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Bone Mineral Density Value Dependence on Bone Width

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Abstract:

Dual x-ray absorptiometry (DXA) is the most widely used measurement for the assessment of bone mass in osteoporosis. In clinical measurement, bone width can affect bone mineral parameters. The purpose of this study was to examine the dependence of bone mineral parameters on bone width. In this study, DXA measurements were conducted on rabbit bone in vivo using clinical instruments. We have selected rabbit's bones that have low BMD and more collagen tissue to predict structure not only measures BMD, but is also sensitive to the structure of the bone. To investigate the effect of bone width on the measured parameters, three regions of femur and tibia bones (N=132) were processed: upper (1/3 of length), middle (1/2 of length) and lower (2/3 of length) for BMC, areal BMD and volumetric BMD. The ANOVA analysis of bone mineral extracted by DXA showed significant differences ($P<0.05$) between BMC, BMDa and BMDv of six groups of upper, middle and lower parts of the femur and the tibia. It shows that BMC and BMD correlate well with the bone width, but BMDv inversely correlates with bone width. Linear and nonlinear regression analyses were used to examine the relationship between DXA characteristics with bone width and the regression function for each parameter is given. We concluded that BMC, areal BMD, and volumetric BMD in rabbit's bone with collagen fibers more than bone mineral are dependent on bone width. This result may be at least in part due to large precision error measurement of the bone width, in vivo.

Keywords:

[dual-energy x-ray absorptiometry \(DXA\)](#) . [nonlinear regression](#) . [bone width](#)

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