

Bone stress injury of the ankle in professional ballet dancers seen on MRI

Reference:

Elias, I., Zoga, A., Raikin, S., Peterson, J., Besser, M., Morrison, W., Schweitzer, M.. (2008). Bone stress injury of the ankle in professional ballet dancers seen on MRI. *BMC Musculoskeletal Disorders*, 9:39.

Scientific Literature Review

Reviewed by: Lauren A. Fisher, DPM

Residency Program: Massachusetts General Hospital, Boston MA

Podiatric Relevance:

This study serves to evaluate the clinical relevance of MR imaging patterns of bone marrow edema in the ankles of high performance ballet dancers.

Methods:

Twelve (12) ankles of eleven (11) professional dancers were MR imaged. The study group included six (6) females and five (5) males, with a mean age of 24 years. Nine (9) individuals reported mild ankle pain during activity, five (5) of whom also reported some pain at rest. Imaging was performed on either 0.2 T extremity or 1.5 T MRI units. With 0.2 T unit imaging, sagittal and axial T1- weighted spin echo, axial T2- weighted spin echo and sagittal & coronal short inversion time recovery imaging sequences were obtained. An extremity coil was used with the 1.5 T unit, and sagittal T1- weighted spin echo, axial & coronal fat-suppressed T2 - weighted fast spin echo and sagittal STIR imaging were obtained. All images were reviewed by two musculoskeletal radiologists and one orthopaedic surgeon, in consensus for edema location and pattern. Bone marrow signal was evaluated for the presence of edema-type signal (high signal on STIR or fat suppressed T2 - weighted images). If edema-type marrow signal was present, the location and morphology were recorded, and the T1 signal in the area was noted.

Results:

Bone marrow edema signal was seen on fluid-sensitive sequences in nine (9) of the twelve (12) ankles (i.e., 75%). In all of the cases, the edema was within the talus, either centered in the talar neck or body. In three (3) of the cases, the edema extended toward the talar dome, but was still centered in the body or neck of the talus. The edema appeared patchy with a rounded shape and poorly defined margins in all cases. All subjects presented with marrow edema strictly located in the talus, which was not identified in the other bones of the ankle or foot. All eight (8) patients (i.e., nine ankles) with marrow edema had associated pain. A phi correlation was run to assess the association of bone marrow edema and ankle pain, and a moderately strong correlation ($\phi=0.77$, $p=0.0054$) was found between edema and pain.

Conclusion:

The bone marrow edema pattern described in this study should not be misinterpreted as a morphologic pathology such as stress fracture, avascular necrosis, osteochondrosis dissecans or degenerative arthritis. Rather, this specific MRI finding should be considered a sign of an overuse syndrome and may indicate an earlier and less severe bone stress injury of the talus. When this finding is detected in the symptomatic ballet dancer, the authors suggest reassessment of training regimen and reduction in training intensity be considered.