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

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INTRODUCTION

- Professional athletes with adequate vitamin D status jumped higher and sprinted faster than those with insufficient status [<50 nmol/L]¹
- The incidence of deficiency varies throughout the year, with rates increasing from 12% in the fall to 63% in the winter²
- This seasonal dip may adversely affect skeletal muscle function and performance

PURPOSE: To evaluate serum vitamin D [25(OH)D₃] status and anaerobic performance in collegiate female basketball players and verify whether 2000 IU/daily vitamin D₃ is sufficient to maintain optimal 25(OH)D₃ 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 ± 1.4 y)
- Subjects were randomly divided into two groups: 1) 2000 I.U. vitamin D₃/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)D₃ 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

<table>
<thead>
<tr>
<th>Serum 25(OH)D (nmol/L)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>Deficient</td>
</tr>
<tr>
<td>50-75</td>
<td>Insufficient</td>
</tr>
<tr>
<td>75-125</td>
<td>Optimal</td>
</tr>
</tbody>
</table>

RESULTS

Table 2. Serum vitamin D₃ status and anaerobic performance changes over 60 day supplementation period (mean ± SD)

<table>
<thead>
<tr>
<th>Placebo group (n=7) 2000 IU vitamin D₃/day (n=7)</th>
<th>25(OH)D₃ (nmol/L)</th>
<th>Vitamin D Sufficient (%)</th>
<th>T Drill Agility Test (s)</th>
<th>Vertical Jump (cm)</th>
<th>Power (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>66.9 ± 26.5</td>
<td>42.9</td>
<td>11.3 ± 0.7</td>
<td>47.3 ± 6.7</td>
<td>4086.5 ± 438.4</td>
</tr>
<tr>
<td>Final</td>
<td>56.7 ± 26.5</td>
<td>42.9</td>
<td>11.4 ± 0.3</td>
<td>48.2 ± 6.2</td>
<td>4112.8 ± 476.3</td>
</tr>
<tr>
<td>2000 IU vitamin D₃/day</td>
<td>67.9 ± 24.2</td>
<td>14.3</td>
<td>11.6 ± 1.1</td>
<td>47.8 ± 6.6</td>
<td>4033.3 ± 531.6</td>
</tr>
<tr>
<td></td>
<td>79.0 ± 18.2*</td>
<td>57.1*</td>
<td>11.1 ± 0.6</td>
<td>48.8 ± 6.2</td>
<td>4094.9 ± 497.9</td>
</tr>
</tbody>
</table>

* p < 0.05

CONCLUSIONS

CONCLUSION: Daily supplementation of 2000 IU vitamin D₃ over a 60-day period increased serum 25(OH)D₃, 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

- Direct costs for this study were funded in part by the College of St. Benedict/St. John’s University Department of Undergraduate Research.
- Carol Howe-Veenstra, Coach Michael Durbin, and the College of St. Benedict basketball team for their willing participation.