

## Plenary 3: Dairy Foods and Health

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### Nutrition and adolescent bone health

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Nutrition may have a more important role in building and maintaining bone than has been appreciated from the literature. Studies which have tried to assess the relative role of nutrients among the various predictors of bone health often have poor knowledge of nutrient intake. Better means for assessing nutrient intake are in our future, but we can learn much from controlled feeding studies. The true impact of nutrition is better understood when we consider the whole diet. Recently, we are discovering the important role of energy balance on bone. These issues will be discussed from the perspective of the lifestage where rapid bone growth occurs, i.e. adolescence. More than one-fourth of adult bone mass is acquired between the ages of 12 to 14 years in girls and 13-15 years in boys. Calcium and vitamin D are two nutrients important to bone health that are most likely to be deficient. In controlled metabolic balance studies in black and white adolescent girls, calcium intake and race explained nearly equal amounts of the variance in calcium retention (1). However, usual calcium intakes estimated from diet records was not a significant predictor. In a large study of early pubertal girls from 6 states, dietary calcium and physical activity were small, but significant predictors of bone mass (2). Yet, dietary calcium and physical activity under controlled conditions have important influences on bone quality (3,4). Vitamin D studies and bone studies are sparse in children. Cross sectional studies do not support a positive relationship between vitamin D status and calcium absorption (5,6). Vitamin D supplementation may only increase bone mass when children are deficient in vitamin D (7). Dietary salt negatively impacts calcium retention (8). The incidence of childhood fracture is increasing coincident with the increase in obesity (9). This has been attributed to higher trauma with falls in overweight children and negative effects of body fat on bone quality (10). Adequate dairy intake may protect against childhood fractures. Milk avoiders have increased risk of prepubertal fractures. Perceived lactose intolerance, but not measured lactose malabsorption, was associated with poor bone health in early pubertal girls (11). Calcium intakes (largely determined by dairy intake) may determine the amount of bone mass accrued in overweight children.

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