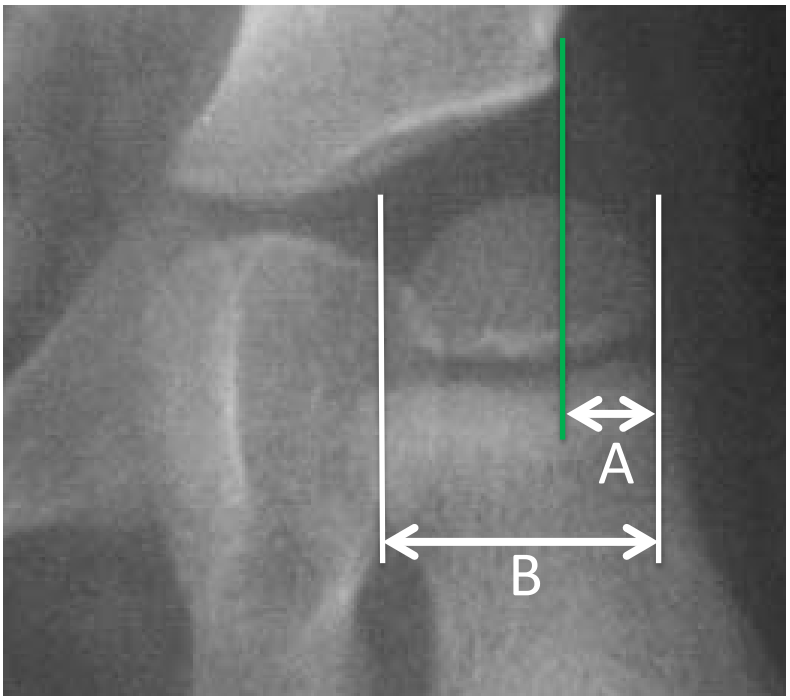
Using the Migration Percentage Ruler

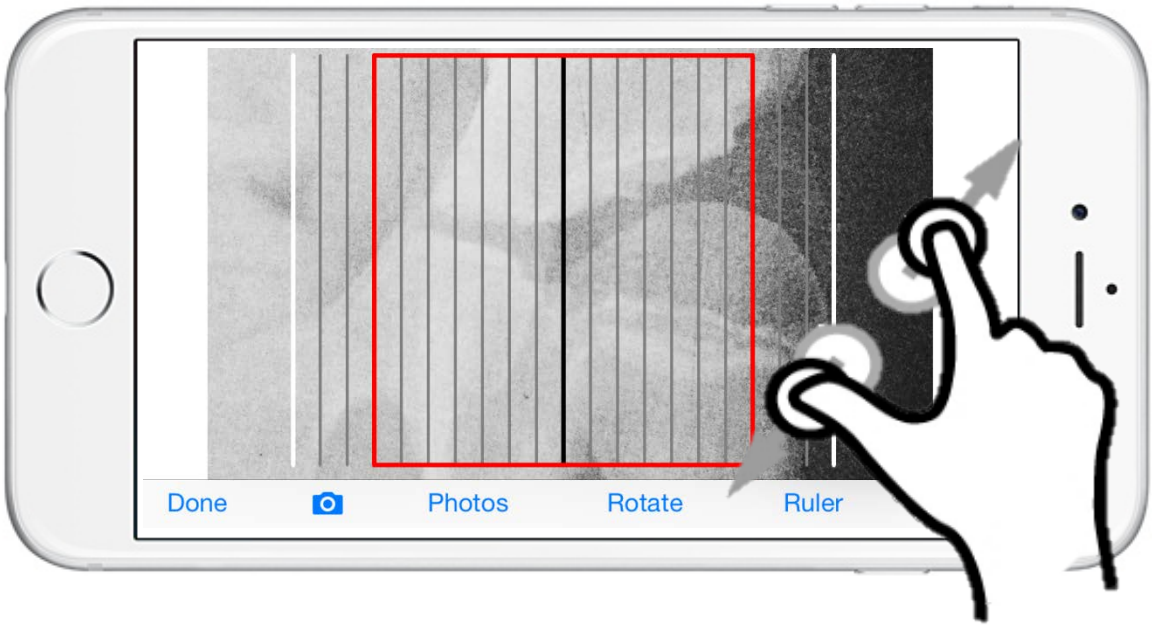
The most important measurement on an x-ray is each hip's ***migration percentage***, or the percentage of the femoral head that is outside of the margin of the acetabulum.



