

## Intro to Yoga Anatomy (Paul Grilley video)

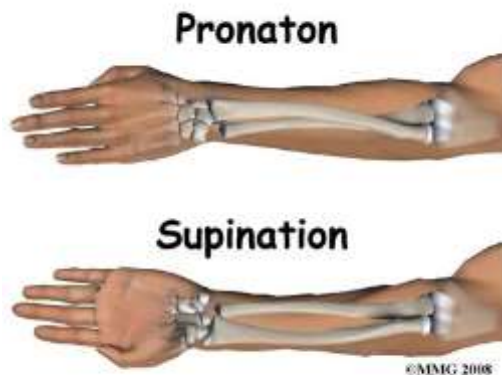
Two basic reasons we are limited in a pose: **Tension and Compression**

The 8 joints where compression will occur are:

1. Wrist/Forearm
2. Elbow
3. Shoulder
4. Neck
5. Lumbar Spine
6. Pelvis/Femur
7. Knee
8. Ankle

### 1. Wrist/Forearm

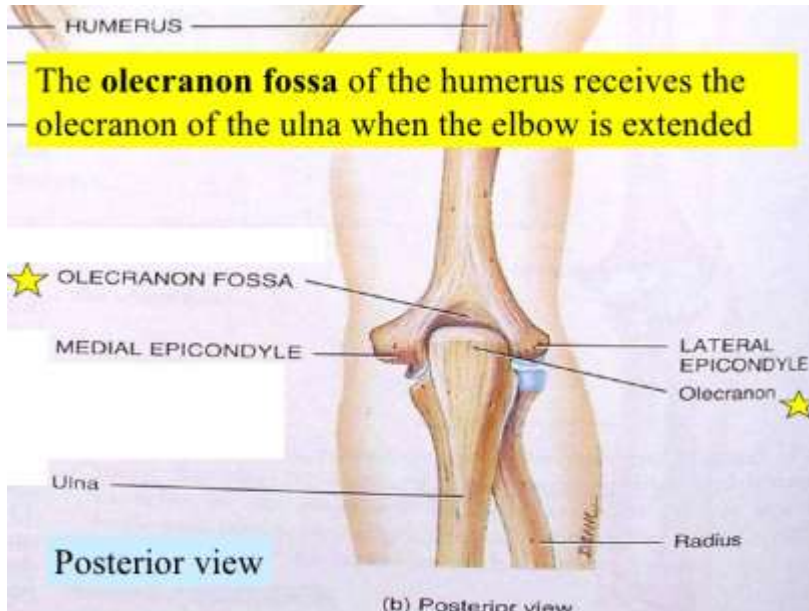
The forearm bones are the radius (thumb side) and ulna (pinky finger side). The ulna is stationary so the radius (radial head) moves around the ulna to produce pronation and supination of the forearm.



The degree of motion is variable and will affect poses such as **Downward Facing Dog** or poses that require forearms on the ground such as **Dolphin**. **If our forearms cannot pronate enough to create a flat palm on the floor, the shoulder will have to rotate inward** to compensate. We may notice this by **elbows flaring out** in these poses. Some people may not be able to tuck elbows into ribs during 4-Limbed staff for this reason.

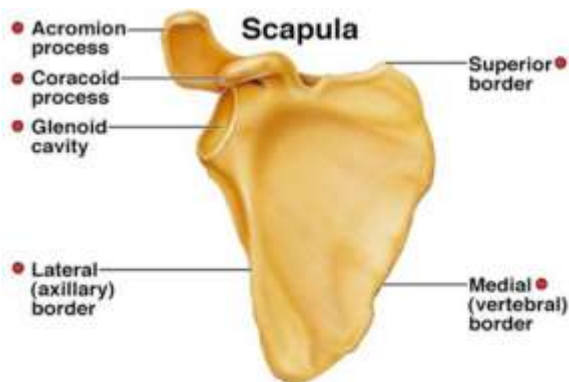
## 2. Elbow

The variation in elbow extension will depend on the size of the olecranon (ulna) and the depth of the olecranon fossa (humerus). These variations, such as **hyperextension of the elbow**, will be visible in poses involving being on all 4s (ex. Cat pose) and Downward Facing Dog.



