

## Differences in bone health and bone biomarkers between exercising male protein supplement users and non-users

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Increasing protein intake through protein supplements is a growing practice amongst exercising individuals. However, there are varying reports in terms of the detrimental<sup>(1)</sup> and beneficial<sup>(2)</sup> effects of protein on bone. The effect of high level protein supplementation on bone health in exercising individuals is relatively unexplored. The aim of this study was to investigate the effect of variations in protein intake on bone health and bone biomarkers in exercising males.

Fifty non-supplement users (25.9±5.1 years) and 52 supplement users (25.4±4.9 years) were recruited.

The average length of time for supplement use was 33 months. All subjects completed a food diary for 3 d which was analysed using Comp Eat™. The net endogenous acid production (NEAP) was calculated by the method described by Remer *et al.*<sup>(3)</sup>. Protein content of supplements consumed was obtained from product labels. Effect of exercise on bone health was calculated using osteogenic index (OI). Bone health (bone mineral density (BMD) and bone mineral content (BMC)) and percentage lean body mass (LBM) was measured using dual energy X-ray absorptiometry (DEXA). Serum samples were analysed for osetocalcin (S-OC) and crosslaps (S-CTx) using commercially available ELISA kits. Urine was measured for pH using a digital urine analyzer with urinary calcium (U-Ca) and creatinine (U-Cr) levels being measured spectrophotometrically. Independent samples *t*-test or Mann–Whitney *U* test (depending on data normality) were used to test for any differences between supplement users and non-users. There were no significant differences in the potential confounders of BMI, OI or percent LBM (*P*>0.05) between users and non-users.

	Protein group				<i>P</i>
	Non-users ( <i>n</i> 50)		Supplement-users ( <i>n</i> 52)		
	Mean	SD	Mean	SD	
Protein (g/d)	114.96 <sup>a</sup>	41.28	179.60 <sup>b</sup>	86.88	<0.001
NEAP (mEq)	14.45 <sup>a</sup>	25.13	33.33 <sup>b</sup>	34.75	<0.001
Dietary sulphur (mEq)	22.45 <sup>a</sup>	12.37	28.61 <sup>b</sup>	16.06	0.031
BMD (g/cm <sup>2</sup> )	1.16	0.10	1.19	0.15	0.179
BMC (g)	3470.00	390.00	3550.00	550.00	0.336
Urinary pH	6.30	0.55	6.21	0.37	0.421
U-Ca (mmol Ca/mmol Cr)	0.30	0.15	0.31	0.17	0.745
S-OC (ng/ml)	30.39	15.80	32.96	13.75	0.246
S-CTx (ng/ml)	1.36	2.98	0.98	0.35	0.579

<sup>a,b</sup>Means with unlike superscript letters were significantly different (*P*<0.05).

Protein intake, NEAP and sulphur content of the diet were significantly greater in users than non-users. There were no significant differences in BMD, BMC, urine pH or calcium, serum osteocalcin or crosslaps between users and non-users. This study demonstrates that a protein supplementation of 33 months duration has no effect on bone health in exercising males.

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1. Ballard TL, Specker BL, Binkley TL *et al.* (2006) *Bone* **38**, 898–904.
2. Manninen AH (2006) *Br J Sports Med* **40**, 900–905.
3. Remer T, Dimitriou T & Manz F (2003) *Am J Clin Nutr* **77**, 1255–1260.