

Dual-energy x-ray absorptiometry of the forearm: reproducibility and correlation with single-photon absorptiometry.

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Although single-photon absorptiometry (SPA) has been the predominant tool used to assess bone mineral density (BMD) in the forearm, the development of dual-energy x-ray absorptiometry (DEXA) provides the benefits of greater source stability, reduced scanning time, and improved image resolution compared to SPA. In the present study we used the DEXA bone densitometer (Hologic, Inc., Waltham, MA) to (1) measure BMD in the one-third radius and ultradistal radius; (2) examine the reproducibility of these BMD measurements; and (3) compare the BMD at the one-third radius with SPA (SP2, Lunar Corp., Madison, WI). In 65 normal women (ages 22-74 years) we examined changes in the forearm DEXA BMD with age, revealing significant quadratic regression equations. The reproducibility of DEXA BMD (mean +/- SEM) in 7 normal subjects aged 22-50 years is 0.85 +/- 0.16% for the predominantly cortical one-third radius site and 0.97 +/- 0.15% for the more trabecular ultradistal site. The regression relationship between DEXA and SPA of the one-third radius in 26 subjects (ages 22-68 years) is $DEXA\ BMD = 0.105 + 0.826\ (SPA\ BMD)$; $R = 0.97$, $R^2 = 0.94$, p less than 0.0001. Bone densitometry of the forearm using DEXA may be performed relatively rapidly, providing reproducibility and image resolution that are generally superior to those observed with SPA.

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