Migration Percentage =

$$\frac{\text{Distance A}}{\text{Distance B}} \times 100\%$$

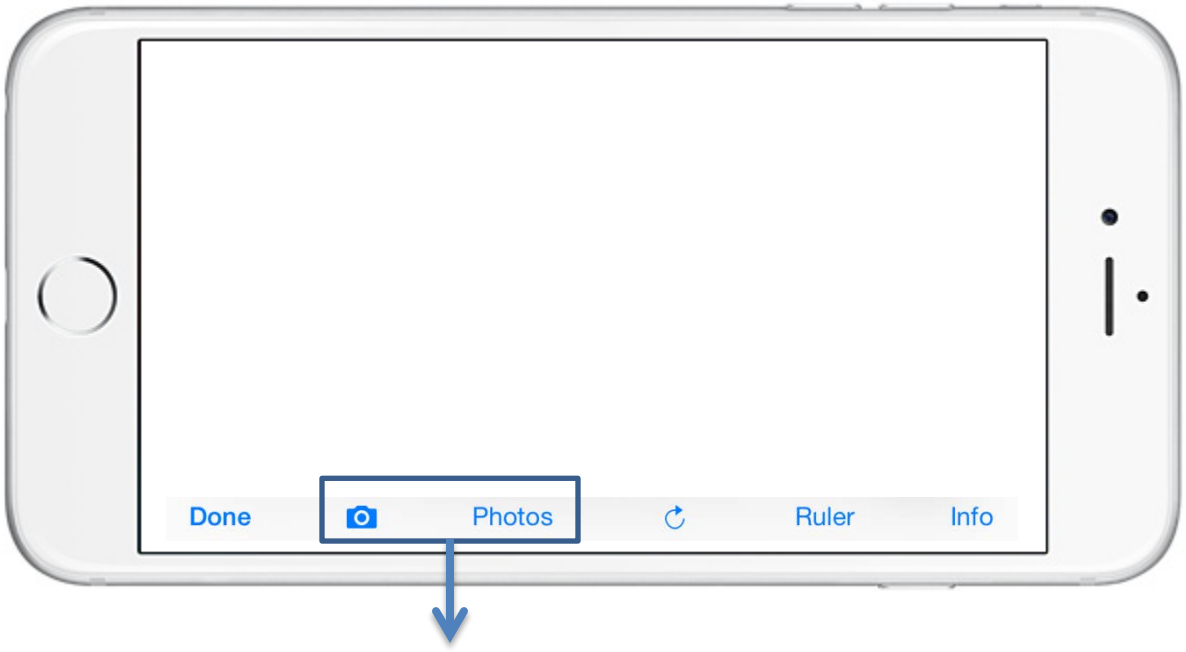
There is an increased risk of progressive hip displacement if the **migration percentage** is equal or greater than **30%**.



HipScreen's **Migration Percentage Ruler** allows you to take a picture of an x-ray and expand the hip to fit a ruler overlay using the device's touchscreen. This allows for a quick calculation of the Migration Percentage without measurement of distance.

Step 1:

