



The Spectrum of Severity in Metopic Craniosynostosis: An Updated Analysis of the CranioRate™ Machine Learning Algorithm

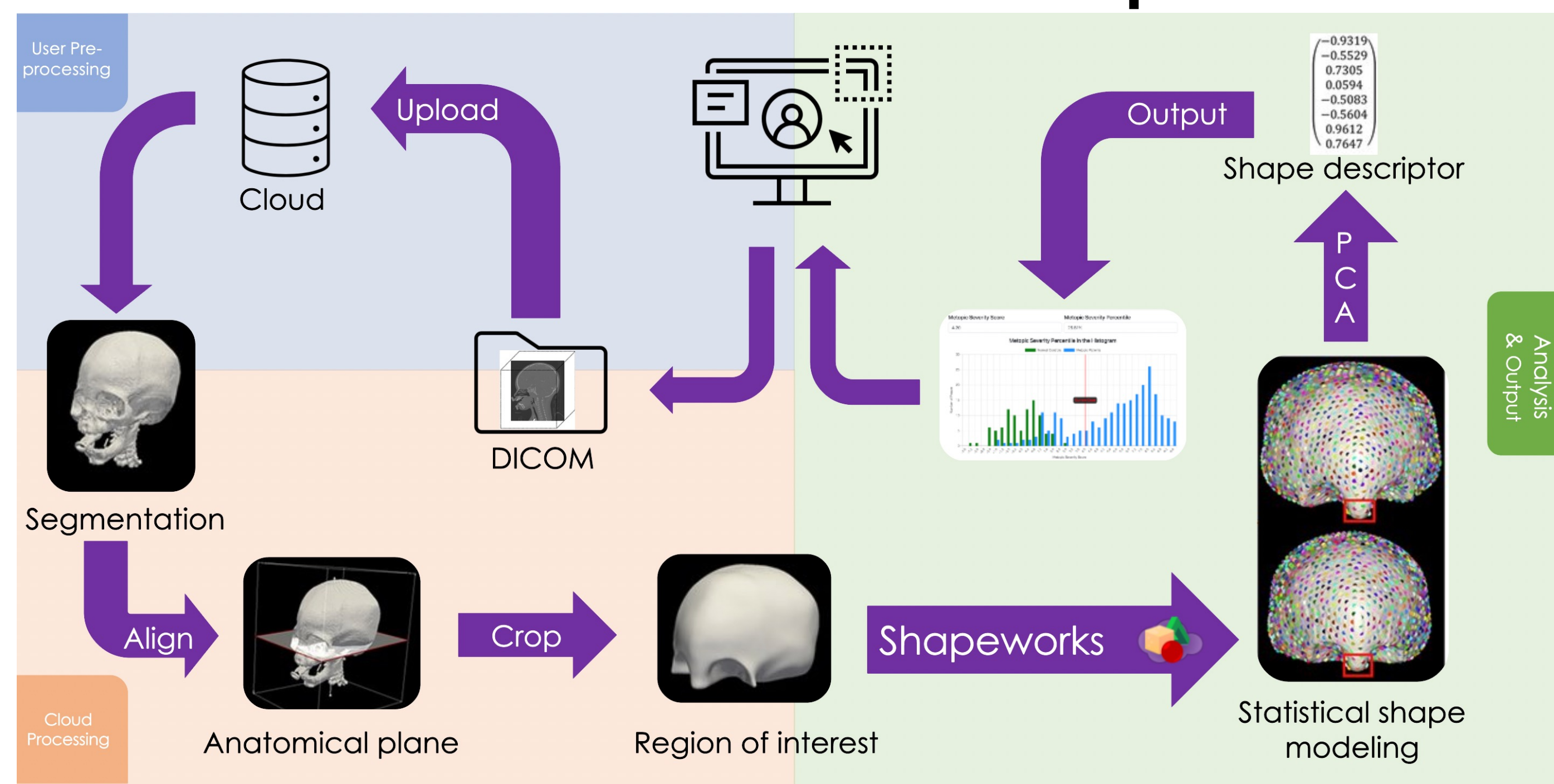
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INTRODUCTION AND METHODS

