

Journal of orthopedic Trauma (march 2010):

<https://insights.ovid.com/crossref?an=00005131-201003000-00007>

Pubmed: <https://www.ncbi.nlm.nih.gov/pubmed/20182254/>

## **A Comparison of Quantitative Ultrasound of the Calcaneus With Dual-Energy X-ray Absorptiometry in Hospitalized Orthopaedic Trauma Patients**

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*Journal of Orthopaedic Trauma*: March 2010 - Volume 24 - Issue 3 - p 176-180

doi: 10.1097/BOT.0b013e3181b8b036

**Objectives:** Osteoporosis remains underdiagnosed in orthopaedic trauma patients. Recently, protocols have emerged to identify and treat osteoporosis in this population. Our purpose was to compare the usefulness of quantitative ultrasound of calcaneus (QUS) with dual-energy x-ray absorptiometry (DXA) for identifying orthopaedic trauma patients at risk for osteoporotic fractures.

**Design:** A retrospective review of an osteoporosis screening protocol comparing QUS and DXA.

**Setting:** Regional trauma center.

**Patients:** Three hundred sixty consecutive hospitalized orthopaedic trauma patients treated by a single surgeon.

**Intervention:** QUS T-score and DXA bone mineral density T-scores (hip or radius) were obtained relative to U.S. normative data.

**Main Outcome Measurements:** QUS and DXA data were statistically compared to analyze their relationship. Potential thresholds for osteoporosis risk were subsequently defined.

**Results:** Testing was successfully performed with heel QUS in 350 patients and with DXA in 129 patients. One hundred twenty-six patients underwent testing with both modalities. According to World Health Organization criteria, 17% of patients tested with DXA had osteoporosis.

A good predictive relationship between hip bone mineral density, as estimated by calcaneal QUS, and direct DXA measurement was seen (Pearson's r correlation coefficient of 0.53; area under the curve of 0.84 with 95% confidence interval = 0.75-0.90; P = 0.0001). QUS T-score cutoffs of greater than -0.9 resulted in 90% sensitivity (defining low osteoporosis risk) and a threshold of -1.6 or less resulted in a specificity of 80% (defining high osteoporosis risk).

**Conclusions:** Substantial logistical difficulties are inherent in attempting to obtain DXA scans in orthopaedic trauma patients at our regional trauma center. For those patients who did undergo DXA, a strong predictive relationship was seen between hip bone mineral density and QUS parameters. QUS thresholds in defining low- and high-risk subjects for osteoporosis in this population using this device are proposed.

QUS is a simple, reliable, and relatively inexpensive tool for evaluating osteoporosis risk in orthopaedic trauma patients.