Load the X-Ray image into HipScreen

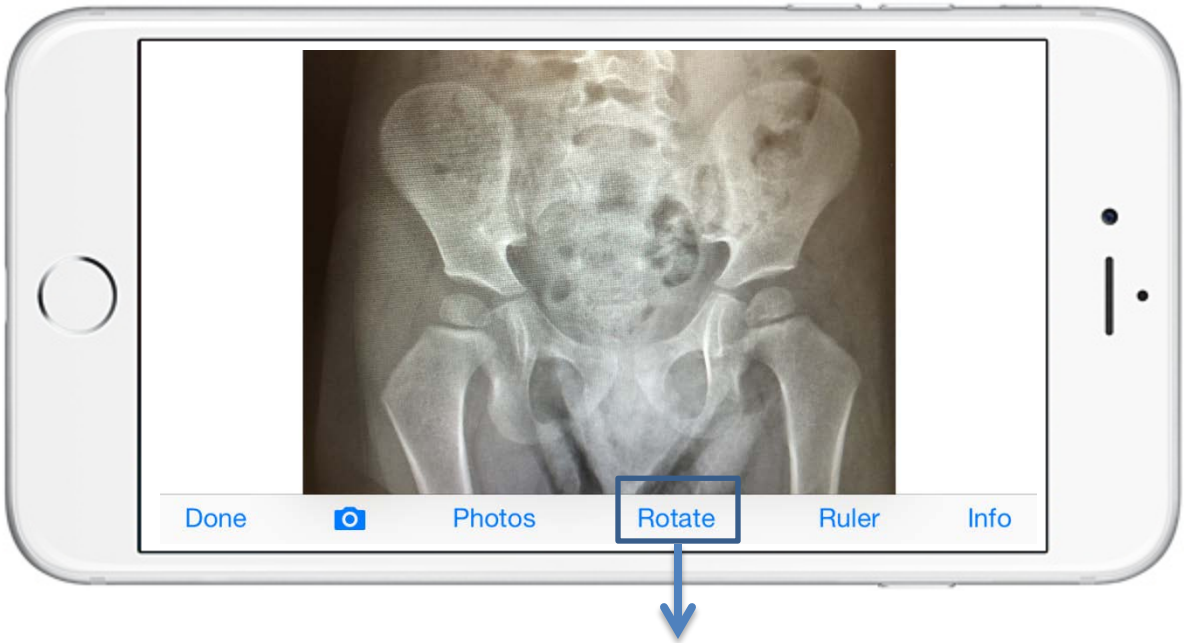


Take a picture of an x-ray using the camera icon, or load an x-ray already stored in your “Photos” into HipScreen.

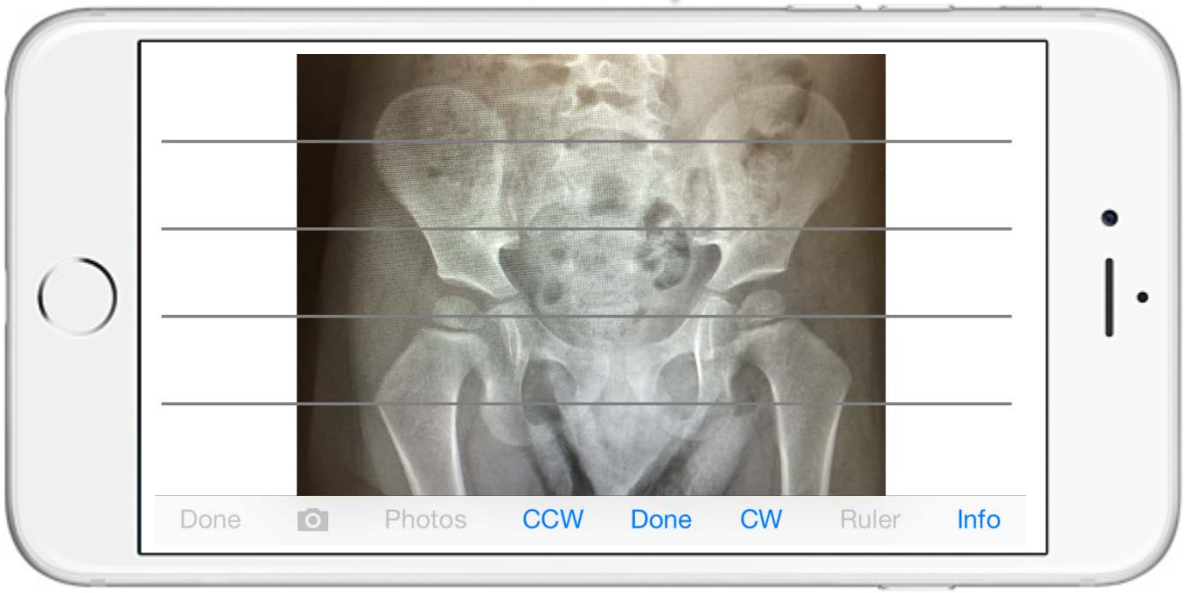
Pictures taken within the HipScreen App are not stored on your phone.

