

The Effects of Sodium Bicarbonate on Waka Ama Athletes' Ergometer 500m Sprint Performance.

Nathan Rennie and Russ Best

Centre for Sport Science and Human Performance, Wintec, Hamilton, New Zealand



Introduction

Little scientific literature has explored the ergogenic potential of nutrition interventions within Waka Ama. Due to the nature of Waka Ama sprint performance, anaerobic energy is the main source utilized to fuel performance. Sodium bicarbonate (SB) has been used as an external buffering source for high intensity exercises over multiple sporting codes. This ergogenic aid has been shown to improve efflux rates of hydrogen ions resulting in a delayed onset of muscular fatigue, whilst maintaining higher exercise intensities (Krustup et al., 2015).

The purpose of this study was to investigate if sodium bicarbonate elicited any ergogenic effects on 500m ergometer sprint performance on competitive waka ama athletes.

Methods

Design

This study used a double blind parallel group crossover design.

Participants

Ten competitive male waka ama paddlers (mean \pm SD; age: 18.7 ± 1.5 y, body mass: 89.39 ± 18 kg, height: 173.5 ± 29.9 cm) volunteered to participate. Two participants dropped out during the study.

Intervention

Participants acutely ingested $0.3 \text{ g}\cdot\text{kg}^{-1}\text{BM}$ of either sodium bicarbonate or a matched dose of Splenda™ (placebo) in gelatine capsules 120min before commencing their 500m performance trial (Kilding et al., 2012).

Data collection

Pre warm-up, blood lactate levels were measured. Immediately completing their 500m trial, the participants sprint times were recorded followed by another blood lactate measure. Ten minutes post trial the final blood lactate sample was taken. RPE was also collect after the trial, though data was not of interest in this study.

Statistical Procedures

Descriptive statistics (means and standard deviation) were calculated for performance times and blood lactate responses. Comparisons were then made between bicarbonate and placebo supplementation responses utilizing the comparative methods of Hopkins (2006). A specialized post only cross over spreadsheet allowed for percentage differences and effect sizes to be calculated. Effect size magnitudes were grouped based on the categories described by Cohen (1990).

