

## **High dairy-protein versus high mixed-protein energy restricted diets; the effect on bone turnover and calcium excretion in overweight adults**

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**Background** - A moderate exchange of some dietary carbohydrate for protein appears to have metabolic and weight loss advantages in human studies. This dietary strategy raises safety concerns for bone health. The impact of dietary calcium in high protein diets on bone turnover has not been investigated.

**Objective** – This study examined the effect of protein source and calcium content in high protein, energy restricted diets on calcium excretion and bone metabolism in 50 overweight adults (BMI  $33.4 \pm 2.1$  kg/m<sup>2</sup>).

**Design** - The parallel study consisted of a 12-week energy restriction phase followed by a four-week energy balance phase. Subjects were randomised to one of two isoenergetic (5.5 MJ/d, 34% energy from protein, 41% from carbohydrate and 24% from fat) diets; high dairy protein (DP, 2400mg Ca/d) or high mixed protein (MP, 500mg Ca/d).

**Outcomes** - Energy restriction was the primary determinant of weight loss ( $-9.7 \pm 3.8$  kg,  $P < 0.01$ ) with no significant effect of protein source. Twenty-four hour calcium excretion decreased during both interventions ( $-1.09 \pm 0.23$  mmol/day,  $P < 0.009$ ). By week 16 the MP diet had a 40% larger increase in deoxypyridinoline (a bone turnover marker) compared to the DP diet ( $P = 0.008$ ). Osteocalcin (a marker of bone formation) increased from week zero to 16 in the MP diet only ( $+2.22$  ng/ml  $P = 0.001$ ).

**Conclusion** - Overall, the DP diet has a modest advantage over MP diet by reducing the accelerated bone turnover associated with weight loss.