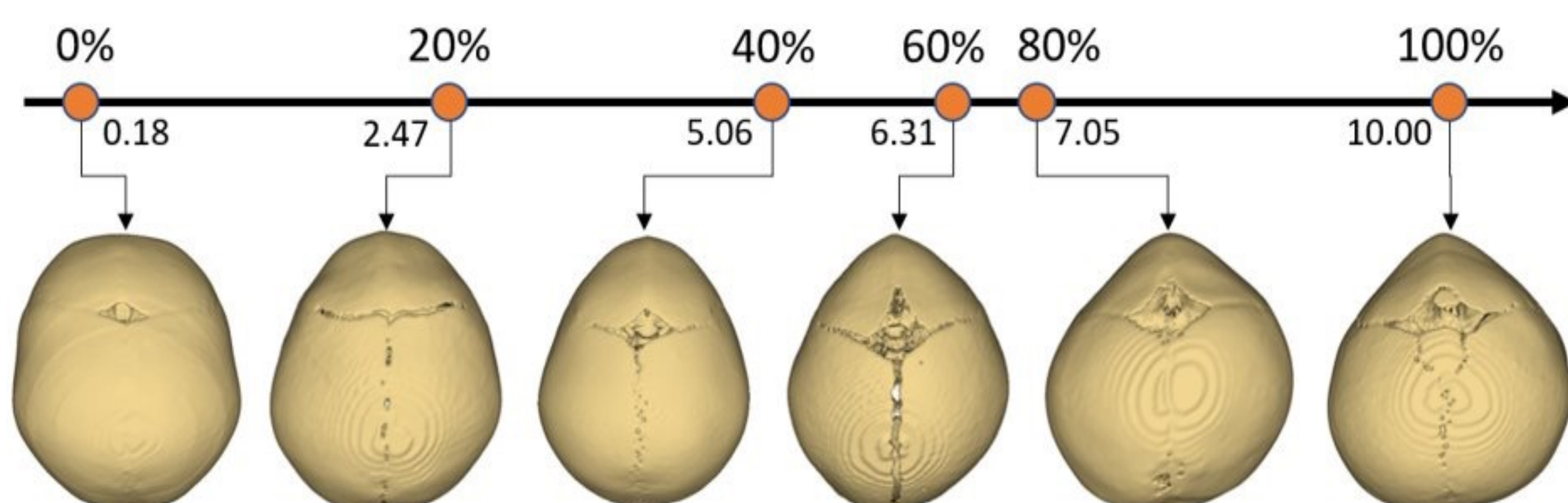
Skull morphology in metopic craniosynostosis is poorly understood

- Wide spectrum in phenotype
- No consensus on measurement tools
- Unexplored relationship to important outcomes
- Prior metrics reductive/difficult to use

Point-of-Care Tool Development



Spectrum of severity



We used CranioRate™ to evaluate **743 patients** with metopic craniosynostosis and define the **spectrum of severity**

