Discordant effect of body mass index on bone mineral density and speed of sound

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Background
Increased BMI may affect the determination of bone mineral density (BMD) by dual X-ray absorptiometry (DXA) and speed of sound (SOS) measured across bones. Preliminary data suggest that axial SOS is less affected by soft tissue. The purpose of this study is to evaluate the effect of body mass index (BMI) on BMD and SOS measured along bones.

Methods
We compared axial BMD determined by DXA with SOS along the phalanx, radius and tibia in 22 overweight (BMI > 27 kg/m2), and 11 lean (BMI = 21 kg/m2) postmenopausal women. Serum bone specific alkaline phosphatase and urinary deoxypyridinoline excretion determined bone turnover.

Results
Mean femoral neck – but not lumbar spine BMD was higher in the overweight – as compared with the lean group (0.70 ± 0.82, -0.99 ± 0.52, P < 0.00001). Femoral neck BMD in the overweight – but not in the lean group highly correlated with BMI (R = 0.68, P < 0.0001). Mean SOS at all measurement sites was similar in both groups and did not correlate with BMI. Bone turnover was similar in the two study groups.

Conclusions
The high BMI of postmenopausal women may result in spuriously high BMD. SOS measured along bones may be a more appropriate means for evaluating bones of overweight women.