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Vitamin D status in elite Irish athletes

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Recent evidence suggests that vitamin D insufficiency is associated with an increased risk of stress fracture, total body inflammation, infectious illness and impaired muscle function^(1,2) and is thus likely to impair the training ability of athletes in addition to affecting their overall health. Though not widely studied, vitamin D deficiency and insufficiency have been reported among athletes, irrespective of geographic location⁽³⁾. The aim of the current study was to assess vitamin D status in two groups of elite Irish athletes sampled in different months of the year.

Non-fasting blood samples were taken from consenting volunteers (*n* 66) and total serum 25-hydroxyvitamin D (25(OH)D) was quantified by enzymeimmunoassay (IDS Limited, Boldon, UK). Serum calcium and plasma parathyroid hormone (PTH) concentration were also assessed (using the I-lab 650 Clinical Chemistry analyser and ARCHITECT i1000SR integrated system, respectively).

	Paralympians (<i>n</i> 32)			Gaelic Footballers (<i>n</i> 34)			<i>P</i> value*
	Median	25 th	75 th	Median	25 th	75 th	
Sampling month	November			March			
25(OH)D (nmol/L)	57.44	48.60	67.23	33.35	28.76	41.58	<0.001
PTH (ng/mL)	34.55	19.95	45.55	37.90	28.40	43.65	0.572
Ca (mmol/L)	2.50	2.41	2.58	2.43	2.36	2.46	0.002
Vitamin D intake (µg/d)†	5.49	2.57	8.09	~	~	~	
Calcium intake (mg/d)†	909	507	1474	~	~	~	

*Significant difference between athletic groups ($P < 0.05$, independent t-test). Significance remained after controlling for age and gender ($P < 0.001$, ANCOVA); †mean daily intakes estimated from a validated food frequency questionnaire⁽⁴⁾ (*n* 25); 25(OH)D, 25-hydroxyvitamin D; PTH, parathyroid hormone.

Vitamin D status was significantly lower in the gaelic athletes compared to the paralympians. Moreover, a greater proportion of gaelic athletes had a 25(OH)D < 50 nmol/L compared to the paralympians (94% vs. 28%); a level most experts use to define 25(OH)D deficiency⁽³⁾. Among the paralympians, the serum 25(OH)D and calcium concentrations of wheelchair-bound athletes were significantly lower compared to that of their able-bodied counterparts ($P = 0.013$ and $P = 0.001$, respectively), without significantly affecting PTH concentrations ($P = 0.676$). There were no significant differences in mean daily vitamin D ($P = 0.903$) or calcium ($P = 0.210$) intakes between the two groups of paralympians. Mean daily vitamin D and calcium intake were significantly correlated after controlling for age and gender ($r = 0.464$, $P = 0.030$), however were not associated with circulating 25(OH)D, PTH or calcium concentrations.

This study highlights a high prevalence of vitamin D deficiency among elite Irish athletes, particularly at the end of winter. Inadequate sun exposure, rather than diet, is the likely cause of lower 25(OH)D concentrations observed in the wheelchair athletes. A serum 25(OH)D concentration ≥ 80 nmol/L has recently been postulated as desirable for athletes⁽²⁾ however, the majority of athletes sampled in this study failed to reach this level. Vitamin D supplementation should therefore be considered for these athletic groups.

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