Vitamin D was related to VO2 but not Anthropometric or Quality of Life in Healthy Males

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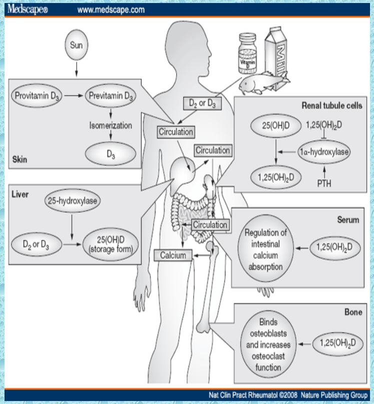
Background



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1,25(OH)2D
1a-hydroxylase
1,25(OH)2D
PTH
Liver
25-hydroxylase
D2 or D3
25(OH)D (storage form)
Circulation
Calcium
Regulation of intestinal calcium absorption
Serum
1,25(OH)2D
Bone
Binds osteoblasts and increases osteoclast function
1,25(OH)2D
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These findings are from a study whose primary outcome measures the effects of acute exercises and Vitamin D supplementation on the IGF system in men. This is screening data from that study.

Vitamin D insufficiency or deficiency may affect over a billion people across the globe. Vitamin D is taken in either through sunlight or diet. Once in circulation, Vitamin D either goes to the liver for storage, or to the renal tubules for further processing. After being processed in the renal tubules, Vitamin D may be released in the blood to regulate calcium update in the digestive tract or it may go to the bones where it regulates osteoblasts and osteoclasts.

1-RM: The maximum amount of weight that can be lifted through the full range of motion, for one repetition, with proper form[1]

VO2 max: Maximal aerobic capacity or oxygen uptake and is expressed as milliliters of oxygen used in one minute per kilogram of body weight[2]

BMI: Body Mass Index. A comparison of weight in kilogram over height in meters squared

%BF: Percent Body Fat. The percent of a person's body mass that is composed of fat

Demographics

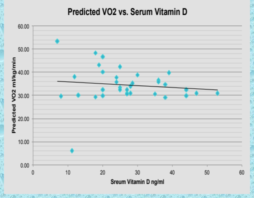
All subjects were males between the ages of 30-65 with no Malabsorption syndrome with serum 25-hydroxyvitamin D levels less than or equal to 30 ng/ml.

Averages			
Age	44.9±10.1	1-RM Percentile	33.6±32.9
Body Fat % 7 Site	18.5±6.7	% of wt Bench	75.9±20.4
BMI	27.3±6.0	Dep Score	10.8±5.8
WHR	0.9±0.1	Fitz Score	19.1±6.2
VitDSerum	28.6±11.1	PCS	54.5±5.4
%RDAVitDintake	47.9±54.0	MCS	52.1±6.5
PredVO2	35.4±6.0	Yale PA	1507.85±1515.1

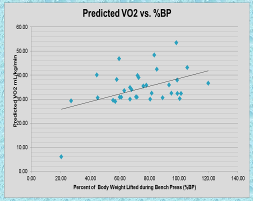
Abstract

Vitamin D potentially influences skeletal muscle function. Recent research examining Vitamin D and anthropometrics have correlated obesity with poor aerobic and anaerobic function, and quality of life measures. In order to determine if there is an association between serum 25(OH)-Vitamin D levels and exercise, anthropometrics, and quality of life measurements, data was collected from 36 healthy males (45.8 ± 9.7 years old). Serum 25(OH)-Vitamin D levels, percent body weight lifted for one-repetition maximum for bench press (%BP), Submaximal Predicted VO2, Waist to Hip Ratio (WHR), BMI, and Percent Body Fat using 7 sites (%BF) were collected. The Depression Scale (CES-D), General Health Survey (SF-36), and Yale Physical Activity Survey (YPAS) were also used. Positive correlations were seen between Vitamin D and Predicted VO2; Predicted VO2 and %BP; CES-D and BMI; and BMI and %BF. Negative correlations were found between CES-D and the physical (PCS) and mental (MCS) summaries of the SF-36; %BP with BMI and WHR; and PCS with BMI, WHR, and YPAS.

