

## **BROADBAND ULTRASOUND ATTENUATION (BUA) IMAGING TECHNIQUE:**

### **The effect of calcaneus size on the automatic region of interest (ROI) BUA measurements**

An increasing role is currently recognized in quantitative ultrasound (US) in evaluating density and structure of calcaneus. Recently, US transmission systems have been developed with imaging capability that enables selection of the position of a circular region of interest (ROI) of 15 mm in diameter; the region of measurement is always the area of minimum attenuation in the posterior part of the calcaneus. This is an automatic procedure, totally independent of operator interaction. This study investigates the effect of calcaneus size on Broadband Ultrasound Attenuation (BUA) measurements. Imaging of the right calcaneus was performed using a computer controlled transmission system (Ubis 3000, DMS, France). Parametric images are obtained from the BUA values. BUA was estimated at the 15 mm diameter circular region (ROI1) and at an integral region of interest (ROI) encompassing more of the trabecular area of the bone (ROI2) in 122 female patients. ROI2 was traced manually. BUA estimated at ROI1 was significantly correlated with area of ROI2 ( $BUA = 73.7 - 0.019 \text{ AREA}$ ,  $r = -0.46$ ,  $p < 0.0001$ ). In contrast, no correlation was found between BUA averaged within ROI2 and area of ROI2. Ultrasound attenuation measured at an automatic circular region with BUA imaging technique is affected by the size of the calcaneus. Definition of a bone size dependent ROI is needed to counterbalance the effect of calcaneus size on BUA measurements.