

The effect of vitamin D supplementation on improving muscle strength, muscle volume and cardiorespiratory fitness through resistance training in male athletes with vitamin D deficiency

Abstract:

Backgrounds: The purpose of this study was to investigate the effect of 8 weeks of resistance training with vitamin D injection on muscle strength, muscle volume, and cardio-respiratory fitness in futsal men with vitamin D deficiency.

Materials and Methods: For this purpose, 40 male futsal players (mean age: 25.95 ± 3.61 , height: 176.82 ± 4.9 cm, weight: 70.26 ± 5.34 kg, body mass index: $1.67 \pm 22.09\%$, body fat percentage: 13.31 ± 3.97) which according to the American Cardiology Association Index (with a mean serum level 19.24 ± 15.5) had high vitamin D deficiency, were selected through convenience sampling and randomly divided into 4 groups of 10 subjects: exercise, exercise-complement, supplement and control. The supplement and supplement-exercise groups received injections of vitamin D₃ supplementation (intramuscular injection of 50,000 units) for 8 weeks, once every two weeks. The exercise and supplement-exercise groups for 8 weeks, performed resistance training with intensity of 75% 1RM, 3 sessions per week. One day before and after intervention, blood sampling was collected to measure 1.25 (OH) ₂D levels. Muscle strength and volume as well as Vo₂max were measured and recorded before and after the training and supplementation period.

Results: The results of this study showed that muscle strength in all three experimental groups had a significant increase from pre-test to post-test, and significant increase in muscle volume was observed only in exercise and supplemented exercise groups. The cardiorespiratory fitness increased in all groups were so small that the increase was not significant ($P \geq 0.05$). ANOVA's test output showed between supplement-exercise group with supplemental and exercise groups, no significant difference was observed in any of the measured variables ($P \geq 0.05$).

Conclusion: Based on the findings of the present study, it seems that simultaneous application of vitamin D supplementation and resistance training for eight weeks does not have a significant effect on the improvement of the performance of futsalists. Perhaps the type of sporting activity tested, the level of physical fitness, and the type of sport of subjects will have an impact on the effectiveness of supplementation.

Keywords: Resistance training, Vitamin D, cardiovascular fitness, muscle mass and muscle strength