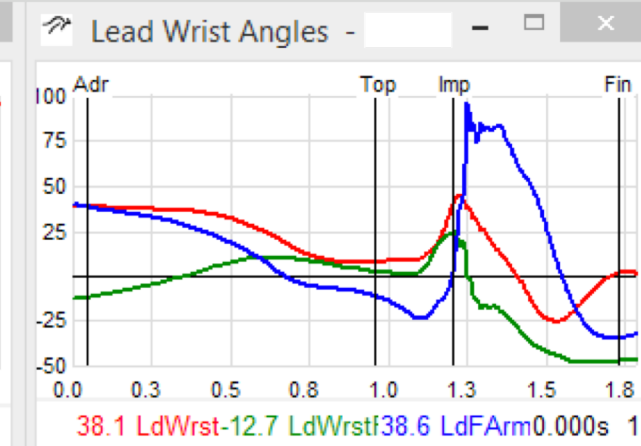
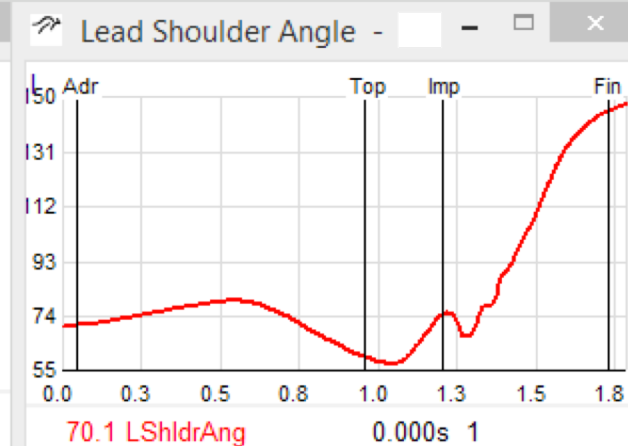
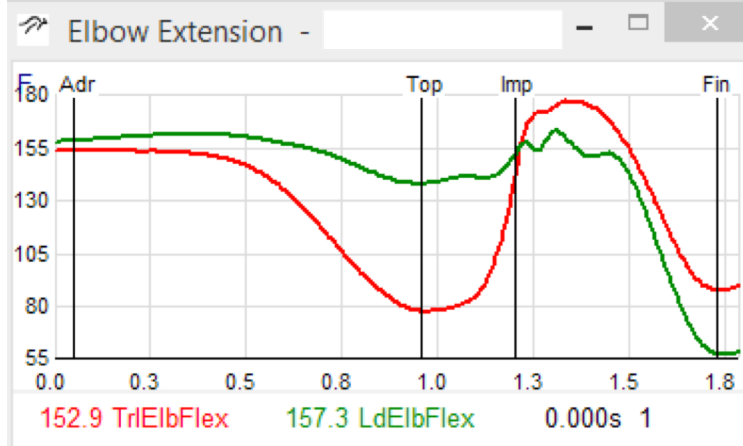






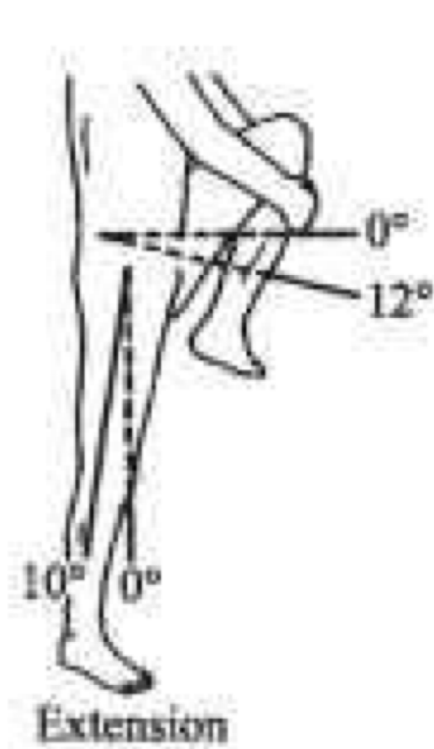




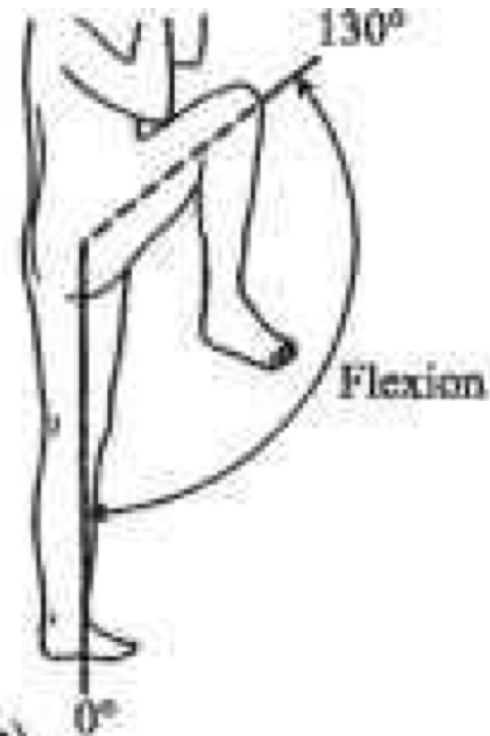


# The Hip

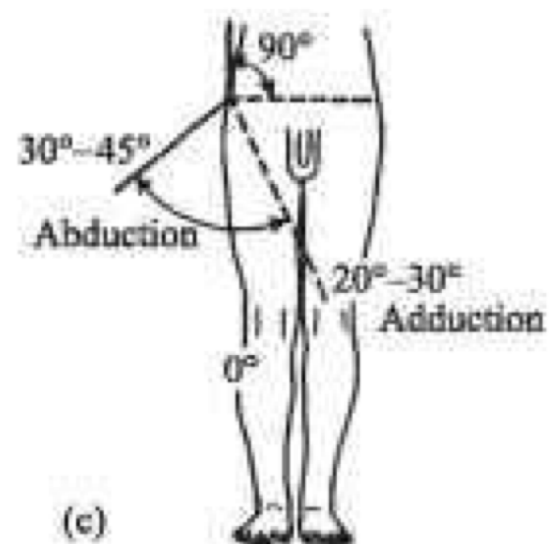
(a)



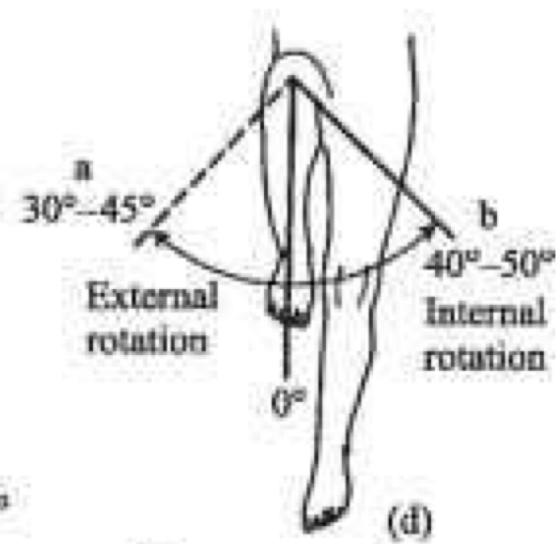
(b)



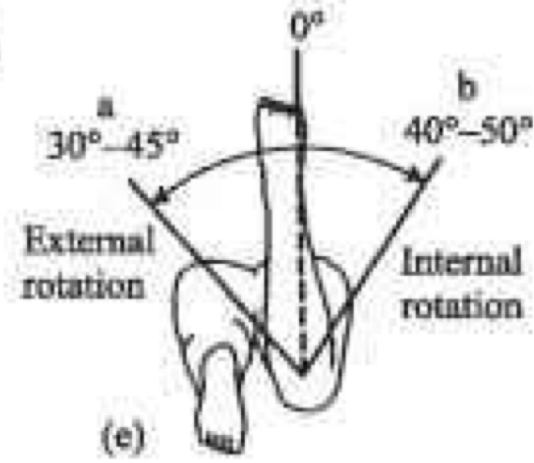
(c)



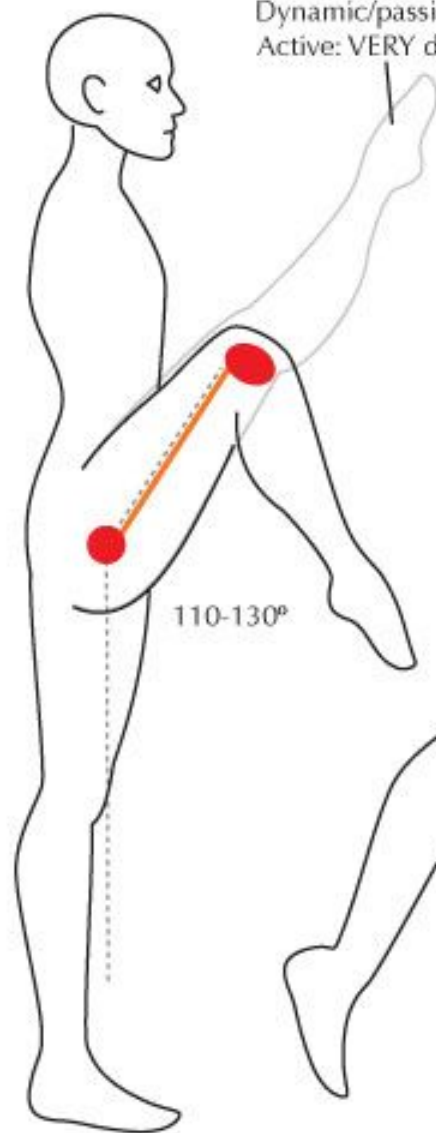
(d)



(e)

