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Ammonia Inhalants Impact on Shot Put Throw Distance

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The Effect of Ammonia Inhalation on Shot Put Distance

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Abstract

A variety of ergogenic aids have been researched in the past to assess effects on athletic performance. One potential aid relatively unstudied is ammonia inhalants (AI's), commonly referred to as smelling salts. AI's have been found to enhance peak and mean power output (PPO/MPO) in anaerobic activities. Because shot put throws rely primarily on anaerobic power, there is the potential for AI's to improve performance. This study was designed to determine whether an acute, one second inhalation of a commercially available AI immediately prior to a shot put throw would increase the total distance a college athlete shot putter (n=10) could throw in meters. Following a baseline analysis, subjects were matched into two separate groups based on initial shot put throw distance without the use of AI's. During the first testing day one group performed three trials using a one-second acute inhalation of AI immediately followed up by a maximal shot put throw. Shot puts were thrown using a standing/power throw, rather than with full technique (glide or spin) to reduce error. The second group performed the same procedure but with a placebo inhalant. Ten minutes of passive rest separated each trial. The second testing day involved the same procedure with the exception that the substance each individual used was switched. It was hypothesized that the three second inhalation of AI would significantly increase the shot put distance thrown. Significant results would suggest that an acute ammonia inhalation may improve shot put throw distance. This study is ongoing and the results will be available during the spring research poster celebration.

Introduction

Ammonia inhalation (AI) has inconsistent results regarding its effect on power performance

- Increase in peak/mean power during 15-second Wingate test post AI inhalation (Rogers et al., 2022)
- Increase in peak force rate of development during countermovement jumps and isometric thigh pulls (Bartolomei et al., 2018)
- No increase in back squat or bench press repetitions completed at 85% of 1RM (Richmond et al., 2014)

The shot put event relies heavily on power output (Landolsi et al., 2018)

No study to date has directly focused on the effect of ammonia inhalation on shot put distance

Purpose

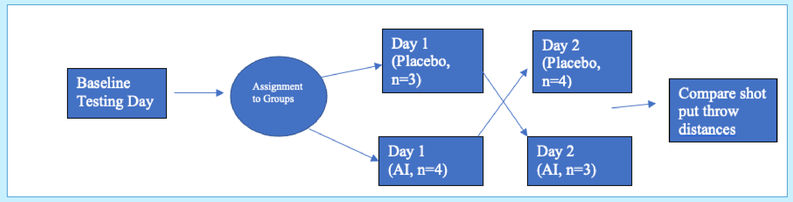
The purpose of this study was to examine the effect of an acute 1-second ammonia inhalation completed within 15 seconds of throwing on shot-put throw distance in DIII male and female track and field athletes compared to placebo inhalation.

Methods

Subjects

- 7 participants(M=3, F=4) were recruited from the Hope College Track and Field team.

Study Design:



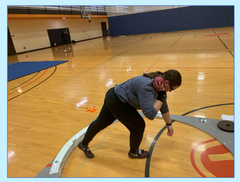
- The study required 3 visits. The first visit involved baseline testing and analysis to obtain informed consent, familiarization, and baseline throws.
- Participants were matched into two groups based on baseline values, one group inhaled the placebo on the first testing day (Day 1) while the second group inhaled the AI. The other substance was inhaled during Day 2 of testing.
- Data collection occurred over a 4 day period. Due to scheduling conflicts, 4 participants completed the two testing days Tuesday/Thursday while the other 3 did so on Wednesday/Friday.
- Each day, participants performed an acute, one second inhalation of the assigned substance and then performed a standard power throw. This was followed by a 10 minute rest and was repeated for a total of three trials.
- Heart rate was measured after inhalation and after the power throw.
- Alertness was measured after the power throw via a visual analog scale.

Inhalation

- Acute, one second inhalation of assigned substance.
- Substance held 10cm from subject's nose around the chin.

Power Throw

- Based on standards set by Hope College Track and Field team.



Results

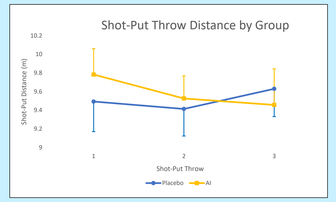


Figure 1. Comparison of shot-put distance (m) between AI and Placebo groups. No significant difference was observed (p=0.228). There was a trend for greater distance for the first throw to be higher in AI compared to placebo when analyzed by paired t-test (p=0.132)

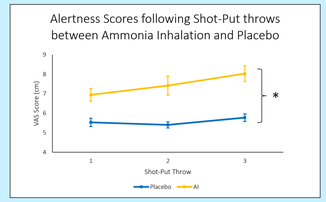


Figure 2. Comparison of Alertness between AI and Placebo groups. AI group had significantly higher alertness (*p=0.003).

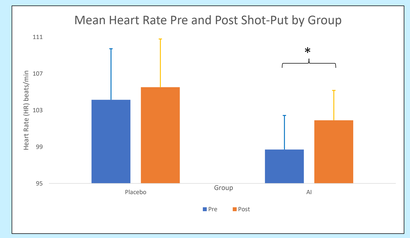


Figure 3. Comparison of heart rate pre- and post-shot put throw between Placebo and AI groups. There was a main effect for time, with post heart rate values being significantly higher than pre (p=0.003). The difference between pre and post was greater for AI than for Placebo (* p=0.045)

Discussion

Conclusions

- No significant difference for throw distance between groups (p=0.228)
- The greatest difference between throw distance occurred after the first throw (1-tailed paired t-test, p=0.132)
- Significantly greater difference between pre-throw and post-throw heart rate in the AI compared to placebo (p=0.045).
- Participants had significantly higher alertness scores after inhaling AI compared to placebo (p=0.003).

Limitations

- Low number of participants
- Participant's behavior outside of study
- Smelling salt strength when inhaled
- Participant's effort during testing

Implications

- Further research is necessary to analyze the effect of smelling salts on shot put throw distance

References

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