

Discrimination Between Hip Fractures and Age Matched Controls Using a Commercialized Multi-Site Quantitative Ultrasound Device

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Preliminary results from the new Quantitative Ultrasound (QUS) prototype—the Omnisense—developed by Sunlight, show that it is capable of discriminating osteoporotic fractured patients from age-matched controls. This device measures velocity using a combination of the “semi reflection” mode and the critical angle concept. Improvements have been incorporated into the prototype and a new model—the Omnisense Clinical—is now commercially available. In this study we assessed the discriminatory ability of SOS, measured with this new version of the Omnisense at different skeletal sites, to differentiate subjects with recent hip fractures from normal controls.

Forty subjects with recent hip fractures (less than 6 months) (mean age 76 ± 6) and 80 controls without fractures (mean age 73 ± 6) were included in the study. None of these women had any history of bone disease other than osteoporosis nor any treatment known to affect bone metabolism. Ultrasound measurement was performed at the distal radius, the metatarsal, the proximal phalanx of the 3rd finger and the tibia. Discrimination of fractured versus control cases was assessed using logistic regression analysis (expressed as age-Body Mass Index (BMI)-adjusted odds ratios (OR) per standard deviation decrease with 95% confidence intervals (CI) and p value) and the area under the curve (AUC). T-score values were also provided. Finally precision (Root Mean Square Coefficient of Variation: RMSCV) was assessed by measuring 4 young healthy volunteers, 4 times with repositioning, over two days.

Site	age-BMI-adj. OR (95% CI)	AUC	p<	T-score	RMSCV
Radius	2.75 (1.7-4.4)	0.77	0.0001	-3.4	0.6%
Metatarsal	2.6 (1.02-6.8)	0.80	0.045	-1.9	1.3%
Phalanx	2.9 (1.5-5.3)	0.83	0.0005	-2.45	1.0%
Tibia	Non significant	0.75	0.35	-1.4	0.5%

SOS along the cortical bone at the radius, the metatarsal and the phalanx showed significant discrimination between cases and controls, while the measurement at the tibia was not significant. Precision calculated at the different sites is better than previously reported. The results confirm and strengthen our previous study performed on the prototype. Whether combining different sites would improve discrimination on this new model remains to be investigated.

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