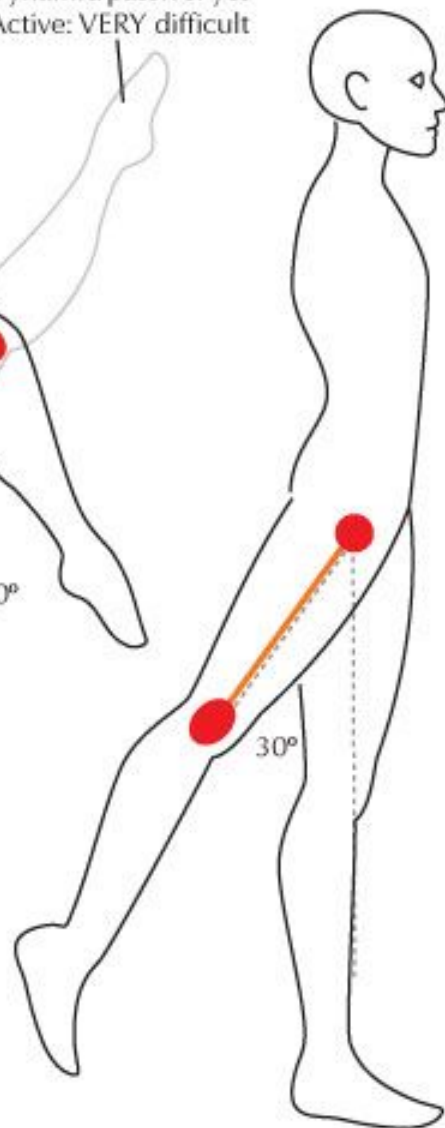


### Flexion

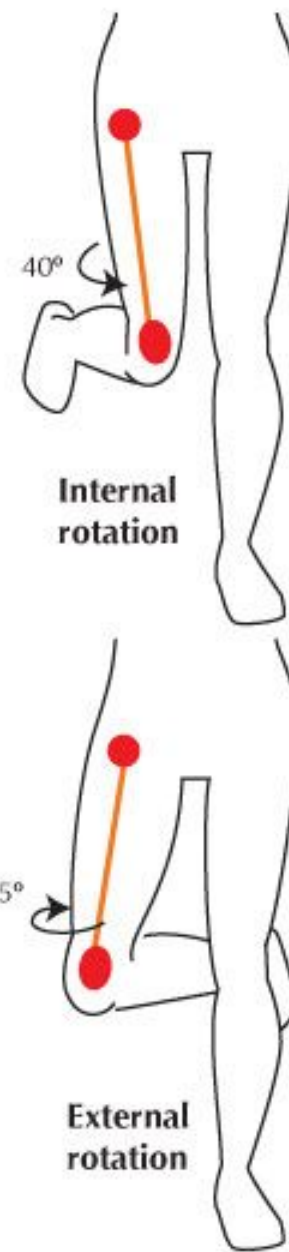
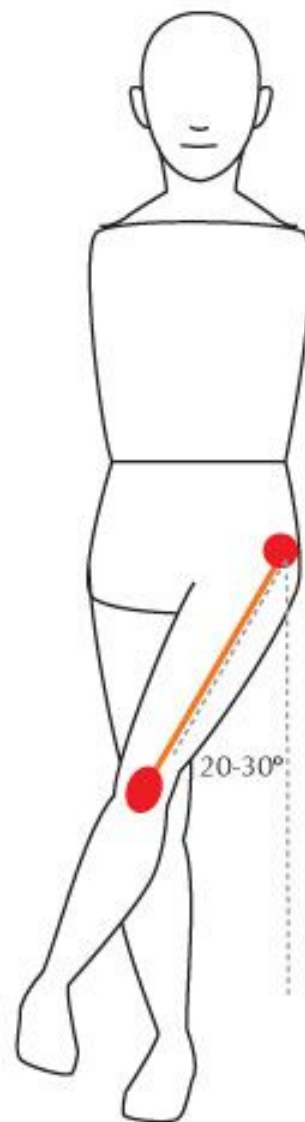


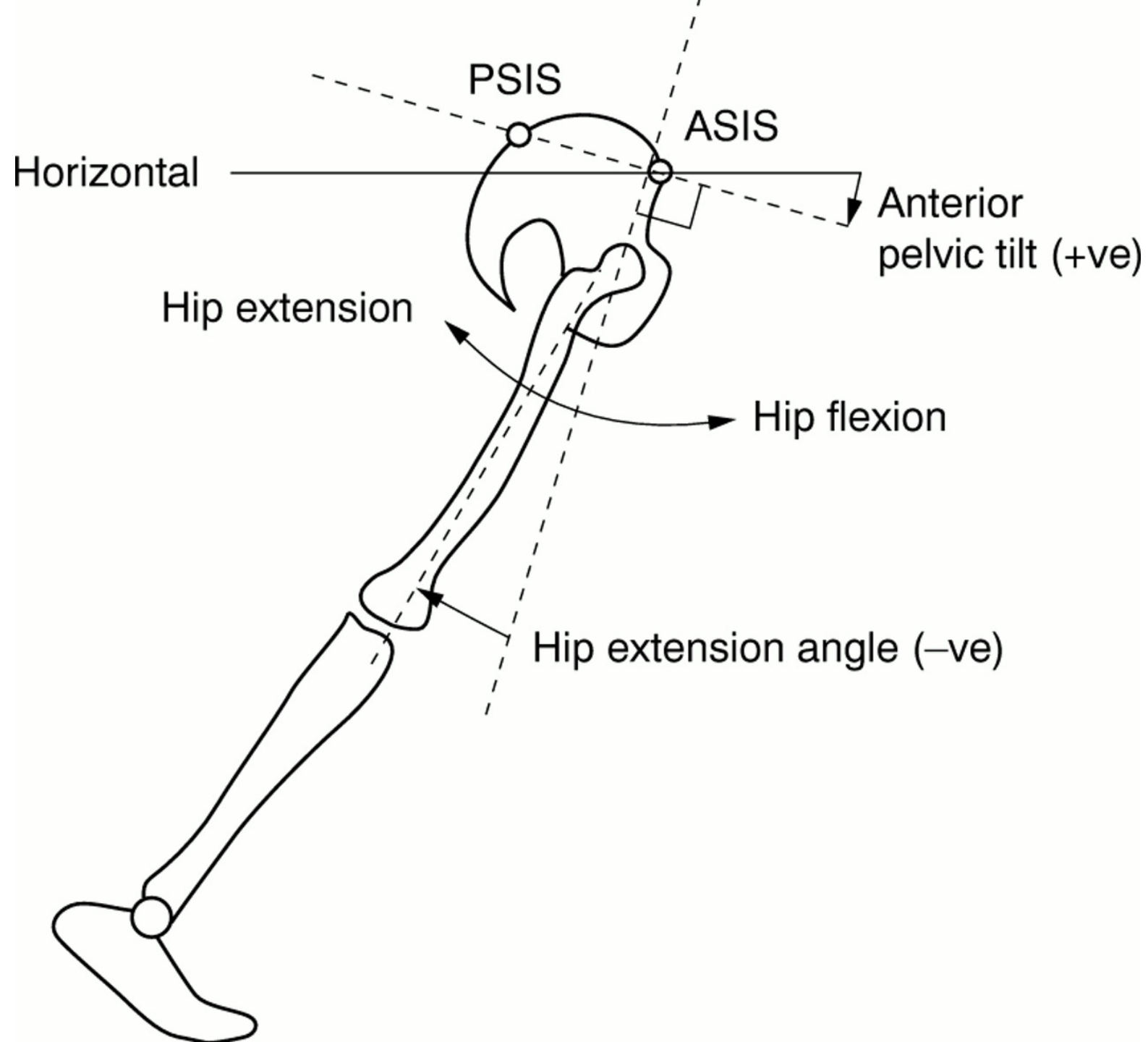
Dynamic/passive: yes  
Active: VERY difficult

