3.0T MR imaging of the ankle: Axial traction for morphological cartilage evaluation, quantitative T2 mapping and cartilage diffusion imaging-A preliminary study.

Abstract:
To determine the impact of axial traction during high resolution 3.0T MR imaging of the ankle on morphological assessment of articular cartilage and quantitative cartilage imaging parameters. MR images of n=25 asymptomatic ankles were acquired with and without axial traction (6kg). Coronal and sagittal T1-weighted (w) turbo spin echo (TSE) sequences with a driven equilibrium pulse and sagittal fat-saturated intermediate-w (IMfs) TSE sequences were acquired for morphological evaluation on a four-point scale (1=best, 4=worst). For quantitative assessment of cartilage degradation segmentation was performed on 2D multislice-multiecho (MSME) SE T2, steady-state free-precession (SSFP; n=8) T2 and SSFP diffusion-weighted imaging (DWI; n=8) images. Wilcoxon-tests and paired t-tests were used for statistical analysis. With axial traction, joint space width increased significantly and delineation of cartilage surfaces was rated superior (P<0.05). T2 values were lower at the tibia than at the talus (P<0.001). Reproducibility was better for images with axial traction. Axial traction increased the joint space width, allowed for better visualization of cartilage surfaces and improved
compartment discrimination and reproducibility of quantitative cartilage parameters.

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