


IMAGE VIEWER TOOLS – GENERAL CHIROPRACTIC TOOL

To open a study in the viewer, double-click a study you would like to open. Here are the tools we'll be taking a look at:

1. Mark spot
2. Cervical Curve
3. Lumbar Curve
4. Circumscale
5. Extended Line
6. Horizontal Angle
7. Horizontal Orthogonal Angle
8. Horizontal Level
9. Vertical Level
10. Center Point
11. Vertebrae Line
12. Center Line (Vertical)
13. Center Line (Horizontal)
14. Gonstead Ruler
15. George's Line
16. Ilium Analysis


Mark Spot Tool – used to mark an anatomical point

1. Make sure the **Annotation Edit Mode** is activated → 
2. Left click on the Mark Spot tool
3. Left click anywhere on the image you would like to place a dot annotation
 - a. NOTE: every single left click will produce a dot annotation
4. Triple-click on the last plotted point OR select **End Annotation** tool to deactivate **Mark Spot** tool

END
Anno

Cervical Curve Tool

- Used on a **lateral view** of the **cervical spine**.
- Displays an arc of a circle with the radius of 17cm / 170mm
- Indicates a patient's cervical curve in relation to the textbook normal and how much adjustment their spine is in need of based on the deviation in mm and degrees

1. Make sure **Annotation Edit Mode** is activated → 
2. Left click on **Cervical Curve Tool**
3. Left click on the *top of the posterior aspect of the anterior tubercle*. This is the 1st point of 3
4. Left click on the *middle of the anterior vertebral body of T2*. This is the 2nd point of 3
5. Left click on the left side of the spine if the curve should display on the left side. OR left click on the right side of the spine if the curve should display on the right side. This is the 3rd and final point, causing the curve itself to display.




Lumbar Curve Tool

- Used on a **lateral view** of the **lumbar spine**
 - Displays an arc of a circle with a **19-24cm / 190-240mm** radius
 - Indicates a patient's lumbar curve in relation to the textbook normal and how much adjustment their spine is in need of based on the deviation, in mm and degrees
1. Make sure the **Annotation Edit Mode** is activated
 2. Left click on the **lumbar curve** tool
 3. Left click on the *anterior superior portion on the vertebral body of L1*. This is the 1st point of 3
 4. Left click on the *anterior portion of the sacral base/promontory*. This is the 2nd point of 3
 5. Left click on the left side of the spine if the curve should display on the left side. OR left click on the right side of the spine if the curve should display on the right side
 6. This is the 3rd and final point, causing the curve itself to display




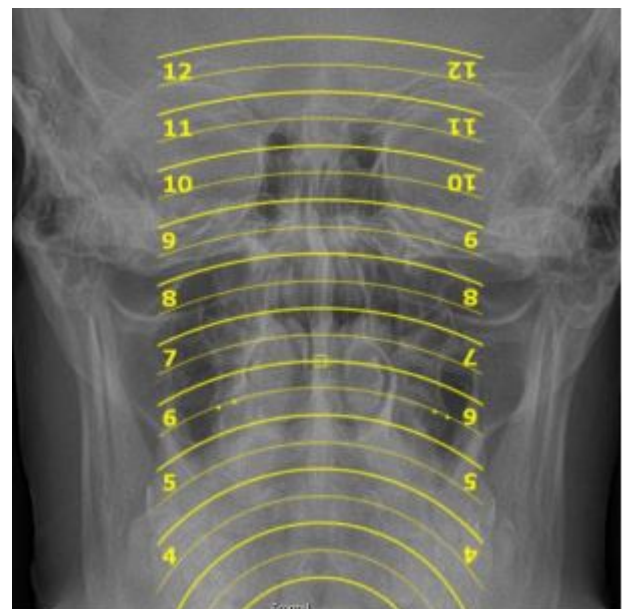
Change the Radius of the Circle in both Cervical Curve and Lumbar Curve tools:

