THE EFFECT OF CALCIUM SUPPLEMENTATION FOR 18 MONTHS ON BONE MASS IN ADOLESCENT FEMALE TWINS

C.A. NOWSON, R.M. GREEN, C.S. GUEST, R.G. LARKINS, A.J. SHERWIN, J.L. HOPPER* and J.D. WARK

Genetic and environmental factors determine peak bone mass, and peak bone mass is a major determinant of osteoporosis in later life. This three-year, double-blind, placebo-controlled study of calcium supplementation is being conducted to determine the effect over time on bone density.

Female twins were randomised to receive either 1000 mg calcium or a matched placebo. Forty-two pairs have completed six months, 37 completed 12 months and 29 pairs have completed 18 months. The mean age of the twins was 14.0 (2.6)(SD) years, (range 11-17 years). Bone density (BD) was measured by dual energy X-ray absorptiometry. The group changes and the within-pair differences in changes over the three, six-monthly intervals are shown in Table 1. There was an increase in BD in both groups. There was no within-pair difference in height or weight change. There was a significantly greater within-pair increase in bone BD at the spine and at the total hip in calcium-supplemented individuals at the end of six months. However, this effect did not continue in the second and third six months' intervals.

Table. Within pair differences of percent changes at six, 12 and 18 months (Mean ± SEM) ($P<0.05$* $P<0.01$**)

	Within pair differences of percent change (calcium - placebo)		
	0-6 months 42 pairs	6-12 months 37 pairs	12-18 months 29 pairs
Lumbar spine (g/cm^2)	1.53 ± 0.56*	0.26 ± 0.50	0.27 ± 0.56
Total hip (g/cm^2)	1.27 ± 0.50**	-0.06 ± 0.50	-0.45 ± 0.62
Femoral neck (g/cm^2)	1.12 ± 0.68	1.30 ± 0.79	0.19 ± 1.00

These interim results indicate that calcium supplementation is effective in increasing bone density at the spine and hip in females (mean age 14 yr). This effect is evident after only six months and may indicate that there is a threshold level for dietary calcium intake, which when reached results in no further increase in bone density. The subsequent analysis and follow-up after three years will determine whether this effect on bone density is maintained.

Department of Medicine, Royal Melbourne Hospital, Melbourne, Victoria 3050 *Department of Community Medicine, University of Melbourne, Parkville, Victoria 3050