

# Serum 25-Hydroxyvitamin D Status and Anaerobic Performance in Female Collegiate Basketball Players

Anna Krieger, Manuel Campos, PhD<sup>1</sup>, Amy Olson, PhD, RD, LD<sup>2</sup>

## Affiliations

<sup>1</sup>Department of Biology; <sup>2</sup>Department of Nutrition; College of Saint Benedict/Saint John's University, St. Joseph, MN USA 55424



## INTRODUCTION

- Professional athletes with adequate vitamin D status jumped higher and sprinted faster than those with insufficient status [ $<50\text{nmol/L}$ ]<sup>1</sup>
- The incidence of deficiency varies throughout the year, with rates increasing from 12% in the fall to 63% in the winter<sup>2</sup>
- This seasonal dip may adversely affect skeletal muscle function and performance

**PURPOSE:** To evaluate serum vitamin D [25(OH)D<sub>3</sub>] status and anaerobic performance in collegiate female basketball players and verify whether 2000 IU/daily vitamin D<sub>3</sub> is sufficient to maintain optimal 25(OH)D<sub>3</sub> levels during the winter months

## METHODS

- CSB/SJU IRB approval was obtained prior to testing
- 15 varsity female collegiate basketball players volunteered to participate in the double blind, placebo-controlled investigation. One subject was excluded from data analysis due to problems with supplementation compliance (age =  $19.7 \pm 1.4$  y)
- Subjects were randomly divided into two groups: 1) 2000 I.U. vitamin D<sub>3</sub>/daily or 2) 100 I.U. vitamin E/daily (i.e. placebo)
- Supplements were consumed for 60 days
- Health questionnaires, T drill sprint tests, and vertical jumps were completed pre- and post-supplementation
- Serum vitamin D concentrations were measured pre- and post-supplementation using an using a 25(OH)D<sub>3</sub> ELISA assay
- SPSS t-tests were used for statistical analysis of data
- Vitamin D deficiency was defined in accordance with the Endocrine Society guideline for inadequacy ( $<75$  nmol/L)

**Table 1.** Endocrine Society vitamin D concentration classifications

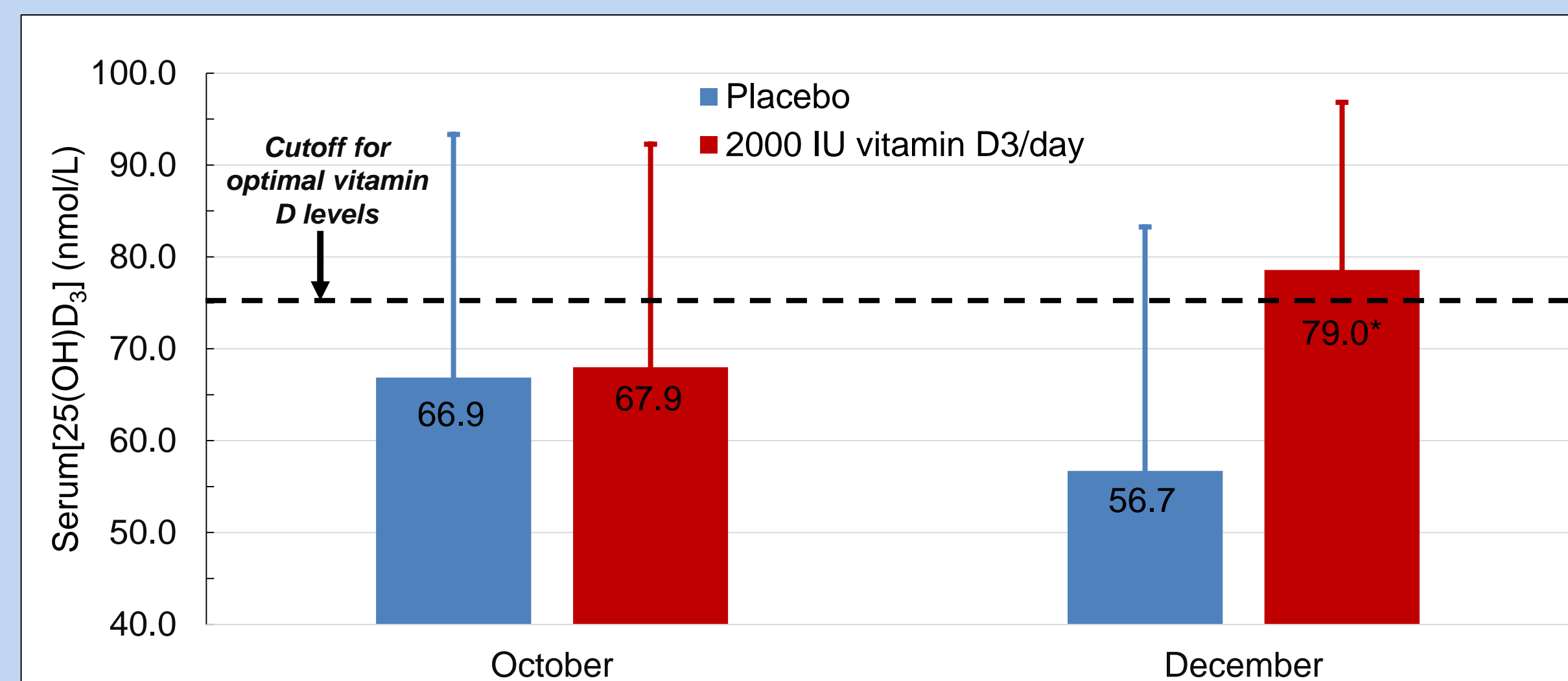
Serum 25(OH)D (nmol/L)	Status
$< 50$	Deficient
50-75	Insufficient
75-125	Optimal

