

The effect of two years milk supplementation on bone mineral accretion in Chinese adolescent girls

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To investigate the effect of milk supplementation on bone mineral accretion during early puberty, a two-year double-blind, controlled supplementation trial with vitamin D and/or calcium fortified milk was carried out in Chinese 757 girls aged 10 years consuming plant-based diets. They were divided into three groups according to randomly selected Beijing schools: In Group 1 schools, subjects received 330 mL UHT milk fortified with Ca as milk salts (providing an extra 560 mg Ca/day) on every school day; in Group 2 schools, subjects received the same milk additionally fortified with vitamin D (8 µg/day); in Group 3 schools, subjects were unsupplemented controls. Bone mineral density (BMD) of distal (DF) and proximal forearm (PF), was measured in all subjects, and of total body (TB) was measured in a sub-sample of 414 girls by dual X-ray absorptiometry (DXA) at baseline and end-trial.

	Group 1 (milk) n = 237	Baseline Group 2 (milk + vitD) n = 260	Group 3 (control) n = 260	Group 1 (milk) n = 209	End-trial Group 2 (milk + vitD) n = 243	Group 3 (control) n = 251
Weight (kg)	33.79 (7.24)	33.43 (7.01)	33.73 (6.94)	45.53 (9.68)	45.34 (9.26)	44.11 (8.94)
Height (cm)	140.48 (6.39)	141.13 (6.99)	141.11 (6.46)	153.73 (6.53)	154.12 (6.60)	153.25 (6.34)
DFBMD (g/cm ²)	0.233 (0.029)	0.233 (0.029)	0.233 (0.028)	0.277 (0.047)	0.276 (0.044)	0.280 (0.047)
PFBMD (g/cm ²)	0.479 (0.050)	0.480 (0.049)	0.480 (0.051)	0.541* (0.084)	0.543* (0.080)	0.492 (0.072)
TBBMD (g/cm ²)	0.690 (0.058)	0.683 (0.049)	0.696 (0.053)	0.743 (0.084)	0.746 (0.078)	0.726 (0.083)

Values are mean (SD); * P < 0.001; # subject nos 145, 136, 133 at baseline, 112, 114, 124 at end-trial for 24 months, respectively.

A total of 327 days supplementation was provided over day during the two years was 327 days. The additional Ca intakes were averaged 251 mg per day over this period. While only 56.3% of subjects had breast development either at Tanner stage 2 or 3 at baseline, 81.5% had reached Tanner stage 2 or 3, and 13.8% had reached Tanner stage 4 or 5 at 24 months. No significant differences in terms of weight, height and pubertal status were found between groups at baseline or end-trial 24 months. Both supplemented groups had significantly higher PFBMD than controls group at end-trial 24 months. Compared with controls group, Group 1 and Group 2 subjects had significantly higher percentage gains (mean ± SEM) in PFBMD (13.06 ± 0.92, 12.88 ± 0.83 vs 2.78 ± 0.90, P < 0.001), and TBBMD (7.02 ± 0.59, 8.89 ± 0.61 vs 3.86 ± 0.58, P < 0.001). 24 months milk supplementation on school days over 24 months, significantly increased bone mineral accretion in Chinese adolescent girls. If this gain persists, the eventual peak bone mineral density should also be increased in the study subjects. Milk supplementation (330 mL with a total of 560 mg Ca with/without 8 mg vitamin D on school days over two years) significantly increased bone mineral accretion in Chinese adolescent girls. If this gain persists, peak bone mineral density may increase in supplemented subjects, and reduce the risk of future osteoporotic fracture.

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