1. Activate **Annotation Edit Mode** → 
2. left click on a point on the curve annotation created
3. Press (?) key on the keyboard
4. Enter the value of the radius of the circle in mm

Circumscale


- Used on a **Nasium/Frontal** view. Zoom and adjust image contrast as needed
- This template is used for manually finding the axial and condyle circles
- *Specific Application Example:* Used for assessment of the *Superior Articular Surface (SAS)* of C2 For the purpose of determining the angle of the articulation of the lateral articular edge of the occipital condyle and the lateral articular edge of the SAS and C2
- *Suggestion:* Use the **Mark Spot Tool** to mark the lateral articular edges of C2 points plotted about 1/8 inch apart on both sides, before placing Circumscale template, for reference

1. Make sure the **Annotation Edit Mode** is activated → 
2. Left click on the **Circumscale** tool
3. Left click the image to place the **Circumscale** tool on the image
4. **To move this template**, hover your cursor over the small square in the center of the template. Left click the square and holding your mouse button, move the template into the position to where the template is placed over the 4 point generated using the **Mark Spot** tool to find an arc that simultaneously touches all for dots on the cortex
5. Left click to engage template



Extended Line Tool


- Provides a straight line through the selected anatomical point based on what is required for the specific analysis being performed

1. Make sure the **Annotation Edit Mode** is activated → 
2. Left click on the **Extended Line** tool
3. Left click to begin drawing your line on the chosen anatomical structure
4. Drag your mouse to position the line
5. Left click on the second anatomic structure to set the extended line



Horizontal Angle


- This tool generates a horizontal angle on a **Lateral/Sagittal** view to determine the proper *angle* needed to set the x-ray tube to capture the AO joint for Frontal/Nasium view
- For Example:* used to display how superior the atlas vertebrae is located, in degrees, in relation to the True Horizontal (bottom edge of the film)

1. Make sure the **Annotation Edit Mode** is activated → 
2. Left click on the **Horizontal Angle** tool
3. Left click on the desired anatomical structure to plot the 1st point (note: the degree of angle measurement will display)
4. To plot the 2nd point, drag the mouse along the line of measurement and left click on the second anatomical point
5. Upon plotting the 2nd point, the Horizontal Angle measurement will display yielding the optimum frontal shot
6. Keep in mind, in Annotation Edit Mode, the annotation may be edited by hovering over the annotation to highlight its activity. Then edit with a left click and use a drag motion to change the angle measurement in relation to the True Horizontal

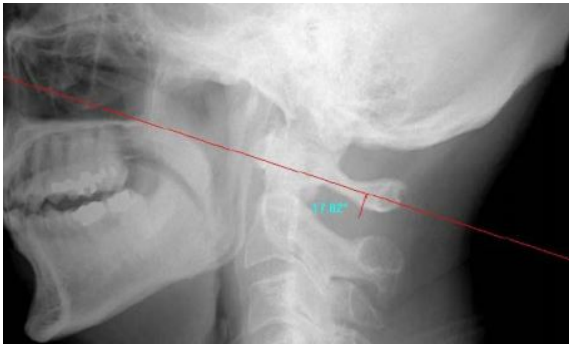


Horizontal Orthogonal Angle

- This tool generates a horizontal angle on a Lateral/Sagittal view to determine the proper perpendicular angle for the Frontal /Nasium view.

1. Left click and drag the Lateral/Sagittal View thumbnail so it appears in the image viewing area
2. Make sure the **Annotation Edit Mode** is activated → 
3. Left click on the **Horizontal Orthogonal Angle** tool
4. Left click to plot the 1st point. (Note: the degree of angle measurement will display)
5. Drag the mouse perpendicular to the line of measurement and left click to plot the 2nd point

