MORPHOMETRIC PARAMETERS AND CRANIOCERVICAL INSTABILITY

Paolo A. Bolognese, MD
The Chiari Institute

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

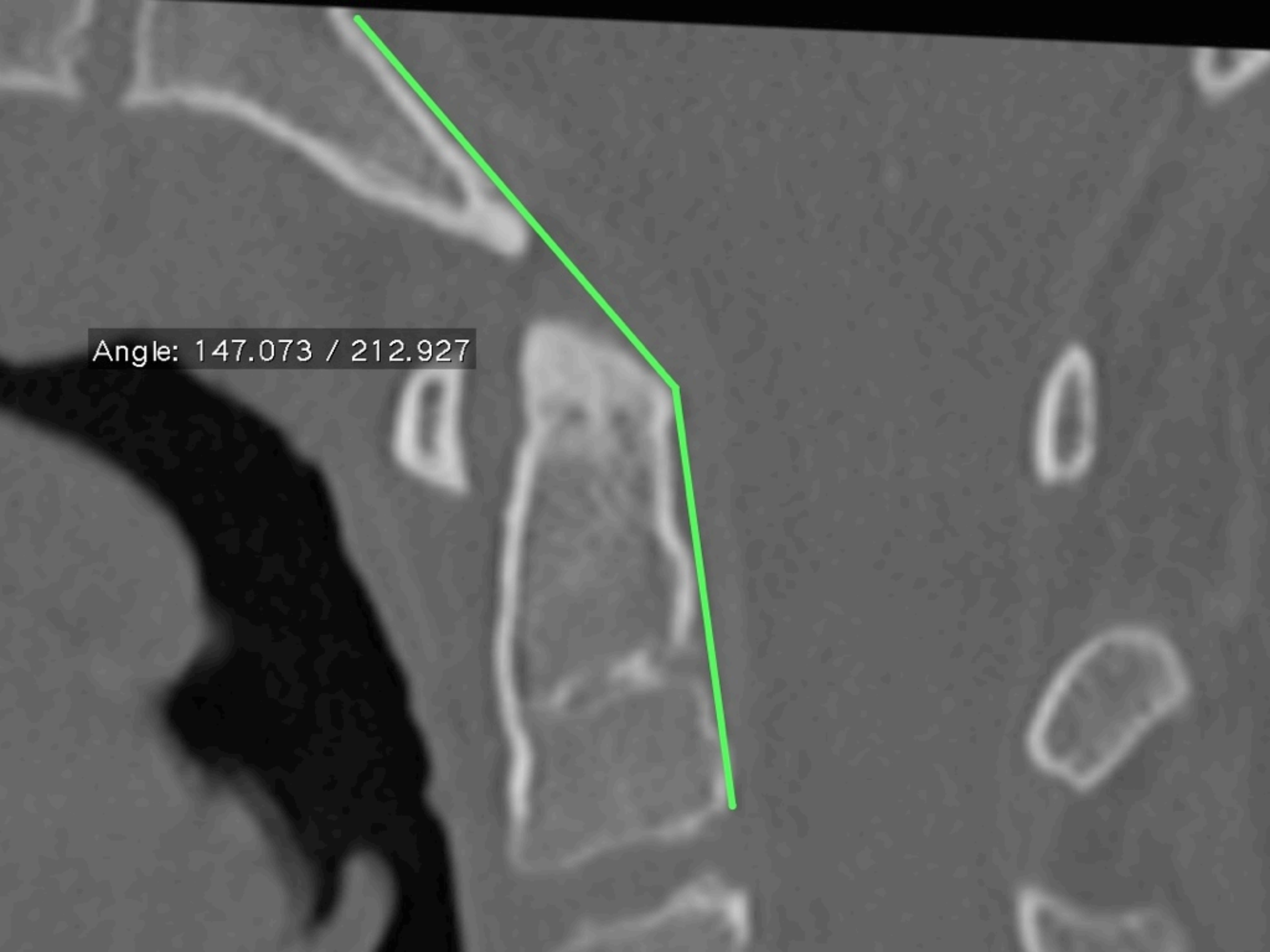
- A large body of literature has been focused on the use of these parameters in Trauma and Rheumatoid Arthritis
- Spectrum from normality to severe post-traumatic changes
- The middle of the spectrum includes pathologies affecting ligamentous integrity, bone density, and bone shape at the CCJ