## RESULTS

**Table 2.** Serum vitamin D<sub>3</sub> status and anaerobic performance changes over 60 day supplementation period (mean  $\pm$  SD)

	Placebo group (n=7)	2000 IU vitamin D <sub>3</sub> /day (n=7)
<b>25(OH)D<sub>3</sub> (nmol/L)</b>		
Baseline	66.9 $\pm$ 26.5	67.9 $\pm$ 24.2
Final	56.7 $\pm$ 26.5	79.0 $\pm$ 18.2*
<b>Vitamin D Sufficient (%)</b>		
Baseline	42.9	14.3
Final	42.9	57.1*
<b>T Drill Agility Test (s)</b>		
Baseline	11.3 $\pm$ 0.7	11.6 $\pm$ 1.1
Final	11.4 $\pm$ 0.3	11.1 $\pm$ 0.6
<b>Vertical Jump (cm)</b>		
Baseline	47.3 $\pm$ 6.7	47.8 $\pm$ 6.6
Final	48.2 $\pm$ 6.2	48.8 $\pm$ 6.2
<b>Power (W)</b>		
Baseline	4086.5 $\pm$ 438.4	4033.3 $\pm$ 531.6
Final	4112.8 $\pm$ 476.3	4094.9 $\pm$ 497.9

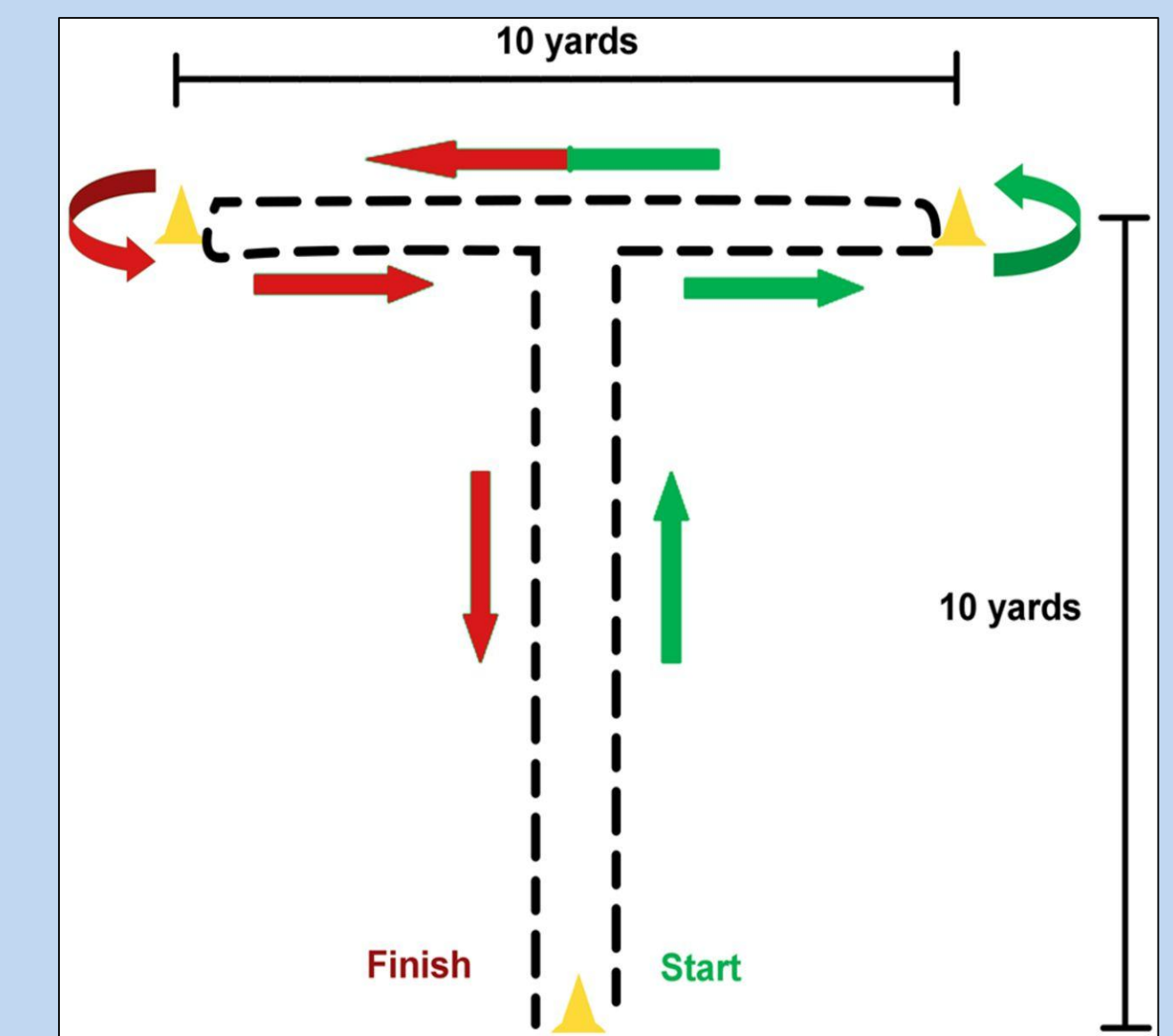
\*  $p < 0.05$



**Figure 1.** Changes in serum 25(OH)D<sub>3</sub> (nmol/L) following 60-day supplementation



**Figure 2.** Just Jump mat vertical jump



**Figure 3.** T drill agility test diagram

## CONCLUSIONS

**CONCLUSION:** Daily supplementation of 2000 IU vitamin D<sub>3</sub> over a 60-day period increased serum 25(OH)D<sub>3</sub>, but the elevated vitamin D status did not improve our chosen measures of anaerobic performance in collegiate female basketball players.

- 72% of participants were either vitamin D deficient or insufficient in October (28.5% and 43%, respectively).
- Compliance:** 64% of subjects reported taking their supplements 5-7 days/week; 29% complied 3-5 days/week; and 7% reported 1-3 days/week
- Vitamin D supplementation did not appear to make a difference on anaerobic performance, which may indicate that a chronic deficiency of vitamin D or a more severe deficiency is needed to adversely affect muscle function.

## ACKNOWLEDGEMENTS

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<sup>1</sup>Close, G.L., Russell, J., Cobley, J.N., Owens, D.J., Wilson, G., Gregson, W., Fraser, W.D. & Morton, J.P. (2013). Assessment of vitamin D concentration in non-supplemented professional athletes and healthy adults during the winter months in the UK: implications for skeletal muscle function. *Journal of Sports Sciences*. 31(4): 344-353. doi: 10.1080/02640414.2012.733822

<sup>2</sup>Halliday, T.M., Peterson, N.J., Thomas, J.J., Kleppinger, B.W., Larson-Meyer, D.E. (2011). Vitamin D status relative to diet, lifestyle, injury, and illness in college athletes. *Medicine and Science in Sports and Exercise*. 43(2). 335-43. doi: 10.1249/MSS.0b013e3181eb9d4d.