

## **Dietary indicators of acid base balance and bone accrual in pubertal children.**

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Net renal acid excretion (NAE) calculated from dietary intake and body surface area has been shown to be an indicator of acid base balance as determined from 24 hour urine samples in children during puberty. However, the rapid growth may obscure the effects of diet on bone accrual. The objective of this presentation is to examine the relationship between dietary estimates of acid base balance, fruit and vegetable consumption, composite of 24 hour urinary mineral excretion and bone measurements as children transition through puberty. Two culturally diverse populations, white females residing in Memphis Tennessee USA and in Jyväskylä Finland participated in the study. Food records and 24-hour urines mineral excretion (magnesium, sodium, potassium and calcium) were collected 5 times over a 2-year period. Bone area, mineral content (BMC) and areal mineral density (BMD) of the whole body were assessed using a Dual energy x-ray absorptiometry. The girls residing in Finland were taller and had a higher body weight compared to the US cohort. Finnish girls reported consuming a more alkaline diet as estimated by predicted renal acid load (PRAL) and had lower excretion of calcium, sodium, and higher excretion of potassium than those girls residing in the US. PRAL and NAE were significantly correlated with the calculated urinary mineral composite score. Cross-sectional (What?), PRAL per kg, NAE per kg and calculated NAE from urine samples per body weight were negatively related to bone area, BMC and BMD of the whole body at baseline and 12 months of follow-up ( $P < 0.002$ ) but there was no relationship seen with the 24 month values. A high urinary mineral composite was related to lower accretion of bone area. These data suggest that increased metabolic acid load may jeopardize bone accrual during puberty.