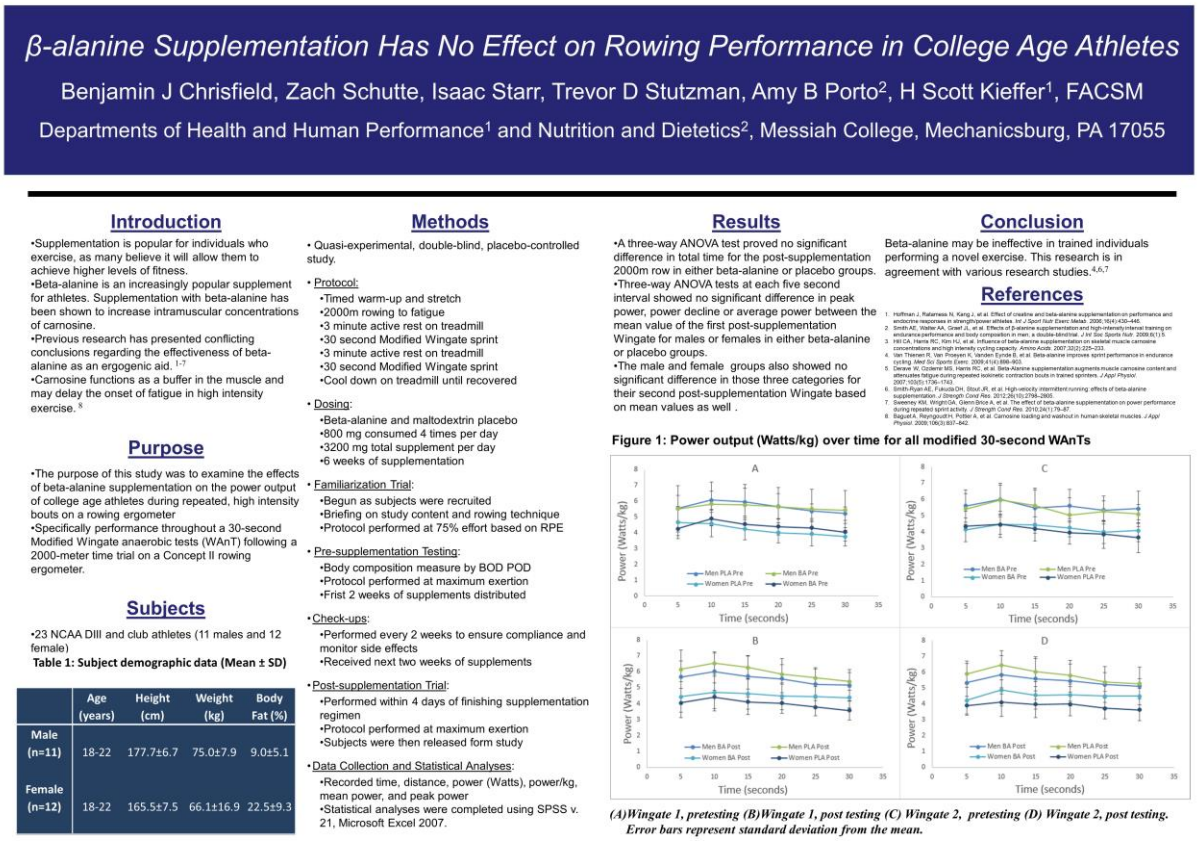
β-Alanine Supplementation Has No Effect on Rowing Performance in College Age Athletes

Benjamin J. Chrisfield, Trevor D. Stutzman, Zach Schutte, Isaac Starr, Amy B. Porto, H. Scott Kieffer FACSM. Presented at the American College of Sports Medicine Annual Meeting in San Diego, California, May, 2016.

β-alanine supplementation has been shown to increase the buffering capacity of the cell during short high intensity activity (S-HI). However, the usefulness of β-alanine across sports that combine endurance high intensity activity (E-HI) with S-HI is limited. **PURPOSE:** The purpose of this study was to examine the effects of β-alanine supplementation on performance measured during E-HI and subsequent S-HI power performance. **METHODS:** Eleven men (mean±SD: age = 20±1.3 years; weight=75.0±7.9 kg; height=177.7±6.7 cm) and twelve women (age=20.2±1.5 years; weight=66.1±16.9 kg; height=165.5±46.5 cm) participated in a six-week, double-blind, quasi-experimental study and were randomly assigned to one of two groups: β-alanine (BLA)(n=11(6 women, 5 men); 800 mg tablets, 4 times daily) or placebo (PLA) (n=12 (6 women, 6 men); 800 mg maltodextrin tablets, 4 times daily). The cohort consisted of NCAA Division III track, swimming, wrestling, and soccer athletes who were actively training in their respective sports. Prior to, and immediately following supplementation, participants performed a 2000 meter row at full exertion followed by two modified rowing Wingate tests (WAnT) with three minutes of rest between each exercise. Researchers measured total time and peak power (PP) for the mean value of both pre-supplementation and post-supplementation testing for each treatment. Data were analyzed with a two-way factorial ANOVA using SPSS (v. 21) ($p < 0.05$). **RESULTS:** No significant treatment effects were observed for the 2000 meter row for time to completion for men or women ($p>0.05$, Post-treatment results: BLA males=446.5±8.7 seconds, PLA males=445.2±20.4 seconds, BLA females=554.7±51.3 seconds, and PLA females=513.9±42.5 seconds). Additionally, no significance difference was found in PP for either WAnT ($p > 0.05$, Post-treatment results $WAnT_1$: BLA males=478.6±88.3 watts (W), PLA males=490.2±82.0 W, BLA females=293.3±54.6 W, and PLA females=287±57.5 W. $WAnT_2$: BLA males=458.2±79.1 W, PLA males=482.0±79.1 W, BLA females=298.5±57.8 W, and PLA females=287.2±57.5 W) **CONCLUSION:** This data suggests that β-alanine may not enhance performance that utilizes E-HI or S-HI among different sport activities in a group of diversely trained athletes.



