LONG-TERM RESPONSES TO MATURITY-SOWS TO CHRONIC DIETARY ACID LOADS. II MID-DIAPHYSAL FEMORAL CORTICAL BONE HISTOMORPHOMETRY. 

This hypothesis was investigated with twenty non-gravid, crossbred sows fed maintenance diets with 0 (n=5), 0.5 (n=8), or 1.5% NH₄Cl (n=7) calculated to provide 190, 378, or 504 meqCl/4 for 8 months. Cortical bone histomorphometric responses to dietary acid loads were assessed with double label fluorochrome markers administered initially (basal diet, label=teracycline) and before termination of the study (acidogenic diets, label=calcium) using a 1-1.5 day labeling protocol. Complete femoral mid-diaphyseal cross sections were embedded in polymethylmethacrylate, cut, ground to 80 micrometers and mounted. Each specimen was subdivided into 8 anatomic sections for data collection.

Averaged across all anatomic sections, no significant dietary effects were detected for periosteal labeled surface defined as 

\[ \text{label} = \frac{\text{label}}{\text{diam}} \times \text{diam} \]

where \( \text{diam} \) is the cortical bone area available for cross sections. 

\[ \text{label} \times \text{diam} \]

The observed changes in bone turnover suggested that the capacity of bone tissue to respond to vitamin status may vary with age, and that vitamin status may influence bone turnover in different ways. It is also possible that regional differences in strain and mechanical factors may also contribute to the responsiveness of bone turnover to vitamin status.

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We assessed bone mineral content (BMD) and density (BMD) in children, and their relationship with bone age and anthropometric parameters in 21 normal weight prepuberal local children (10 girls and 21 boys), aged 7.5 ± 0.3 y (7.2 - 8.3 y). All were within the normal range (< 95th centile) for height (123 ± 8 cm) and weight (< 35 ± 1 kg) according to the NHIS charts. Spine (L2-L4) and total body were studied by DXA (Lunar Corp, Madison WI). Bone age (BA) was estimated by the Tanner analysis of a radiograph of the left wrist and ankle. There were no differences between boys and girls throughout the studies. spine BMD averaged 0.65 ± 0.01 g/cm² (0.52 - 0.794) and total body BMD averaged 0.82 ± 0.051 g/cm² (0.72 - 0.893), while BA averaged 7.5 ± 1.1 (y 4.7 - 10.2).

Correlation (r) between BMD or BMI is weight, height, bone age, or chronological age (p < 0.001).

Both spine and total body BMD correlated significantly with all parameters tested, while neither spine nor total body BMD did so. Conclusions: (i) the spine and total body BMD of normal children did not correlate well with anthropometric parameters or bone age; (ii) spine and total body BMD, however, did correlate with all parameters tested; (iii) BMD can be used to evaluate bone mass in children because it is independent of morphology within a homogeneous population compared to BMI.