Differences in volumetric bone mineral density (vBMD) at the radius and tibia in premenopausal Caucasian and Asian women

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Current studies indicate that women of European origin have higher bone mineral density (BMD) than Far-East Asian women but few data exist on South Asian women. Roy et al (2005) explained differences in BMD between Caucasian and Asian women by differences in bone size¹. The aim of this study was to investigate differences between volumetric bone mineral density (vBMD) between Caucasian (C) and Asian (A) women. Thirty-five healthy premenopausal women (19 C and 16 A), age range 18-55 yrs, were studied. Peripheral Quantitative Computed Tomography (pQCT) measurements were taken at the radius and tibia (non-dominant) using a Stratec XCT 2000 pQCT scanner.

Caucasian were slightly lighter and taller than Asian women, with an average BMI of 24.9 (4.12) and 27.7(5.8) respectively. The table below shows the results of vBMD at 4% and 66% radius; 4%, 14%, and 38% tibia in C and A women

		Caucasian(n=22)	Asians (n=19)
pQCT 4% radius	TOT_DEN (mg/cm ³)	315.6(45.3)	312.1(45.6)
	TRAB_DEN (mg/cm ³)	178.9(35.5)	175.3(37.2)
pQCT 66% radius	TOT_DEN (mg/cm ³)	746.6(86.3)	768.8(85.9)
	CORT_DEN (mg/cm ³)	1134.7(38.4)	1126.3(42.5)
pQCT 4% tibia	TOT_DEN (mg/cm ³)	303.3(31.7)	343.6(53.4)*
	TRAB_DEN (mg/cm ³)	228.7(29.2)	272.4(66.9)*
pQCT 14% tibia	TOT_DEN (mg/cm ³)	571.6(117.4)	495.5(92.1)*
	CORT_DEN (mg/cm ³)	1135.6(24.4)	1095.0(65.5)*
pQCT 38% tibia	TOT_DEN (mg/cm ³)	903.6(76.9)	856.8(85.2)
	CORT_DEN (mg/cm ³)	1179.8(19.4)	1160.9(53.3)

*p<0.05, **p<0.01 for 2 sample t-test. Data expressed as the mean (SD); Abbreviations: TOT_DEN, total density; TRAB_DEN, trabecular density; TOT_A, total area; TRAB_A, trabecular area; CORT_DEN, cortical density; CORT_A, cortical area.

Asian women had significantly higher total density and trabecular density at 4% tibia than C women; but they had significantly lower cortical density at 14% tibia site. Asian women had also significant lower total area and trabecular area (p<0.05) at 4% tibia site. There were no significant differences in vBMD between C and A in radius sites. (Not shown in the table) however, at the 4% radius, Asian have significant lower bone mass (p<0.05), total area (p<0.01) and trabecular area (p<0.01) than Caucasian. Our finding supports the results of Ward et al (2007) where there was no difference in vBMD at the radius between A and C women². Our novel findings for differences in the tibia sites for A and C women require further investigations as there are no data examining this bone site in ethnic groups.

References:

¹ Roy et. al. Osteoporosis Int. 2007; 41: 117-121

² Ward et. al. Bone. 2005; 16; 1254-1262