Step 2:

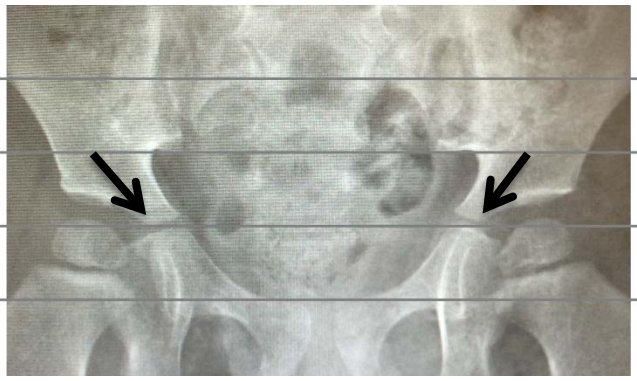
Rotate image to level the pelvis.



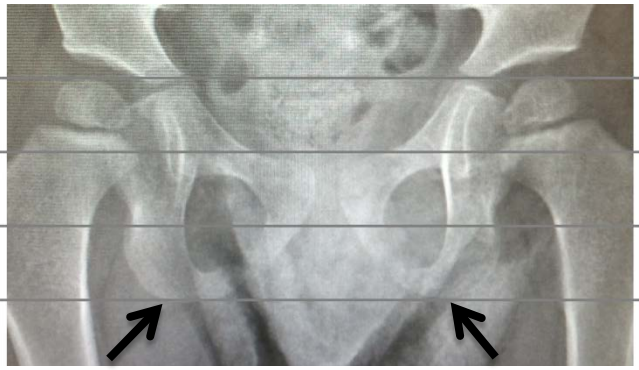
Opens up the Rotate Tool.
"CW" rotates clockwise.
"CCW" rotates counter clockwise.
Press "Done" when finished rotating.



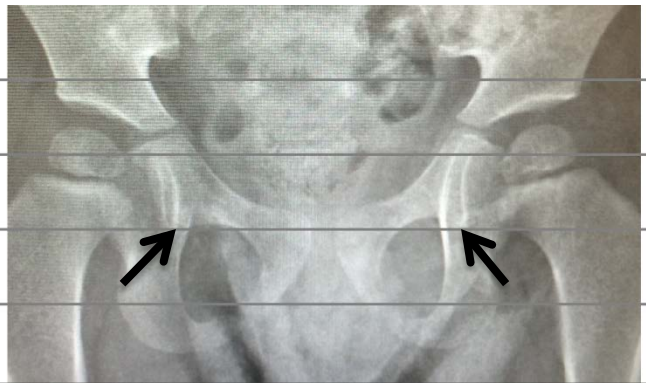
Use the CW and CCW buttons to level the pelvis using any of the common landmarks marked by the arrows below.



Tri-radiate cartilage



Ischial Tuberosity



Acetabular Teardrop

Iliac Crest

Remember, you can Pinch-Zoom and Pan to place the lines over the landmarks.

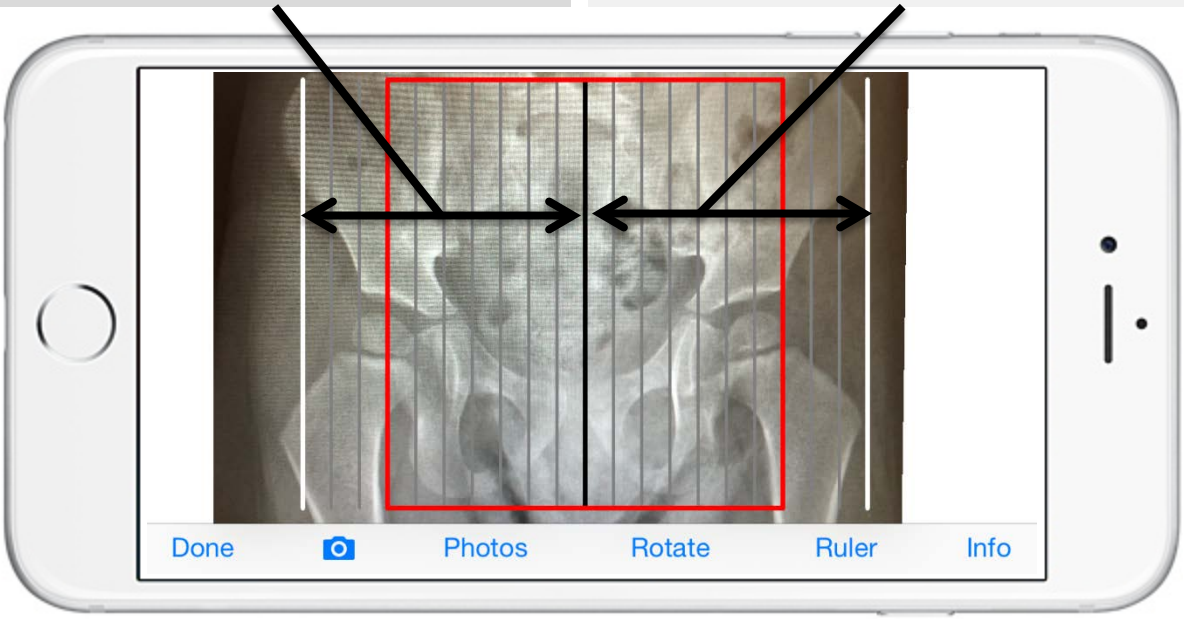
Step 3:

