

MORPHOMETRIC PARAMETERS AND CRANIOCERVICAL INSTABILITY

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PREMISE

- There are many available morphometric parameters to assess Craniocervical Instability
- No single parameter is sufficient by itself
- At least two parameters need to be used together
- Current favorites: CXA, Grabb's, (BDI, BAI)

PREMISE

- A large body of literature has been focused on the use of these parameters in Trauma and Rheumatoid Arthritis
- Spectrum from normality to severe post-traumatic changes
- The middle of the spectrum includes pathologies affecting ligamentous integrity, bone density, and bone shape at the CCJ

PREMISE

- CCJ is a biomechanically complex joint
- Pathology can affect different sub-components of the CCJ biomechanics (horizontal, vertical, rotational instability)


PROBLEM

- There are guidelines in literature about how to execute the actual measurement of these parameters
- BUT there is a wide inter-individual variability
- BECAUSE of different measurement “styles”
- BECAUSE of distorted anatomy




Angle: 147.073 / 212.927

This is a sagittal CT scan of a lumbar vertebra. A green line is drawn across the vertebral body, starting from the upper left corner and ending at the lower right corner. The line is composed of two segments meeting at a vertex in the center of the vertebral body. A text box in the upper left corner displays the angle measurement: 'Angle: 147.073 / 212.927'.




Angle: 154.985 / 205.015

This is a sagittal CT scan of the cervical spine. A green line is drawn from the superior articular process of a vertebra to the inferior articular process of the vertebra below it, forming an angle. The text 'Angle: 154.985 / 205.015' is displayed on the left side of the image.



