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Titel des Beitrags: Validation of bone marrow fat quantification in the presence of trabecular bone using MRI.

Abstract: To validate six-echo, chemical-shift based MRI with T2 * correction for the quantification of bone marrow fat content in the presence of trabecular bone. Ten bone phantoms were made using trabecular bone cores extracted from the distal femur and proximal tibia of 20 human cadaveric knees. Bone marrow was removed from the cores and the marrow spaces were filled with water-fat gelatin to mimic bone marrow of known fat fractions. A chemical-shift based water-fat separation method with T2 * correction was used to generate fat fraction maps. The proton density fat fractions (PDFF) between marrow regions with and without bone were compared with the reference standard of known fat fraction using the squared Pearson correlation coefficient and unpaired t-test. Strong correlations were found between the known fat fraction and measured PDFF in marrow without trabecular bone (R(2) = 0.99; slope = 0.99, intercept = 0.94) as well as in marrow with trabecular bone (R(2) = 0.97; slope = 1.0, intercept = -3.58). Measured PDFF between regions with and without bone were not significantly different (P = 0.5). However, PDFF was systematically underestimated by -3.2% fat fraction in regions containing trabecular bone. Our implementation of a