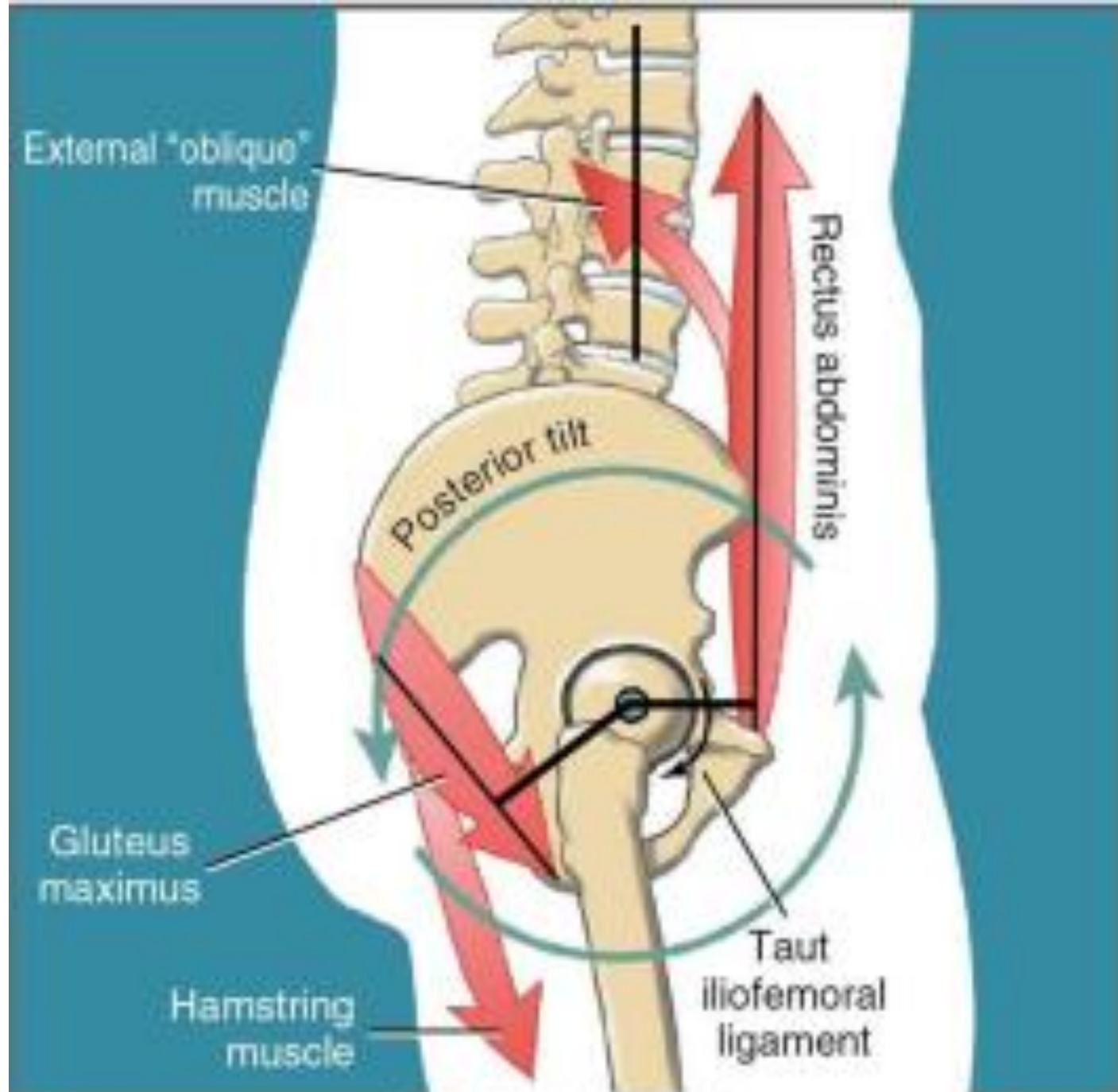
### Extension



### Abduction





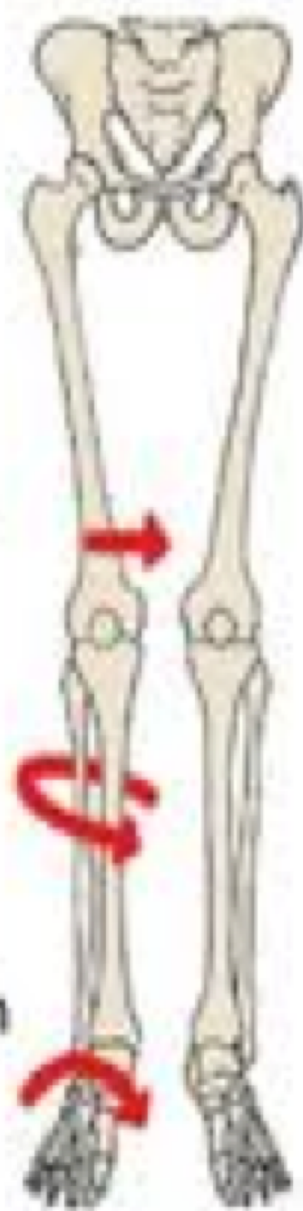




Knee moves  
inward

Leg  
internally  
rotates

Overpronation  
of the foot



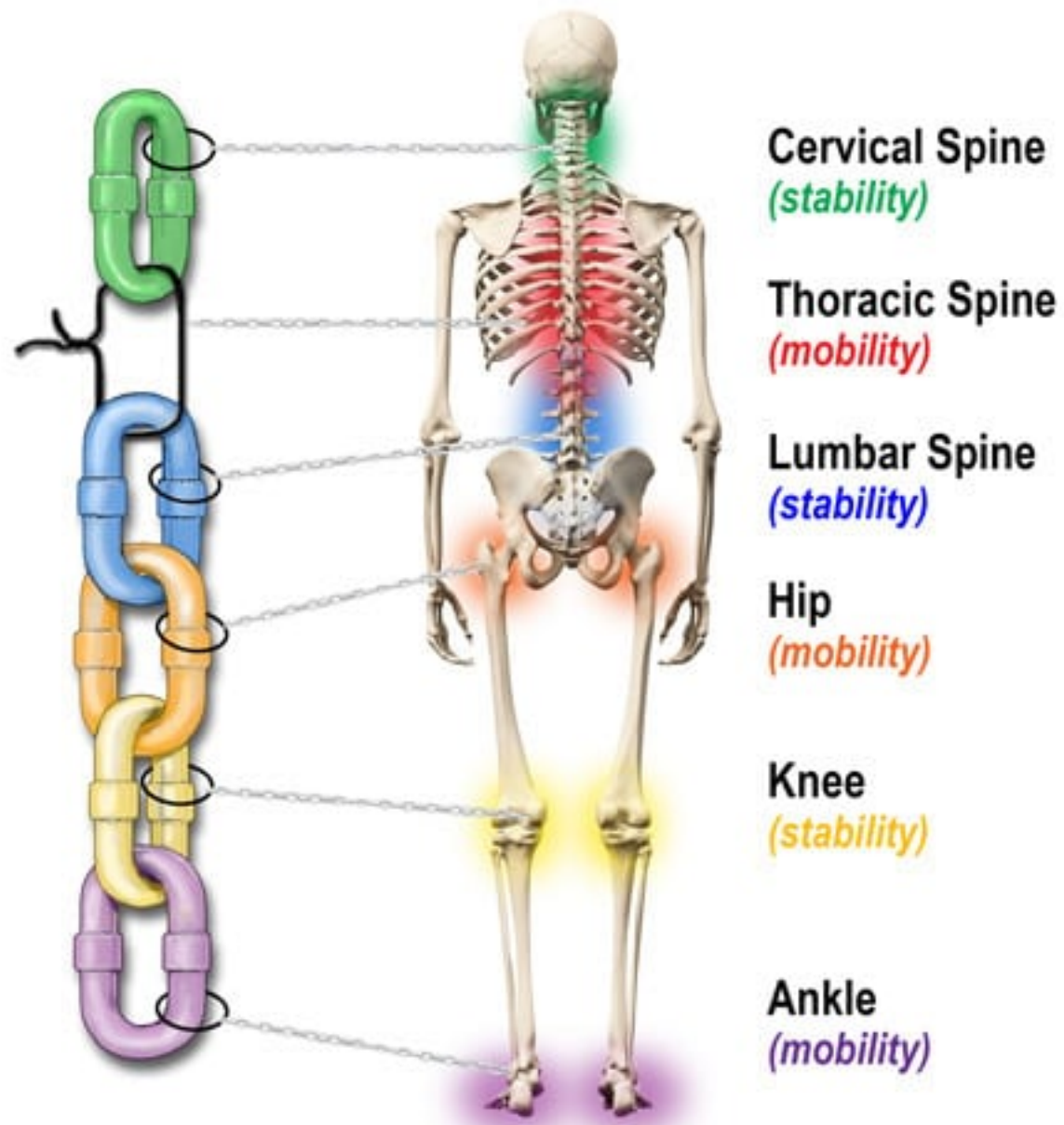
Pelvis tilts  
forward

Hip  
Internally  
Rotates

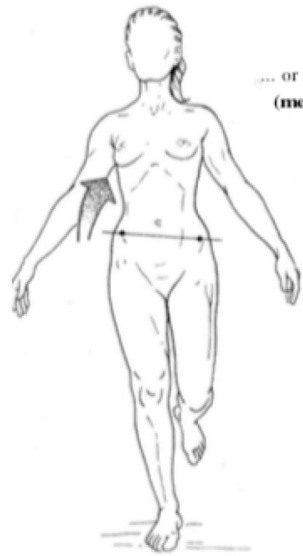
Leg  
internally  
rotates



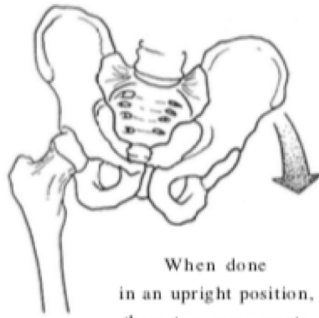




**Image 1.** Immobile t-spine = Weak Link ©erikdalton.com



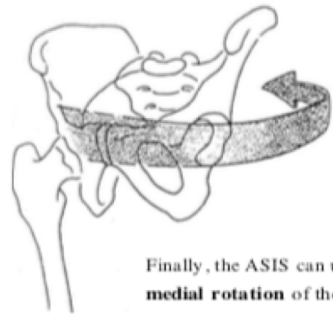
... or superomedially  
(**medial flexion**).



When done  
in an upright position,  
these two movements  
are associated  
with sidebending  
of the lumbar spine.



Note that in these  
two illustrations,  
you can observe the  
movement of the pelvis  
on the supported hip  
and not on the  
unsupported hip.



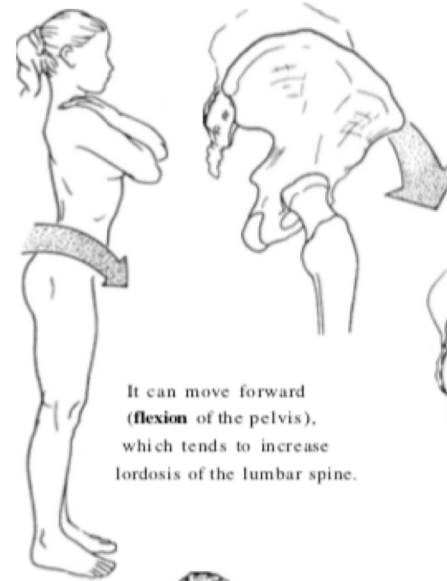
Finally, the ASIS can undergo limited  
**medial rotation** of the pelvis...



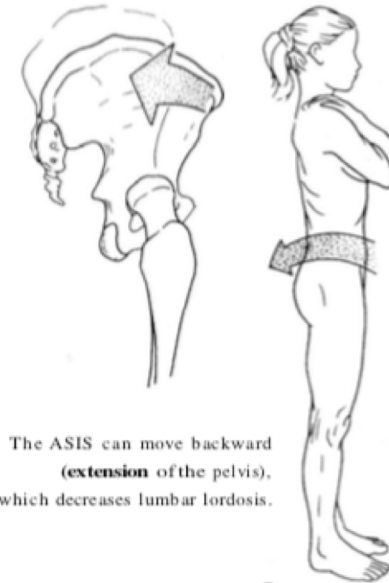
or **lateral rotation**  
of the pelvis.



Let us now consider the possible movements of the pelvis at the hip joint, assuming that the femur is fixed. We will focus on the anterior superior iliac spine (ASIS) as a reference point.



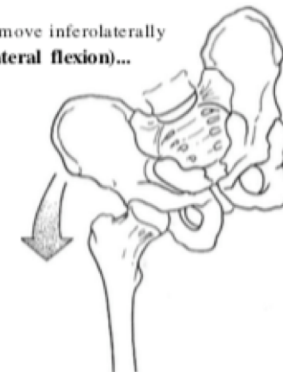
It can move forward  
(**flexion** of the pelvis),  
which tends to increase  
lordosis of the lumbar spine.



The ASIS can move backward  
(**extension** of the pelvis),  
which decreases lumbar lordosis.

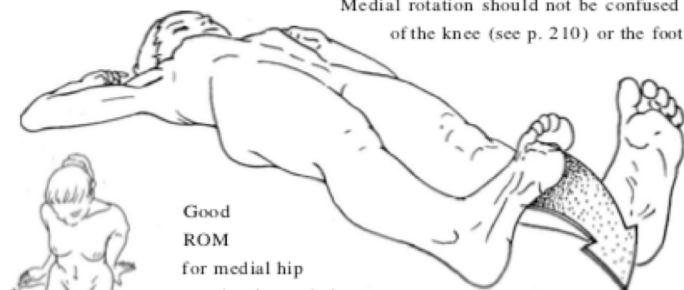


It can move inferolaterally  
(**lateral flexion**)...