6. Immediately following the plotting of the 2nd point, the Horizontal Orthogonal Angle measurement will display

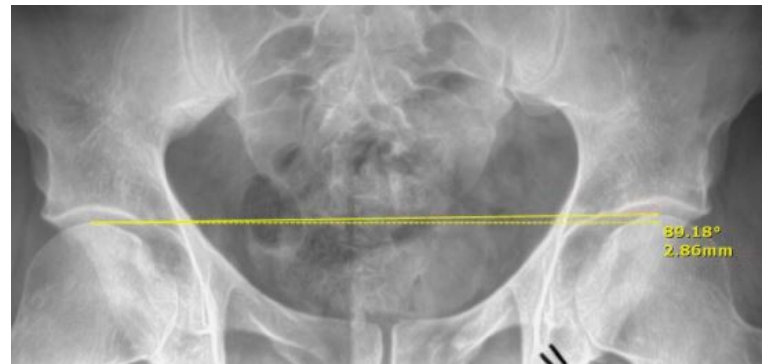


← Horizontal Orthogonal Angle

Horizontal Level

- Used to measure the vertical difference between two anatomical points by placing a perfect horizontal line across an image using chosen anatomical points
- Measures height in mm between a perfect horizontal and any other chosen anatomical point and provides degrees for the angle created.
- NOTE: The dashed line shows the true horizontal and the solid line displays along the chosen anatomical points.

1. Make sure the **Annotation Edit Mode** is activated →
2. Left click on the Horizontal Level tool
3. Left click a point to automatically create the dashed line (true horizontal line)
4. Left click to automatically create the solid line where the cursor is attached
5. Drag and drop the 2nd point to create the measurement and angle



Vertical Level

- Used to measure the horizontal difference between two anatomical points by placing a perfect vertical line across an image using chosen anatomical points
- Measures height in mm between a perfect vertical and any other chosen anatomical point and provides degrees for the angle created
- NOTE: The dashed line shows the true vertical and the solid line displays along the chosen anatomical points

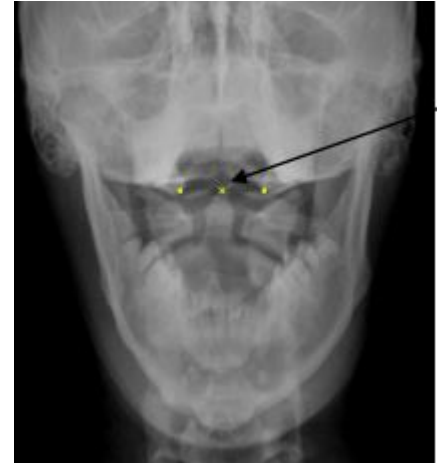
1. Make sure the **Annotation Edit Mode** is activated →
2. Left click on the **Vertical Level** tool
3. Left click a point to automatically create the dashed line (true vertical line)
4. Left click to automatically create the solid line where the cursor is attached
5. Drag and drop the 2nd point to create the measurement and angle



Center Point Tool

- This tool generates a center point measured between two plotted points

1. Make sure the **Annotation Edit Mode** is activated →
2. Left click on **the Center Point** tool
3. Left click to plot the first anatomical point. (Plot all points from left to right)
4. Left click to plot the second anatomical point
5. The **Center Point** is generated



Vertebrae Line Tool

- This tool generates a vertical line that passes through six points plotted along the spinal canal

1. Make sure the **Annotation Edit Mode** is activated →
2. Left click on the **Vertebrae Line** tool
3. Plot the six points below, plotting all points from top to bottom and left to right, each performed by a single left click
 - a. Plot **Point 1** on the left side of the vertebral body
 - b. Plot **Point 2** on the right side of the vertebral body



The software will generate a middle point of the vertebrae exactly between point 1 and 2

Plot **Point 3** at the junction of the lamina (or tip of the spinous process)

The software will generate a middle point from the previous middle point of the vertebrae and point 3 to represent the center of the spinal column