Results

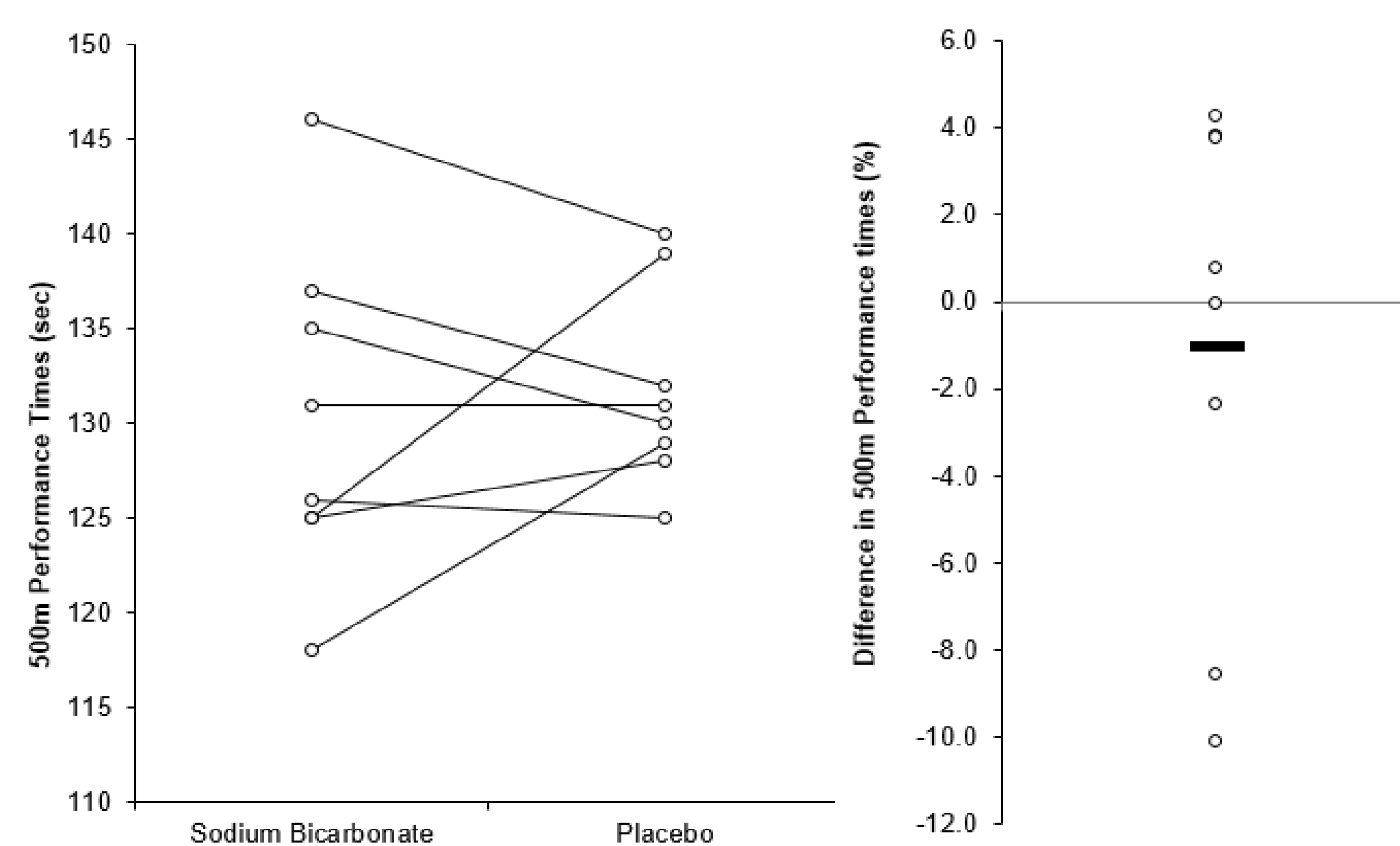


Figure 1. Comparison of 500m performance times of each individual between the two supplemented trials.

The percent of difference between SB and placebo are also seen. Three out of eight participants improved their performance times following SB ingestion with percentage differences of -2.3, -8.5, and -10.1% between trials. From this SB elicited small effect sizes ($ES = -0.27$) on performance times.

