The Effects of Caffeinated Gum and Caffeine Capsules on Running Sprint Performance

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Introduction

Use of anhydrous caffeine is an established and widely used ergogenic method. In sprinting events, optimum performance is highly dependent on the simultaneous peak functioning of a host of physiological systems. Therefore, caffeine supplementation protocols need to be perfectly timed in order to achieve culmination in sprint performance parameters within a narrow time window.

Caffeine capsules are ingested approximately one hour before exercise however absorption rates may be highly variable. An alternative mode of ingestion is through caffeinated gum where caffeine is rapidly absorbed through the buccal mucosa.

Our **aim** was to investigate the acute effects of two distinct modes of caffeine ingestion on sprint performance.

Methods

Following ethics approval, eight trained male sprinters aged 20.2 ±0.8 years, completed a screening and familiarisation session before they completed four trials (3x40 m sprints with four minutes recovery) a week apart. See **Figure 1** for overview of tests and testing procedures.

A double-blind randomized crossover design was adopted where, during the trials, participants received: 1) **Caffeine gum** (CAFG, 6 mg·kg^{-1} of body mass), 2) **CAFG placebo** (CAFGP), 3) **Caffeine capsules** (CAFC, 6 mg·kg^{-1} of body mass), 4) **CAFC placebo** (CAFCP).

