Magnetic resonance imaging of ankle tendon pathology: benefits of additional axial short-tau inversion recovery imaging to reduce magic angle effects.

Our goals were to quantify the reduction of the magic angle effect using short-tau inversion recovery (STIR) imaging and to determine the value of adding an axial STIR sequence to the magnetic resonance imaging ankle protocol. Axial STIR sequences were used to measure normal tendon T1 and to estimate signal loss due to the inversion recovery preparation of our clinical protocol. In addition, 102 ankles were imaged with axial fat-suppressed intermediate-weighted fast spin echo and STIR sequences. Two radiologists analyzed the tendons for signal intensity, size, abnormalities, and magic angle effect. The diagnostic value and image quality of the two sequences were compared.

We calculated a 50% reduction of signal intensity in healthy tendons on the STIR sequence at TI = 170 ms compared with TI = 0 ms, explaining the decrease in the magic angle effect. Using the STIR sequence, our study demonstrated significantly lower signal intensity within the tendons, more precise tendon size, and a lower magic angle effect compared with the standard intermediate-weighted FSE sequence (p< 0.001). Diagnostic classification of tendon abnormalities using the STIR sequences showed higher sensitivity (82.35% vs. 75.27%) and better agreement with a reference standard than the intermediate-weighted sequences,
and superior image quality (p< 0.01). Axial STIR sequences reduce magic angle effects and improve visualization of ankle tendon pathology.