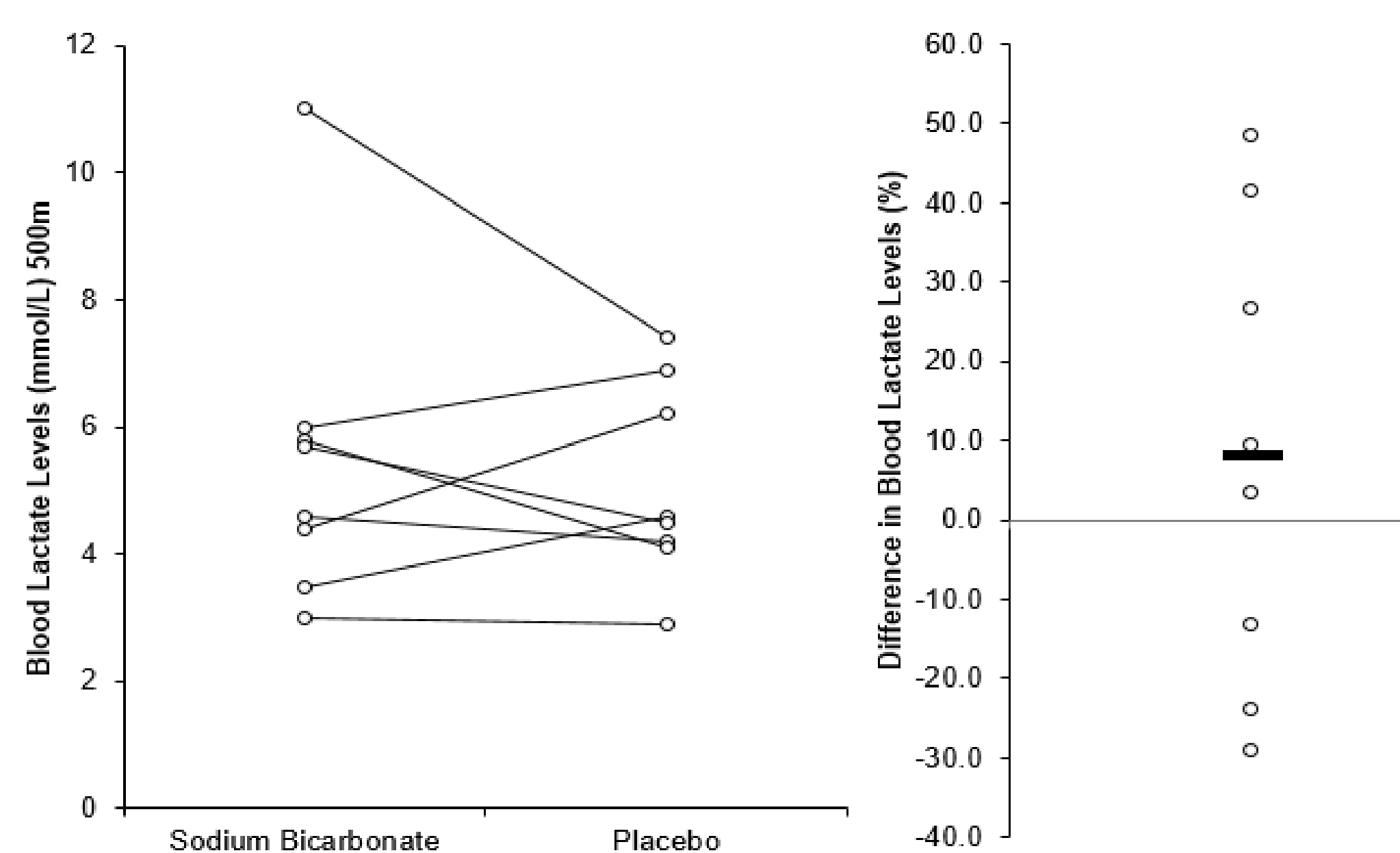


Figure 2. Individual blood lactate levels at 500m with percentage differences between SB and placebo trials.

Blood lactate responses immediately following the 500m produced trivial effect sizes ($ES = 0.12$) between the two trials. Five participants saw greater increases in blood lactate levels during the SB trial. Three out of the eight participants had lower blood lactate levels in the SB trial when compared to the placebo trial (-13, -23.9, and -29% difference).

