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The effect of vitamin D and omega-3 fatty acids supplementation on athlete's metabolism

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Background: Vitamin D deficiency is common among athletes depending on their skin color, geographic region and indoor exercise time. Vitamin D is a vital component in biological reactions in human. Scientific articles have shown that vitamin D supplementation has positive effects on athletes' performance. Besides that, omega-3 fatty acids (FA) play supportive role on athlete's cardio-vascular system.

Objectives: The purpose of this review article was to evaluate the effect of vitamin D and omega-3 FA supplementation on muscles, aerobic capacity, exercise performance and cardio-vascular system in athletes.

Methods: Among the total 40 articles including entrance criteria, 19 articles including 13 original and 6 review articles were analyzed.

Results: Vitamin D plays important roles in synthesis of proteins, hormones, gene expression regulation and muscular performance. Vitamin D deficiency is common among athletes which increases the risk of fractures, inflammation, infection and prolonged recovery time. Furthermore, vitamin D increases calcium availability and improves cross bridge cycle and muscular contractions. Decreased level of vitamin D lower than 30 nmol/lit leads to reduced exercise power and increases the risk of infections, in contrast, level higher than 80 nmol/lit results lower risk of inflammation. Omega-3 FAs improves cardio-vascular function via nitric oxide production and also leads to less total oxygen consumption, lower heart rate and muscular oxygen requirement. Researchers have suggested that omega-3 FAs supplementation increases the level of Ecosapanthanoic acid (EPA) in erythrocytes and decreases the peroxidative erythrocyte's protein destruction which results in oxidative balance.

Conclusions: Vitamin D and omega-3 FAs supplementation have beneficial effects on athletes performance and doses higher than physiological daily intake may be needed according to increased requirement and deficiency prevalence in athletes.

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The B.E.S.T. program for osteoporosis prevention

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Osteoporosis is a metabolic bone disease characterized by excessively low bone density, bone fragility, and increased risk of fracture with relatively minor trauma. This debilitating disease cannot be cured but can be prevented. The etiology of osteoporosis is complex and multi-factorial. Evidence indicates the incidence of osteoporosis may be increasing even more than would be expected based on the increased number of older persons, suggesting a decrease in bone quality from generation to generation. If not prevented, osteoporosis can progress silently and painlessly until a bone fractures. The already staggering medical, social and economic costs related to osteoporosis can be expected to increase unless effective prophylactic and therapeutic regimens are developed. The combination of adequate nutrient intake from food and supplements, exercise and medications may have added benefits for improving bone mineral density and preventing osteoporosis compared to a single intervention. This presentation will focus on key nutritional and exercise factors for the prevention of osteoporosis. It will feature the exercise intervention and findings from the Bone Estrogen Strength Training research study (B.E.S.T) which was a United States National Institutes of Health funded clinical trial. This study demonstrated that bone mineral density could be maintained or increased in the short term (1 year) and the long term (4 years) in postmenopausal women with a progressive resistance and weight-bearing exercise program and adequate nutritional intake. This research study indicated that individuals who consistently did the prescribed volume of weight lifted had the greatest effect on increasing bone mineral density. Health-care professionals may implement the B.E.S.T Exercise program by using the step-by-step educational book entitled *The BEST Exercise Program for Osteoporosis Prevention*.

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