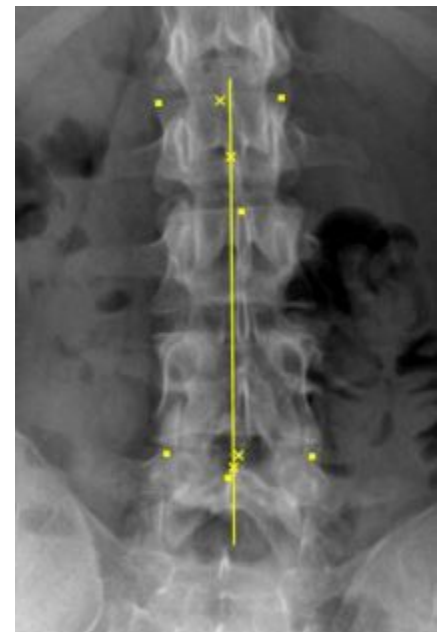
Plot **Point 4** on the left side of the next vertebrae in question

Plot **Point 5** on the right side of the next vertebrae in question

The software will generate a middle point of the vertebrae exactly between points 4 and 5

Plot **Point 6** at the junction of the lamina (or tip of the spinous process)

A line will be generated that passes through the center of the spinal canal



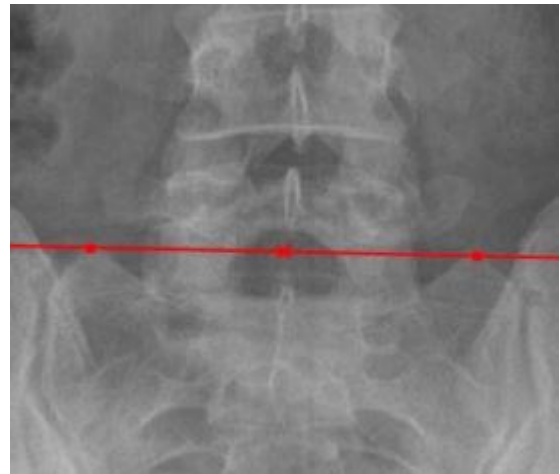
Center Line (Vertical)

- Finds a center vertical line between points
1. Make sure the **Annotation Edit Mode** is activated →
 2. Left click on the **Center Line (Vertical)** tool
 3. Left click on the 1st anatomical point
 4. Left click on the 2nd anatomical point
 5. A center vertical line will be generated



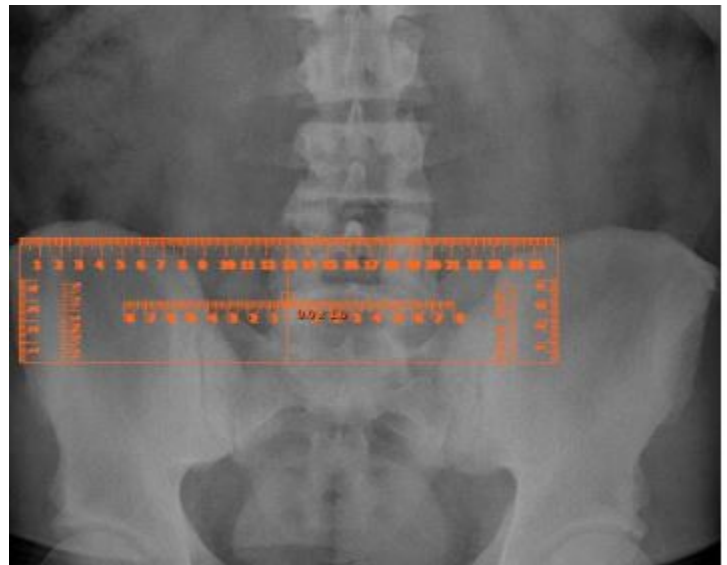
Center Line (Horizontal)

- Finds a center vertical line between points
1. Make sure the **Annotation Edit Mode** is activated →
 2. Left click on the **Center Line (Horizontal)** tool
 3. Left click on the 1st anatomical point
 4. Left click on the 2nd anatomical point
 5. A center horizontal line will be generated