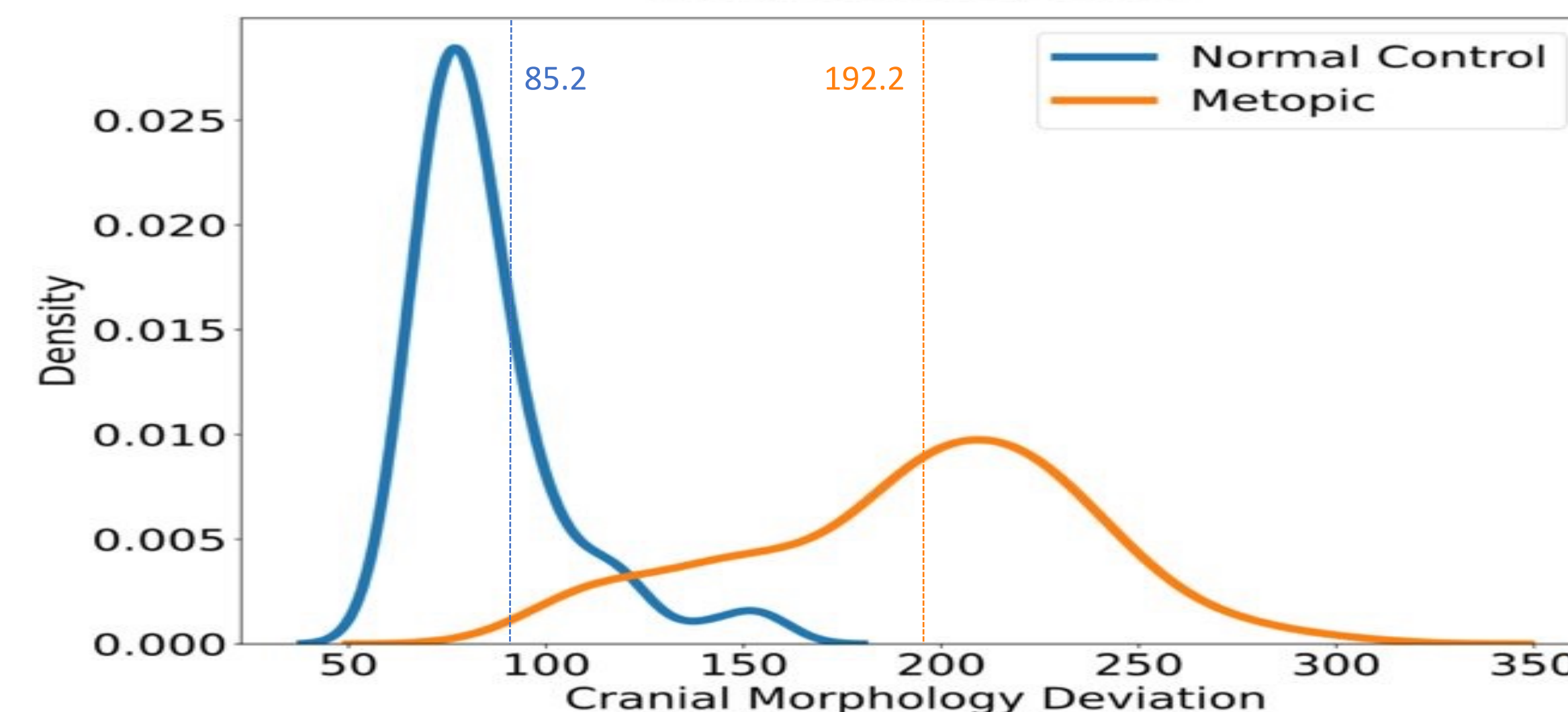
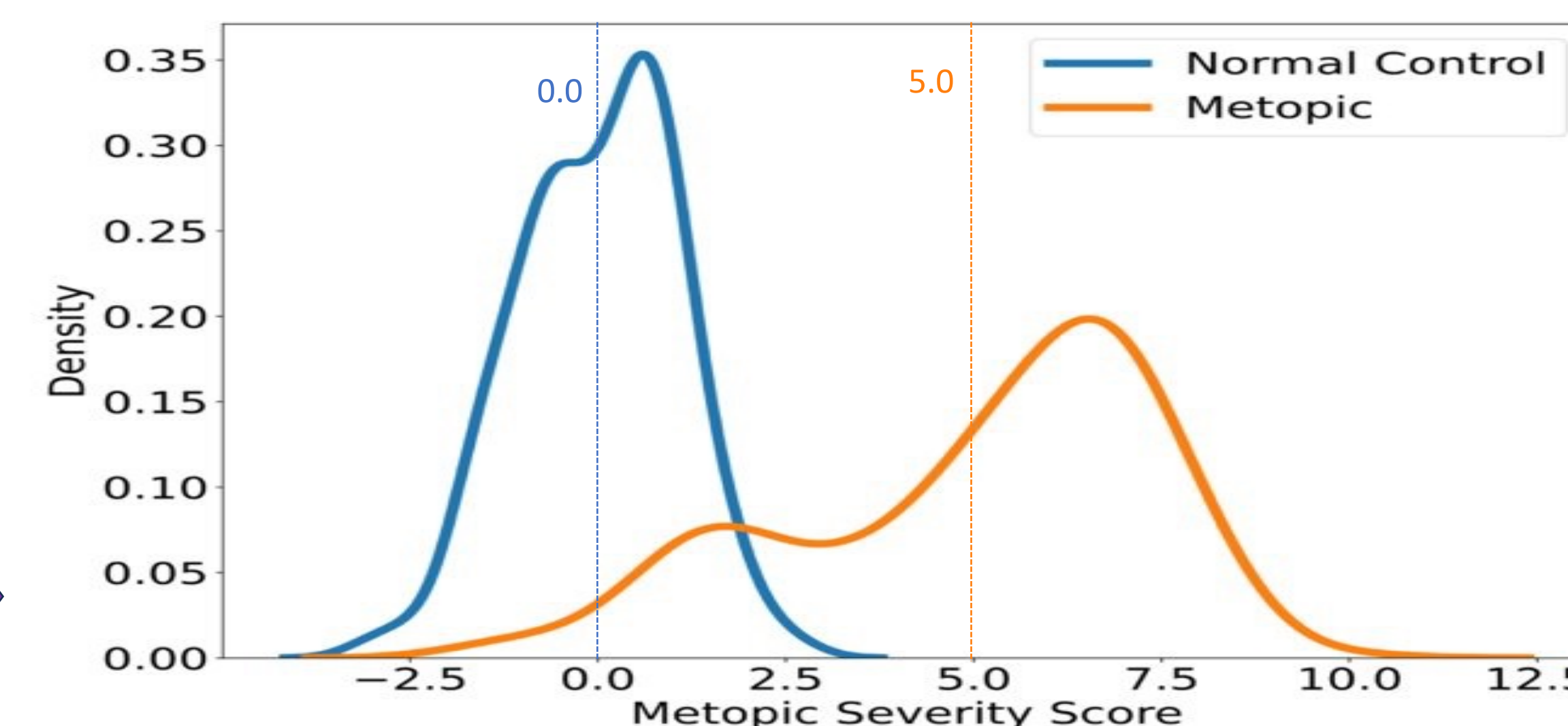