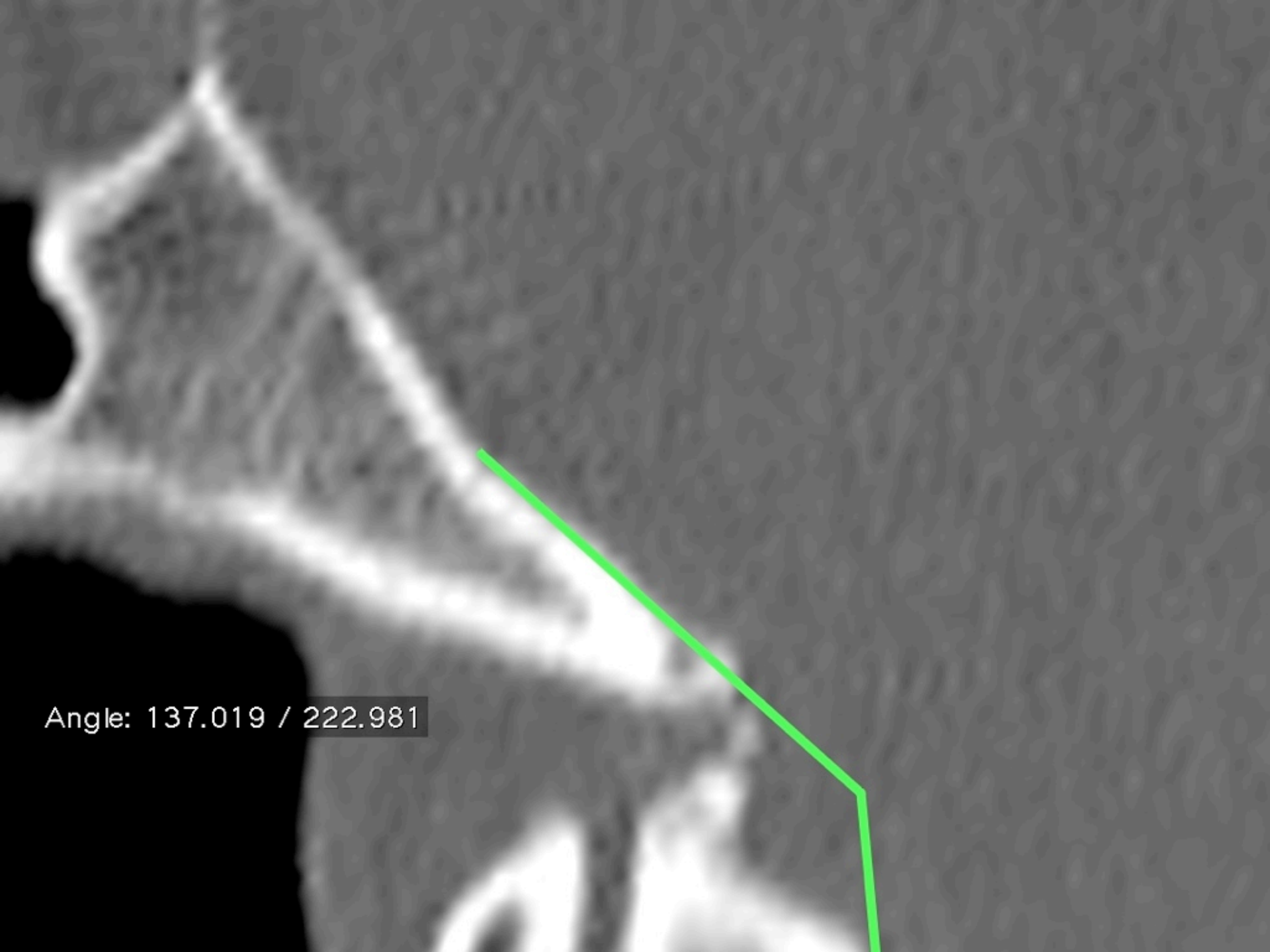
Angle: 147.139 / 212.861

This is a sagittal CT scan of the cervical spine. A green line is drawn to indicate a measurement angle. The line starts at the superior articular process of a vertebra, extends downwards and forwards, and then turns to follow the inferior articular process. The angle between these two segments is labeled as 147.139 / 212.861 degrees. The image shows the bony structures of the spine, including the vertebral bodies, intervertebral discs, and the articular processes.