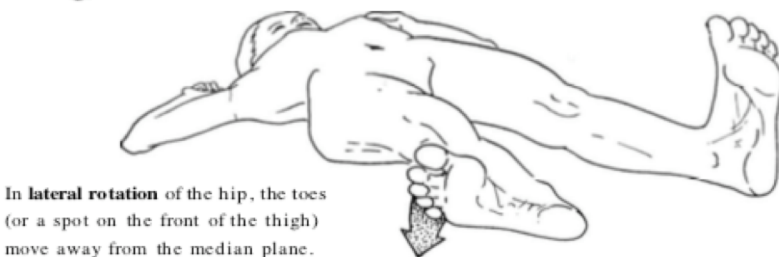


In **medial rotation** of the hip, the femur rotates on its own long axis, and the toes of the foot (or an imaginary spot on the front of the thigh) move closer to the median plane.

Medial rotation should not be confused with rotation of the knee (see p. 210) or the foot (p. 261).



Good ROM for medial hip rotation is needed to assume the position shown at left without forcing lateral rotation at the knee joint.

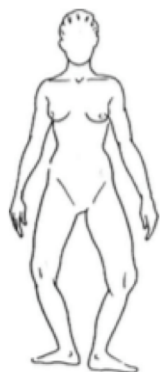


In **lateral rotation** of the hip, the toes (or a spot on the front of the thigh) move away from the median plane.

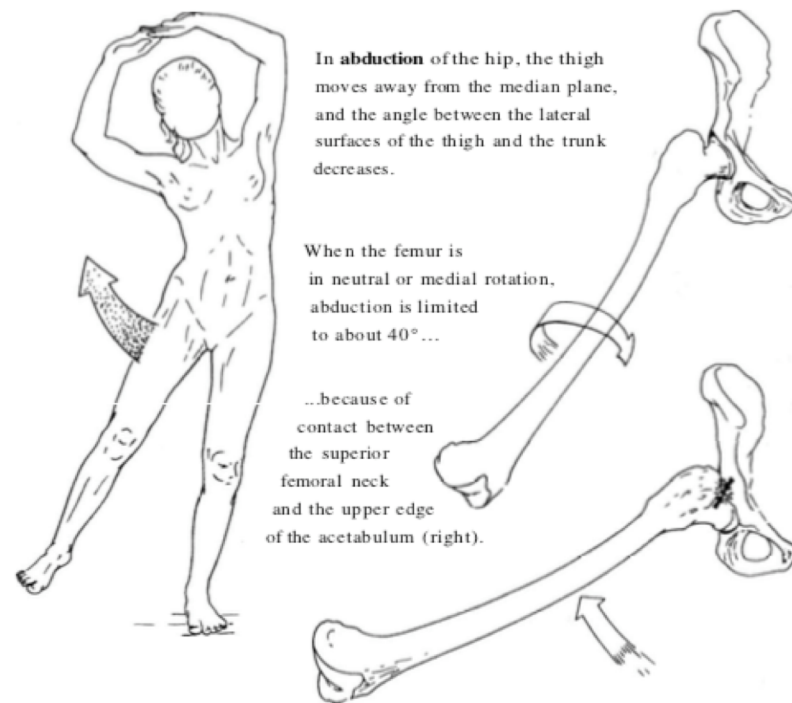
Good ROM for lateral rotation is needed for the "en dehors" position of ballet...

...or for assuming the "lotus position" without stressing the knee and ankle joints.

When the hip is flexed, ROM for lateral rotation is greater because the ilio-femoral ligament is slack.



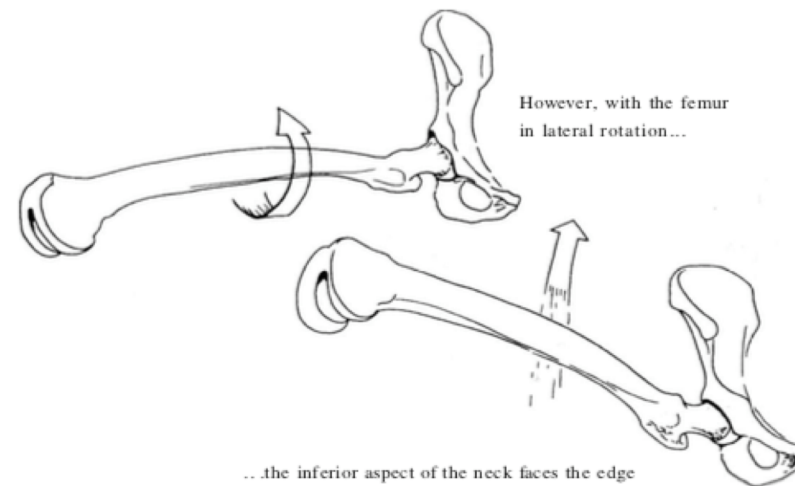
Most often, the hip movements described here combine several directions in one movement, e.g., abduction + lateral rotation, or flexion + abduction



In **abduction** of the hip, the thigh moves away from the median plane, and the angle between the lateral surfaces of the thigh and the trunk decreases.

When the femur is in neutral or medial rotation, abduction is limited to about 40° ...

...because of contact between the superior femoral neck and the upper edge of the acetabulum (right).



However, with the femur in lateral rotation...

...the inferior aspect of the neck faces the edge of the socket, and ROM for abduction is greater.

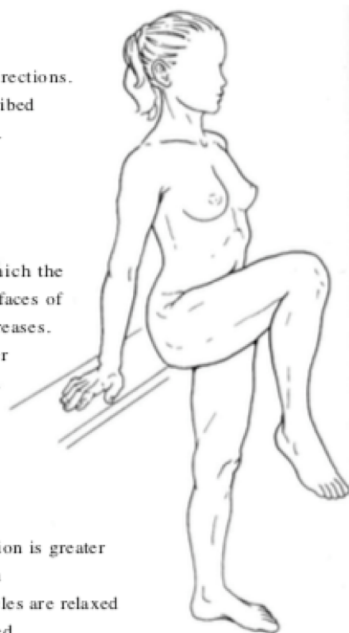
## Movements of hip

The shape of its articulations (see p. 201-202) allows the hip joint to be moved in many different directions. For ease of study, the movements of the hip are described with respect to the planes they intersect (see p. 8-10).

We assume first that the pelvis is fixed and the femur is moving.

**Flexion** is the movement in which the angle between the anterior surfaces of the thigh and the trunk decreases.

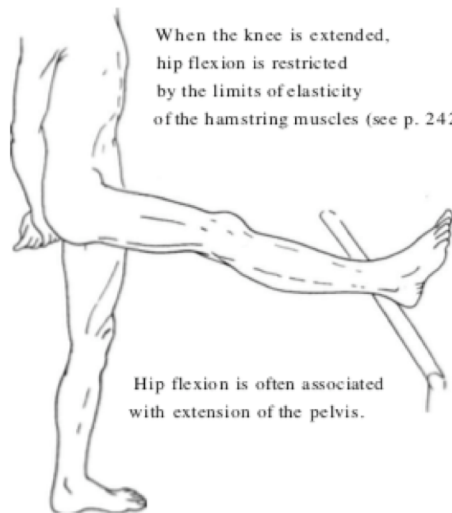
ROM for hip flexion is greater when the knee is also flexed.



ROM for passive flexion is greater than for active flexion since the flexing muscles are relaxed and can be compressed.



When the knee is extended, hip flexion is restricted by the limits of elasticity of the hamstring muscles (see p. 242).

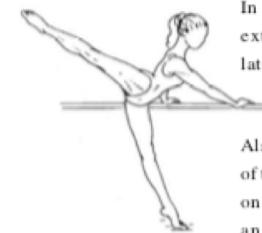


Hip flexion is often associated with extension of the pelvis.

In **extension** of the hip, the angle between the posterior surfaces of the thigh and the trunk decreases.



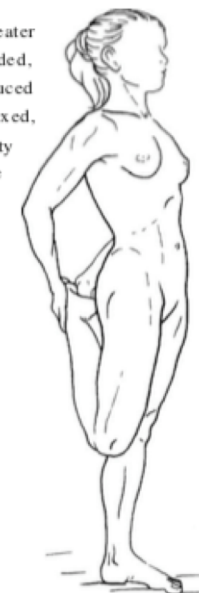
ROM for extension is limited compared to that for flexion, and this movement is often confused with or increased by lumbar lordosis (see p. 35).



In the "grande arabesque," extension is combined with lateral rotation of the hip.

Also, flexion and rotation of the pelvis (see p. 198) on the opposite side can give an impression of extension.

ROM for hip extension is greater when the knee is extended, but is reduced when the knee is flexed, because of the limits of elasticity of the rectus femoris muscle (see p. 240).



In **adduction** of the hip, the thigh moves toward or past the median plane. It can be combined with slight flexion (as shown here)...



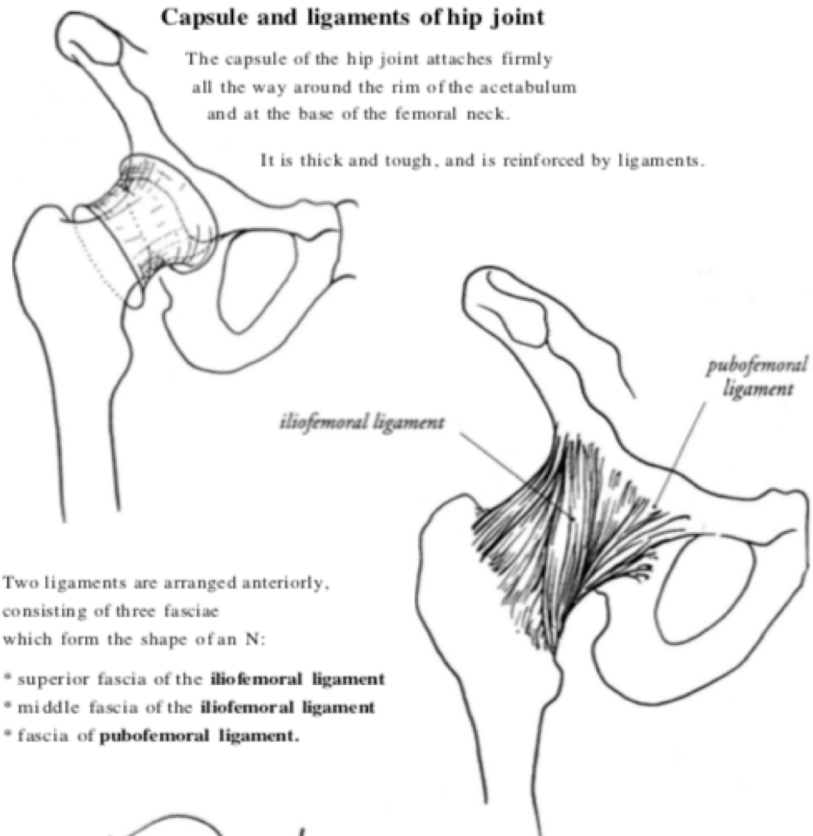
...or extension, with the other leg slightly displaced accordingly, so that the two legs can move past each other.



