



# **Repeated 6-hour Oxygen Dives Diminish Dynamic and Static Exercise Performance**

**Navy Experimental Diving Unit**

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Sponsoring Institution: ONR – 6.2

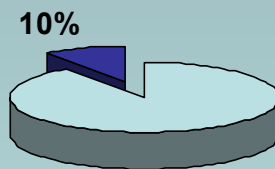


# Background

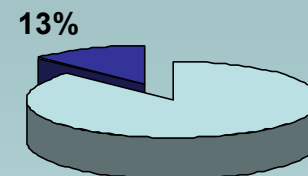


- **Problem** – pathological fatigue and inability to exercise dependent on duration and repetition of dives
- Adverse effects from extended immersion and 100% O<sub>2</sub> pose a significant human limitation

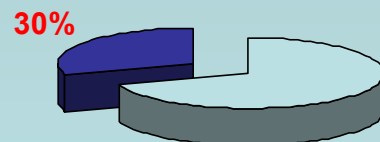
Single 4-hr 100% O<sub>2</sub> dives



Multiple 4-hr 100% O<sub>2</sub> dives



Single 8-hr 100% O<sub>2</sub> dives



Multiple 6-hr 100% O<sub>2</sub> dives



- **Objective** – to determine the impact of single or multiple 6-hour oxygen dives on dynamic and static exercise performance and fatigue



# Subject Characteristics



Sex (M)	8
Age (years)	35±2
Height (cm)	180±2
Weight (kg)	87±3
BMI (kg/m <sup>2</sup> )	26±1
Body fat (%)	17±1
VO <sub>2</sub> max (ml/kg/min)	58±3
Total cholesterol (mg/dl)	202±9
HDL (mg/dl)	50±5
LDL (mg/dl)	131±11
Hemoglobin (mg/dl)	15±0
Hematocrit (% PCV)	44±1

- Inclusion criteria

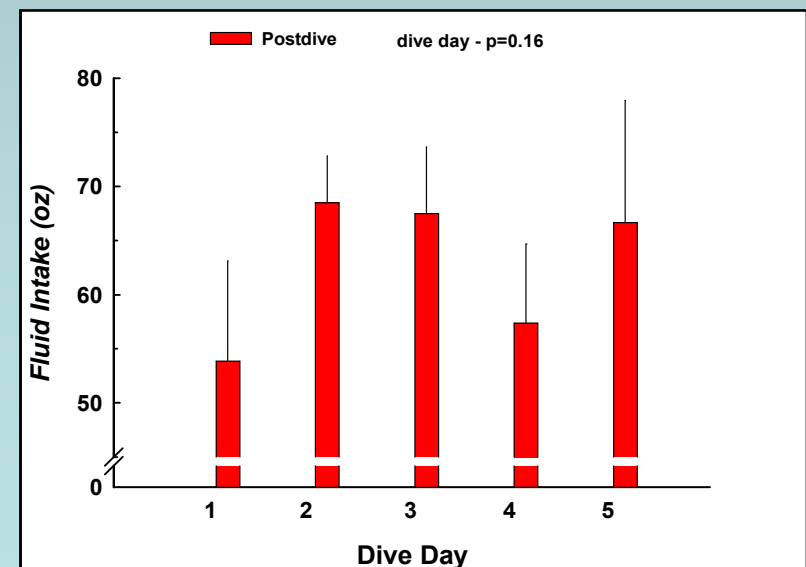
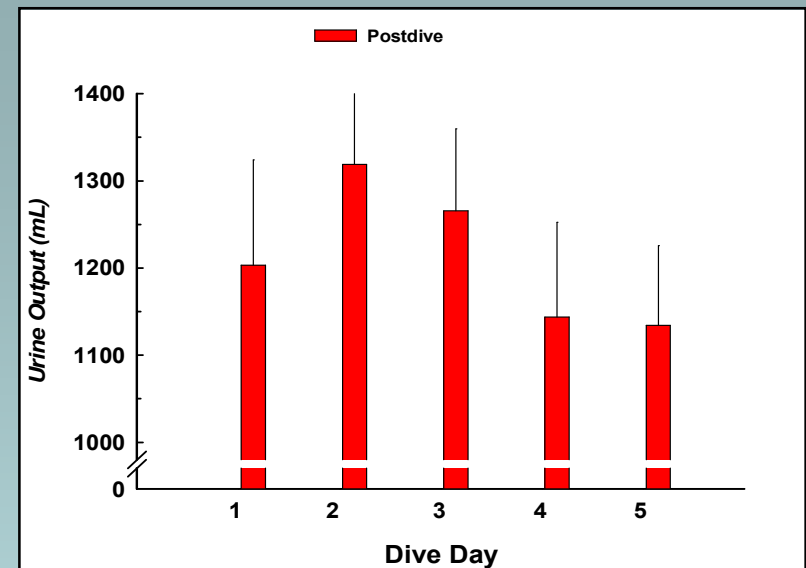
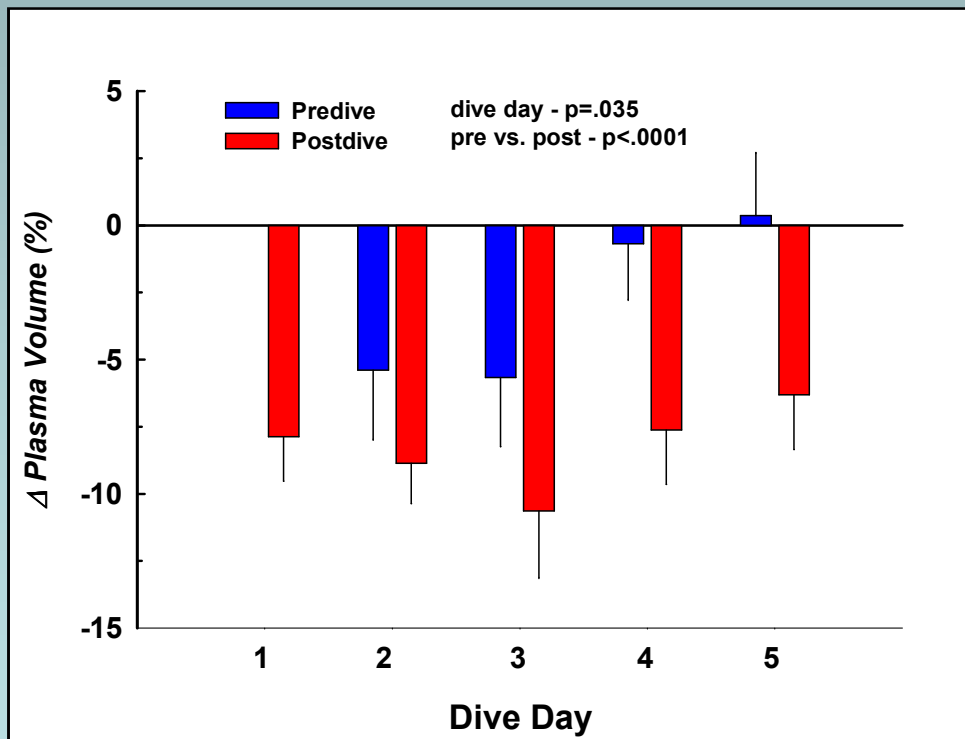
- Healthy
- Nonsmoker
- Not hypertensive
- No medications
- BMI < 30 and body fat < 20%
- Total chol < 220 mg/dl

