

Effects of milk supplementation on cortical bone gain in Chinese girls aged 10-12 years

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Objective – To study the effect of milk supplementation on cortical bone gain in Chinese girls aged 10-12 years.

Design – a 24 months double-blind, controlled supplementation trial with vitamin D and/or calcium fortified milk in 757 Beijing girls aged 10 years. Subjects were randomized into three groups according to their schools, with 238 girls in Milk + Ca group receiving 330 ml calcium fortified UHT milk per school day, 260 girls in Milk + Ca + Vit D group receiving 330 ml calcium and vitamin D fortified UHT milk per school day, and 259 unsupplemented girls in the control group. X-ray radiographs of the non-dominant hand were obtained in 606 girls (177, 210, 219 from Milk + Ca, Milk + Ca + Vit D and control groups, respectively) at baseline and 24 months. Periosteal diameter (outer width) and medullary diameter (inner width) of the midshaft of the second metacarpal were measured with a digital caliper (Mitutoyo, Japan). The combined cortical thickness (CCT) was calculated as: outer width - inner width.

Outcomes – After 24 months, in comparison with controls, both supplemented groups had significantly higher percentage gains in periosteal diameter (8.95 ± 0.24 , 9.32 ± 0.24 vs 8.14 ± 0.19 , $P=0.036$ and $P<0.001$, respectively), lower gains in medullary diameter (-3.23 ± 1.06 , -1.14 ± 0.86 vs 4.51 ± 1.03 , $P<0.001$), and higher gains in CCT (20.75 ± 1.08 , 19.45 ± 0.94 vs 12.58 ± 0.97 , $P<0.001$).

Conclusions – Milk supplementation (330 ml with a total of 560 mg calcium with/without 8 μ g vitamin D on school days over 24 months) led to greater periosteal apposition and cortical bone gain in Chinese adolescent girls, thus conferring greater bone strength on the supplemented girls.