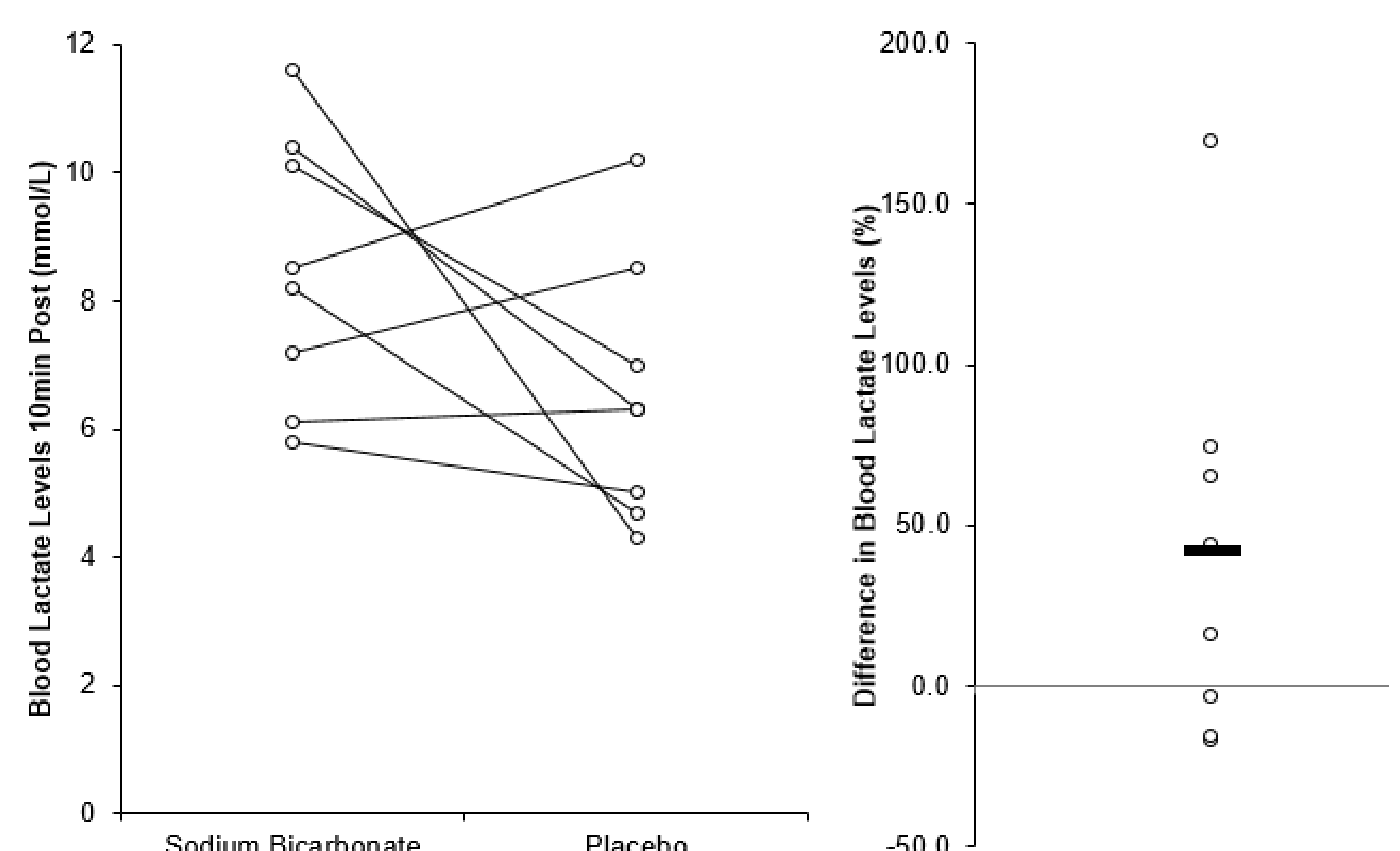


Figure 3. Individual blood lactate levels 10min post trial with percentage differences between SB and placebo trials.

Five out of eight participants showed increased blood lactate responses 10min post 500m erg performance following SB ingestion, revealing a moderate effect size ($ES = 0.96$).

Findings

The results of this study show that following SB ingestion, 500m blood lactate responses were trivial (3-6mmol/L). Lactate levels then increased (6-12mmol/L) when samples were taken 10min post trial, producing moderate effects when compared to the placebo trials. This physiological response was in accordance with the current scientific literature (Lindh et al., 2008). Although these physiological responses agreed with previous studies, acute SB loading only exerted small effects on 500m waka ergometer time performance.

Future research is required to further quantify the possible benefits of SB supplementation in waka ama paddlers.

Take Home Message

Sodium bicarbonate has potential to:

- Improve 500m waka ama ergometer performance times in SB responders.
- Be a successful ergogenic aid in SB responders in competitive environment where numerous races are performed over multiple days.

References

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