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Introduction

•Supplementation is popular for individuals who exercise, as many believe it will allow them to achieve higher levels of fitness.
•Beta-alanine is an increasingly popular supplement for athletes. Supplementation with beta-alanine has been shown to increase intramuscular concentrations of carnosine.
•Previous research has presented conflicting conclusions regarding the effectiveness of beta-alanine as an ergogenic aid. [1-7]
•Carnosine functions as a buffer in the muscle and may delay the onset of fatigue in high intensity exercise. [8]

Purpose

•The purpose of this study was to examine the effects of beta-alanine supplementation on the power output of college age athletes during repeated, high intensity bouts on a rowing ergometer
•Specifically performance throughout a 30-second Modified Wingate anaerobic tests (WAnT) following a 2000-meter time trial on a Concept II rowing ergometer.

Subjects

•23 NCAA DIII and club athletes (11 males and 12 female)

Table 1: Subject demographic data (Mean ± SD)

	Age (years)	Height (cm)	Weight (kg)	Body Fat (%)
Male (n=11)	18-22	177.7±6.7	75.0±7.9	9.0±5.1
Female (n=12)	18-22	165.5±7.5	66.1±16.9	22.5±9.3

Methods

• Quasi-experimental, double-blind, placebo-controlled study.

• Protocol:
•Timed warm-up and stretch
•2000m rowing to fatigue
•3 minute active rest on treadmill
•30 second Modified Wingate sprint
•3 minute active rest on treadmill
•30 second Modified Wingate sprint
•Cool down on treadmill until recovered

• Dosing:
•Beta-alanine and maltodextrin placebo
•800 mg consumed 4 times per day
•3200 mg total supplement per day
•6 weeks of supplementation

• Familiarization Trial:
•Begun as subjects were recruited
•Briefing on study content and rowing technique
•Protocol performed at 75% effort based on RPE

• Pre-supplementation Testing:
•Body composition measure by BOD POD
•Protocol performed at maximum exertion
•Frist 2 weeks of supplements distributed

• Check-ups:
•Performed every 2 weeks to ensure compliance and monitor side effects
•Received next two weeks of supplements

• Post-supplementation Trial:
•Performed within 4 days of finishing supplementation regimen
•Protocol performed at maximum exertion
•Subjects were then released form study

• Data Collection and Statistical Analyses:
•Recorded time, distance, power (Watts), power/kg, mean power, and peak power
•Statistical analyses were completed using SPSS v. 21, Microsoft Excel 2007.

Results

•A three-way ANOVA test proved no significant difference in total time for the post-supplementation 2000m row in either beta-alanine or placebo groups.
•Three-way ANOVA tests at each five second interval showed no significant difference in peak power, power decline or average power between the mean value of the first post-supplementation Wingate for males or females in either beta-alanine or placebo groups.
•The male and female groups also showed no significant difference in those three categories for their second post-supplementation Wingate based on mean values as well .

Conclusion

Beta-alanine may be ineffective in trained individuals performing a novel exercise. This research is in agreement with various research studies. [4,6,7]

References

1. Hoffman J, Ratamess N, Kang J, et al. Effect of creatine and beta-alanine supplementation on performance and endocrine responses in strength/power athletes. *Int J Sport Nutr Exerc Metab*. 2006;16(4):430–446.
2. Smith AE, Walter AA, Graef JL, et al. Effects of β-alanine supplementation and high-intensity interval training on endurance performance and body composition in men: a double-blind trial. *J Int Soc Sports Nutr*. 2009;6(1):5.
3. Hill CA, Harris RC, Kim HJ, et al. Influence of beta-alanine supplementation on skeletal muscle carnosine concentrations and high intensity cycling capacity. *Amino Acids*. 2007;32(2):225–233.
4. Van Thienen R, Van Proeyen K, Vanden Eynde B, et al. Beta-alanine improves sprint performance in endurance cycling. *Med Sci Sports Exerc*. 2009;41(4):898–903.
5. Derave W, Ozdemir MS, Harris RC, et al. Beta-Alanine supplementation augments muscle carnosine content and attenuates fatigue during repeated isokinetic contraction bouts in trained sprinters. *J Appl Physiol*. 2007;103(5):1736–1743.
6. Smith-Ryan AE, Fukuda DH, Stout JR, et al. High-velocity intermittent running: effects of beta-alanine supplementation. *J Strength Cond Res*. 2012;26(10):2799–2805.
7. Sweeney KM, Wright GA, Glenn Brice A, et al. The effect of beta-alanine supplementation on power performance during repeated sprint activity. *J Strength Cond Res*. 2010;24(1):79–87.
8. Baguet A, Reyngoudt H, Pottier A, et al. Carnosine loading and washout in human skeletal muscles. *J Appl Physiol*. 2009;106(3):837–842.

Figure 1: Power output (Watts/kg) over time for all modified 30-second WAnTs

(A)Wingate 1, pretesting (B)Wingate 1, post testing (C) Wingate 2, pretesting (D) Wingate 2, post testing. Error bars represent standard deviation from the mean.