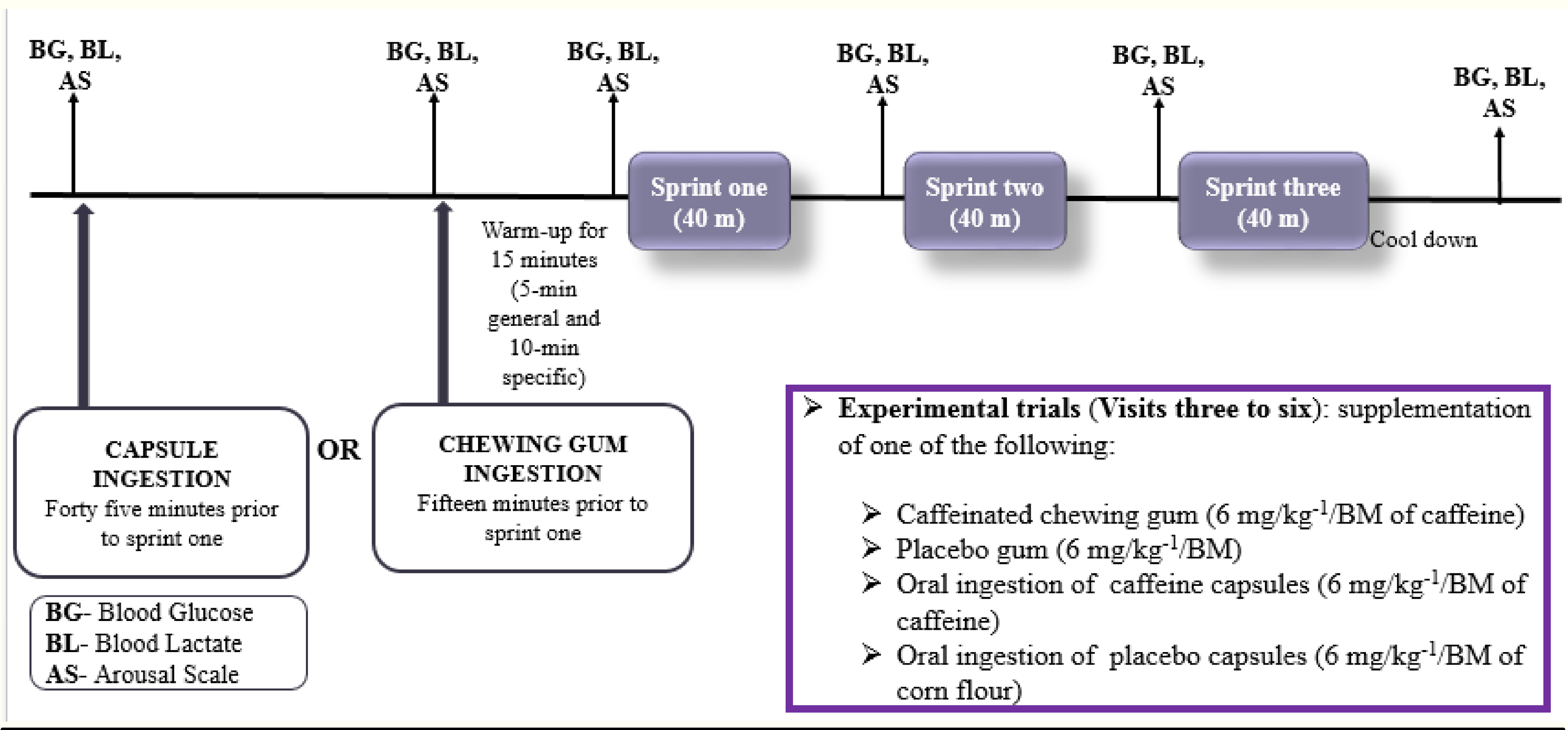

Figure 1. Outline of tests and testing procedures

Capsules and gums were given 45 and 15 minutes respectively before sprint one. The gums were chewed for five minutes. Arousal ratings (*Russel et al. 1989) and* concentration of blood glucose and lactate were monitored throughout testing (**Figure 1**)

Results

Mean time to complete all three sprints were 5.00(±0.23), 5.03(±0.17), 5.10(±0.15), and 5.10(±0.14) seconds for the CAFG, CAFC, CAFGP and CAFCP conditions respectively (**Figure 2**). Participants ran significantly faster ($p<0.05$) during the caffeine compared to the placebo conditions.

Sprint two in the CAFG was also significantly faster (0.84±0.56 %, $p=0.022$) than sprint two in the CAFC condition .

Blood glucose (**Figure 3**) and arousal ratings (**Figure 4**) were significantly higher during the caffeine trials.

