PURPOSE: To retrospectively evaluate plantar fat pad (PFP) signal intensity alterations in magnetic resonance (MR) imaging studies of asymptomatic volunteers and to compare PFP alterations with histopathologic findings in cadavers and patients. MATERIALS AND METHODS: After appropriate institutional review board approval and any required informed consent were obtained, MR imaging studies of 70 asymptomatic volunteers (35 women, 35 men; mean age, 45 years; range, 21-69 years) obtained for another investigation were retrospectively analyzed by two musculoskeletal radiologists in consensus. The location, signal intensity, margin, extent, and size of PFP alterations were determined. MR imaging-histopathologic comparison was performed in six cadaveric feet and six feet of symptomatic patients (one woman, five men; mean age, 43 years; range, 31-60 years). For volunteers, the relationship between PFP alterations and Morton neuroma, age, and sex was analyzed by using the Fisher exact test, Spearman rank correlation, and the Wilcoxon rank sum test, respectively. Bonferroni correction was applied, and $P<.01$ was considered to indicate a significant difference. RESULTS: Fifty-nine (84%) volunteers had PFP signal intensity alterations. Forty-nine (70%), six (9%), one (1%), four (6%),
and 43 (61%) volunteers had alterations beneath the first, second, third, fourth, and fifth metatarsal heads, respectively. Ninety-four (91%) of 103 signal intensity alterations were in the form of hypointensity on T2-weighted images. Blurred margins were present in 90 (87%) alterations. Ninety percent of all PFP alterations in asymptomatic volunteers were 14 mm or smaller. The relationship between PFP alterations and Morton neuroma, age, and sex was not statistically significant. In cadaveric forefeet, PFP alterations corresponded histopathologically to a variable amount of fibrosis. In nine PFP alterations, development of fluid-containing spaces resembling bursae was present. Among the six patients with PFP alterations, histopathologic examination revealed fibrosis and adventitious bursae in two, fibrosis with inflammation in three, and a soft-tissue chondroma in one.

CONCLUSION: PFP signal intensity alterations are commonly seen in asymptomatic volunteers under the first and fifth metatarsal heads. At histologic examination, PFP signal intensity alterations correspond most commonly to fibrosis and adventitious bursae.