



Topical Edge PR Lotion significantly Improves High-Intensity Interval Cycling Performance.

Background: Athletes continuously search for safe, effective and compliant ergogenic aids that will improve their performance and give them an edge on their competitors. Oral sodium bicarbonate (baking soda) use is a time-tested and effective method of providing that edge, but oral use causes a myriad of intolerable side-effects such as indigestion, gastric pain, vomiting, and diarrhea which limits use. Topical Edge PR Lotion (TE-PR) delivers sodium bicarbonate transdermally. If proven effective, it will provide athletes the ability to use sodium bicarbonate, without the limiting side effects that come with oral use.

Objective: The objective of this field-testing exercise was to evaluate the impact of Topical Edge PR Lotion use on high-intensity interval cycling performance utilizing a randomized, controlled and blinded testing protocol.

Testing Design: Eight volunteer cyclists who were current clients of the Source Endurance Training Center of the Rockies (SETCR) tested Control lotion versus Topical Edge PR Lotion in a controlled, randomized, blinded, cross-over design.

Testing Methodology: Cyclists were informed of the testing procedures and signed waivers prior to participation. All cyclists had an athlete profile already built that included a reliable measure of functional threshold power (FTP). A 20-minute time trial was performed prior to the test sessions to set power for test sessions. All testing was completed on personal

bicycles on a Wahoo Kickr being driven by PerfPRO Studio software. Two sessions of high-intensity Intervals were completed using Topical Edge PR Lotion (TE-PR) or Control lotion (contained all ingredients except sodium bicarbonate) provided in blinded tubes (labeled A or B) by the manufacturer. To create the double-blind, cyclists and test administrators did not know the identity of each lotion. For the first testing session, the choice of Control or TE-PR was randomized. For the second test, the alternate lotion, Control or TE-PR, was used. Cyclists were instructed to apply 1 tablespoon of assigned lotion per leg 30 minutes prior to beginning a warm up. In order to prevent uncontrolled training schedules from confounding the testing results, the following schedule was adhered to:

Day 1: Cyclists completed 60 minutes of light riding at a recovery pace

Day 2: Cyclists completed a 20 minute time trial (see Table 1)

Day 3: Same as Day 1

Day 4: Cyclists completed high-intensity intervals until exhaustion (see Table 1)

Day 5: Same as Day 1

Day 6: Cyclists completed high-intensity intervals until exhaustion (same as Day 4 but with alternate sample used, see Table 1)

Table 1. Topical Edge PR Lotion Product Testing Protocol

Day 2: 20 minute Time Trial/ Power Test

Activity/Duration	Power
Warm Up	
4 min	self-selected
1 min	90% FTP
4 min	self-selected
5 min	100% FTP
6 min	self-selected
Begin Test	
20	Time Trial (TT)
Cool Down	
10	Self-selected

Day 4/6: High-Intensity Intervals to Exhaustion (failure)

Activity/Duration	Power
Warm Up	
4 min	self-selected
1 min	90% FTP
4 min	self-selected
5 min	100% FTP
6 min	self-selected
Begin Test	
30 seconds	
20 seconds	
<i>repeat to failure, count repetitions</i>	
Cool Down	
10	self-selected

Results were analyzed by using a paired t-test with a significance level set at $p < 0.05$. Results are presented as means \pm standard deviations.

Results: There was a significant difference ($p=0.009$) between Topical Edge PR Lotion and Control lotion in the number of high-intensity cycling intervals completed before exhaustion. Cyclists completed an average of 13.6 ± 3.9 intervals when using Control lotion versus 17.0 ± 4.9 intervals when using the Topical Edge PR Lotion (see Figure 1).