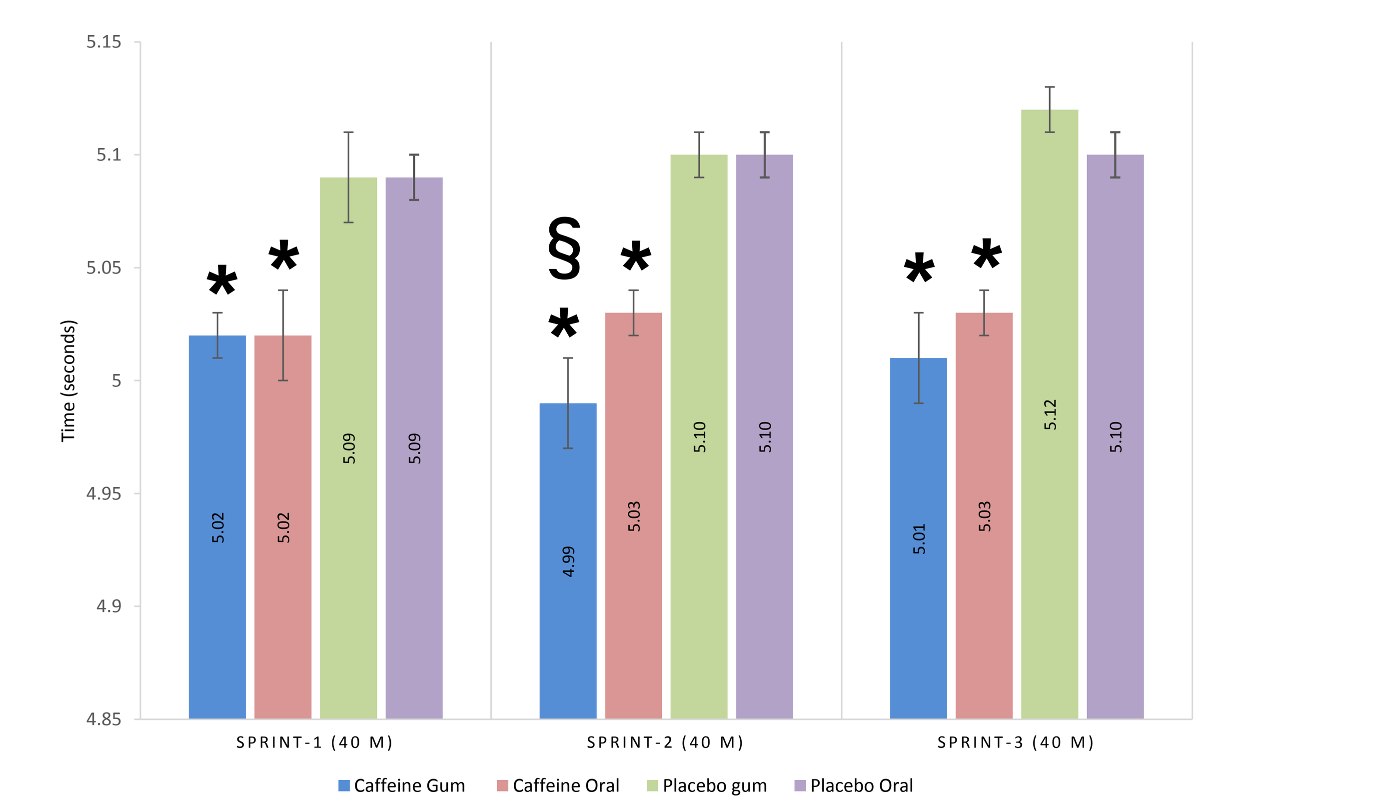

Figure 2. Mean time for all sprints. An asterisk (*) denotes significantly different from corresponding placebo value and a section sign (§) significantly different from caffeine capsule