Figure 1. Using two machine learning models, Metopic Severity Score (MSS; supervised model) and Cranial Morphology Deviation (CMD; unsupervised model) were developed. Kernel density plots of the MSS (above) and CMD (below).

Distribution of Scans

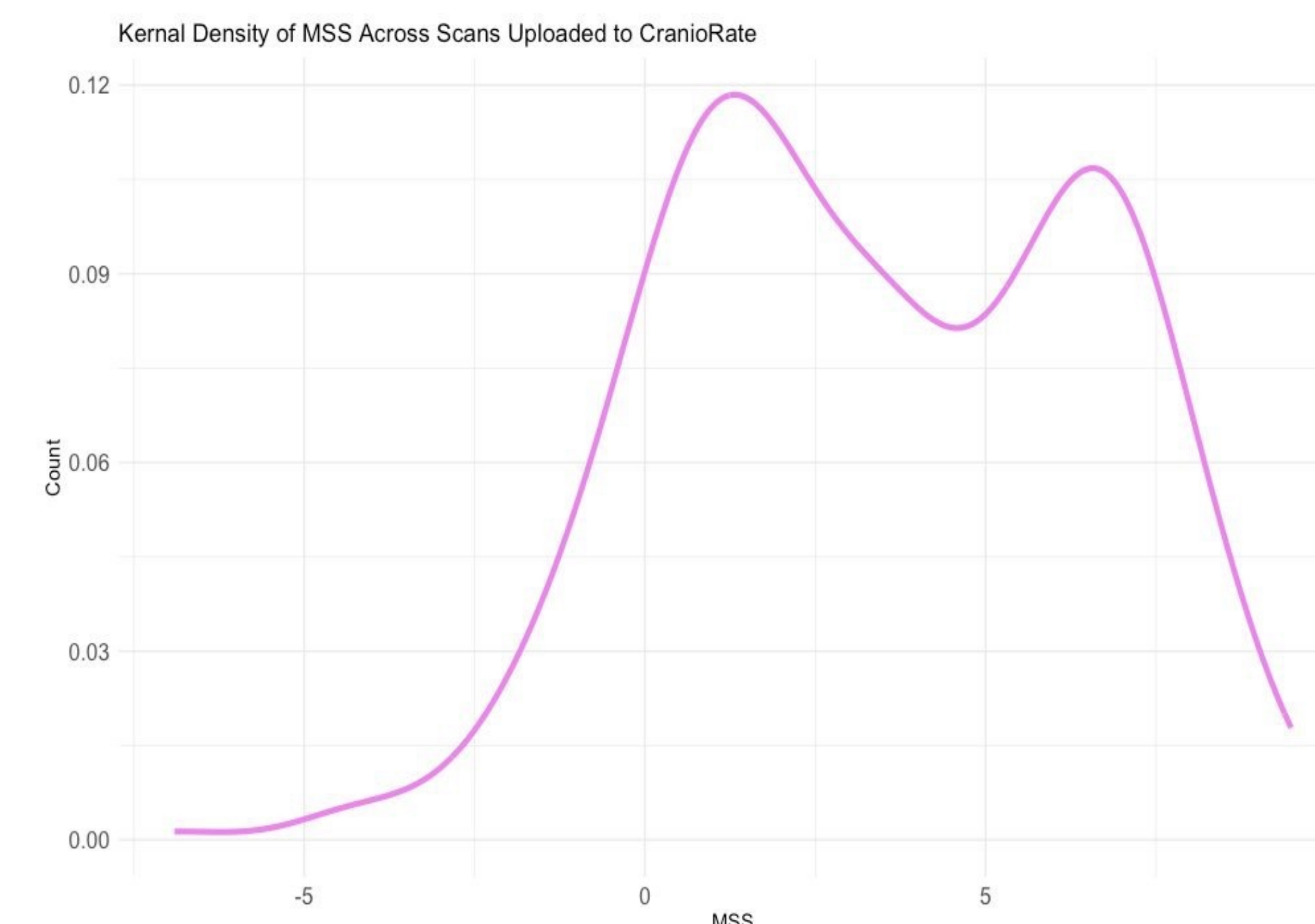


Figure 3. Total of 353 unique scans from 52 users have been uploaded to CranioRate point-of-care tool.