Use the Ruler to determine Migration Percentage.

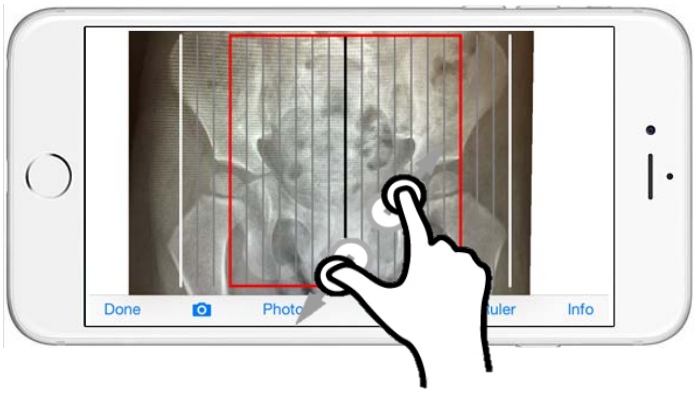
Press “Ruler” to toggle this feature on and off.

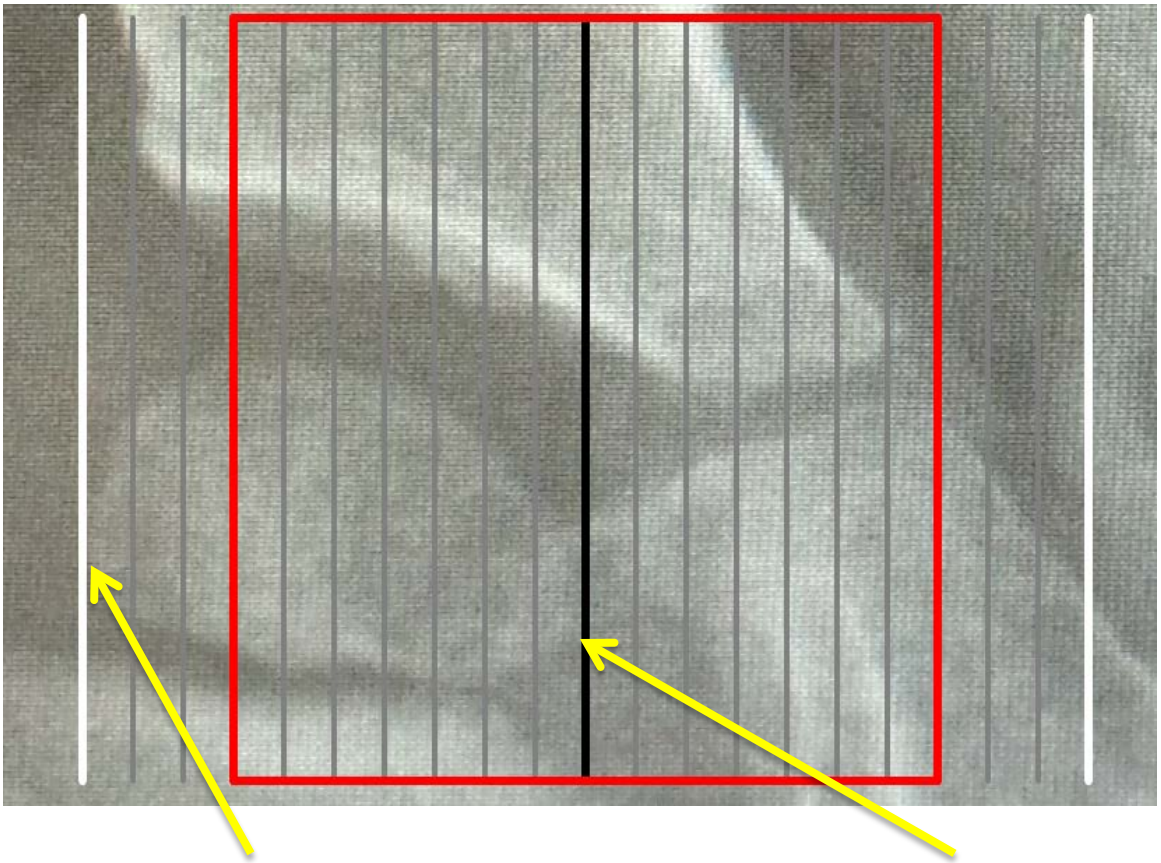
The right half of the ruler is used for the hip on the right side of the screen.