Gonstead Ruler

- The Gonstead Ruler is a digital version of the ruler used in analog analysis to determine measurements in mm, draw a line to measure length, identify end plate lines or apply Gonstead feather lines
1. Make sure the **Annotation Edit Mode** is activated →
 2. Select **Gonstead Ruler** tool
 3. Left click on the image to place the **Gonstead Ruler** tool on the image
 4. **To move the template**, hover your cursor over the small box in the center of the Template. The cursor changes to crosshairs. Left click and hold the left mouse key down to drag and move Gonstead Ruler template into position
 5. **To rotate the template**, press (<) or (>) keys. For example - if using the tool to identify vertebral end plate lines
 6. **To place a vertical line on the vertebral end plates** using the Gonstead Ruler, press (?/) key on the keyboard
 7. Continue to check the entire vertebral column, lining up the ruler edge and marking it with a Horizontal line



George's Lines

- This tool is used on a lateral view of the cervical spine to generate measurements (in mm) between vertebrae
1. Make sure the **Annotation Edit Mode** is activated → 
 2. Left click on the **George's Line** tool
 3. Begin drawing lines on each posterior vertebral body from superior to inferior as indicated:
 4. Left click on the top of the *posterior vertebral body*
 5. Left click on the bottom of the *posterior vertebral body*
 6. Repeat steps 4 and 5 until all desired lines have been drawn on part or all of the vertebral column
 7. Triple-click off to the side of the lines drawn OR select End Annotation tool () and the software will generate measurements (in mm) which account for the anterior or posterior offset in relation to the vertebrae immediately below



George's Line Tool

Ilium Analysis

The Ilium Analysis provides a full analysis of the pelvis using an AP Bilateral Pelvic view to display different aspects of pelvic/sacral misalignment using a 16 point system of anatomically plotted points and a set of calculations to display appropriate lines and measurements (in mm and degrees)

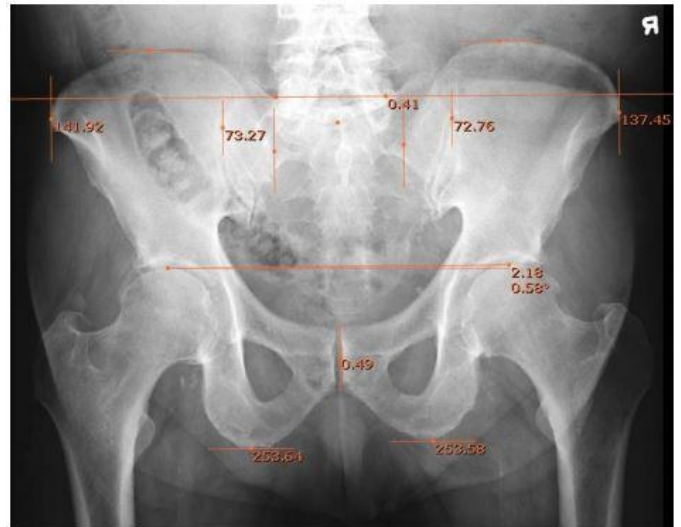
Step by Step Instructions

Step 1

Use AP Pelvis image making sure the image displays the tops of the iliac crests, borders of the sacrum, and inferior borders of the Ischia

Step 2

1. Make sure the **Annotation Edit Mode** is activated →
2. Select **Ilium Analysis** tool
3. Using the left click, plot the following 16 points, one plot at a time, on the **image in the following order**:



1. Top of the left iliac crest
2. Top of the right iliac crest
3. Left sacral groove
4. Right sacral groove
5. Center of the first sacral tubercle
6. Lateral border of the left ilia
7. Lateral border of the left sacrum
8. Medial border of the left ilia

