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CTXA Hip - An Extension of Classical DXA Measurements Using QCT

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Introduction: Bone mineral density (BMD) estimates for the proximal femur using DXA are currently considered the standard for making a diagnosis of osteoporosis in an individual patient using BMD alone. We have compared BMD results from a commercial QCT BMD analysis system, CTXA Hip (see Figure 1), which provides clinical data for the proximal femur, to results from DXA. We have also used CTXA Hip to determine cortical and trabecular contributions to total BMD.

Material and Methods: Sixty-nine patients were scanned using 3D QCT and DXA. CTXA Hip BMD measurements for Total Hip and Femoral Neck were compared to DXA results. Twenty-two women were scanned at 0,1,2 years and CTXA Hip and DXA results analyzed for long term reproducibility.

Results: Reproducibility was 0.011 g/cm² for CTXA Total Hip and 0.012 g/cm² for CTXA Femoral Neck compared to 0.012 g/cm² and 0.013 g/cm² respectively for DXA (see Table 1). The correlation of Total Hip BMD CTXA vs. DXA was R=0.97, and for Femoral Neck (see Figure 2) was R=0.95 (SEE 0.044 g/cm² in both cases). Cortical bone comprised 62 ± 5% (mean ± SD) of total hip bone mass in osteoporotic women.

Conclusion: CTXA Hip provides substantially the same clinical information as conventional DXA, and in addition provides estimates of volume-derived parameters which may be useful in evaluation of bone strength.

	Total Hip		Femoral Neck	
	CTXA	DXA	CTXA	DXA
Areal Density (g/cm ²)	0.645	0.700	0.551	0.598
Precision (g/cm ²)	0.011	0.012	0.012	0.013
CV (%)	1.7	1.7	2.1	2.1

Table 1: Summary of Long-Term In Vivo Precision, CTXA vs. DXA, in Osteoporotic Subjects

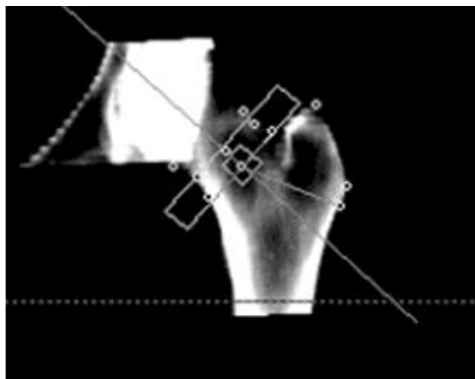


Figure 1. CTXA projected image with standard regions of interest used for BMD calculations (femoral neck, trochanter, intertrochanter, and Total Hip as sum of these three regions)

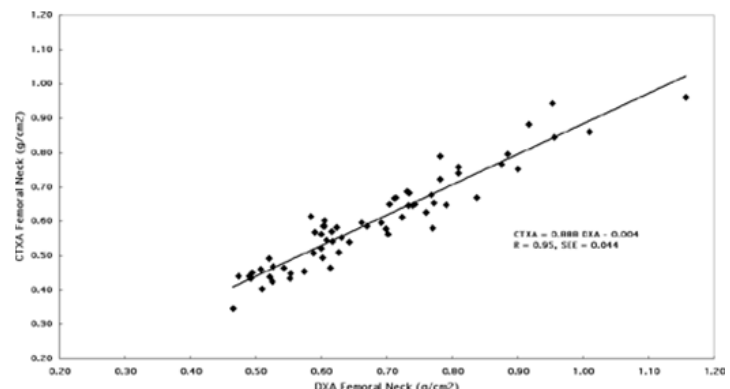


Figure 2. Correlation of area BMD for CTXA and DXA for femoral neck region of interest.