



HAWKEYE HABITABILITY: A SEAT CUSHION STUDY

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INTRODUCTION

- Aircrew of the E2-C/D Hawkeye experience restricted movement during flight operations which can affect comfort, fatigue, and, ultimately, mission readiness.
- With plans to enable in-flight refueling capabilities, the Hawkeye will remain airborne for substantively longer periods of time, thereby heightening habitability concerns.
- The current pilot study addressed these concerns by examining a prototype seat cushion against the current model for its potential to reduce the burden of prolonged sitting.

METHODS

- Active duty subjects ($n = 21$; 20 male) sat for at least 2 hours on the prototype Continuous Wave Cushion (CWC) and the existing Non-Ejection Seat Endurance (NESE) cushion.
- Objective measurements were obtained on tissue oxygenation index (TOI) and skin blood flow (SBF), and subjective measurements were obtained on perceived comfort and fatigue.
- Repeated measures analysis of variance assessed measurement changes from baseline to 120 min across conditions (with weights at baseline, 60 min, and 120 min, as available).



(U.S. Navy Photo by Mass Communication Specialist 3rd Class Jarod Hodge/Released)

Fig 1. Tissue Oxygenation Index

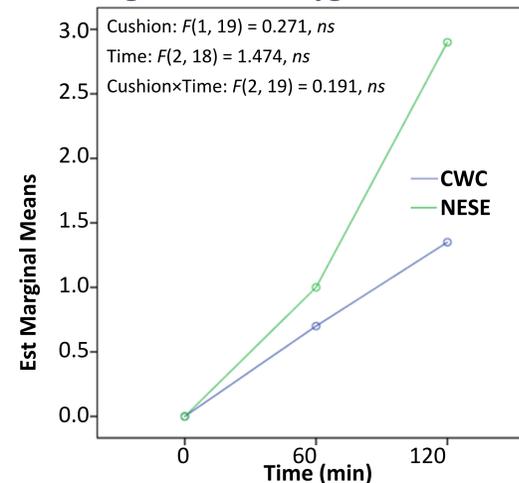


Fig 2. Skin Blood Flow

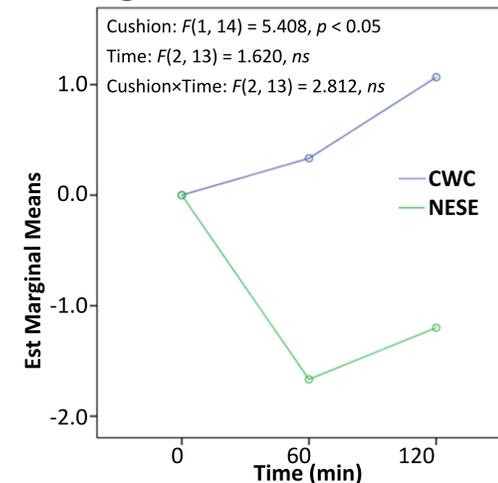


Fig 3. Comfort Ratings

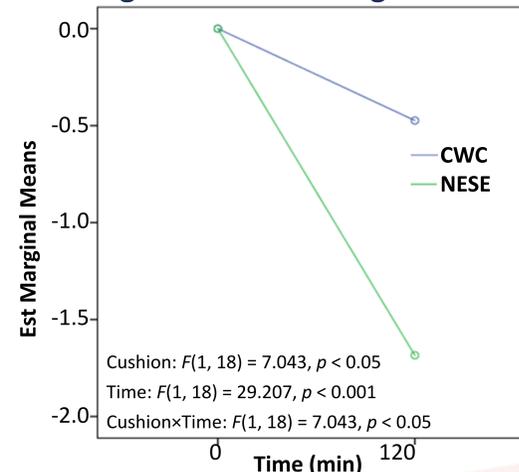
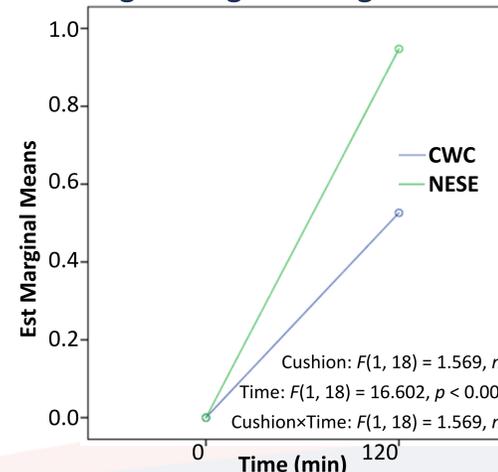


Fig 4. Fatigue Ratings



RESULTS

- Statistically significant results were obtained for SBF, comfort, and fatigue but not TOI (Figs. 1–4).
- The significant main effect for cushion on SBF indicated, regardless of time spent sitting, subjects exhibited increased SBF while sitting on the CWC versus the NESE.
- Although subjects reported decreased comfort for both cushions, the significant interaction between cushion and time on comfort suggested this decrease was more pronounced for the NESE.
- The significant main effect for time on fatigue indicated subjects reported increased fatigue over time, regardless of cushion.

CONCLUSIONS

- These results suggest the CWC is more comfortable and allows for increased SBF compared with the NESE.
- Results also confirmed that sitting for extended periods leads to increased fatigue.
- With extended flight operations on the horizon, future studies should examine the CWC over increased time intervals to further evaluate the impact of this seat cushion design on Hawkeye aircrew habitability concerns.