### Capsule and ligaments of hip joint

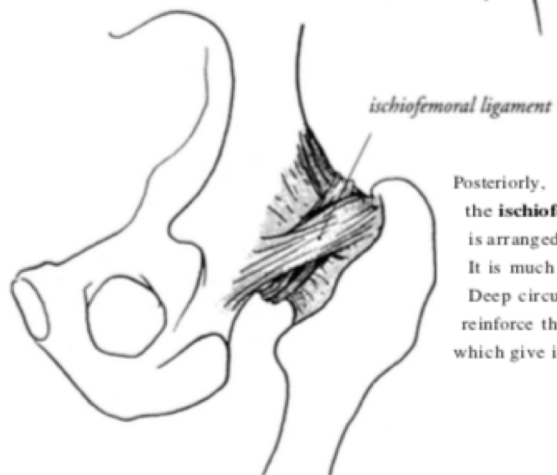
The capsule of the hip joint attaches firmly all the way around the rim of the acetabulum and at the base of the femoral neck.

It is thick and tough, and is reinforced by ligaments.



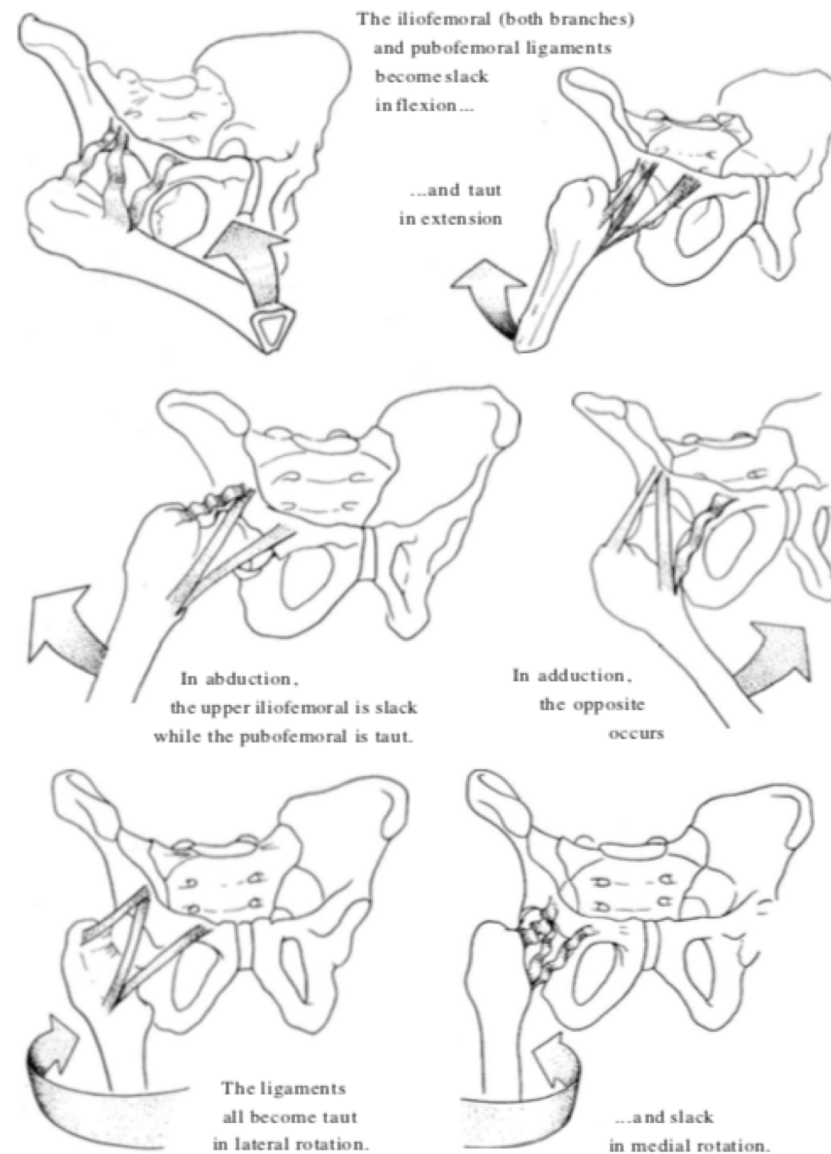
Two ligaments are arranged anteriorly, consisting of three fasciae which form the shape of an N:

- \* superior fascia of the **iliofemoral ligament**
- \* middle fascia of the **iliofemoral ligament**
- \* fascia of **pubofemoral ligament**.



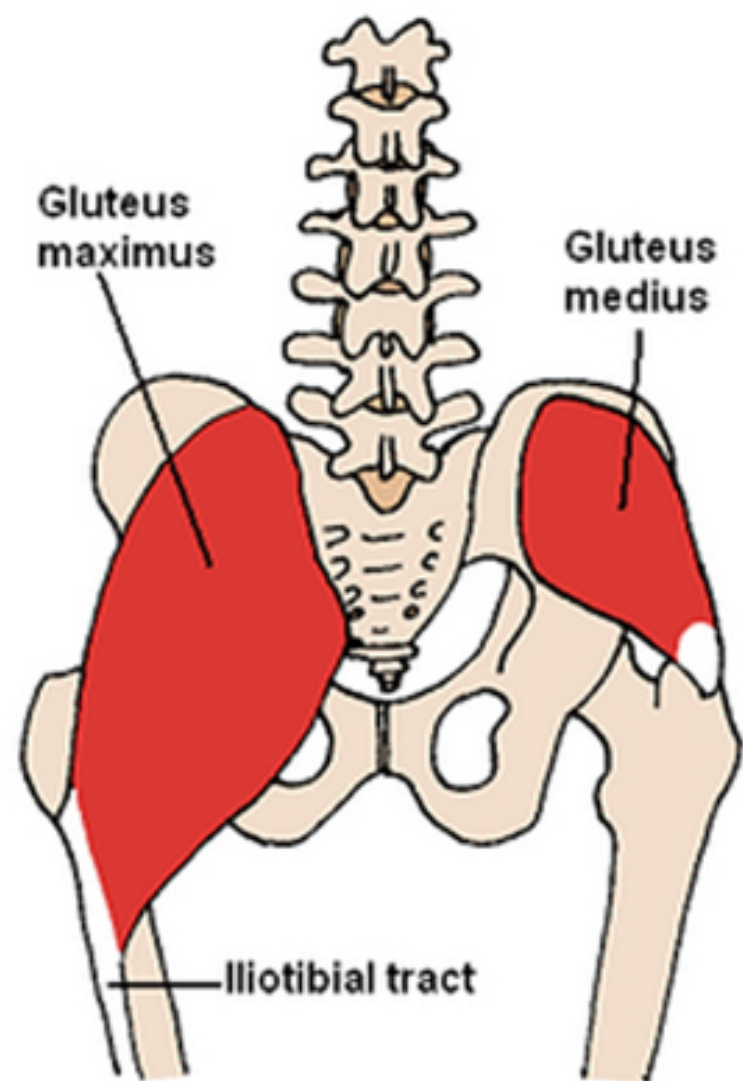
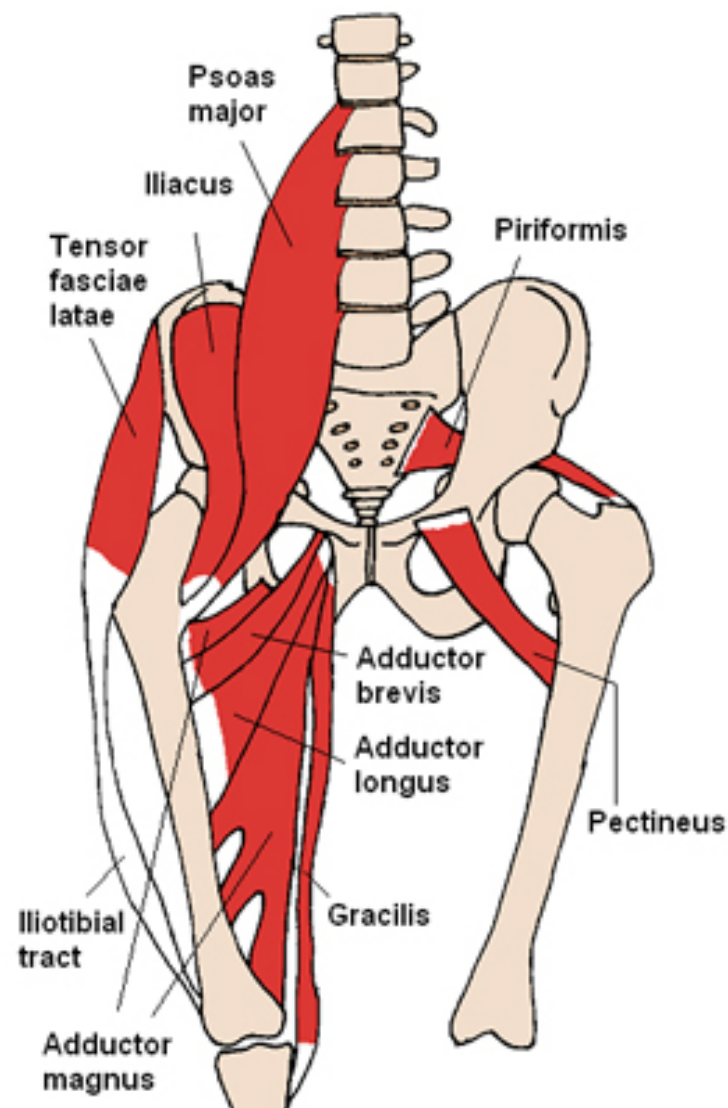
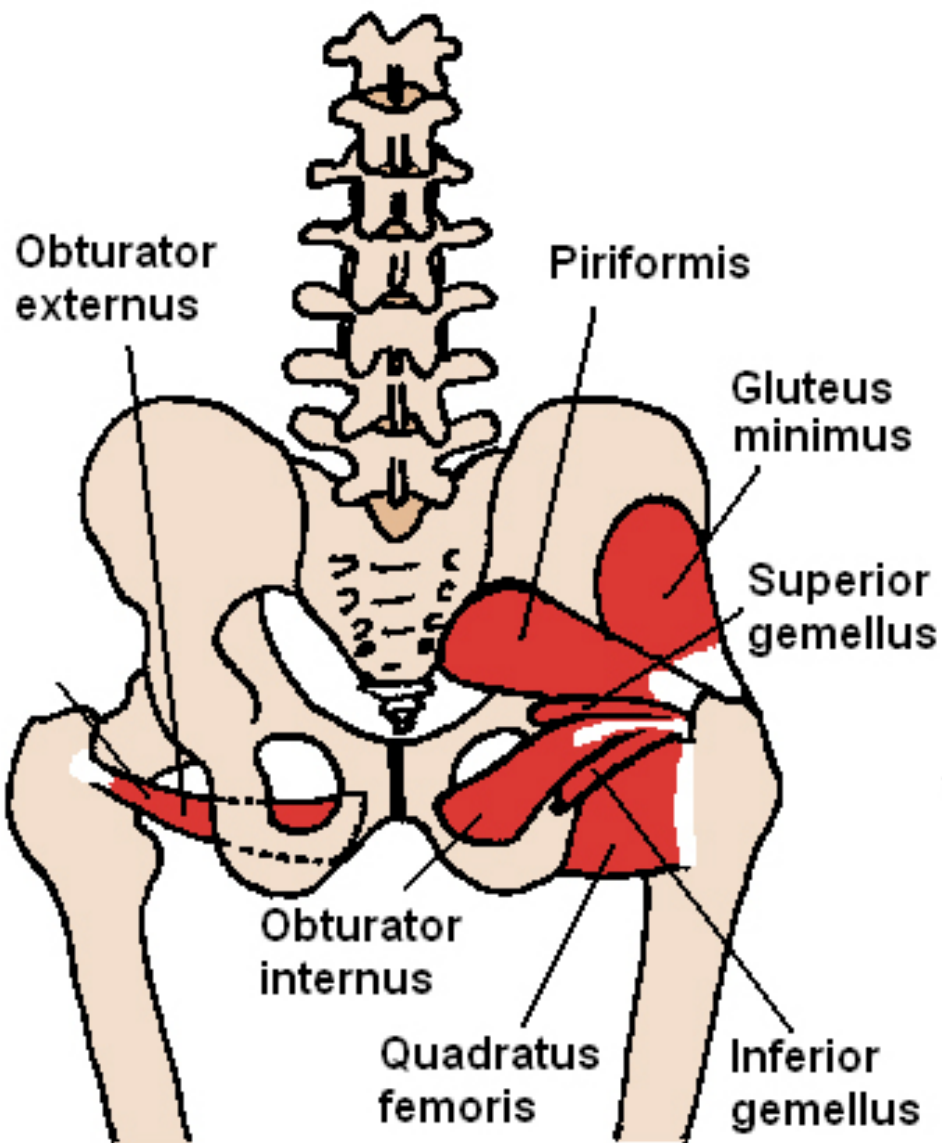
Posteriorly, the **ischiofemoral ligament** is arranged like a spiral. It is much weaker than the others. Deep circular fibers reinforce the middle of the capsule, which give it an hourglass shape.

