Milk-derived proteins and minerals alter serum osteocalcin in prepubertal boys after 7 days

We have previously shown that at equal protein content, milk, but not meat, decreased bone turnover in boys. This suggested that milk-derived components are important for bone metabolism. In the present study, we hypothesized that milk-derived proteins (whey and casein) affect bone turnover during growth depending on the content of milk minerals (calcium and phosphorus). This was a randomized, parallel, double-blind study. Eight-year-old boys (n = 57) received 1 of 4 milk drinks: whey protein with low or high content of minerals, or casein protein with low or high content of minerals. The amount of whey and casein was identical to their content in 1.5 L of milk. We measured serum osteocalcin (sOC), bone-specific alkaline phosphatase, and C-terminal telopeptides of type 1 collagen (immunoassay) and estimated dietary intake (3-day weighed food record) at baseline and after 7 days. Only sOC was significantly affected by the treatments (P < .05). There was a significant interaction between milk-derived proteins and minerals with regard to sOC (P = .01). The intake of milk drinks containing whey increased sOC at the low content of minerals, whereas it decreased sOC at the high content of minerals (P < .05). In contrast, milk drinks containing casein increased sOC both at the low and at the high contents of minerals. In conclusion, whey and casein (corresponding to their content in 1.5 L of milk) differently affect sOC in 8-year-old boys depending on the content of milk minerals, but do not seem to affect other markers for bone turnover.