

## Ultrasonography in Early Diagnosis of Metatarsal Bone Stress Fractures. Sensitivity and Specificity

To the Editor:

The recent article by Banal, *et al*<sup>1</sup> demonstrated intriguing evidence about the potential for diagnostic musculoskeletal ultrasonography in laboratory investigations of metatarsal stress fractures. It was noted that there were no false-positives for stress fracture when "cortical thickening" was observed on ultrasound. It is not clear if "cortical thickening" is synonymous with the diagnostic criteria of "cortical disruption" or if "cortical thickening" is instead a subgroup of "cortical disruption."

Assuming that "cortical thickening" and "cortical disruption" are equivalent, then the specificity of the test would increase to 100% if the diagnostic criteria were changed from 2 out of 3 (cortical disruption, periosteal hypoechoic elevation, and increased periosteal vascularity) to requiring cortical disruption in combination with at least one of the other 2 signs. Using this more strict definition would arguably be more useful to clinical practitioners since it would yield a more accurate "rule-in" test. Also, if the proposed metatarsal stress fracture diagnostic algorithm presented in the article were used with these stricter diagnostic criteria, the resulting higher specificity would achieve lower rates of false-positive

tests, resulting in avoidance of unnecessary treatment. Of course this would presumably lead to decreased sensitivity of the test because of increased false-negatives.

We would be interested to see data on the change in the sensitivity and false-negative rate for ultrasonography of suspected metatarsal bone stress fractures if the diagnostic criteria were adjusted to require cortical disruption.

AARON PARKIN LEININGER, MD, Sports Medicine Fellow; KARL BERTRAND FIELDS, MD, Site Director for Department of Family Medicine and Sports Medicine, Moses H. Cone Memorial Hospital, Greensboro, North Carolina, USA

### REFERENCE

1. Banal F, Gandjbakhch F, Foltz V, Goldcher A, Etchepare F, Rozenberg S, et al. Sensitivity and specificity of ultrasonography in early diagnosis of metatarsal bone stress fractures: a pilot study of 37 patients. *J Rheumatol* 2009;36:1715-9.

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