

Seven days of high and low dose creatine supplementation III: Hemodynamics

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Abstract

Background Creatine and nitrates are popular dietary supplements. While both have been examined in singularity, little is known regarding their co-ingestion relative to performance, side effects and safety. The purpose of this study was to examine the safety and efficacy of a creatine nitrate dietary supplement.

Methods In a double-blind, crossover, randomized and placebo-controlled manner; 28 apparently healthy and recreationally active men and women (18 men, 10 women, 21.6±3.7 yr, 20.4±10.6% fat, 24.7±2.9 kg/m²) ingested daily supplements for 7-d consisting of a dextrose flavored placebo (PLA); a low dose of creatine nitrate (Low, 3g) and a high dose of creatine nitrate (6g). Participants repeated the experiment with the alternate supplements randomly with a 7 day washout period between each. Participants had systolic and diastolic blood pressure and heart rate measured after lying supine for 15 minutes and again after 2 minutes lying vertical on a tilt table. This was conducted both pre and 30 minutes post supplement, post resistance exercise on days 1 and 6. Data were analyzed by repeated measure 8 x 3 MANOVA with Time and Group as factors using Greenhouse-Geisser as appropriate and are presented as mean change from Day1 Supine ± 95%CI.

Results Statistical analysis revealed significant changes over time for DBP and heart rate (HR) (p<0.001), but not SBP (p>0.05). No significant group differences or group x time interactions were observed among groups. Therefore, the following reflects pooled cohort time point comparisons. Mean change± 95%CI from Day1 Supine for DBP (mmHg) are: Day 1 vertical (2.8, 95%CI 1.3, 4.3), Day1 Post Supplement, Post Exercise Supine (0.7, 95%CI -0.8, 2.3), Day1 Post Supplement, Post Exercise Vertical (4.0, 95%CI 2.2, 5.8), Day 6 supine (0.8, 95%CI -1.3, 2.9), Day6 vertical (3.8, 95%CI 1.5, 6.2), Day6 Post Supplement, Post Exercise Supine (1.0, 95%CI -1.1, 3.0), and Day6 Post Supplement, Post Exercise Vertical (3.5, 95%CI 1.3, 5.6). Significant differences were found between all supine and vertical DBP measures except between Day1 Vertical and Day6 Supine & Day6 Post Supplement, Post Exercise Supine. Mean change ± 95%CI for HR (bpm) are: Day 1 vertical (11.8, 95%CI 10.0, 13.5), Day1 Post Supplement, Post Exercise Supine (14.5, 95%CI 12.3, 16.6), Day1 Post Supplement, Post Exercise Vertical (24.4, 95%CI 21.8, 27.0), Day 6 supine (-1.4, 95%CI -3.4, 0.5), Day6 vertical (12.4, 95%CI 10.0, 14.8), Day6 Post Supplement, Post Exercise Supine (15.2, 95%CI 12.5, 17.9), and Day6 Post Supplement, Post Exercise Vertical (24.8, 95%CI 21.5, 28.0). Significant differences were found between all time points, Day1 Supine & Day6 Supine, Day1 Vertical & Day6 Vertical, Day1 Post Supplement, Post Exercise Supine & Day6 Vertical, Day1 Post Supplement, Post Exercise Supine & Day6 Post Supplement, Post Exercise Supine, and Day1 Post Supplement, Post Exercise Vertical & Day6 Post Supplement, Post Exercise Vertical.

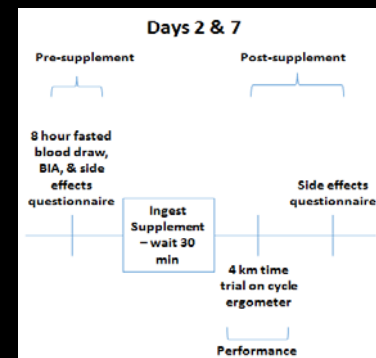
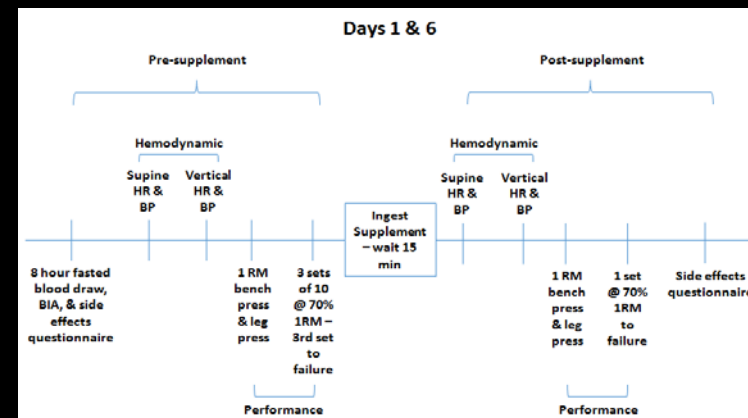
Conclusion Changes in body position and exercise increased DBP and HR. However, supplementation of 3 or 6 g/d of creatine nitrate did not significantly affect hemodynamic responses in comparison to a placebo.