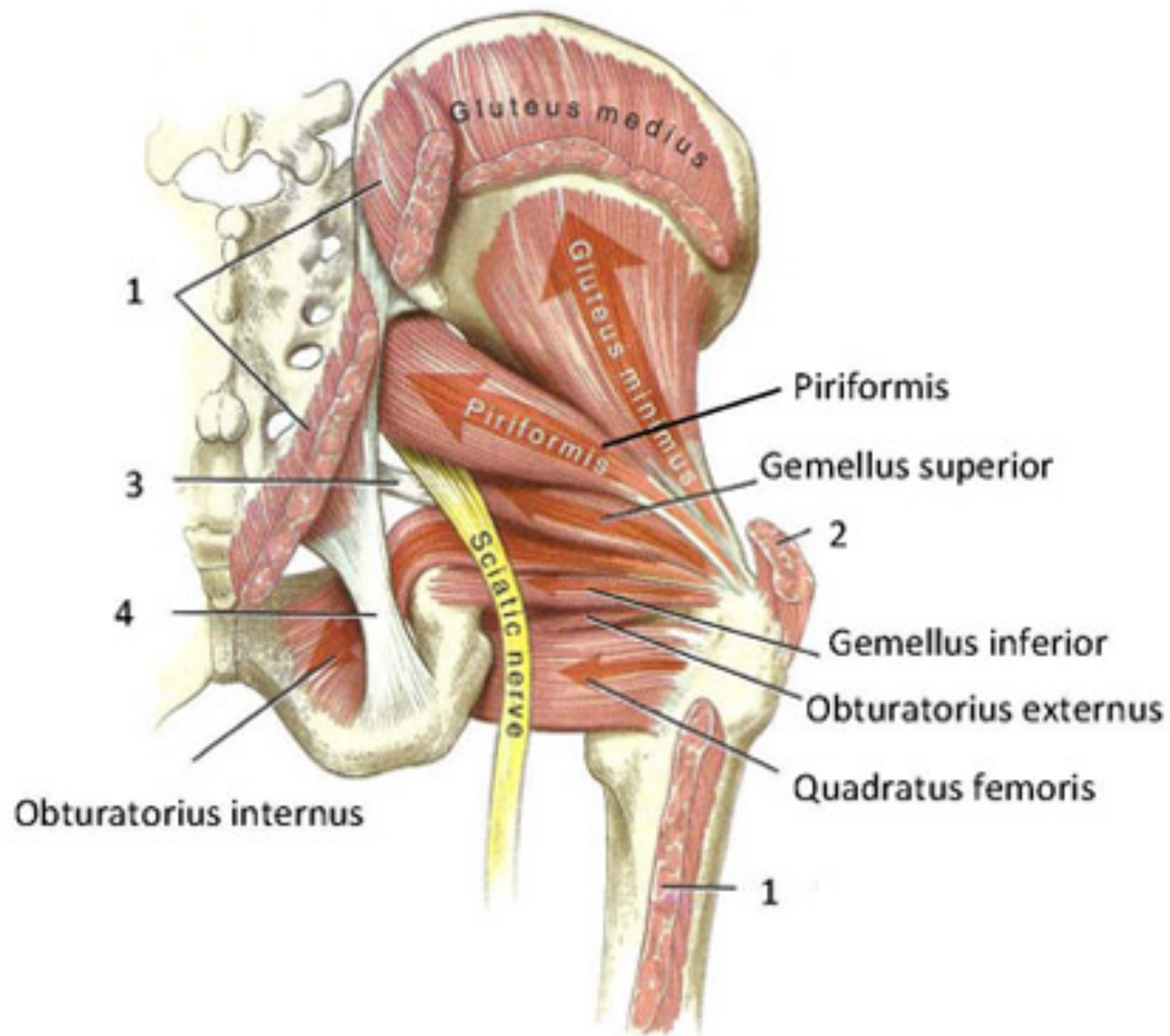
During movements of the hip, the anterior ligaments display varying degrees of tightness.



In summary, flexion and medial rotation loosen the ligaments, while extension and lateral rotation make them taut.

# MUSCLES OF THE HIP COMPLEX







## Posterior Spiral Line

4th hemetring

Sacrospinous  
ligament

Biceps femoris  
(long head)

