

# C4 The Original Pre-Workout & Explosive Force

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## INTRODUCTION/RATIONALE

- C4 pre-workout can potentially increase force generated through its properties in the beverage, this has resulted in billions of servings of C4 pre-workout sold worldwide.
- Caffeine that is ingested 30 to 90 minutes prior to exercise has been shown to result in performance increases of up to 6% in events lasting from a few minutes to several hours. (Glaister & Gissane, 2018)
- Caffeine enhances peak power production, improves cognitive performance and enhances readiness to invest physical effort. (Duncan et al., 2019)

## PURPOSE/HYPOTHESIS

**Purpose:** To determine if there is a significant difference in force when the C4 supplement is used vs. when our placebo is used.

**Hypothesis:** We hypothesized that there will be an increase in explosive force when our participants take the C4 pre-workout, thus resulting in an increase of force generated and rate of force development compared to the placebo.



- Figures above demonstrate a counter movement jump being performed on a force plate.

## METHODS

Participants:

- We had ten participants in total. Four females and six males
- Between ages 19-25

Experimental Design:

- Single Blind Study
- Participants attended two sessions on two days, 48 hours apart.
- We randomly sampled our participants. Half took the C4 supplement and the other half will take our placebo on day 1
- 25 minutes after they have taken their drink our participants went through a 5 minute dynamic warm up
- After the warmup they stood on a force plate and perform one countermovement vertical jump
- We measured the peak force and rate of force development
- On day 2 our participants did the exact same routine as day 1, however those who took the placebo now took the c4 supplement and vice versa.
- Our placebo was a mix of pink lemonade flavored crystal light mixed with 250ml of water
- The C4 pre-workout was also mixed with 250ml of water



- Placebo on the left of the figure
- C4 Pre-workout on the right of the figure



- C4 Pre-workout in the figure above

## RESULTS



Although the average peak force and average rate of force development increased with the use of C4 pre-workout the data was not statistically significant. The p value for the peak force generated was 0.53 and the p value for the rate of force development was 0.77.

## DISCUSSION/CONCLUSION

- The average peak force increased by 6.4% with the use of C4 pre-workout
- The average rate of force development increased by 9% with the use of C4 pre-workout
- Results show that the C4 supplement did increase the explosive force in our participants, however it was not statistically significant.
- The above indicates that elite athletes may want to consider taking pre-workout as it may give them a slight competitive advantage, however the average person should save their money.
- Caffeine is the main ingredient that provides the explosive force, pre-workout may be more beneficial in aerobic activity as caffeine is a stimulant.
- Although our data was not statistically significant the use of C4 pre-workout did not show any negative effects in regards to force & rate of force development

## REFERENCES

- Duncan, M. J., Dobell, A. P., Caygill, C. L., Eyre, E., & Tallis, J. (2019). The effect of acute caffeine ingestion on upper body anaerobic exercise and cognitive performance. *European Journal of Sport Science*, 19(1), 103–111. <https://doi.org/10.1080/17461391.2018.1508505>
- Glaister, M., & Gissane, C. (2018). Caffeine and Physiological Responses to Submaximal Exercise: A Meta-Analysis. *International Journal of Sports Physiology & Performance*, 13(4), 402–411. Retrieved from <http://0-search.ebscohost.com/orca.douglascollege.ca/login.aspx?direct=true&db=s3h&AN=129945782&site=eds-live&scope=site>

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