The left half of the ruler is used for the hip on the left side of the screen.



Use the familiar touchscreen features to pinch-zoom and pan the image so that:





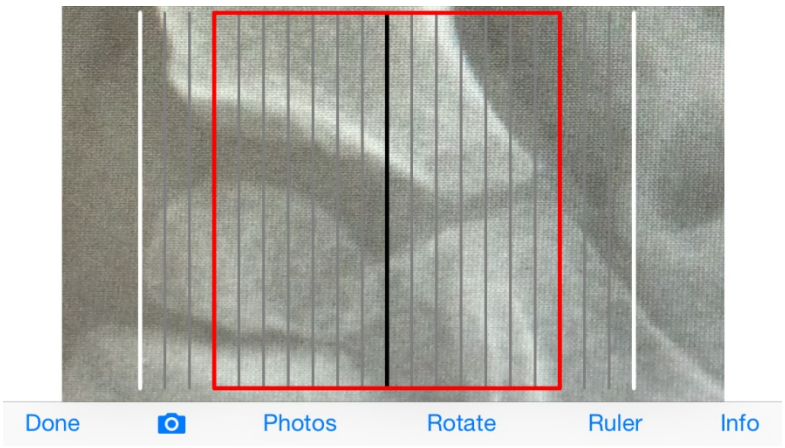
<u>White</u> line touches the <u>lateral</u> border of the femoral head ossific nucleus

Black line touches the **medial** border of the femoral head ossific nucleus

Remember, you can toggle the ruler on and off.