Peroneus longus

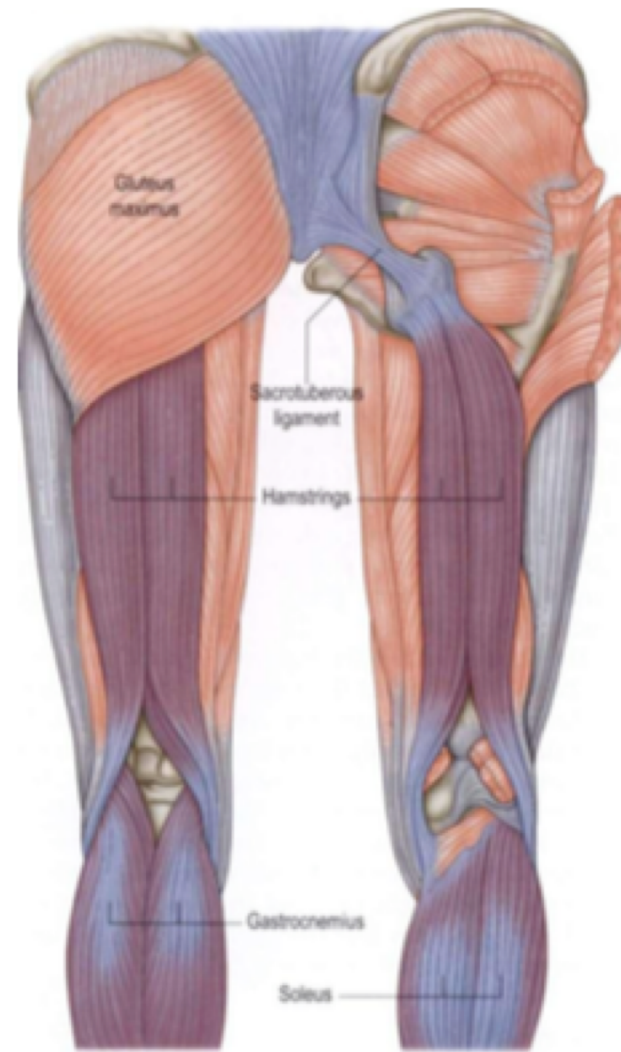
Middle part of  
adductor magnus

Linea aspera

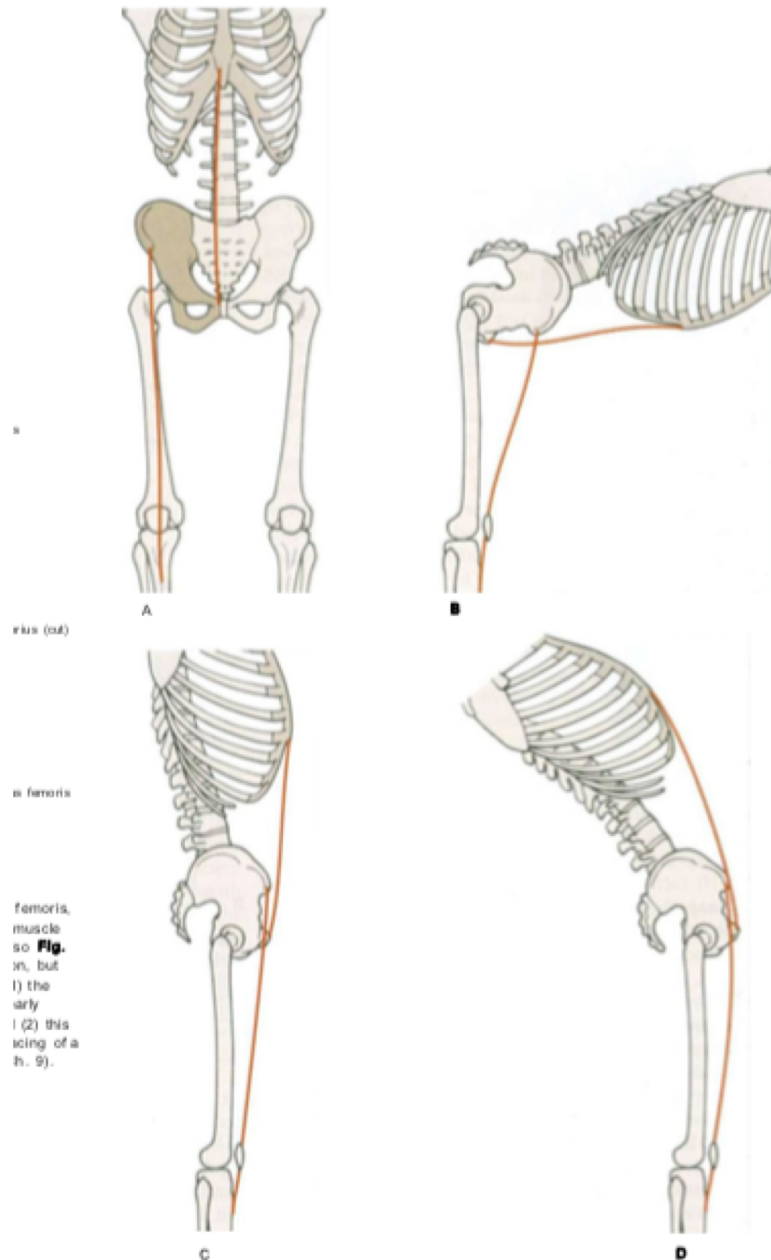
Biceps femoris  
(short head)







**Fig. 3.21** A superficial view (left) shows the hamstrings disappearing under the gluteus maximus, but despite the gluteus being a superficial muscle on the back, it is not part of the SBL. It is disqualified by involving both a change in direction, and a change of level. Remove the gluteus (which will show up later as part of other lines) to see the clear connection from the hamstrings to the sacrotuberous ligament.

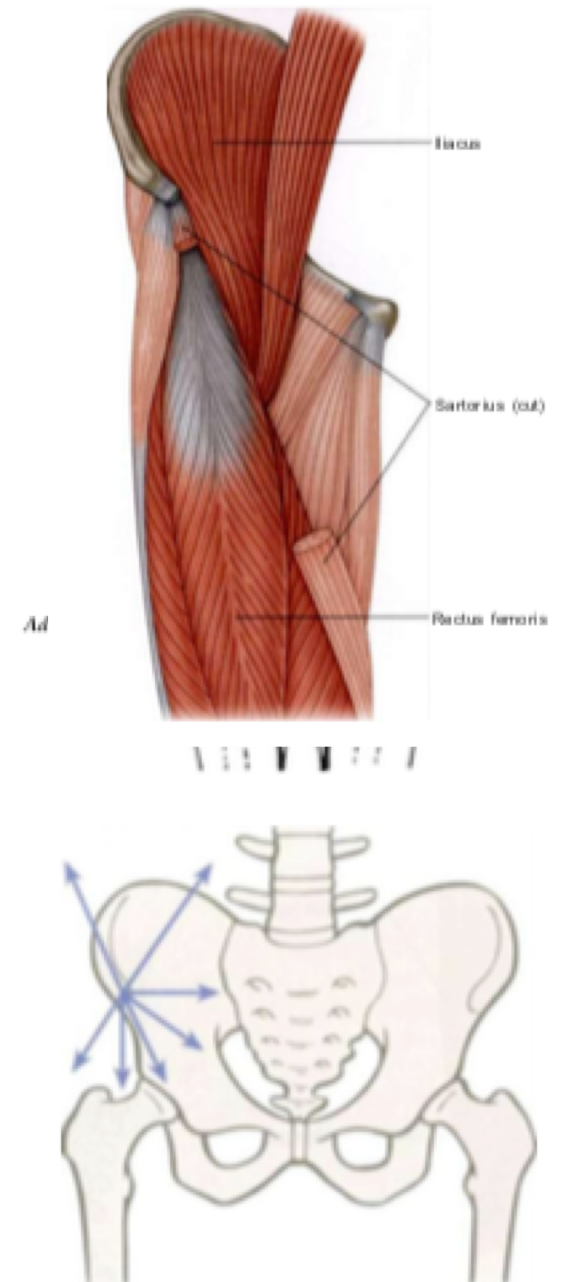


**Fig. 4.10** (A) The rectus femoris and rectus abdominis are connected mechanically through each bone. (B) If both contract, the hip and trunk flex to approximate the rib cage and the knee. (C) In standing, relative tonus will help determine pelvic tilt. (D) In hyperextension, both are stretched away from each other - if one part is inelastic, the other must make up for it or pass the strain along the SFL.



**Fig. 4.13** There are two branch lines or alternative routes to the rectus femoris from the knee to the hip. The sartorius curves up from the inside to the anterior superior iliac spine, and the anterior edge of the iliotibial tract does the same on the outside of the leg.

**4.14A).** The muscle contiguous to the rectus femoris on

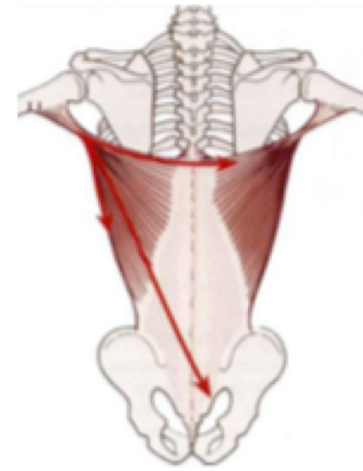




**Fig. 10.2** unwinding involves the (pictured) contraction and lateral



**Fig. 8.10** The cricket bowler uses the Front Functional Line to add impetus to the power of the arm.



**Fig. 8.8** A backhand shot could similarly join the Superficial Back Arm Line to its opposite partner as well as down the torso to the pelvis and beyond.



nal muscle, an  
Depending  
he abducts his  
to leg might be  
more than likely  
each leap. In the  
works through  
leg (**Fig. 8.8**).  
From this, the  
the Functional  
moment-to-mo-  
multiplicity of  
and Lateral Line

