Bone marrow edema (BME) lesion can be commonly found in MRI of acute joint injury. However, BME lesions can also be incidental findings on MRI of repetitively stressed joints of asymptomatic athletes as well. When treating elite runners, it becomes crucial to determine whether or not the incidental finding of asymptomatic BME lesions warrant a change in training regimen.

This article aims to investigate the prevalence of BME lesions in professional runners and determine whether incidental asymptomatic BME lesions predict clinical symptoms in the near future.

The study was conducted on 16 elite runners recruited from the Dutch National Committee middle and long distance running selection with similar levels and training programs. MRI scans of pubic bones, bilateral hips, knees and ankles were performed on these subjects one month before the start of the season and one month after the end of a 6 month season. All athletes were reported to be free of lower extremity injury for the year preceding the study. All athletes completed Lysholm score before and after the season. The lesions were graded as grade 0, absent; grade 1, diameter <5mm; grade 2, diameter 5mm to 20mm; and grade 3, >20mm.

At the start of the study, 14 (88%) athletes showed a total of 45 BME lesions. The most common location for BME was in the ankle joint and foot (31 lesions, 69%). In total, 9 new lesions (20%) developed during the season and 10 lesions (22%) disappeared during the season. Grade 1 and 2 lesions comprised 51% and 44%, respectively. A total of 10 athletes sustained lower extremity injuries (hamstring, Achilles, osteitis pubis, and stress fracture) during the season and the mean Lysholm score decreased from 96 pre-season to 89 post-season. However, none of the BME lesions found on post season MRI corresponded to any of the pathological sites.

A number of studies agree that incidental findings of BME lesions may be asymptomatic abnormalities that do not correlate to pathological sequela. In the current study, more than half (58%, 26/45) of the lesions fluctuated during the season. None of the lesions were associated with clinical complaints. Therefore, there appears to be no correlation between the incidence of BME lesions and clinical complaints.

The cause of BME lesions in elite athletes are hypothesized to be the result of bone, which is a dynamic tissue, responding to biomechanical stress with remodeling. This remodeling process is seen as microfractures and medullary edema on histological examination that mimics bone bruise on MRI. The incidence of development of new lesions and disappearance of old lesions in current study suggests that this particular remodeling process is a reversible, physiological response.
The authors acknowledge few limitations of the study. The first limitation is the relatively small number of participants and the lack of detailed information on variables such as intensity and types of training, footwear and training surfaces. However, the authors believe that selecting subjects from a relatively homogenous group (Dutch National Committee) with similar training schedules would minimize the variables. The second limitation of this study is the use of 1.5-T MRI scanner instead of 3.0-T scanner, which has been shown to be superior in visualizing features of pathological joints.

The authors conclude that incidental findings of a BME lesion on MRI of elite runners should not immediately be related to clinical complaints or lead to an altered training program.