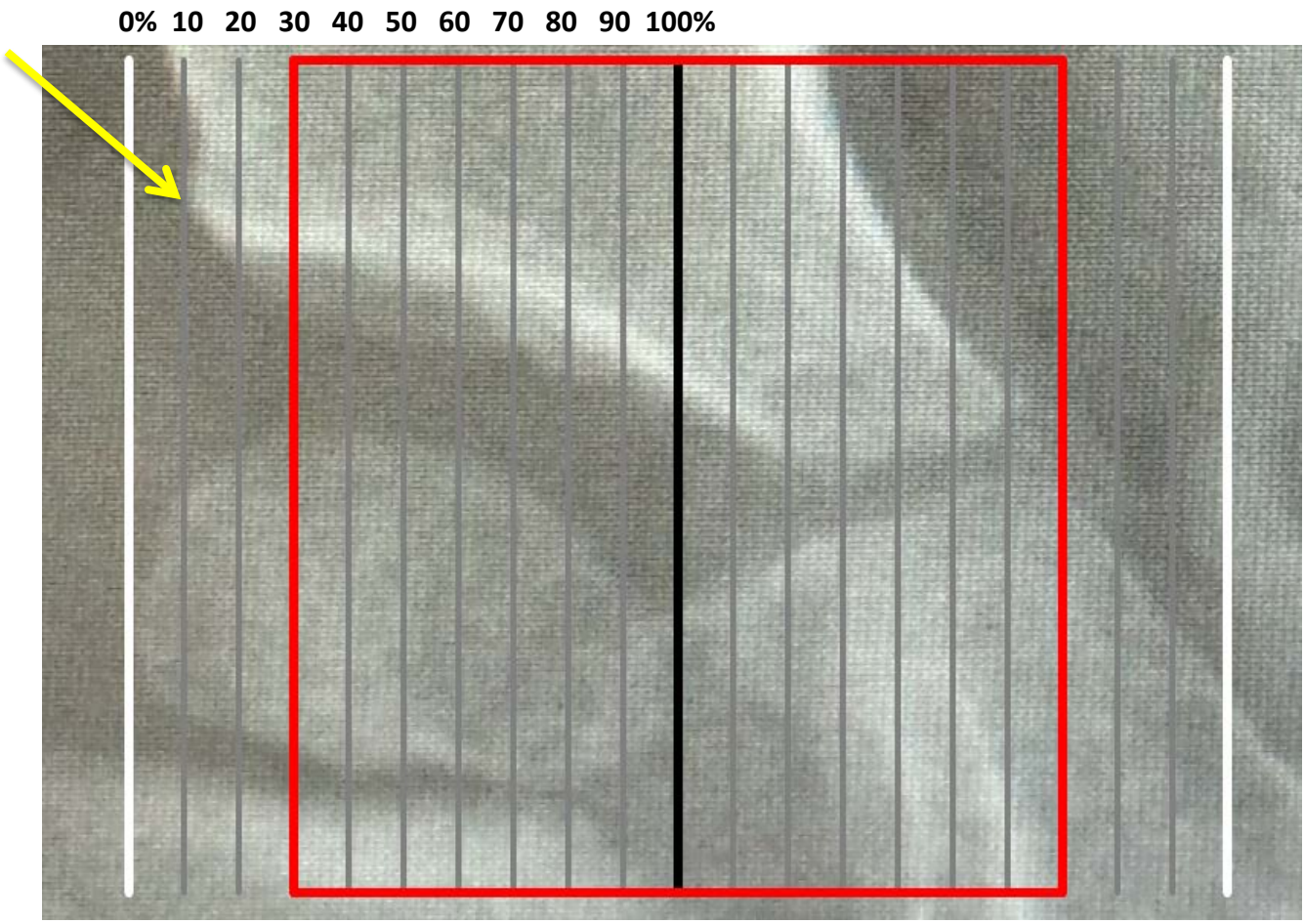
You can also Pinch-Zoom and Pan with or without the ruler.

Without Ruler Overlay



With Ruler Overlay

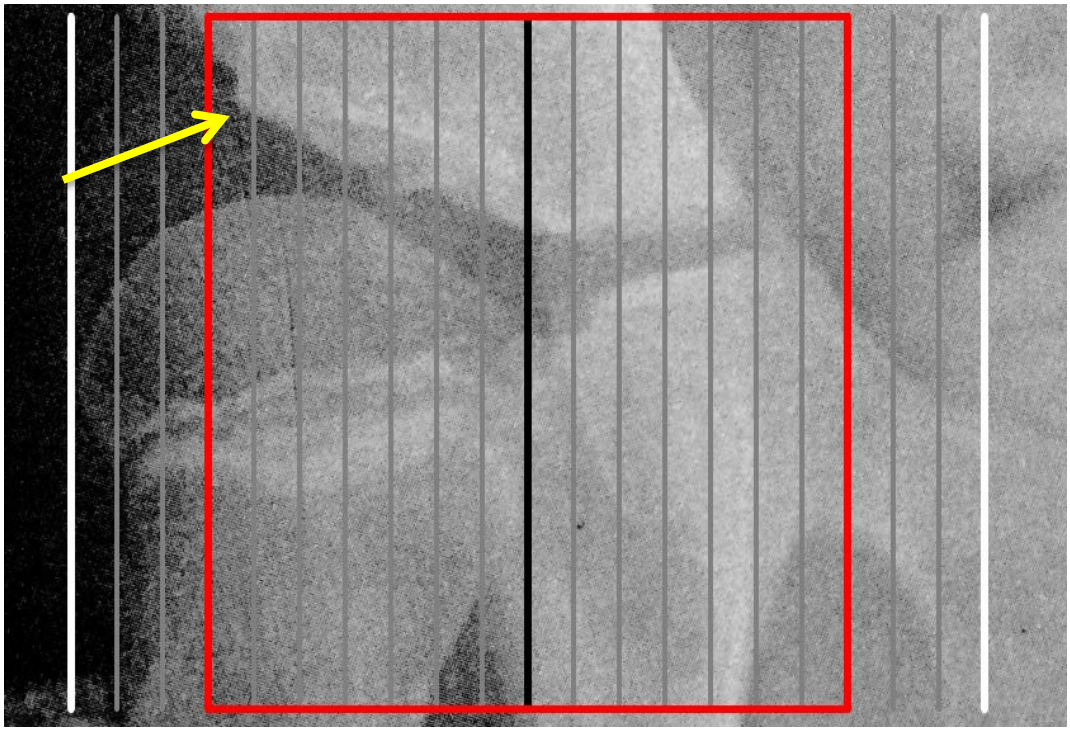
When the femoral head ossific nucleus is appropriately positioned between the white and black lines, notice that the vertical lines divide the femoral head into 10% increments…



