Detection of the Tram Track Lesion in the Ankle Joint: Comparing 3.0-Tesla Magnetic Resonance Imaging an Arthroscopy

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This article discusses the tram track lesion and presents the results of a Level III study investigating the reliability of the lesion's detection with 3.0-Tesla MRI.

The tram track lesion is a talar cartilage defect with a "longitudinal trough shape" which the authors state "relates to a large osteophyte projecting from the anterior distal tibia." The lesions have tended to be an incidental finding during ankle arthroscopy as they are not usually identified in preoperative imaging, including CT and standard MRI. The study aimed to show that the more advanced 3.0-Tesla MRI imaging would be effective in diagnosing the lesions consistently.

The retrospective study examined all arthroscopic ankle surgeries occurring between January 2013 and July 2015, excluding those patients without MRIs as well as those patients with talar OCD lesions or arthritis. Inclusion criteria was the presence of an anterior distal tibial osteophyte. Ultimately, 175 of the 335 ankles fit the criteria for examination. Arthroscopy confirmed the presence of a "distinctive longitudinal trough in the talar dome from anterior to posterior." The lesion was then classified according to the ICRS Grading System. Pre-operative plain films were also examined for the presence of an osteophyte at the anterior distal tibia which was classified using the Anterior Ankle Impingement Classification by Scranton. The ICRS and Ankle Impingement classification gradings were then used to "correlate the severity of spur formation with the cartilage defect." Finally, the images obtained from the 3.0-Tesla MRI were examined, specifically the coronal fat-suppressed T2 images. It should be noted that on MRI, the tram track lesion "is not accompanied by subchondral bone edema or cysts" and "exactly corresponds to the [talus]'s articulation" with the distal tibial osteophyte. The plain films and MRI were evaluated by 2 musculoskeletal specialists who were blinded to the diagnosis. The authors then calculated the sensitivity and specificity of the MRI for detecting the tram track lesion using the arthroscopic findings as reference.

Of the 175 ankles examined, 16 were found to have tram track lesions on arthroscopy. The prevalence of the lesion was calculated at 9.1%. Examination of the plain films found that the Anterior impingement grade did not significantly correlate with the arthroscopic IRCS grade. On MRI, 14 had lesions that were identified by the radiologist and confirmed with arthroscopy. The MRI findings also "correlated well" with the arthroscopic findings with the following results: Sensitivity of MRI for detection of the tram track lesions was calculated at 87.5% with a specificity of 100%; positive predictive value was 100% and negative predictive value was 98.8%. As such, the study concluded that tram track lesions could be effectively identified on MRI with high specificity and sensitivity. Limitations of the study included the small sample size and the specific MRI (3.0-Tesla) used, as most MRIs are performed on the lower power 1.5-Tesla MRI machine.