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EFFECTS OF CAFFEINE ON HIGH-INTENSITY FUNCTIONAL TRAINING PERFORMANCE

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ABSTRACT
Caffeine demonstrates an ergogenic effect on endurance exercise performance, however, limited information exists establishing its efficacy during high-intensity functional training (HIFT). HIFT is an exercise program that incorporates a variety of multi-joint movements performed at a relatively high-intensity and designed to improve parameters of general physical fitness and performance. PURPOSE: Our study aimed to determine the effects of caffeine on HIFT performance. METHODS: 13 HIFT-trained men (age = 28.5 ± 6.6 years, HIFT experience = 4.1 ± 3.0 years, body weight = 84.3 ± 9.9 kg) were randomized in a double-blind, crossover design. After consent, participants completed two HIFT sessions separated by a 7-day washout period, 60 minutes after consuming 5mg/kg of caffeine or a placebo. During HIFT sessions, participants completed as many rounds-as-possible in 20 minutes of pull-ups, 10 push-ups, and 15 air squats, with performance measured as the number of rounds completed (30 repetitions = 1 round). Paired-samples t-tests were used to compare HIFT performance between the caffeine and placebo conditions and to test for a potential learning effect between the first and second sessions. RESULTS: Participants significantly improved HIFT performance during the caffeine trial (15.3 ± 3.6 rounds) as compared to placebo (14.3 ± 3.0 rounds), t(12) = 3.783, p < 0.05. The eta squared statistic (0.30) indicated a large effect size. Moreover, no significant learning effect was identified between the first and second sessions (14.9 ± 3.2 vs. 14.7 ± 3.0 rounds, p = 0.73). CONCLUSION: Caffeine elicited an ergogenic response during HIFT in HIFT-trained men, with no identifiable learning effect, which is useful for competitive HIFT athletes aiming to optimize performance. However, future investigations should establish the efficacy of caffeine during varying-duration HIFT sessions and among female HIFT athletes.

INTRODUCTION
• Caffeine may improve athletic performance through ergogenic effects.
• Caffeine has been documented to improve endurance time trial performance.1
• Evidence is lacking for the effects of caffeine on a combined aerobic and resistance workout performance.2
• Recently, high-intensity functional training (HIFT) which includes endurance, weightlifting, and gymnastics activities performed at a relatively high-intensity, has gained attention among the scientific community.
• However, due to HIFT’s novelty, limited information exists regarding effects of caffeine.

PURPOSE
Our study aimed to determine the effects of caffeine on HIFT performance. We hypothesized that caffeine supplementation would improve HIFT performance.

METHODS
Design
• Double-blind cross-over study

Table 1: Participant Characteristics (N=13)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± SD or %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>28.5 ± 6.6 years</td>
</tr>
<tr>
<td>Height</td>
<td>178.9 ± 5.1 cm</td>
</tr>
<tr>
<td>Weight</td>
<td>84.3 ± 9.9 kg</td>
</tr>
<tr>
<td>Body Fat %</td>
<td>20.1 ± 2.9 %</td>
</tr>
<tr>
<td>HIFT experience</td>
<td>4.1 ± 3.0 years</td>
</tr>
</tbody>
</table>

Procedure
• Participants attended two laboratory sessions with a 7 day wash out period between.
• Participants consumed 5mg/kg of body weight of 200mg caffeine pill(s) or a biotin placebo 60 minutes prior to the HIFT session.
• Performance was measured by the total number of rounds completed in 20 minutes (1 round = 30 reps).

Analysis
• Paired-samples t-tests were used to compare HIFT performance between the caffeine and placebo conditions and to test for a potential learning effect between the first and second sessions.

RESULTS
Table 2: HIFT Performance (Total rounds completed).

<table>
<thead>
<tr>
<th>Condition/Session</th>
<th>Rounds (Mean ± SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo</td>
<td>14.3 ± 3.0</td>
</tr>
<tr>
<td>Caffeine</td>
<td>15.3 ± 3.6*</td>
</tr>
<tr>
<td>Session 1</td>
<td>14.9 ± 3.2</td>
</tr>
<tr>
<td>Session 2</td>
<td>14.7 ± 3.5</td>
</tr>
</tbody>
</table>

Table 2: HIFT performance (total rounds completed) was significantly higher during the caffeine condition compared to the placebo (p < 0.05). No significant difference was found in HIFT performance between the first and second session (p = 0.073).

* Significantly different from placebo at p < 0.05

CONCLUSIONS
Overall, caffeine elicited an ergogenic response in HIFT performance among HIFT-trained men with no identifiable learning effect, which is useful for competitive HIFT athletes aiming to optimize performance. However, future investigations should establish the efficacy of caffeine during varying-duration HIFT sessions and among female HIFT athletes.

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REFERENCES