

# Correlation of Vitamin D Status with Performance in NCAA

## Division III Women Cross Country Runners

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### Introduction

- The risk of vitamin D deficiency in athletes may be higher than previously assumed.
- Vitamin D synthesis in the skin does not occur during the winter months at latitudes above the 35<sup>th</sup> parallel due to insufficient UVB radiation.
- Typical dietary vitamin D intakes are inadequate to achieve optimal vitamin D status.
- Vitamin D deficiency impairs muscle function in the elderly but few studies have examined the role of Vitamin D and athletic performance.

### Purpose

Examine the association between performance [anaerobic and aerobic] and 25 (OH) vitamin D<sub>3</sub> [25 (OH) D<sub>3</sub>] status in female cross country and track and field athletes.

### Methods

- Approval was obtained from the college's Institutional Review Board [IRB].
- 15 women from cross country [fall] and track and field [spring] participated [ages 18-22].
- Blood collections and performance tests were conducted in August '10 and January '11 and 25 (OH) D<sub>3</sub> was assayed using an ELISA kit (ALPCO).
- Anaerobic performance was assessed by a 20 m sprint with 10 m running start, a vertical jump test, and 4-repetition vertical jump test to determine Explosive Leg Power Factor (EFPL).
- Aerobic performance was assessed by a 2.5 mile time trial.
- Three-day diet records were evaluated using Diet Analysis Plus 9.0.
- Solar radiation [SR] for the St. Cloud area was obtained from National Climatic Data Center.

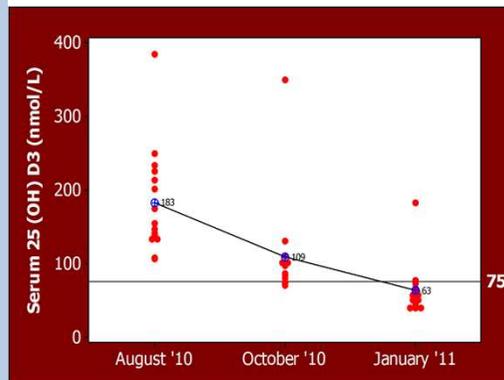
### Mean anaerobic and aerobic performance measurements

Date	20m sprint(s)	Vertical Jump (m)	Explosive Leg Power Factor	2.5 Mile Time Trial
August '10	3.02 ± 0.1	0.42 ± 0.1	2.10 ± 0.3	16:32 ± 0.03
January '11	3.08 ± 0.2	0.41 ± 0.1	2.05 ± 0.3	17:06 ± 0.04
Paired T tests	p=0.066	p=0.577	p=0.583	p=0.003

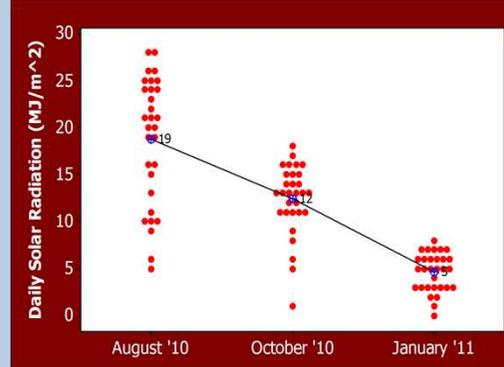
### Acknowledgments

A special thank you to coach Robin Balder-Lanoue and the CSB Cross Country team, Donald Fischer, Mary Pieklo, Marie Boo, Megan Buermann, and Emily Willaert

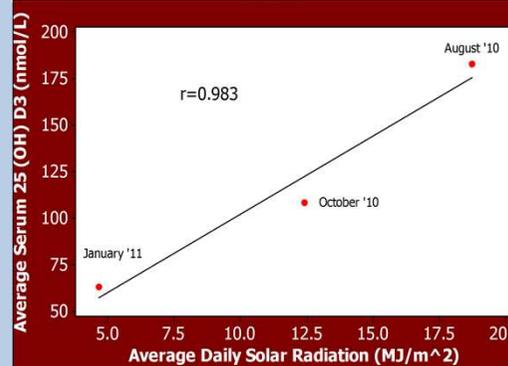
Serum 25 (OH) D<sub>3</sub> (nmol/l) measurements



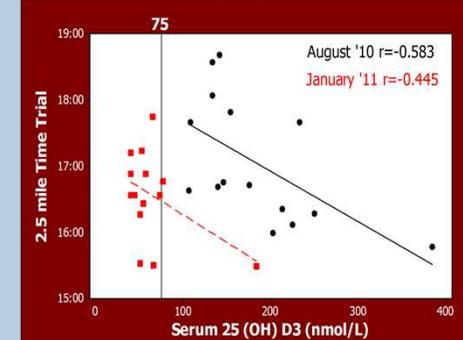
Daily solar radiation (MJ/m<sup>2</sup>) measurements for month prior to respective serum 25 (OH) D<sub>3</sub> assessment points



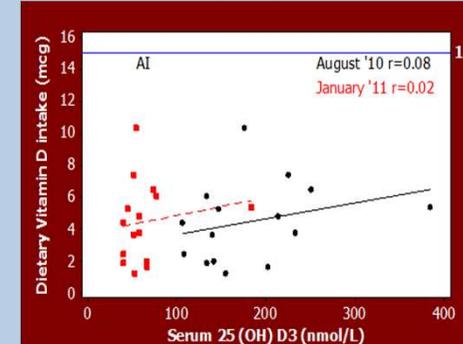
Serum 25 (OH) D<sub>3</sub> means (nmol/l) relative to SR<sub>mean</sub> (MJ/m<sup>2</sup>)



2.5 mile time trials results relative to serum 25 (OH) D<sub>3</sub> (nmol/L)



Dietary intake of vitamin D relative to serum 25 (OH) D<sub>3</sub> (nmol/L)



### Conclusions

- Serum 25 (OH) D<sub>3</sub> decreased significantly from August to January in this population [p = 0.000]
- None of the participants met the new dietary guidelines for dietary vitamin D (600 IU or 15 mcg/day) from food sources; therefore, in order to maintain optimal vitamin D status during the winter months, supplement use is recommended. Use of tanning beds may improve vitamin D status but also increases the risk of skin cancer.
- Anaerobic performance did not decline with lower 25 (OH) D<sub>3</sub> levels in January.
- Aerobic performance, however, did correlate with serum 25 (OH) D<sub>3</sub> levels in August when all athletes had optimal serum D levels.
- In January when serum levels were below optimal for all athletes [except for the one athlete who supplemented] aerobic performance declined and the correlation between serum 25 (OH)D<sub>3</sub> and aerobic performance weakens.