## Discussion

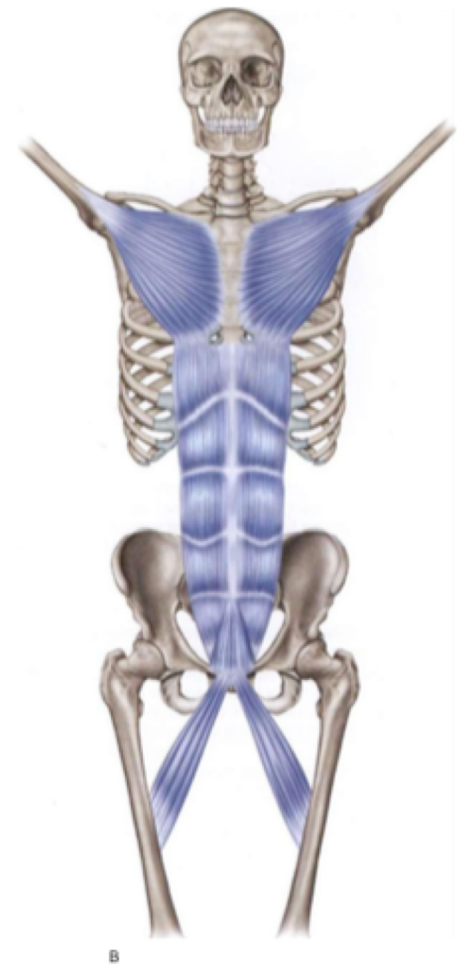
### The Ipsilateral

The following is  
functional to the  
branch of the





A

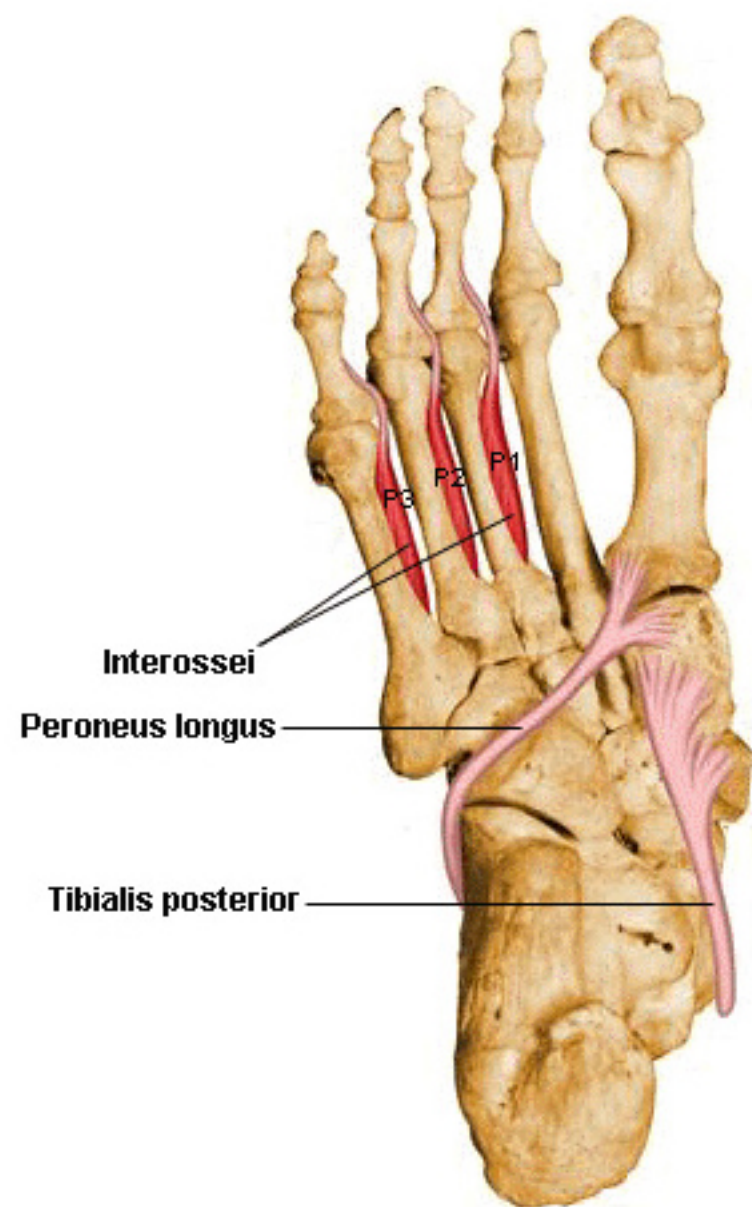


B

Q &A and Swings

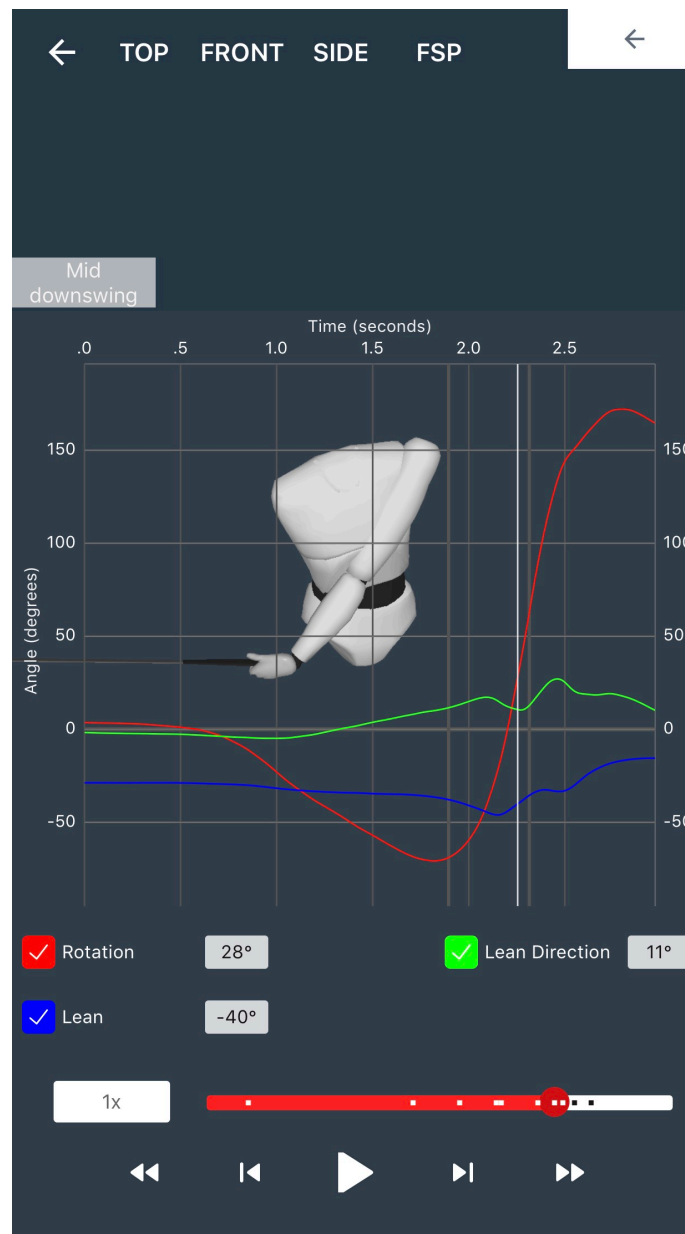
Jonathan

- Can you explain the forces and torques the hands put on the grip on the backswing?
- Do they hand and arm movements on the backswing make the body motions fall into place correctly going back?
- How quickly does a tour player get into the right heel on the backswing?
- You explain in a prior webinar that the backswing starts with a push from the left big toe, what part of the right foot accepts that?
- What causes the head to go down and out toward the target on the backswing?



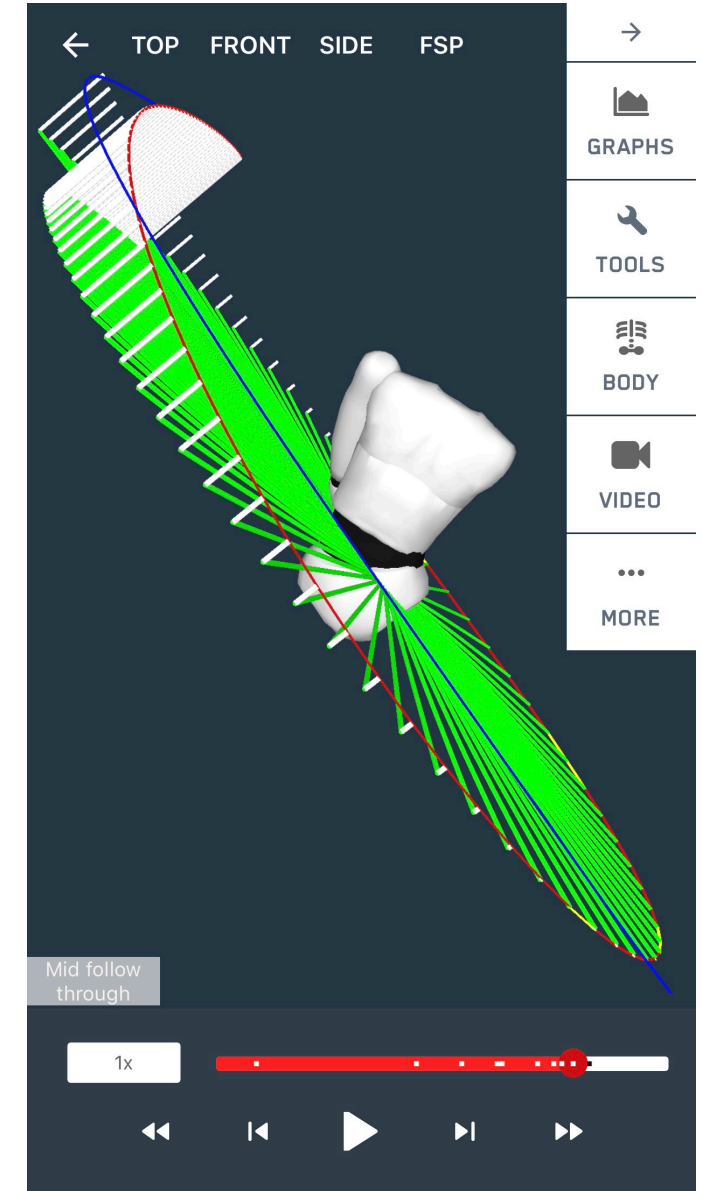
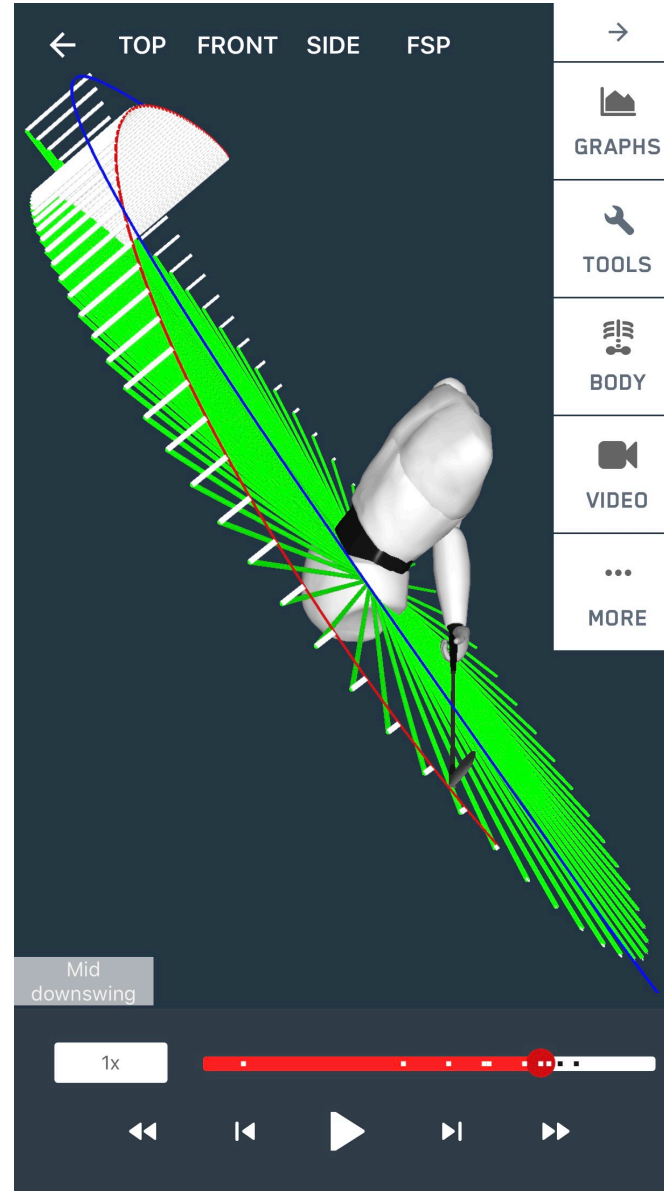
Layer 4

(Below) On the 4d here and when I click on the Kwon3d Graph this is what appears. Any idea how to decipher this graph and apply it for lessons?





(below) Also from 4d this is what appears when I click functional swing plane, which I think is also termed by Dr. Kwon. I understand that the blue line is the club head backswing trace, red is the club head downswing trace, green is the mid backswing to mid follow thru plane(fsp), white seems to be the deviation of backswing/followthrougu clubhead to fsp. How would you utilize this tool to analyze a swing?



If you had a total beginner with no sports background ask you for a lesson, other than setup and grip, Would you start with rotation exercises or mini swings? Or neither? And why?

How would you approach first lessons for beginner juniors (7yrs)?

(See attached movie) I have a swing you could look at for the webinar if you would like. I thought this swing seems unusual as His reverse lower body twists so much the trail foot comes way off the ground towards the finish. Btw, The guy played baseball before. There seems to be a lot of good moves here but how would you tackle this one?







I'm sending a couple of swings from a student for the webinar. This student is a +2 or +3 currently. I have been working on motorcycle and release drills with him. Lately, during tournaments, he has been hitting the ball on the heel and hitting weak right shots.