- Study requirements

- No alcohol (2 days) or caffeine (1 day)
- No O<sub>2</sub> dive (2 weeks) or air dive (1 week)
- Fast for 2 hrs and no exercise prior to dives

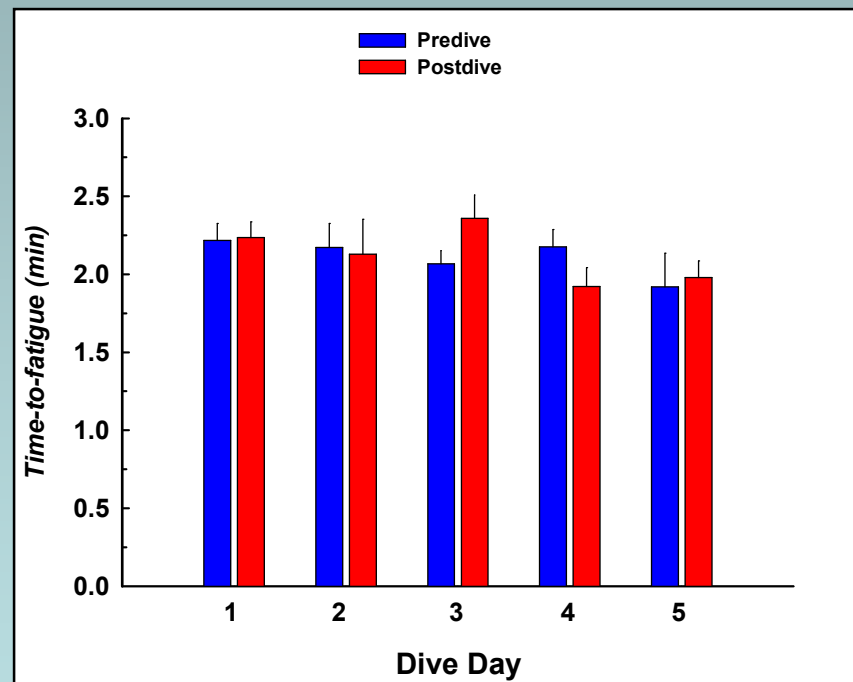
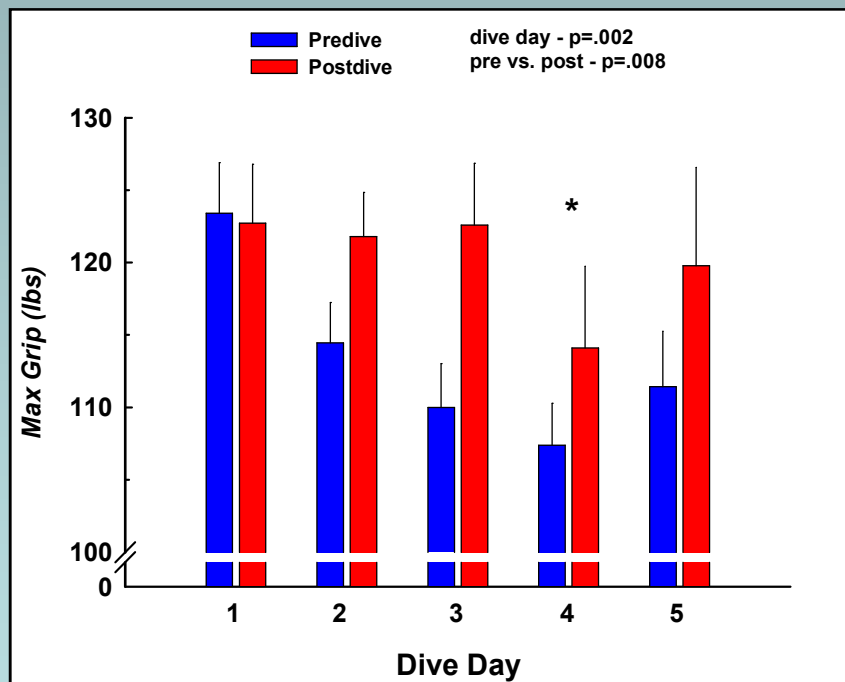


