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THE SKELETAL RESPONSE TO PROLONGED SUN DEPRIVATION IN ANTARCTIC CONDITIONS

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Lack of exposure to solar ultra violet radiation (UVR) results in decreased synthesis of vitamin D, with low serum levels associated with increased bone turnover and bone loss. The long-term effect of this sun deprivation on bone metabolism is not clearly established.

This longitudinal study investigated the skeletal response to solar UVR deprivation in 57 healthy adults, aged 38.6 yrs during their winter in Australia's Antarctic program. Participants we also followed up after leaving Antarctica and returning to a more temperate climate.

Anthropometry was measured at baseline and dietary intake at 6 months. Blood samples were taken at baseline, every three months, and on return to Australia, then analysed for vitamin D and markers of bone turnover (OC; osteocalcin), formation (P1NP; procollagen Extension Peptide) and resorption (Beta X Laps; Beta Cross laps).

Mean (± SE) values were: height; 180.2 ± 1.4 cm, weight 85.7 ± 4.5 kg and calcium intake 755 ± 52 mg/day. Serum values were as followed;

	Baseline	3mths	6 mths	9 mths	12 mths	Follow up
Vit D (nmol/L)	55.2	39.8*	37.9*^	39.6	43.4*	50.0
BXL (ng/ml)	0.33	0.37^	0.34^	0.34	0.38^	0.25

* different to baseline, ^ different to follow up, $p < 0.05$

Serum Vitamin D levels at 3 months were significantly lower than baseline, and remained lower for the year ($p < 0.07$ - 0.0001). Values at 6 months were lower than at follow up. Bone resorption was higher at 3 time points during the Antarctic expedition compared to follow up ($p < 0.05$).

Vitamin D levels were below the normal adult range during the winter months in Antarctica. Bone resorption, but not formation was elevated during the period of sun deprivation. Short-term sun deprivation negatively impacts on bone, especially in extreme environments. The long-term detriment to bone is still to be determined.