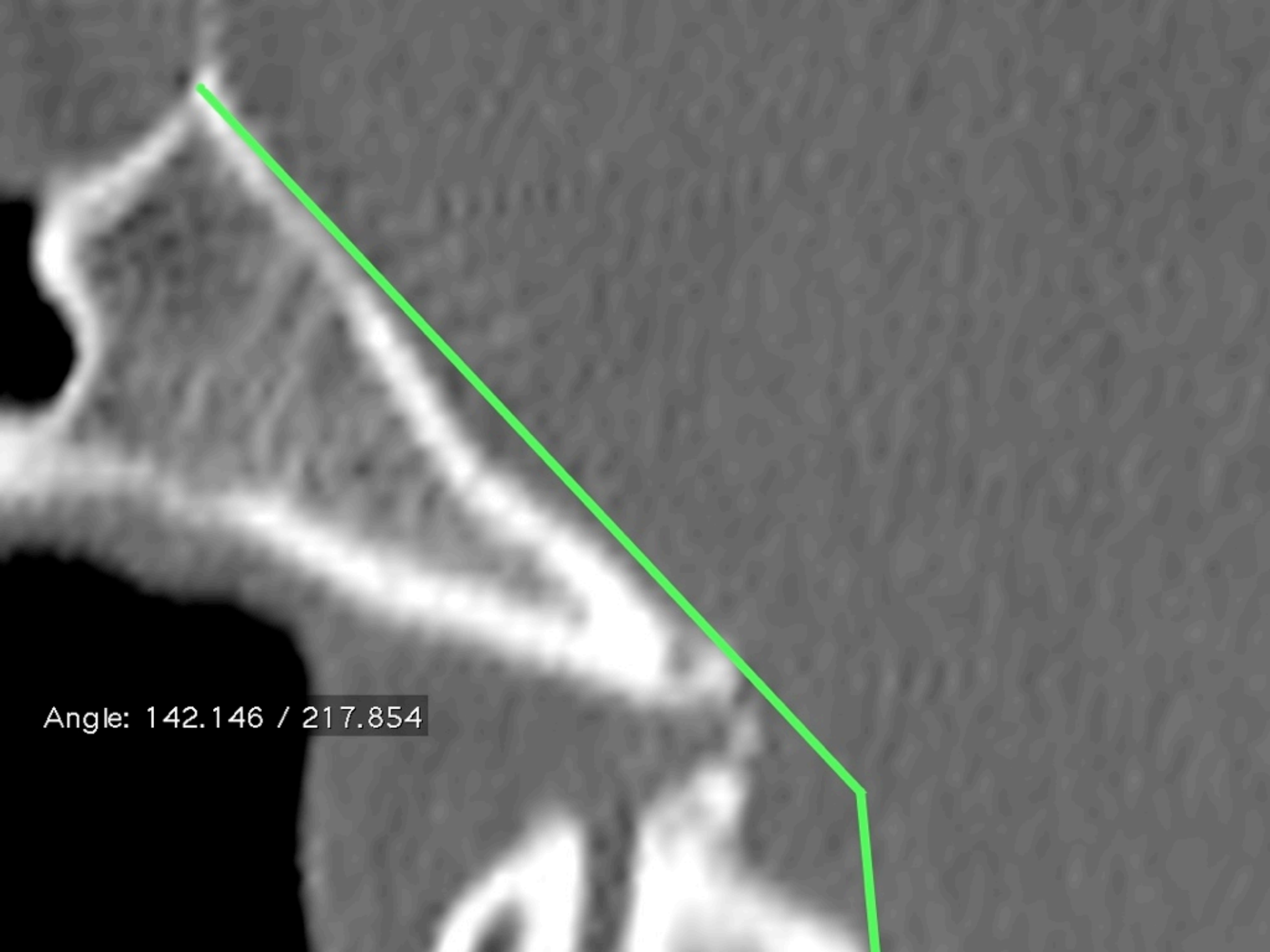


Angle: 138.662 / 221.338

This is a sagittal CT scan of the spine. A green line is drawn from the superior articular process of a vertebra to the inferior articular process of the vertebra below it, forming a 'Y' shape. The angle between these two lines is measured and displayed as 'Angle: 138.662 / 221.338'. The image shows the bony structures of the spine, including the vertebral bodies, intervertebral discs, and the complex of articular processes.



Angle: 137.019 / 222.981



Angle: 142.146 / 217.854

The image is a grayscale medical scan, likely a CT scan, showing a cross-section of a bone. A bright, irregularly shaped bone structure is visible on the left side of the frame. A green line is drawn across the image, starting from the top left and extending towards the bottom right. The line is composed of two segments: a longer, straight segment and a shorter, slightly curved segment at the bottom right. The background is a dark, textured gray.



Angle: 147.678 / 212.322

The image is a grayscale medical scan, likely a CT scan, showing a cross-section of a bone. A bright, curved line represents the bone's edge. A green line is drawn across the image, starting from the top left and ending near the bottom right. The text 'Angle: 147.678 / 212.322' is displayed in the lower-left area, indicating a measurement of the angle between two segments of the green line.



Angle: 156.936 / 203.064



Angle: 141.876 / 218.124

This is a sagittal MRI scan of the spine. A green line segment is drawn across the vertebral bodies, starting from the upper part of a vertebra and ending at the lower part of the same vertebra. The line is composed of two segments meeting at a vertex. A text box displays the angle measurement for this vertex.

Syndrome of occipitoatlantoaxial hypermobility, cranial settling, and Chiari malformation Type I in patients with hereditary disorders of connective tissue

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Object. Chiari malformation Type I (CM-I) is generally regarded as a disorder of the paraxial mesoderm. The authors report an association between CM-I and hereditary disorders of connective tissue (HDCT) that can present with lower brainstem symptoms attributable to occipitoatlantoaxial hypermobility and cranial settling.