The lateral edge of the acetabulum touches the 10% line, allowing us to determine that the percentage of the femoral head outside of the acetabulum (or the Migration Percentage!) is 10%.

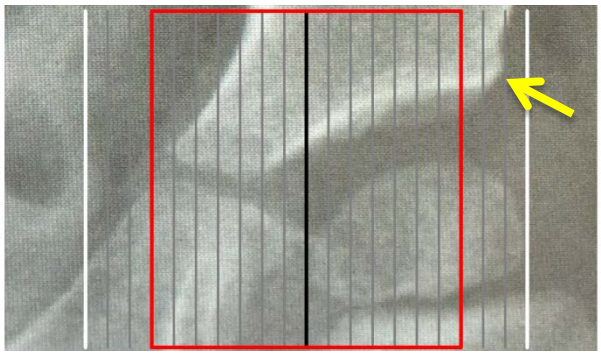
Remember, 30% is the critical Migration Percentage for a hip at risk of displacement. To make it easier to see, a “red box” contains the high risks zones for both hips.

If the edge of the acetabulum lies within the red box, the Migration Percentage is over 30%.



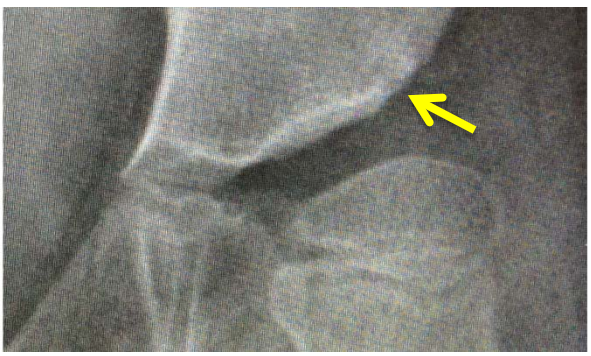
If the lateral edge of the acetabulum is outside the red box, the migration percentage is below 30%.

Without Ruler Overlay

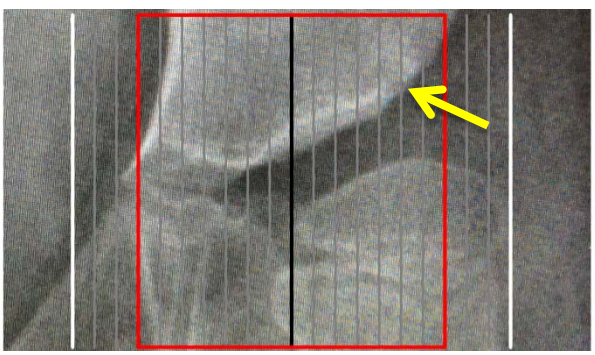


With Ruler Overlay

If the lateral edge of the acetabulum is inside the red box, the migration percentage is above 30%.



Without Ruler Overlay



With Ruler Overlay

Referral to Pediatric Orthopaedic Surgery

A referral should be made to a pediatric orthopaedic surgeon if:

- The migration percentage on x-ray is over 30%
- The hip abduction motion is less than 30 degrees
- There is deterioration in hip motion
- There is asymmetry in hip motion (one side moves less than the other)
- There is hip pain or decreased function