Proceedings of the Nutrition Society (2012), **71 (OCE3)**, E230 doi:10.1017/S0029665112003217

Winter Meeting – Joint meeting between the Nutrition Society and the Royal Society of Medicine, 11–12 December 2012, Dietary Strategies for the Management of Cardiovascular Risk

Associations between vitamin D status and radial bone geometry in older South Asian and Caucasian women

A. L. Darling[1], O. A. Hakim[1], K. Horton[2], M. A. Gibbs[2], L. Cui[3], J. L. Berry[4], S. A. Lanham-New[1] and K. H. Hart[1]

[1]*Department of Nutrition and Metabolism, Faculty of Health and Medical Sciences, University of Surrey, Guildford,* [2]*School of Health and Social Care, Faculty of Health and Medical Sciences, University of Surrey, Guildford,* [3]*Faculty of Engineering and Physical Sciences, University of Surrey, Guildford and* [4]*University of Manchester, Manchester, UK*

It is unknown whether there is an association between vitamin D status and bone geometry parameters in older South Asian women, and whether this differs from same-age Caucasian women. This is the first study, to the authors' knowledge, to assess the relationship between vitamin D status and peripheral quantitative computed tomography (pQCT) indices of bone architecture in older South Asian women. To measure radius bone structure, pQCT scans (Stratec X2000L) at the distal (4%) and mid-shaft (66%) sites were undertaken in $n = 18$ South Asian (mean age 63.5 y +/ − 3.6) and $n = 50$ Caucasian women (mean age 65.9 y +/ − 4.8). A fasting blood sample was obtained for assessment of vitamin D status (25-hydroxyvitamin D). Partial correlations assessed the relationship between vitamin D status and the radial bone indices. Unadjusted and BMI adjusted data can be seen in the table.

		Caucasian $n = 50$				South Asian $n = 18$			
		Unadjusted		BMI		Unadjusted		BMI	
	Parameter/Site	r	p	r	p	r	p	r	p
Mass	**Mass g/cm^{3}4%**	0.21	0.16	0.40	0.01	0.26	0.31	0.23	0.41
	Mass g/cm^3 66%	0.17	0.27	0.38	0.01	0.14	0.60	0.10	0.73
Area	**Total Area mm^2 4%**	0.22	0.14	0.33	0.04	0.03	0.91	−0.03	0.93
	Total Area mm^2 66%	0.11	0.48	0.25	0.12	0.13	0.63	0.12	0.66
	Trabecular Area 4%	0.22	0.14	0.33	0.03	0.03	0.91	−0.03	0.93
	Cortical Area 66%	0.21	0.17	0.34	0.03	0.21	0.42	0.18	0.52
Density	**Total Density mg/cm^3 4%**	−0.02	0.92	0.09	0.55	0.39	0.12	0.37	0.17
	Total Density mg/cm^3 66%	0.07	0.67	0.07	0.64	−0.04	0.88	−0.11	0.70
	Trab. Density mg/cm^3 4%	−0.07	0.66	0.03	0.85	0.54	0.02	0.55	0.04
	CorticalDensitymg/cm^3 66%	0.20	0.19	0.18	0.25	0.05	0.84	0.02	0.96
Strength	**SSIpol mm^{3}66%** ≠	0.19	0.23	0.29	0.07	0.32	0.21	0.33	0.23
	Fracture Load (N) 66% ≠ ≠	0.20	0.20	0.34	0.03	0.13	0.61	0.10	0.72

≠ SSIpol = polar strength strain index (predicted measure of ability to resist torsion forces); ≠ ≠ Fracture Load = predicted amount of Newtons required to fracture the bone. Unadjusted = unadjusted data; BMI = BMI (Body Mass Index) adjusted data.

For BMI adjusted data, in Caucasians, there were significant correlations between vitamin D status and bone mass ($r = 0.379$ $p = 0.013$), strength strain index ($r = 0.337$ $p = 0.029$), area of the cortical layer ($r = 0.343$ $p = 0.026$) and predicted fracture load ($r = 0.337$ $p = 0.029$) at the mid-shaft (66%) site. There were also positive correlations between vitamin D status and total area ($r = 0.327$ $p = 0.035$) at the distal (4%) site. Therefore, in Caucasians, increased vitamin D was associated with increased bone mass, size and measures of bone strength at both distal and mid shaft sites. For Asians, the only significant correlations between vitamin D status and the bone parameters were for trabecular density ($r = 0.547$ $p = 0.035$) at the distal (4%) site, and there were no significant correlations at the mid shaft (66%) site. This suggests, in Asians, increased vitamin D status was only associated with increased density in the trabecular layer, and only at the distal site (4%). Overall, vitamin D appears to be positively correlated with size, strength and mass parameters in Caucasians, and positively correlated with trabecular density in South Asians. Therefore, in both ethnic groups, vitamin D is associated with positive effects on radial bone parameters, and a stronger bone structure. However, the underlying mechanisms in the two ethnic groups may be different. Further research is required to investigate these differences.