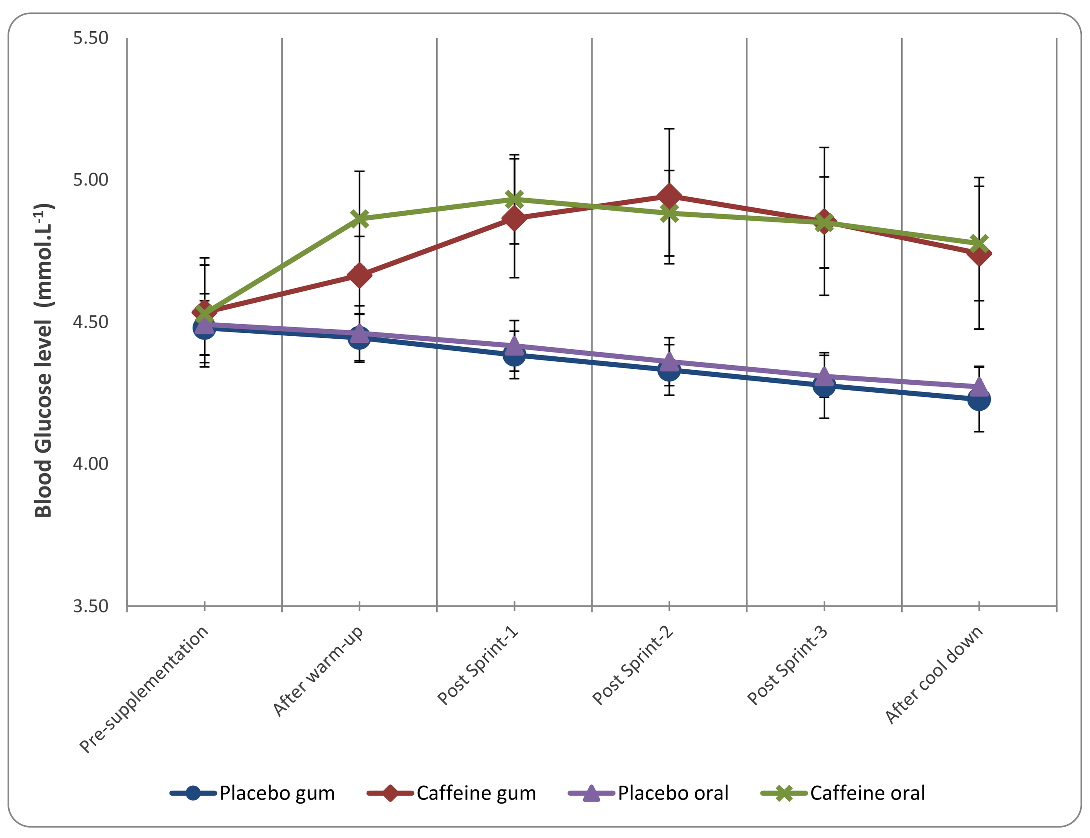

Figure 3. Mean (±SD) blood glucose concentration

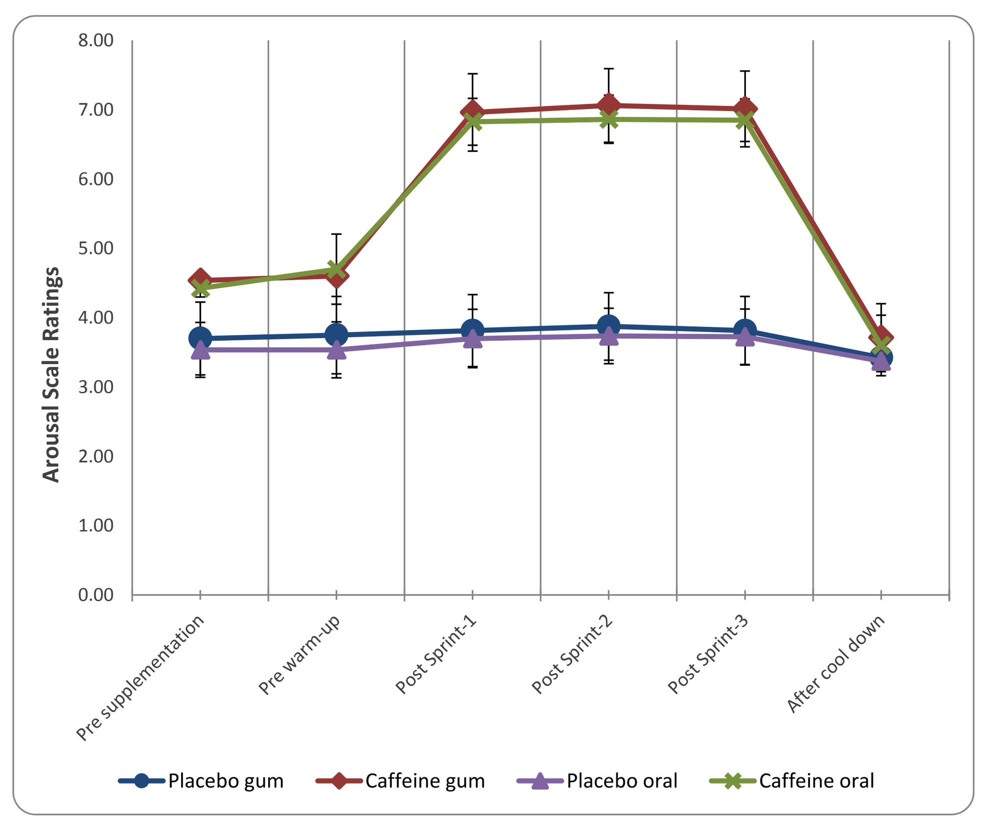

Figure 4. Mean (±SD) arousal ratings

Conclusions

Our data confirms that caffeine is an effective ergogenic strategy for sprinters. Furthermore, the greatest performance gains in sprint two suggests that caffeinated gum may be a more efficacious mode of ingestion than traditional methods of caffeine ingestion.

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