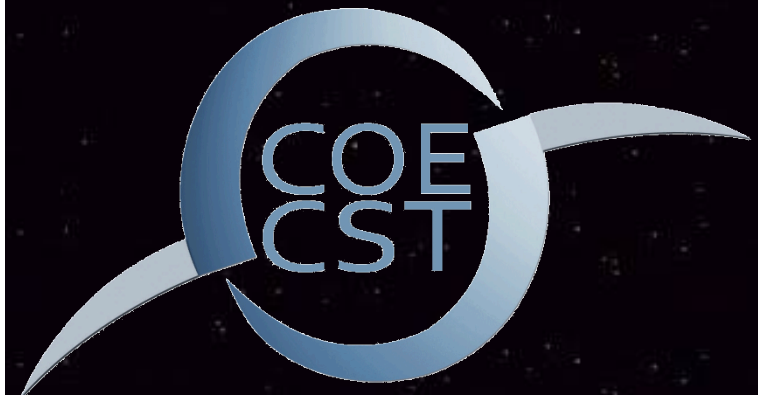


COE CST Fifth Annual Technical Meeting

Task 308: Assessment of Screening and Training Requirements for SFPs regarding Anxiety during Repeated Exposures to Sustained High Acceleration

James Vanderploeg, MD, MPH

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Center of Excellence for
Commercial Space Transportation



Agenda

- Team Members
- Task Description
- Schedule
- Goals
- Results
- Conclusions and Future Work

Team Members

- Principal Investigator: James Vanderploeg, MD
- Co-Investigators: Rebecca Blue, MD; Tarah Castleberry, DO; Charles Mathers, MD
- Residents: **Robert Mulcahy, MD**; Ben Johansen, DO; James Pavela, MD; Rahul Suresh, MD
- Organizations
 - NASTAR Center – Matching Funds
 - Montclair University
 - Wyle

Task Description

- Space flight participant anxiety may present a significant problem for commercial spaceflight companies
- Currently no information about how to train SFP's for mental/physical challenges related to spaceflight environment
- Identify triggers for anxiety and mitigation approaches
- Identify optimum training methods to mitigate anxiety and enhance SFP enjoyment

Tolerance of centrifuge-simulated suborbital spaceflight by medical condition.

Aviat Space Environ Med. 2014 Jul;85(7):721-9.

Blue RS, Pattarini JM, Reyes DP, Mulcahy RA, Garbino A, Mathers CH, Vardiman JL, Castleberry TL, Vanderploeg JM.

RESULTS:

A total of 335 subjects registered for participation, of which 86 (63 men, 23 women, age 20-78 yr) participated in centrifuge trials. The most common causes for disqualification were weight and severe and uncontrolled medical or psychiatric disease. **Five subjects voluntarily withdrew from the second day of testing: three for anxiety reasons, one for back strain, and one for time constraints.** Maximum hemodynamic values recorded included HR of 192 bpm, systolic BP of 217 mmHg, and diastolic BP of 144 mmHg. Common subjective complaints included grayout (69%), nausea (20%), and chest discomfort (6%). Despite their medical history, no subject experienced significant adverse physiological responses to centrifuge profiles.

Subject anxiety and psychological considerations for centrifuge-simulated suborbital spaceflight

Aviat Space Environ Med. 2014 Aug;85(8):847-51.

Mulcahy RA, Blue RS, Vardiman JL, Mathers CH, Castleberry TL, Vanderploeg JM.

INTRODUCTION:

Anxiety and psychological concerns may pose a challenge to future commercial spaceflight. To help identify potential measures of anxiousness and indicators of flight-related stress, the psychiatric histories and anxiousness responses of volunteers exposed to G forces in centrifuge-simulated spaceflight acceleration profiles were examined.

METHODS:

Subjects completed a retrospective self-report anxiety questionnaire. Medical monitors identified individuals exhibiting varying degrees of anxiousness during centrifuge exposure, medical histories of psychiatric disease, and other potential indicators of psychological intolerance of spaceflight.

Subject anxiety and psychological considerations for centrifuge-simulated suborbital spaceflight

RESULTS:

The retrospective survey identified 18 individuals self-reporting anxiousness, commonly related to unfamiliarity with centrifuge acceleration and concerns regarding medical history. There were 12 individuals (5 men, 7 women, average age 46.2 yr) who were observed to have anxiety that interfered with their ability to complete training; of these, 4 reported anxiousness on their questionnaire and 9 ultimately completed the centrifuge profiles. Psychiatric history was not significantly associated with anxious symptoms.

DISCUSSION:

Anxiety is likely to be a relevant and potentially disabling problem for commercial spaceflight participants; however, positive psychiatric history and self-reported symptoms did not predict anxiety during centrifuge performance. Symptoms of anxiousness can often be ameliorated through training and coaching. Even highly anxious individuals are likely capable of tolerating commercial spaceflight.

Schedule

- Identify lay persons without acceleration experience
- Identify specific personality traits in individuals
- Identify response of personality traits to a range of training methods
 - Minimal training
 - Formal didactic
 - Experiential training
- Begin centrifuge runs in November 2015



Goals

- Provide data regarding how individuals with different personality types can best be prepared for suborbital spaceflight through training and anxiety mitigation techniques.
- Develop recommendations for optimum training protocols to reduce anxiety prior to and during suborbital flight

Results

- Pending

Conclusions and Future Work

- IRB approval completed
- 417 subjects registered
- 175 completed medical questionnaires
- 40 subjects scheduled
- Data collection will commence next month

Future Work

- Recruit and schedule 120 more subjects

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Project At-A-Glance

- University: The University of Texas Medical Branch
- Principal Investigator: James Vanderploeg, MD
- Co-Investigators: Rebecca Blue, MD; Tarah Castleberry, DO; Charles Mathers, MD
- Residents: **Robert Mulcahy, MD**; Ben Johansen, DO; James Pavela, MD; Rahul Suresh, MD

Relevance to Commercial Spaceflight Industry

Psychological stressors can be significant challenges in the operational environment. This study will provide data regarding how individuals with different personality types can best be prepared for suborbital spaceflight through training and anxiety mitigation techniques.

Statement of Work

- Identify response of personality traits in individuals to a range of training methods
- Identify triggers for anxiety and mitigation approaches
- Develop recommendations for optimum training protocols to reduce anxiety prior to and during suborbital flight



Status

- IRB approval completed
- 40 subjects scheduled
- Data collection will commence next month

Future Work

- Conduct training and testing at NASTAR centrifuge through 12/2016
- Recruit 120 more subjects