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May 29-June 2, 2018 • Minneapolis, Minnesota USA

Session E-39 - Free Communication/Poster: E-39. Ergogenic Aids III - Bicarbonate an...

2402 / 238 - Double-blind, Placebo Controlled, Randomized Crossover Pilot Study Evaluating The Impacts Of Sodium Bicarbonate in a Transdermal Delivery System on Physiological Parameters and Exercise Performance

June 1, 2018, 11:00 AM - 12:30 PM

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Authors

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Disclosures

M. Kern: Contracted Research - Including Principle Investigator; Ampersand.

Abstract

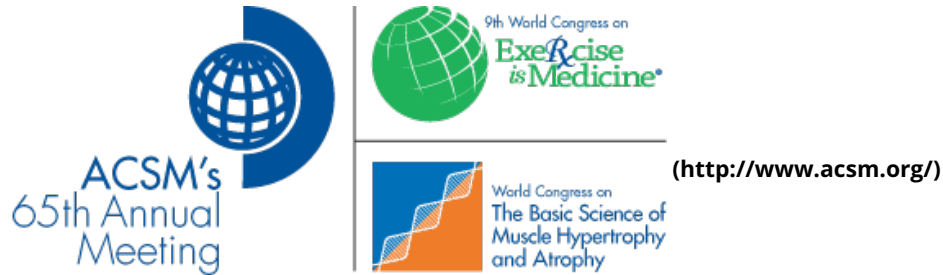
Oral sodium bicarbonate has been used for decades as an ergogenic aid by buffering muscle acid production during exercise and subsequently delaying the onset of fatigue in athletes. However, gastrointestinal side effects limit the use of sodium bicarbonate.

PURPOSE: This study evaluated the efficacy of a commercially available topical transdermal sodium bicarbonate (TSB) lotion (*Amp Human Performance™*) which is claimed to be delivered through the skin using a novel patent-pending transdermal delivery system for impacting exercise metabolism and performance.

METHODS: 20 trained cyclists (Category 1-3) and a professional triathlete participated in this randomized, cross-over, double-blinded, placebo-controlled study. After application of TSB or placebo lotions, subjects completed a variety of exercise and performance tests. On one day subjects completed a high-intensity series of exercise tests which included a ramped protocol until reaching a rating of perceived exertion (RPE) of 17 out of 20, a 30-second sprint performance test, and a 5-minute time trial performance test, with 5 minutes of recovery between tests. On a separate day subjects completed a 1-hour time trial. Heart rate, RPE, blood lactate and pH were assessed before, during, and after performance testing.

RESULTS: Heart rate and RPE were significantly ($p < 0.05$) lower for TSB compared to placebo at the 15-min mark of the 1-hour time trial, but not at other time points. When TSB was applied, lactate was higher ($p < 0.05$) after the high-intensity ramp, sprint and 5-min time trial series (10.8 ± 3.2 mmol/L versus 9.7 ± 3.1 mmol/L for TSB and placebo, respectively). Similar effects were not observed after the 1-hour time trial. Significance was not reached when examining performance differences ($p > 0.05$).

CONCLUSIONS: Overall, the findings from this study provide evidence that TSB can significantly impact blood lactate, heart rate and RPE during performance tests of varying intensity/length. These significant findings support the ability of this lotion to transdermally deliver sodium bicarbonate, which could allow athletes to avoid the side-effects of oral bicarbonate use. Further research is warranted to substantiate these findings and determine the most effective use for this commercially available transdermal sodium bicarbonate lotion.



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2403 / 239 - Double-blind, Placebo Controlled, Randomized Crossover Pilot Study Evaluating the Impacts of Sodium Bicarbonate in a Transdermal Delivery System on Delayed Muscle Onset Soreness

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Abstract

Sodium bicarbonate/alkalinization may reduce muscle mitochondrial damage caused by reactive oxygen species during intense exercise. Such damage can induce post-exercise inflammation and pain, which may be linked to delayed onset muscle soreness, or DOMS. However gastrointestinal side effects limit the use of oral sodium bicarbonate. **PURPOSE:** This study evaluated the efficacy of a commercially available, topical transdermal sodium bicarbonate (TSB) lotion (Topical Edge™), which is claimed to be delivered through the skin using a novel patent-pending transdermal delivery system for impacting DOMS.

METHODS: 20 trained cyclists (Category 1-3) and professional triathletes participated in this randomized, cross-over, double-blinded, placebo-controlled study. After application of TSB or a placebo, subjects completed a variety of exercise and performance tests varying in duration. On one day subjects completed a series of high-intensity exercises which included a ramped protocol to a rating of perceived exertion (RPE) of 17 out of 20, a 30-sec sprint performance test, and a 5-min time trial with 5 minutes of recovery between tests. On a separate day subjects completed a 1-hr time trial. Subjects completed DOMS questionnaires 24- and 48-hours after exercise sessions. Muscle soreness was rated on a scale of 0-100 where 0 = "no soreness", 25 = "mild pain", 50 = "moderate pain", 75 = "severe pain" and 100 = "the worst pain you can imagine".

RESULTS: DOMS was reduced following the high-intensity series with TSB compared to placebo. Similar effects were not observed following the 1-hr exercise bout. From the first to second day following the high-intensity exercise series, subjects using TSB experienced a 54% reduction in DOMS versus an increase in DOMS of 34% with placebo ($p=0.007$).

CONCLUSIONS: Findings from this study suggest that TSB can significantly shorten recovery from DOMS following high-intensity exercise. Findings also support the effectiveness of the transdermal system in delivering sodium bicarbonate topically and may allow athletes to achieve these results while avoiding the side-effects of oral bicarbonate. Furthermore, we believe this study is the first to provide a direct link between sodium bicarbonate use and DOMS in athletes. Additional research is underway to further substantiate these findings.