



THE SUNSHINE VITAMIN

Words SUE APPELBOOM, BSC, MBANT, CNHC

Vitamin D is known as the “sunshine vitamin”, as humans depend on sunlight to synthesise about 90% of their vitamin D requirement, the remainder coming from dietary sources, primarily fish. But in the winter months are athletes getting enough vitamin D and can oral supplementation actually improve muscular strength?

Could supplementing with oral vitamin D improve muscular strength? Advice for athletes from Sue Appelboom, founder of NeatNT.com

Vitamin D is vital for musculoskeletal health, calcium absorption and immune function. Synthesised in the skin under the action of Ultraviolet B radiation, vitamin D3 (cholecalciferol) is converted to a metabolically active form that exerts its action on the tissue receptors of skeletal muscle to influence its function and performance. Deficiency has been associated with sub-optimal muscle function. During the “vitamin D winter” (October to March in the UK for instance) sunlight is of insufficient strength

for production by the skin, or cutaneous production, and serum levels (25-hydroxyvitamin D [25(OH)D], the primary circulating metabolite, a measure of vitamin D status) reach a low point.

Vitamin D insufficiency is prevalent among outdoor athletes who are not sufficiently exposed to sunlight. One UK winter study found insufficiency levels to be as high as 54% in footballers and 79% in jockeys. Another study found average winter levels in UK adults to be below the recommended sufficiency level that assures bone health. Weight-making sports appear to be at greater risk of insufficiency, probably due to low body fat and a decreased ability to store vitamin D, which could have implications for lightweight rowers. Other factors influencing status include skin colour, body mass index, clothing, sunscreen use, season and cloud cover.

Following oral vitamin D3 supplementation, several recent studies have attempted to correlate 25(OH)D levels with muscular strength by testing and assessing mechanical strength and power. While all indicate supplementation is effective in correcting insufficiency, there is conflicting evidence to support supplementation as a definitive means of increasing muscular strength, particularly when athletes are vitamin D replete.

Those studies that demonstrated increased muscle strength as a result of supplementation were subject to methodological limitations and most used doses above upper safe limits. However, there is credible evidence that 25(OH)D levels correlate with muscle strength, albeit without increasing strength, highlighting the need for athletes to attain and maintain a sufficient 25(OH)D concentration that will at least prevent muscular decline and under-performance.

Should you take a supplement?

The UK recommended nutrient intake for dietary vitamin D intake is 400 international units (IU) per day, but most of us do not achieve this, and when cutaneous absorption is not possible, athletes may require supplementation. Vitamin D status among athletes varies widely so it is important to test your status via your GP, particularly during winter.

Symptoms of vitamin D deficiency include tiredness, aches and pains, bone pain, weakness and frequent infections. In the event of being vitamin D deficient, this will need to be corrected, and following vitamin D repletion a maintenance dose may be required. Cashman et al. conducted a trial

During the “vitamin D winter” sunlight is of insufficient strength for production by the skin.

VITAMIN D SOS

- Soak up sunshine safely
- Oily fish provides the richest source of dietary vitamin D
- Supplement as directed only by a health professional

in healthy, young Irish adults – roughly applicable to athletes from various rowing nations in terms of latitude and cloud cover. They calculated that in those who avoided sunshine the total vitamin D intake (from all sources) required to maintain winter 25(OH)D at >50nmol/l was 1,120 IU/d. To elicit a response in skeletal muscle function would require a dose well in excess of the European Food Safety Authority upper safe limit of 4,000 IU/d, raising an issue of safety, as supra-physiological doses are known to cause toxicity.

In contrast to supplementation, intoxication is not possible from sunlight, but there is a need to balance the beneficial effects of maintaining sufficient 25(OH)D with the risk of contracting skin cancer. There is insufficient evidence to advise safely on the length and intensity of sun exposure, but one UK study found that in summertime 13 minutes of cloudless, midday exposure to 35% skin surface, three times per week, resulted in 90% of white-skinned adults attaining sufficient 25(OH)D (50 nmol/l).

The bottom line

Vitamin D levels correlate with muscular strength, and though supplementation can prevent muscular decline it is unlikely to increase strength. With a growing evidence base emphasising the significance of vitamin D in human physiology, supplementation is an attractive option for athletes hoping to enhance their performance by avoiding a state of insufficiency. Athletes are advised to seek professional help from a registered nutritional therapist or health professional regarding safe supplementation. **row360**

Biography

Sue Appelboom is a Registered Nutritional Therapist and recently completed a critical review of the contemporary research regarding vitamin D supplementation and muscular strength. Prior to her career as a nutritionist she was a member of the GB Rowing Team during the 1990s and competed in the lightweight single scull at three World Championships. sue@neatNT.com