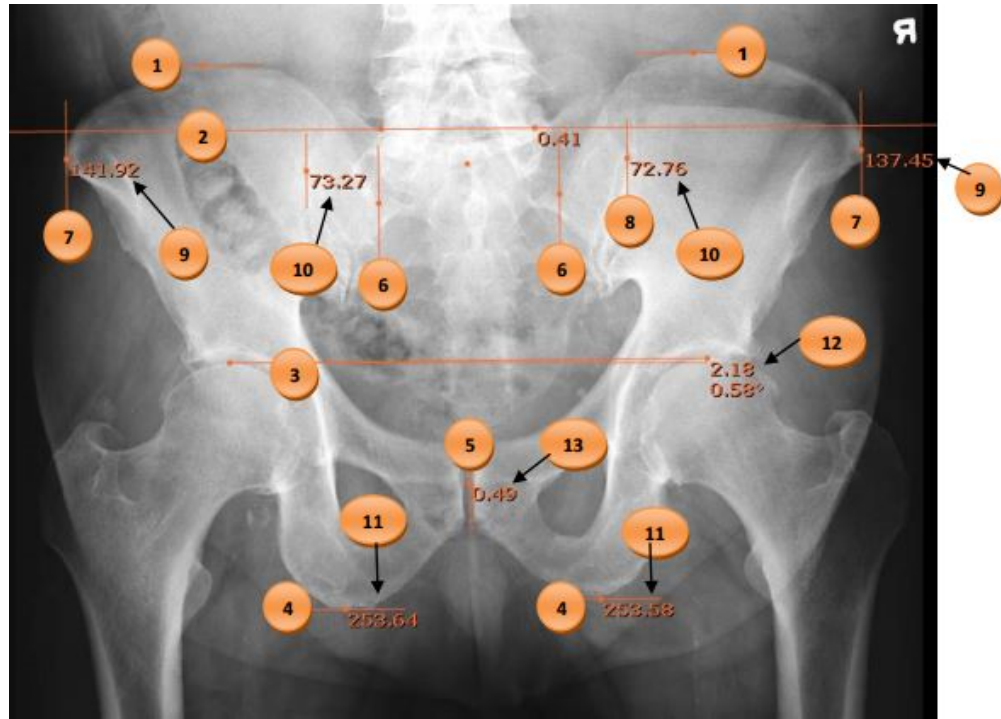
9. Medial border of the right ilia
10. Lateral border of the right sacrum
11. Lateral border of the right ilia
12. Top of left femur head
13. Top of right femur head
14. Center of symphysis pubis
15. Inferior border of left ischeal tubercity
16. Inferior border of right ischeal tubercity

Step 3

Upon plotting the 16th point, all lines and measurements (in millimeters) are displayed on the image to the right

On the next page find an Ilium Analysis Reference for Lines and Measurements. Use in conjunction with the image below to familiarize yourself with the digital version of the Ilium Analysis results.

1. Iliac Crest Lines
2. Horizontal Plane Line of the Sacrum (Sacral Baseline)
3. Femur Head Line
4. Ischium Lines (Ischial Tuberosity Lines)
5. Sacral Center Line
6. Lines of Medial Iliac Border
7. Lines of Lateral Iliac Border
8. Lines of Lateral Border of Sacral Ala
9. Width of Left and Right Ilium (Width between lateral Iliac border & medial iliac border, in mm)
10. Width of Left and Right Sacrum (Rotation of sacrum, in mm)
11. Height of Left and Right Innominates (Top of Iliac Crest to bottom of Ischeal Tuberosity, in mm)
12. Vertical difference in height of femur heads
13. Horizontal difference between Center of Sacrum and Center of Symphysis Pubis



Making a Correction to an Already Plotted Point during the Analysis

If an error is made where one of the points was not placed in the correct location, make a note of which point was placed in error and continue plotting the remaining points. The noted incorrectly placed point can be adjusted at the end of the analysis by activating the Annotation Edit Mode icon, hover over the plotted point to be moved then left click, drag, and drop the point to its correct location.

You may also press the ESC key on the keyboard to cancel the Ilium Analysis and begin again.