

Plenary 2: Nutrition for Childhood and Adolescence

Milk and calcium intakes and bone mineral accretion during puberty in Chinese girls

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Background - Little is known about the bone mineral accretion rate and the relationship between habitual dietary intakes and bone mineral accretion during puberty in Chinese girls habitually consuming plant-based diets low in calcium.

Objectives - To evaluate the rate of bone mineral accretion during puberty in Chinese girls and to study the association between calcium and milk intake and bone mineral accretion rate.

Design - A 5-year observational cohort study was carried out on the unsupplemented controls from a milk intervention trial in Chinese girls. Eighty-seven Beijing urban girls aged 9.5-10.5 years at baseline were included in this analysis. For each of these subjects, there was a complete dataset both at baseline and at years 1, 2, 4 and 5 afterwards. Total body bone mineral content was assessed by dual energy x-ray absorptiometry with a Norland XR-36 densitometer. Average calcium and milk intakes were estimated from 7-day food records at baseline and from 3-day food records at years 1, 2, 4 and 5.

Outcomes - Mean follow-up time was 4.8 years, with a range of 4.6 to 4.9 years. The mean total bone mineral accretion over 5 years from 10 to 15 years of age was 961 (SD 140) g. The mean annual rate of bone mineral accretion was 199 (SD 30) g/year, representing a calcium accretion rate of 164 (SD 24) mg/day and giving an apparent calcium retention efficiency in Chinese girls during puberty of 41.0 (SD 14.7) %. There was a significant association between bone mineral accretion and mean milk intake over the 5 years ($r = 0.216$, $P = 0.04$), but not between bone mineral accretion and mean calcium intake ($r = 0.109$, $P = 0.3$).

	Mean (SD)
Baseline age (years)	10.1 (0.3)
Mean Ca intake over 5 years (mg/day)	442 (140)
Mean milk intake over 5 years (g/day)	137 (90)
BMC accretion (g/year)	199 (30)
Ca accretion rate (mg/day)	164 (24)
Apparent retention efficiency (%)	41.0 (14.7)

Conclusion - Despite their low calcium intakes of less than 500 mg per day, Chinese girls accumulated similar amounts of bone mineral during puberty as western girls consuming 1000 mg calcium per day (1). Milk intake of Chinese girls during puberty appears to have a beneficial effect on bone mineral accretion, independent of calcium intake.

References

1. Whiting SJ, Vatanparast H, Bexter-Jones A, et al. Factors that affect bone mineral accrual in the adolescent growth spurt. *J Nutr* 2004;134:696S-700S.

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