Background

Many individuals seek ergogenic aids to enhance their performance. Dietary supplementation with creatine is one such ergogenic aid. However, health safety is one of the main concerns of supplement usage. This study seeks to examine the safety and efficacy of a pre-workout supplement with creatine nitrate.

Methods

- 28 apparently healthy and recreationally active men and women (21.6±3.7 yr, 20.4±10.6% fat, 24.7±2.9 kg/m²) participated in this study
- Participants ingested one of two different pre-workout supplements, consisting of either a low dose of creatine nitrate (3g: 2g Cr, 1g Nit) or a high dose of creatine nitrate (6g: 4g Cr, 2g Nit), or a placebo containing 6g dextrose, daily for 7 days
- Blood donation occurred after 8+ hours of fasting on days 1, 2, 6, and 7 for each supplement
- Exercise testing occurred at the same time points as blood donation
- Participants were placed on a tilt table for 15 minutes prior to exercise in order to obtain resting HR & BP. Subsequent HR & BP were measured after 2 minutes vertical on the tilt table.
- Participants then followed a 1RM bench press and leg press protocol, reps to fatigue during the 3rd set of BP and LP 1RM at 70% 1RM
- Participants then ingested one of two different pre-workout supplements, consisting of either a low dose of creatine nitrate (Low, 3g: 2g Cr, 1g Nit) or a high dose of creatine nitrate (6g: 4g Cr, 2g Nit), or a placebo containing 6g dextrose
- Participants were placed back on the tilt table 15 minutes after ingestion, for an additional 15 minutes supine. HR & BP were measured synonymously to previous tilt table
- The aforementioned 1 RM bench press and leg press protocol were performed a second time followed by only reps to exhaustion to measure supplement/placebo effect
- A 7 day wash-out period followed each supplement
- Measurements were taken pre-supplement/pre-exercise (Pre) and post supplement/exercise (Post)



Statistical Analyses

Data were analyzed by MANOVA using IBM SPSS for Windows version 22.0 software (Chicago, IL). Data are presented as mean ± SD

Results

- Wilks' Lambda showed significant time effects (p<0.001) for DBP and SBP, but no group or group by time effects (p>0.05)
 - Greenhouse-Geisser univariate analysis revealed significant changes over time (p<0.001) for DBP, but not SBP (p>0.05)
 - Significant changes for DBP were found between supine and vertical positions
- Significant time effects (p<0.001) were found for heart rate, but no difference between groups or group by time interactions (p>0.05)
 - Significant differences were observed between pre and post exercise as well as supine and vertical positions

Conclusions & Applications

- This study demonstrates that supplementation of 3g and 6g of creatine nitrate had similar effects to placebo on heart rate, SBP, and DBP
- Exercise as well as position (vertical or supine) were shown to effect heart rate and blood pressure with no differences between groups

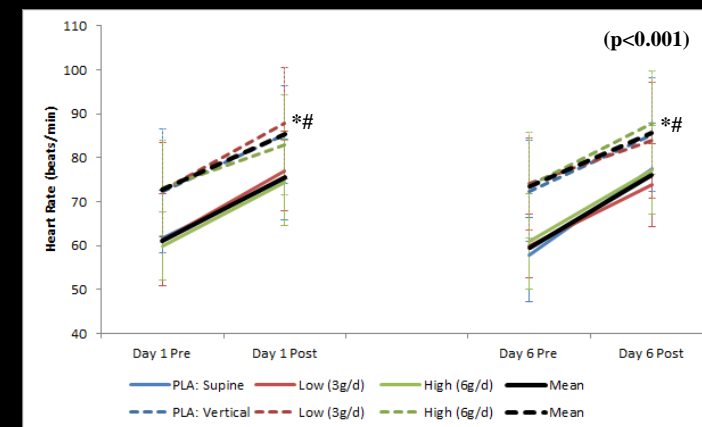
Acknowledgements & Disclosures

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Graphs

Figures represent mean ± SD.



*Indicates differences between supine and vertical.
 #Indicates differences between pre and post.