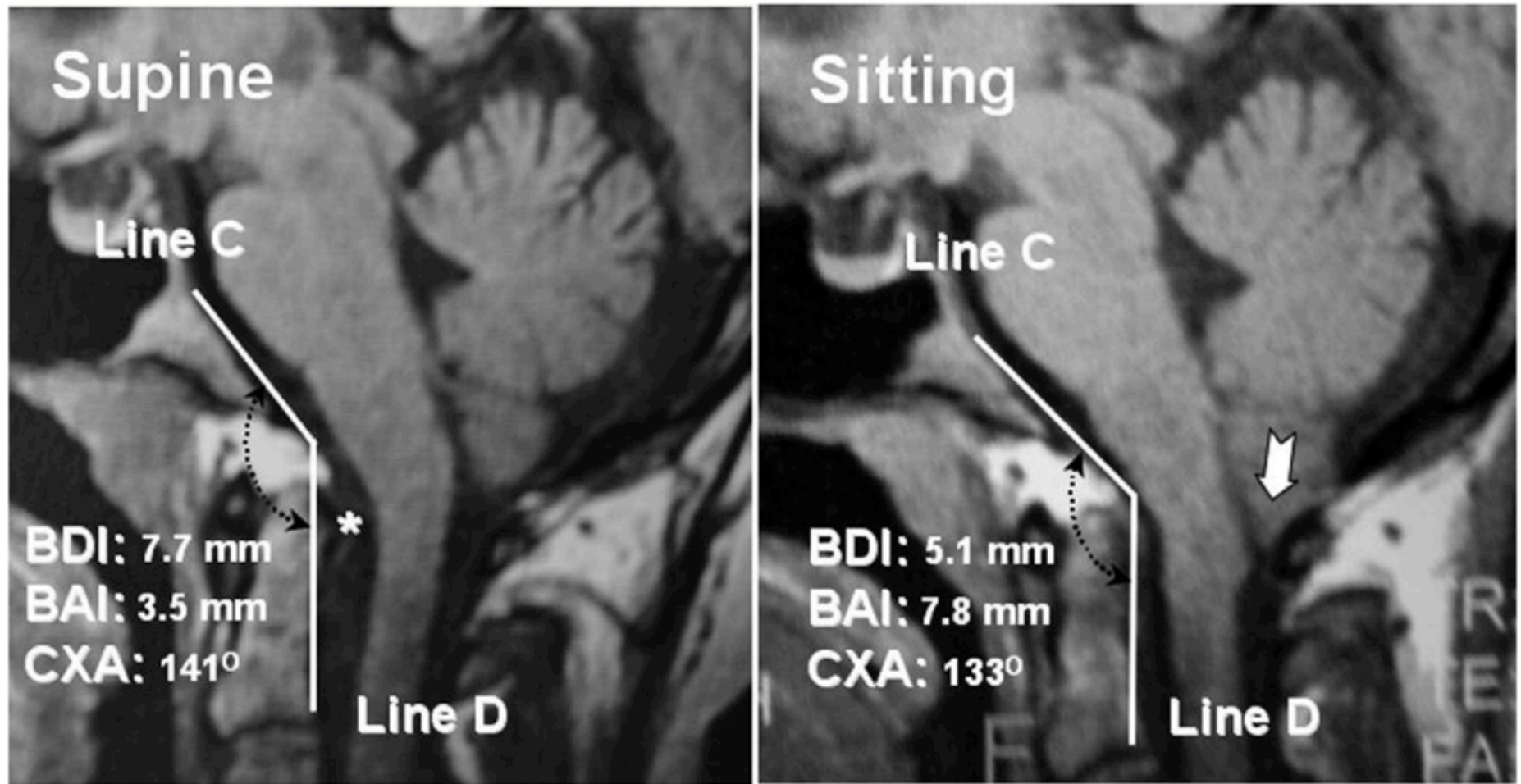


FIG. 6. Results of vertical MR imaging in a 27-year-old woman with HDCT/CM-I. Midsagittal image in supine position (*left*) showing normal basilar cistern depth interval (7.7 mm), normal basilar

PROBLEM

- Disconnect in definition of Basilar Impression, Basilar Invagination, etc. between Radiologists and Neurosurgeons
- Almost exclusive focus on ADI in Radiology reporting
- Other forms of instability and CCJ pathology often missed by the common Radiologist
- Medico-legal implications of a “normal” Radiological reading

GOALS

- We need a common glossary to define pathology
- We need to have a common set of parameters
- We need a common way to measure such parameters
- We need diagnostic and surgical thresholds for these parameters

LP

RA