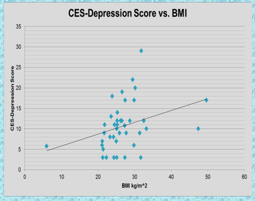
Results



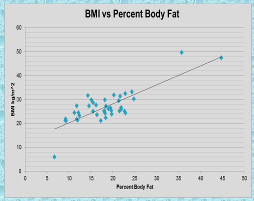
p=0.0245
Predicted VO2 and Serum Vitamin D are positively correlated.



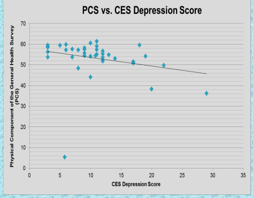
p=0.0279
Predicted VO2 and %BP are positively correlated.



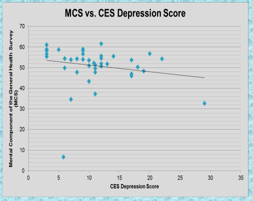
p=0.0175
CES-Depression Score and BMI are positively correlated.



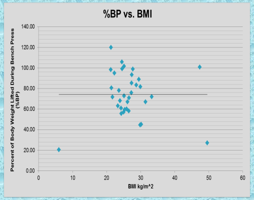
p<0.0001
BMI and Percent Body Fat are positively correlated.



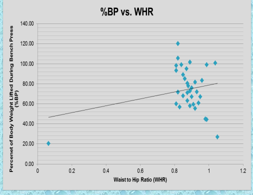
p<0.0001
PCS and CES-Depression Scores are negatively correlated.



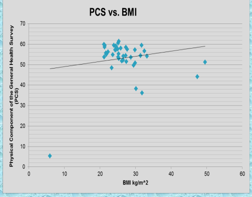
p=0.0033
MCS and CES-Depression Scores are negatively correlated.



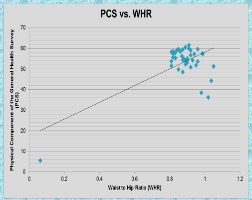
p=0.0037
%BP and BMI are negatively correlated.



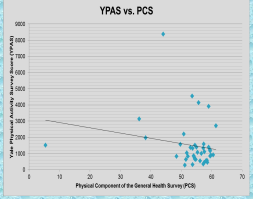
p=0.0030
%BP and WHR are negatively correlated.



p=0.0431
PCS and BMI are negatively correlated.



p=0.0233
PCS and WHR are negatively correlated.



p=0.0386
YPAS and PCS are negatively correlated.

We used Pearson Correlation Coefficient to test possible linear correlations amongst all measures. We used a nominal significance level of p<0.05.

Methods

- Parallel design, double-blinded supplementation of either Vitamin D3 or a Placebo.
- Subjects were screened, and after admittance, underwent at random 3 different acute exercise protocols.
- Screening involved a submaximal VO2 max treadmill test and a one-repetition max (1-RM) measure for squat, bench press, lat pull down, and leg press
- Exercise protocols last for one hour and include mild stretching, aerobic exercise at 50% V02 max on the treadmill, and resistance training with repetitions set at 50% 1-RM
- Three day diet records, food frequency questionnaire, physical activity questionnaire, a depression questionnaire, and general health questionnaire were collected twice
- Anthropometric measures of height, weight, waist to hip ratio, BMI, and body fat percentage were collected during the screen
- Body Fat Percentage will be determined with skin calipers
- During 4 week treatment period of Vitamin D and Placebo subjects were contacted weekly and asked about adverse effects
- After treatment, subjects come in again for the exercise protocols
- Dietary data was compiled and analyzed using Nutritionist Pro software

Conclusions

Individuals with a higher BMI psychologically identify themselves as more depressed with a lower mental health status and recognize themselves as having a poor physical health status. Individuals that not only present as being healthier in BMI, WHR, and percent of body weight lifted in bench press also perceive themselves to be in good physical shape. Serum 25(OH)-Vitamin D was not correlated to any measures of quality of life or other physical measure in this data set. Higher Vitamin D levels may improve aerobic muscular function, but not anaerobic muscular function.

References

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2. Hutchins, Michael. "The Definition of Vo2 Max." *LiveStrong*. N.p., 05 Aug 2011. Web. 21 Mar 2013. <http://www.livestrong.com/article/509102-the-definition-of-vo2-max/>.

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