



[2715.3] Magnesium, but Not Calcium Intake Is Significantly Association with Bone Mineral Status in 4 to 8 Year Old Children

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BACKGROUND: Magnesium (Mg) is a key factor in bone health, but few studies have evaluated magnesium intake or absorption and their relationship with bone mineral content status in children, especially those who are pre-pubertal.

OBJECTIVE: Our primary objective was to evaluate magnesium metabolism in children and determine the relationship between magnesium intake and absorption and bone mineral status. Our secondary goal was to determine fractional and total magnesium absorption and estimated retention and compare these with recommendations including current Dietary Reference Intake values.

DESIGN/METHODS: We measured Mg intake, absorption and urinary excretion in a group of 63 children age 4 to 8 yrs of age. Absorption was determined using a dual-tracer stable isotope method in which 25Mg was given intravenously and 26Mg given orally with subsequent collection of a 72-hour urine and calculation of fractional dietary absorption from the relative recovery of the oral versus the intravenous tracer. Dietary Mg intake was determined using a 3-day weighed diet including one in-patient and two out-patient days. Bone mineral content and density were determined by total body Dual-Energy X-ray Absorptiometry.

RESULTS: We found a small, but significantly greater Mg absorption efficiency in males than females ($65 \pm 11\%$ vs $59 \pm 8\%$, $p = 0.02$, Data are Mean \pm SD) but no difference in estimated net Mg retention (37 mg/day in both males and females) due to higher urinary Mg in the males. Relating dietary Mg intake to estimated Mg retention showed that an intake of approximately 130 mg/day, slightly above the current Estimated Average Requirement of 110 mg/day led to a net average retention of 10 mg/day, the likely growth-related need for net positive retention in this age group. Covariate analysis showed that dietary magnesium intake, but not calcium intake, was significantly associated with both total body bone mineral content and density ($P < 0.01$ for each), whereas gender and race were not significantly related to bone mineral outcomes.

CONCLUSIONS: These results demonstrate that magnesium intakes in small children in the United States mostly meets dietary requirements and that gender differences exist in magnesium absorption and excretion. Dietary Mg intake may be an important, relatively unrecognized, factor in bone mineral accretion in children.

E-PAS2013:2715.3

Session: Platform Session: Pediatric Nutrition (1:00 PM - 3:00 PM)

Date/Time: Sunday, May 5, 2013 - 1:30 PM

Room: 203 - Walter E. Washington Convention Center

Course Code: 2715