Location of severity

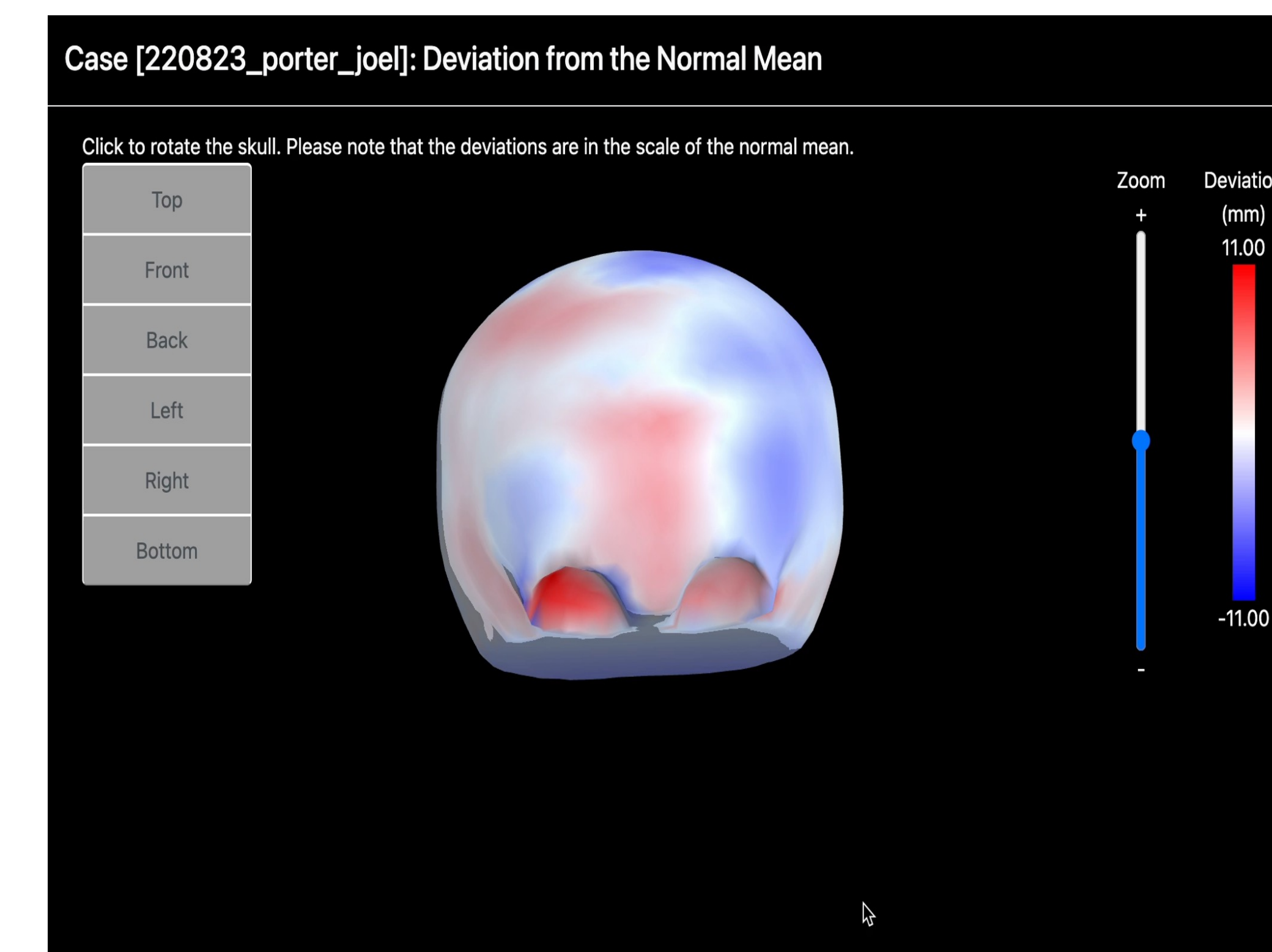


Figure 2. The central frontal bone, lateral orbit, and supraorbital rim are most predictive of severity

MAJOR TAKEAWAYS

- Approximate and quantify the spectrum of severity in Metopic craniosynostosis patients in the US
- Severity scored for a Cohort of 734 Metopic Patients

NEXT STEPS

- Elaborate on morphologic differences with metopic ridge
- Expand to other craniosynostoses → Sagittal
- Compare with neurologic functioning
- Expand consortium