PREMISE

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

PROBLEM

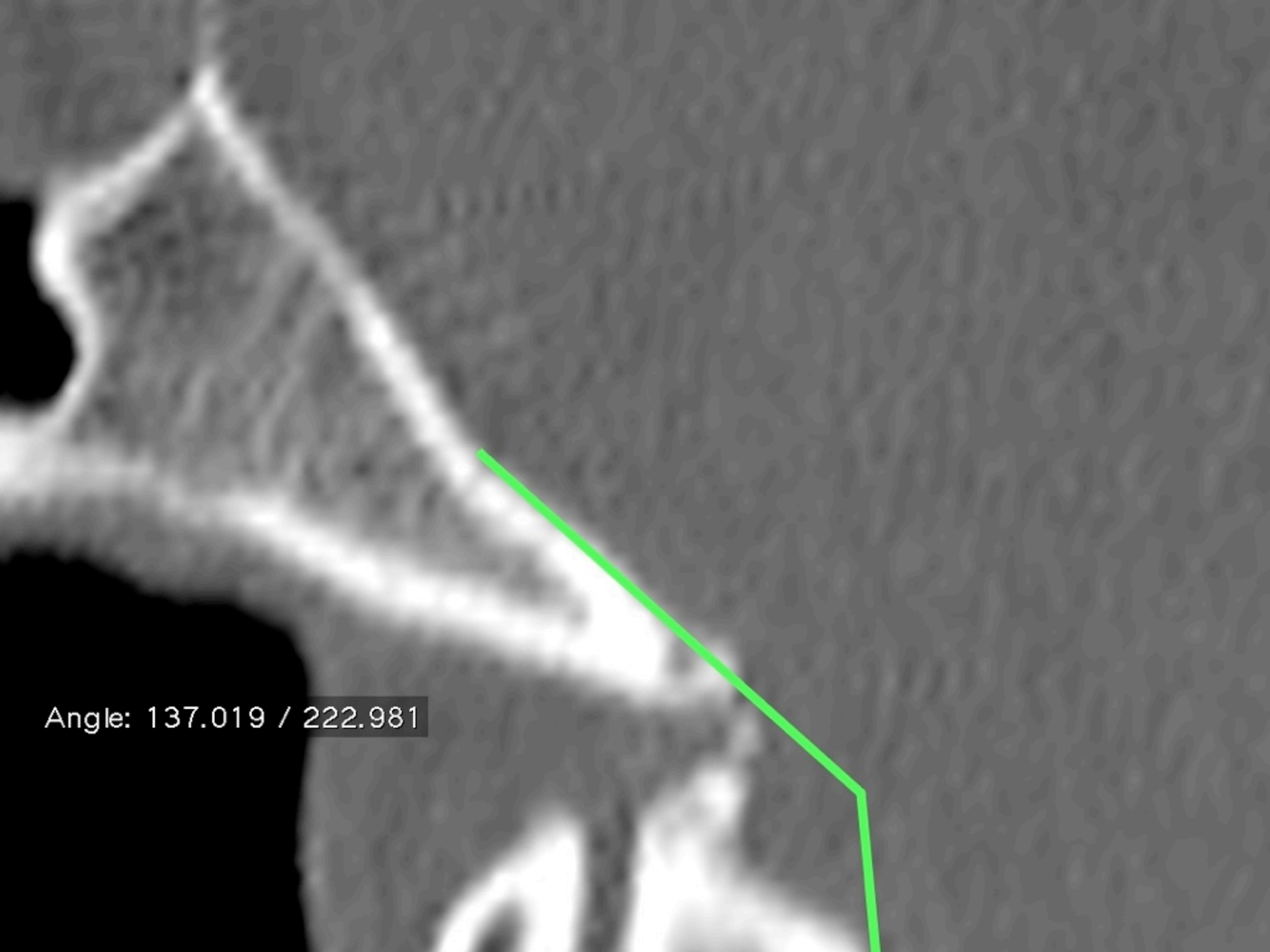
- There are guidelines in literature about how to execute the actual measurement of these parameters
- BUT there is a wide inter-individual variability
- BECAUSE of different measurement "styles"
- BECAUSE of distorted anatomy