Figure 1: High-Intensity Interval Test Results

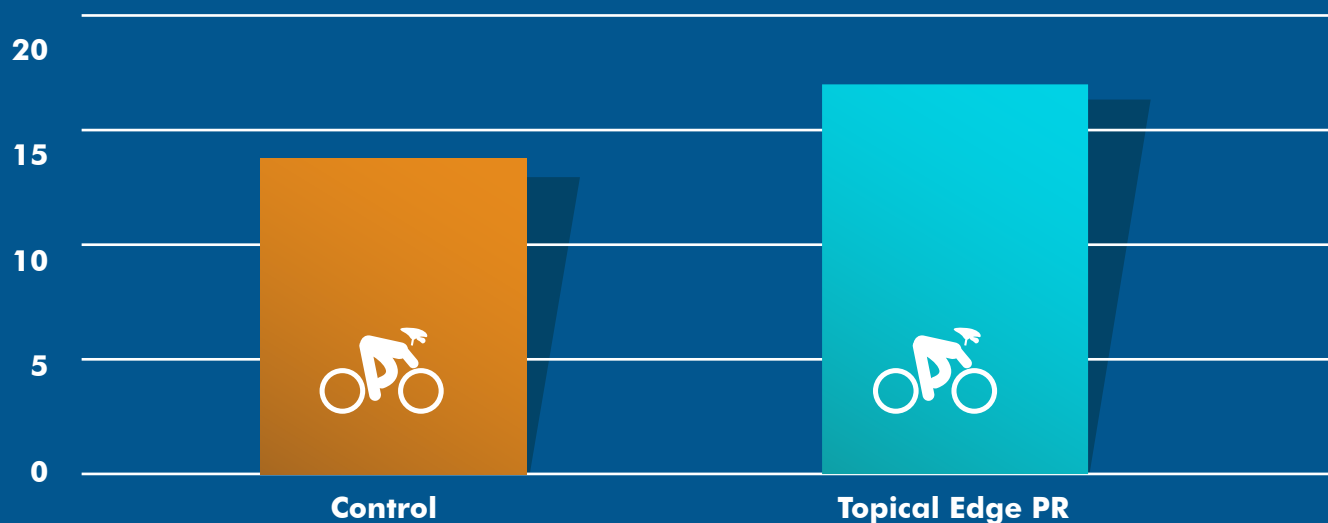


Figure 1. Cyclists performed significantly ($p=0.009$) more high-intensity intervals before exhaustion when using Topical Edge PR Lotion (containing sodium bicarbonate) compared when using Control lotion.

Discussion: Strengths of this testing protocol included the tight control of exercise done before each day of testing and the temporal proximity of test sessions. In the Kern et al. study (in review) of Topical Edge PR Lotion, which was completed during a competitive season, training outside of the test sessions was un-controlled resulting in test sessions falling variably after heavy training days, light training days or competitions. This led to cyclists being tested in different physiological states (e.g. exhausted, partially recovered or fully-recovered) and could have introduced variability into performance metrics. A limitation of this evaluation is the small number of cyclists tested (n=8), although when using the data from this trial, the probability is 80% that a study of a similar cross-over design would detect a treatment difference at a two-sided 0.05 significance level with only 6 subjects.

Conclusion: Testing of Topical Edge PR Lotion in this well-controlled and blinded evaluation demonstrated a significant ($p=0.009$) performance improvement. Well-trained cyclists were able to complete significantly more high-intensity intervals before exhaustion when using Topical Edge PR Lotion compared to Control. The greater than 20% performance improvement observed (3.4 additional intervals completed) is similar to that demonstrated with use of oral sodium bicarbonate, but without the side-effects associated with oral use. Krustup, et al. (1) and Price, et al. (2) Krustup et al. (1) demonstrated a 14% improvement

in performance (total number of meters ran before failure) of high-intensity intermittent (intervals) exercise (20-meter runs with 20 seconds of active recovery jogging), and Price, et al. (2) demonstrated an 11% performance improvement measured as peak power during intermittent cycling sprints (10 repeated 3-minute blocks of intermittent cycling at 40%, 60% and maximal sprint separated by 16 seconds of recovery). The similarity of results between this test and that by Krustup, et al. (1) may be attributed to the similarity of testing protocols that are based on exercise to failure/exhaustion rather than measures of work done (power or wattage) during fixed testing as in that utilized by Price, et al. (2)

Additionally, no side-effects were reported. Topical Edge PR Lotion may, for the first time, allow athletes to use sodium bicarbonate for performance improvement without the fear of experiencing the typical side-effects associated with oral use.

References

1. Krustup P, Ermidis G, Mohr M. Sodium bicarbonate intake improves high-intensity intermittent exercise performance in trained young men. J Int Soc Sports Nutr. 2015;12:25.
2. Price M, Moss P, Rance S. Effects of sodium bicarbonate ingestion on prolonged intermittent exercise. Med Sci Sports Exerc. 2003;35(8):1303-8.

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About the Source Endurance Training Center of the Rockies (SETCR): The Source Endurance Training Center of the Rockies is dedicated to bringing the complete indoor cycling training facility to the athletes of Northern Colorado. With educated, well trained coaches, a rounded indoor cycling training class schedule, weights and gym equipment, certified bike fitting, performance testing, plyometric classes, yoga and motor pacing, SETCR has what it takes to take athletes' training to the next level even in the coldest, darkest months of winter and no matter their goals.