## 3. Shoulder

The acromion process is a flattened ridge extending from the spine of the scapula. The size, angle and length of the acromion process will determine the angle of shoulder flexion before compression occurs. **Once compression occurs the scapula and clavicle will have to move in order to get greater shoulder flexion.** The acromion variations will affect poses such as Wheel and Downward Facing Dog and anytime arms are overhead in standing poses.



## 4. Neck

Cervical flexion and extension range or motion will vary depending on factors

such as the **size, shape and distance of the spinous processes**. **Spinous process is a bony projection off the posterior (back) of each vertebra**. Might impact camel, cobra or other pose.

**Spinous Process**



## **5. Lumbar Spine**

Lumbar compression will also depend on factors such as the size, shape and distance of the spinous process. Impacts back bending poses (extension).

## **6. Pelvis/Femur**

Factors affecting hip range of motion include:

- Acetabulum (ilium) depth
- Acetabulum angle – the hip sockets can be oriented in different directions
- Femur inclination – the bend on the neck of the femur can vary 40 degrees. Consider poses such as standing splits and triangle pose.
- Femur rotation

**Twist of shaft, angle of shaft, length of neck all impact movement**



All of these hip factors play into internal and external hip rotation. For example, ability to get knees down to floor in Cobbler's Pose or do Lotus.

## 7. Knee

The knee does not rotate when straight. It has a variable range of rotation when flexed. We can place extra stress on the knee asking it to harmfully rotate when there is insufficient hip range of motion. Poses to consider here are lotus and hero pose.

## 8. Ankle

The degree of ankle dorsiflexion will affect poses such as Chair and Downward Facing Dog and Garland Pose. Decreased ankle dorsiflexion will affect the ability to place heels on the ground in these poses.

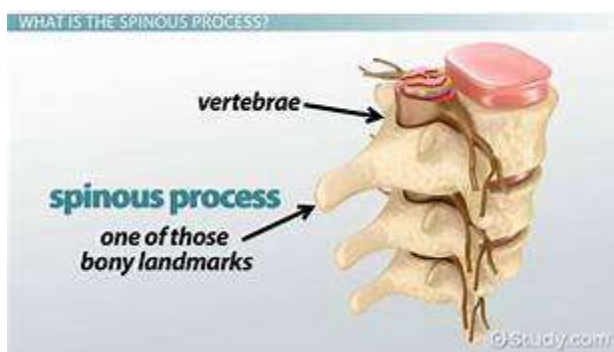
**ACTIVITY:** Go to Paul's website and spend time exploring the different bone sizes and shapes (URL below). Think about how each bone structure would impact movement.

<https://paulgrilley.com/bone-photos/>

**For example**, look at the lumbar vertebrae. Can you see how one has more space between each spinous process?

[https://paulgrilley.com/wp-content/uploads/2017/07/Lumbar\\_Vertebra-e1506904758627.jpg](https://paulgrilley.com/wp-content/uploads/2017/07/Lumbar_Vertebra-e1506904758627.jpg)

Here's a spinous process:



If there's more space between each of the spinous processes, can you see where there would be more spinal extension? Why? Because if my spinous processes are close together, as soon as I start bringing these bony projections closer together (as happens in extension) they will hit each other pretty quickly and I am done bending back. This is compression. If I have a lot of space between the spinous processes, I can bend a lot further back before hitting the spinous process.

There are many more bones on Paul's site at the URL above. Look at the photos and think about how these different sizes and shapes might impact movement. We all reach the end of our pose through either tension or compression. Of course, we could consciously choose not to go to our end range, but if we are trying to go to our end range, we will reach it via tension or compression every single time.