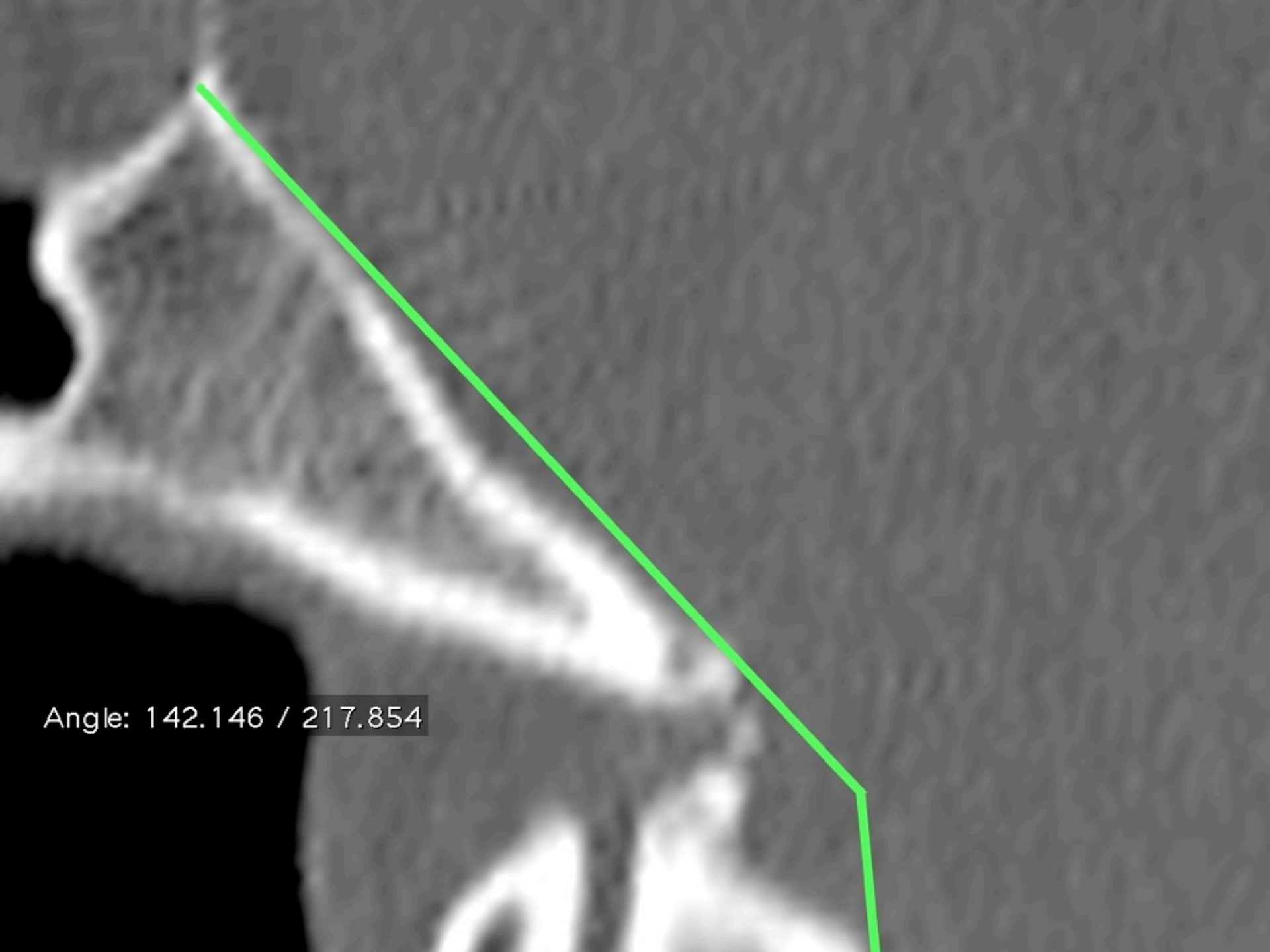

Angle: 147.073 / 212.927

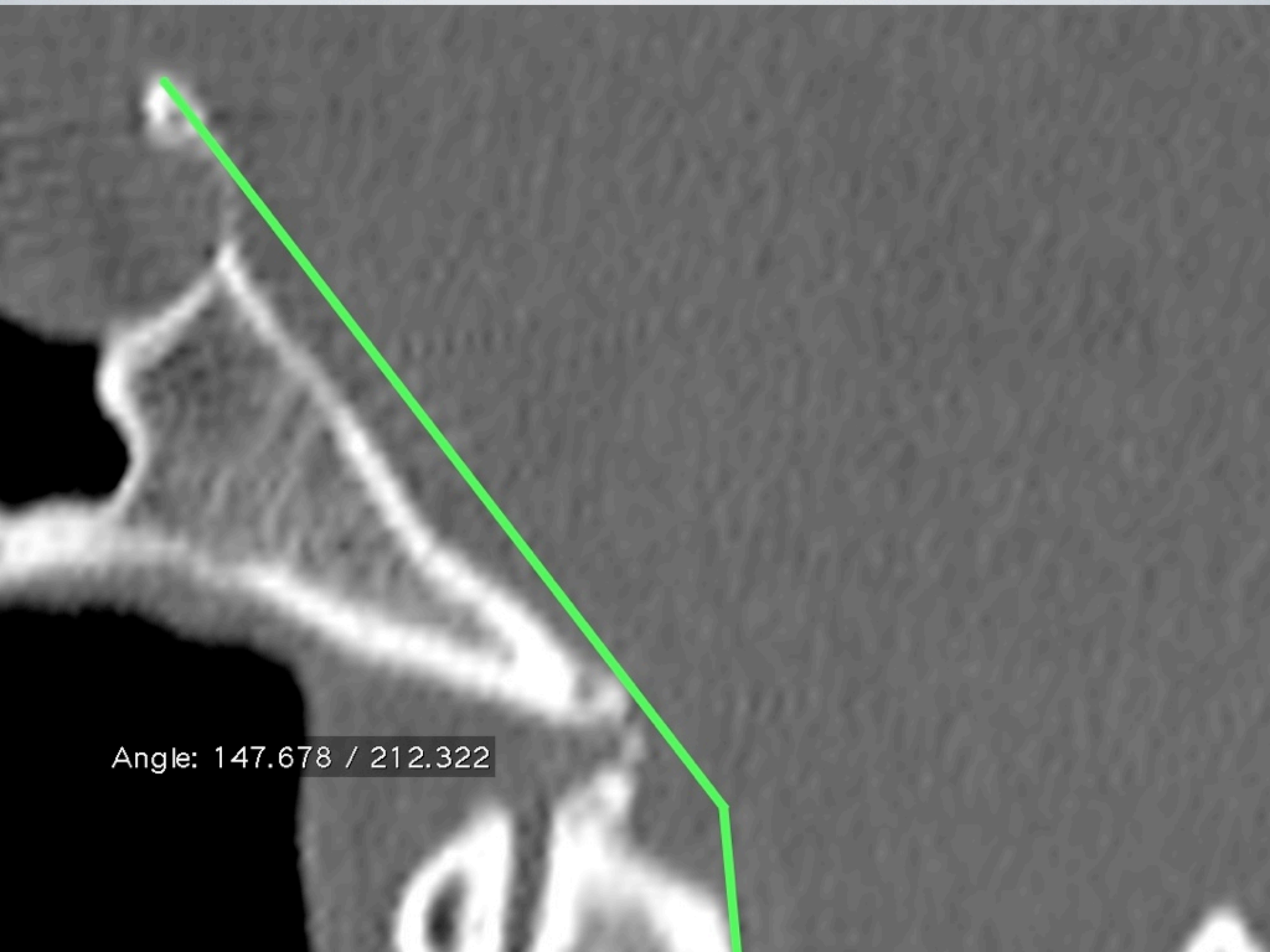

Angle: 154.985 / 205.015

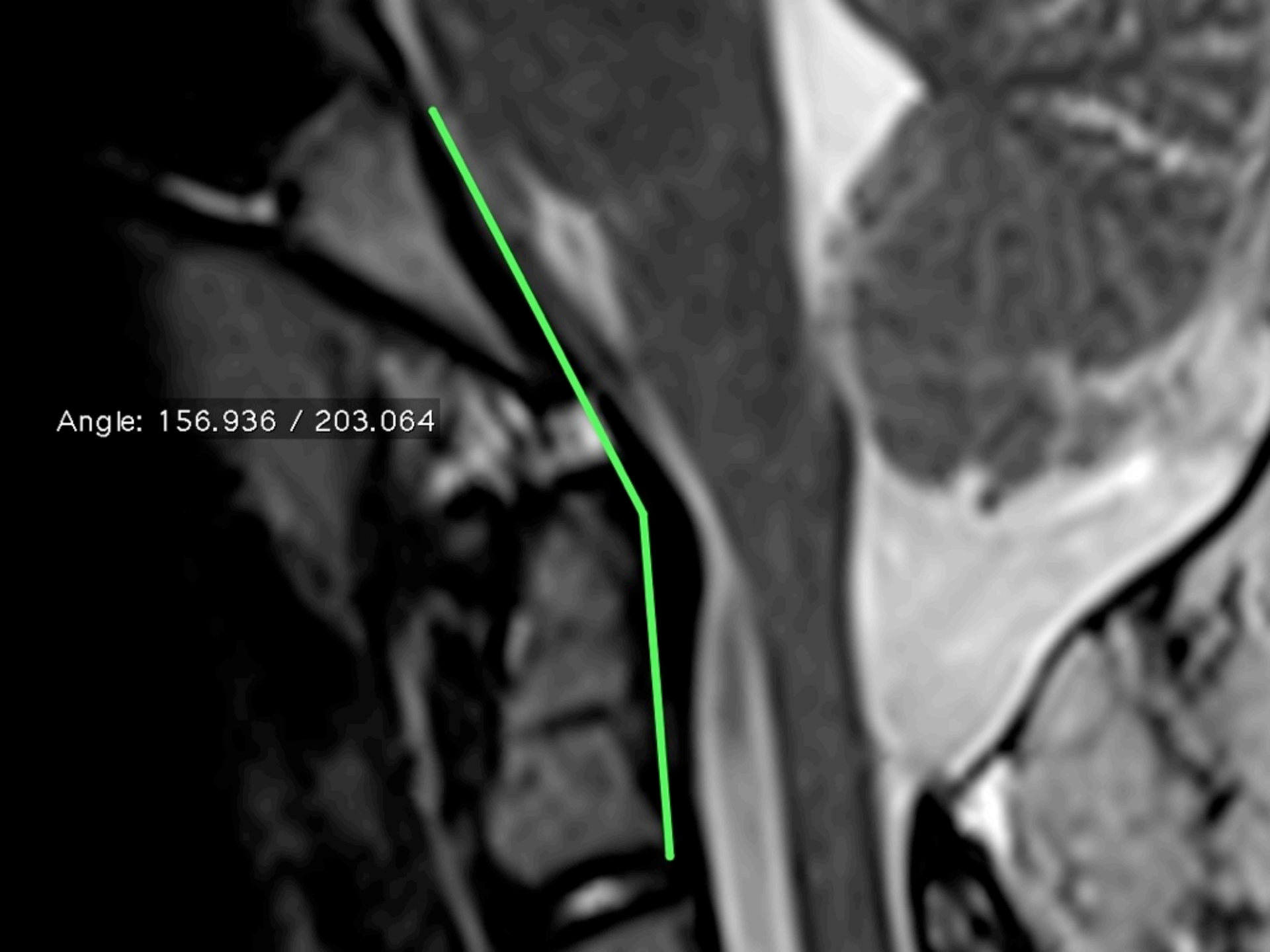

Angle: 147.139 / 212.861

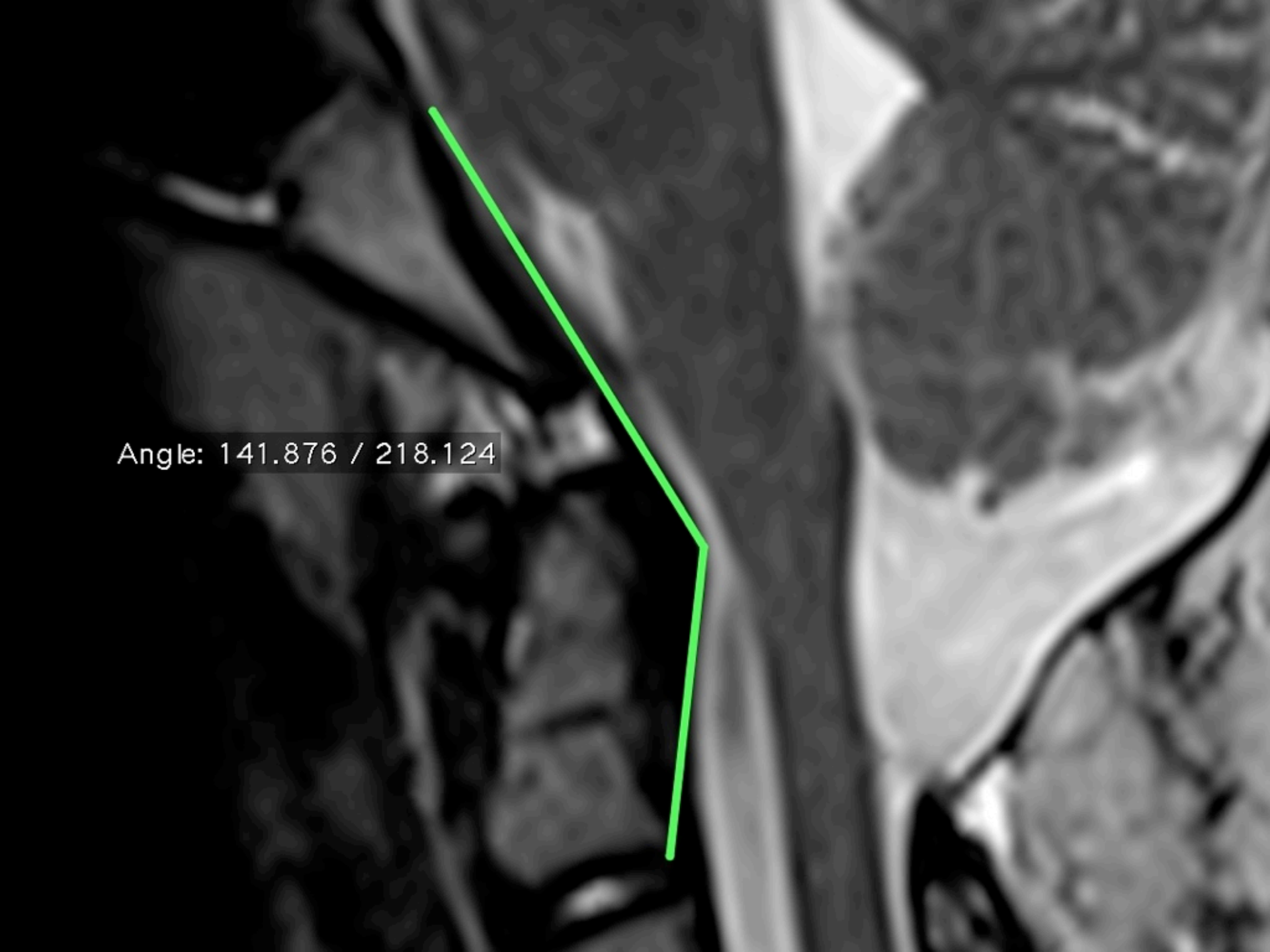

Angle: 138.662 / 221.338


Angle: 137.019 / 222.981


Angle: 142.146 / 217.854


Angle: 147.678 / 212.322


Angle: 156.936 / 203.064


Angle: 141.876 / 218.124

J Neurosurg Spine 7:601–609, 2007

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

Thomas H. Milhorat, M.D.,[1] Paolo A. Bolognese, M.D.,[1] Misao Nishikawa, M.D.,[1] Nazli B. McDonnell, M.D., Ph.D.,[2] and Clair A. Francomano, M.D.[3]

[1]Department of Neurosurgery, The Chiari Institute, North Shore-Long Island Jewish Health System, Manhasset, New York; [2]Medical Genetics, NIH National Institute on Aging; and [3]Harvey Institute for Medical Genetics, Greater Baltimore Medical Center, Baltimore, Maryland

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.

