

OSTEOSCOOP

News on current events in osteoporosis and rheumatology

Seasonal changes in mineralization are related to Vitamin D deficiency

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A seasonal variation in osteoid surfaces and calcification fronts was noted several decades ago in bone biopsies from hip fracture patients and attributed to vitamin D status. It was suggested at that time that mild vitamin D deficiency might cause osteoporosis from malabsorption of calcium and more severe deficiency might cause osteomalacia. In order to further explore this hypothesis, Need *et al.* [1] examined bone biopsies, calcium absorption data, and serum vitamin D metabolites in 121 ambulant patients with osteoporosis.

They observed that 25(OH) vitamin D levels were significantly lower from late autumn to early spring than from late spring to early autumn (51 ± 23 versus 61 ± 27 nM; $p < 0.040$). None of the biopsies yielded a diagnosis of osteomalacia, but osteoid thickness was greater in the winter than the summer months as was mineralization lag time. Osteoid thickness and mineralization lag time were both inversely related to serum 25(OH) vitamin D but not serum 1,25(OH)₂ vitamin D. In contrast, calcium absorption was related to serum 1,25(OH)₂ vitamin D but not to serum 25(OH) vitamin D.

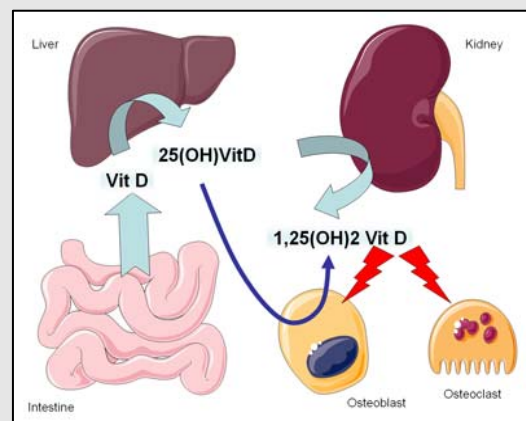
The authors conclude that circulating 25(OH) vitamin D affects the mineralization process, whereas circulating 1,25(OH)₂ vitamin D affects bone indirectly through its effect on calcium absorption. These results may suggest that 1,25(OH)₂ vitamin D is produced in bone from 25(OH) vitamin D and acts on its site of synthesis.

1. Need AG *et al.* *J Bone Miner Res.* 2007;22:757-761.

Vitamin D synthesis and action

After intestinal absorption or synthesis in the skin, Vit D is transformed into 25(OH) Vit D in the liver and then into calcitriol in the kidney.

However, calcitriol synthesis occurs also in bone where osteoblasts are equipped to synthesize this hormone. Locally formed calcitriol acts on bone cells to modulate osteoid tissue synthesis, mineralization and bone resorption.



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