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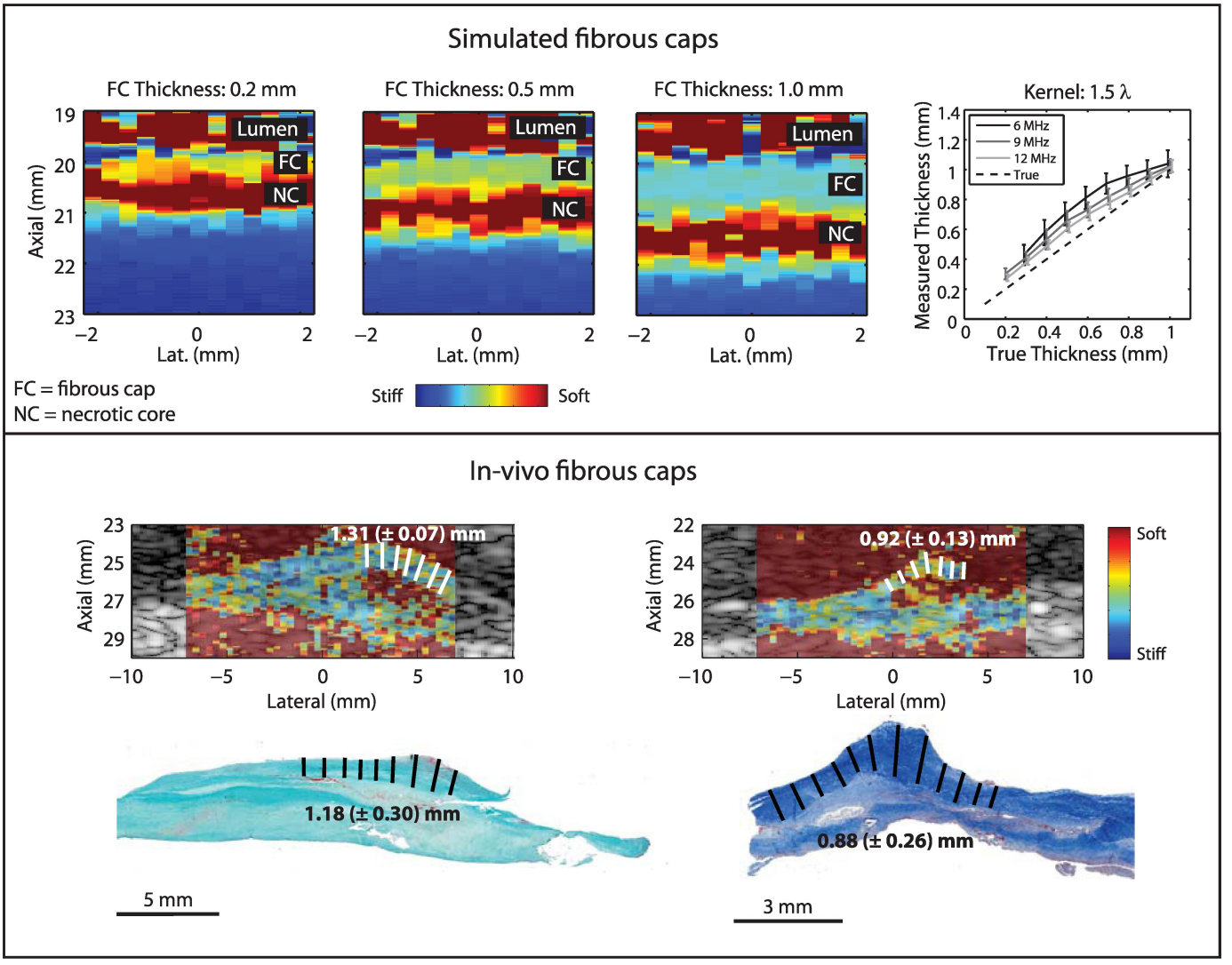

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Quantification of Carotid Plaque Fibrous Cap Thickness With Acoustic Radiation Force Impulse (ARFI) Imaging

The top panel shows three ARFI peak displacement images of fibrous caps simulated by finite element method (FEM) modeling. Simulations consisted of a stiff, transversely isotropic (TI) layer to represent fibrous cap on top of a soft, isotropic layer to represent necrotic core on top of another stiff, TI layer. ARFI-derived cap thickness was quantified using a semi-automated k-means algorithm and compared to the true simulated thickness for three different tracking frequencies (6 MHz, 9 MHz, and 12 MHz). Simulations suggest that ARFI-measured thickness correlates well with true thickness but with a positive bias of 0.13 ($\pm$0.05) mm. The bottom panel shows two *in vivo*, human ARFI examples with matched histology. As predicted from FEM simulations for a 6 MHz tracking frequency, ARFI overestimates histology-measured thickness, with mean error of 0.13 mm and 0.04 mm, respectively.

Images are courtesy of Tomasz J. Czernuszewicz and Caterina M. Gallippi. T. J. Czernuszewicz is with the Joint Department of Biomedical Engineering, University of North Carolina, Chapel Hill, NC 27599 USA, and also with the North Carolina State University, Raleigh, NC 27607 USA. C. M. Gallippi is with the Joint Department of Biomedical Engineering, University of North Carolina, Chapel Hill, NC 27599 USA, and also with the Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC 27607 USA.

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