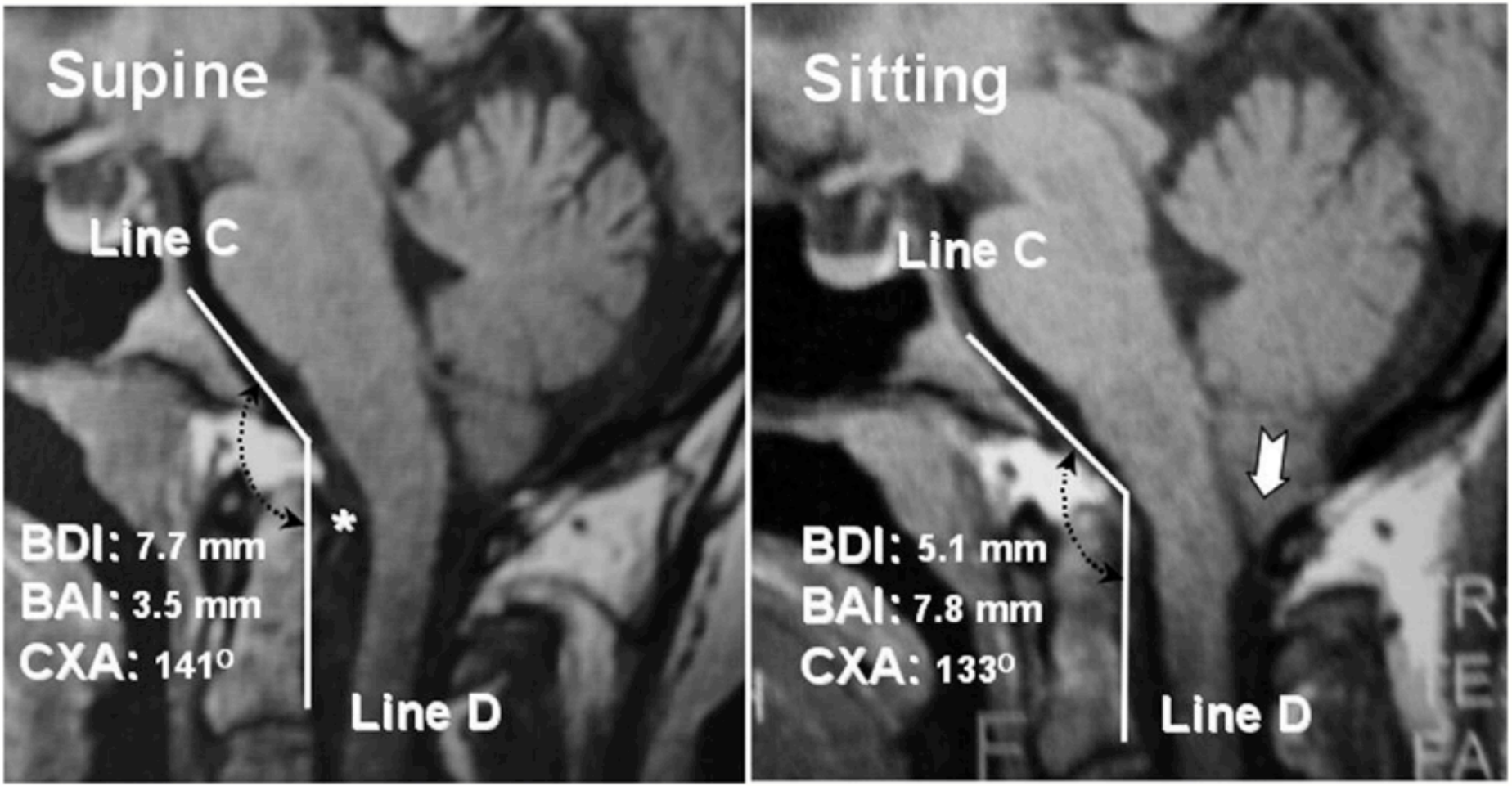


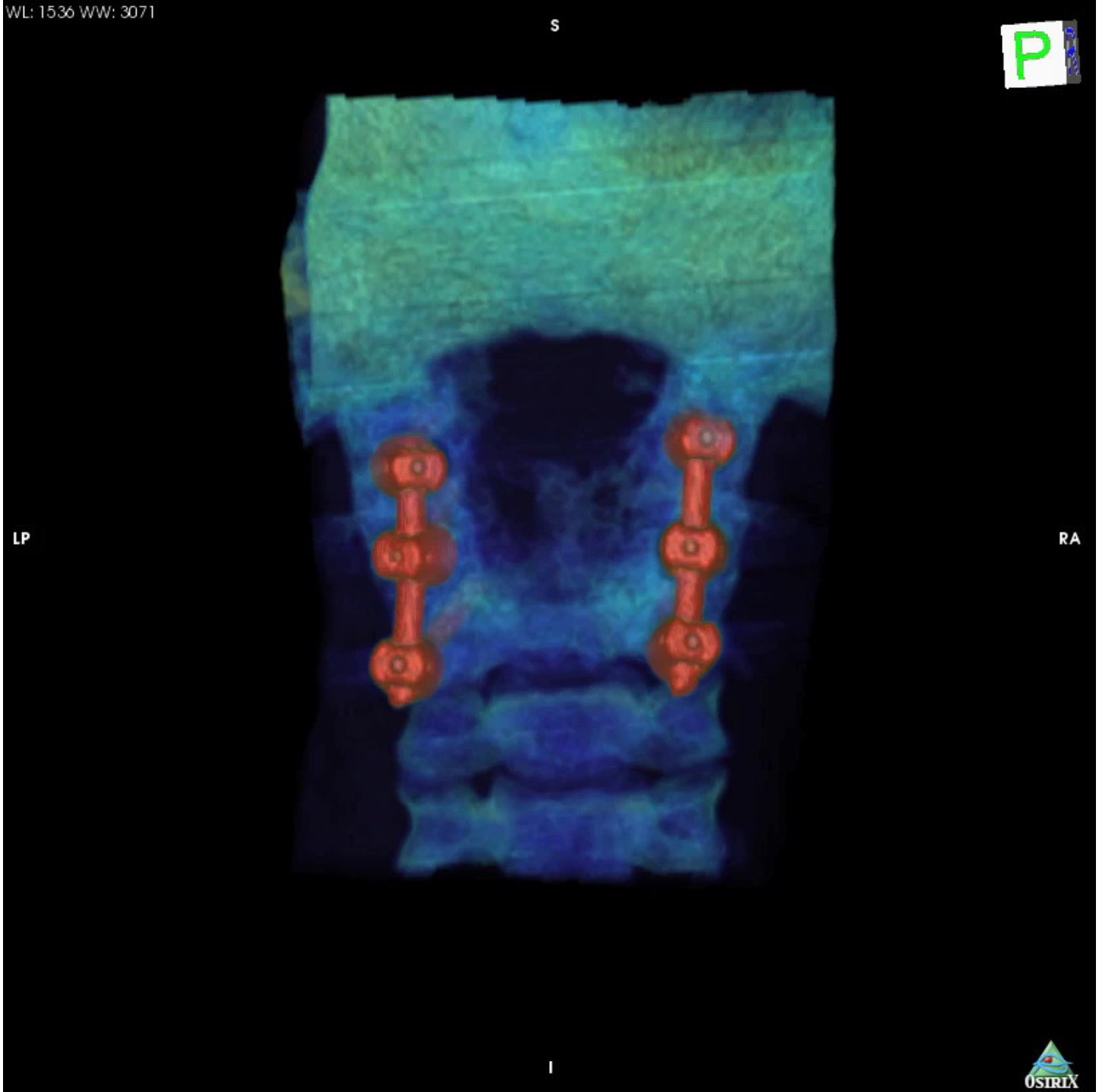
FIG. 6. Results of vertical MR imaging in a 27-year-old woman with HDCT/CM-I. Midsagittal image in supine position *(left)*

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


WL: 1536 WW: 3071
S
P
LP
RA
I
OSIRIX