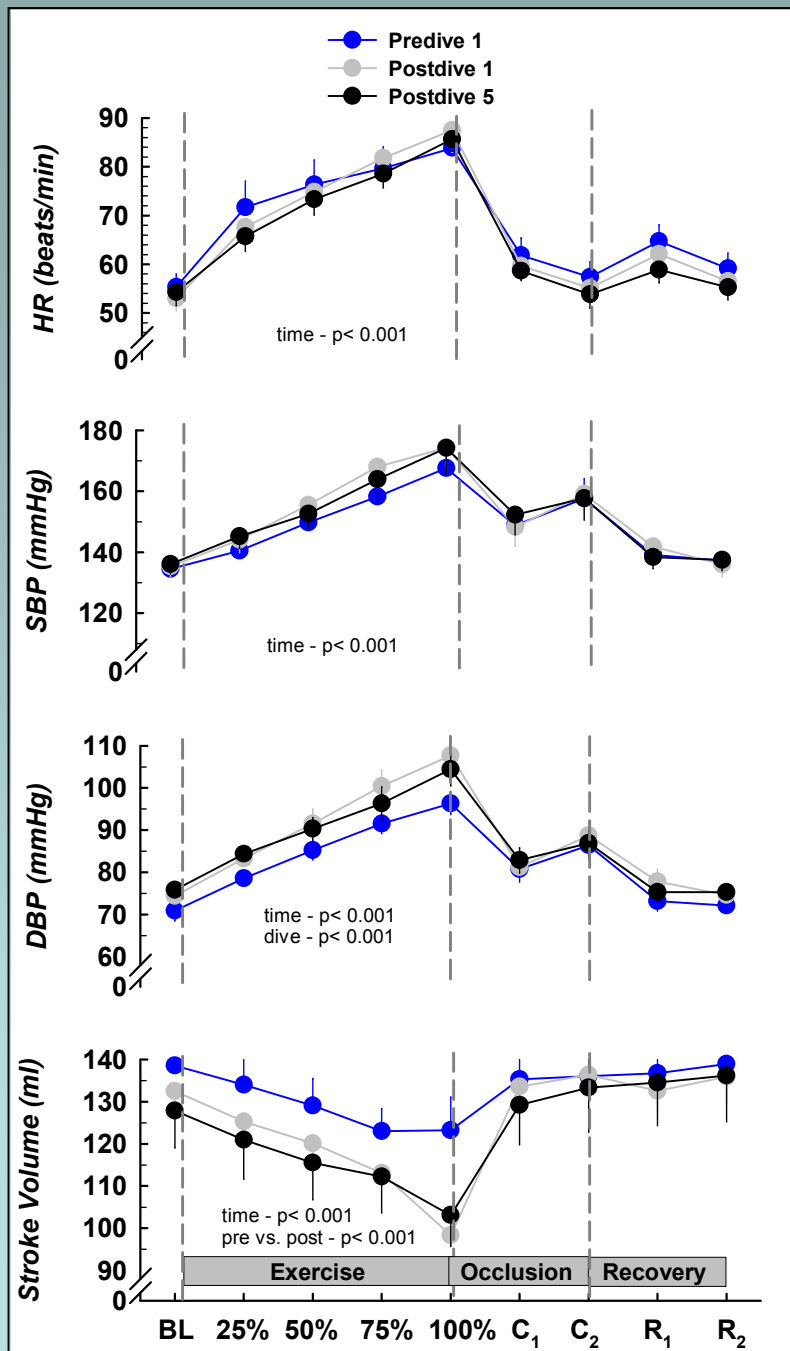
# Results





# Static Exercise

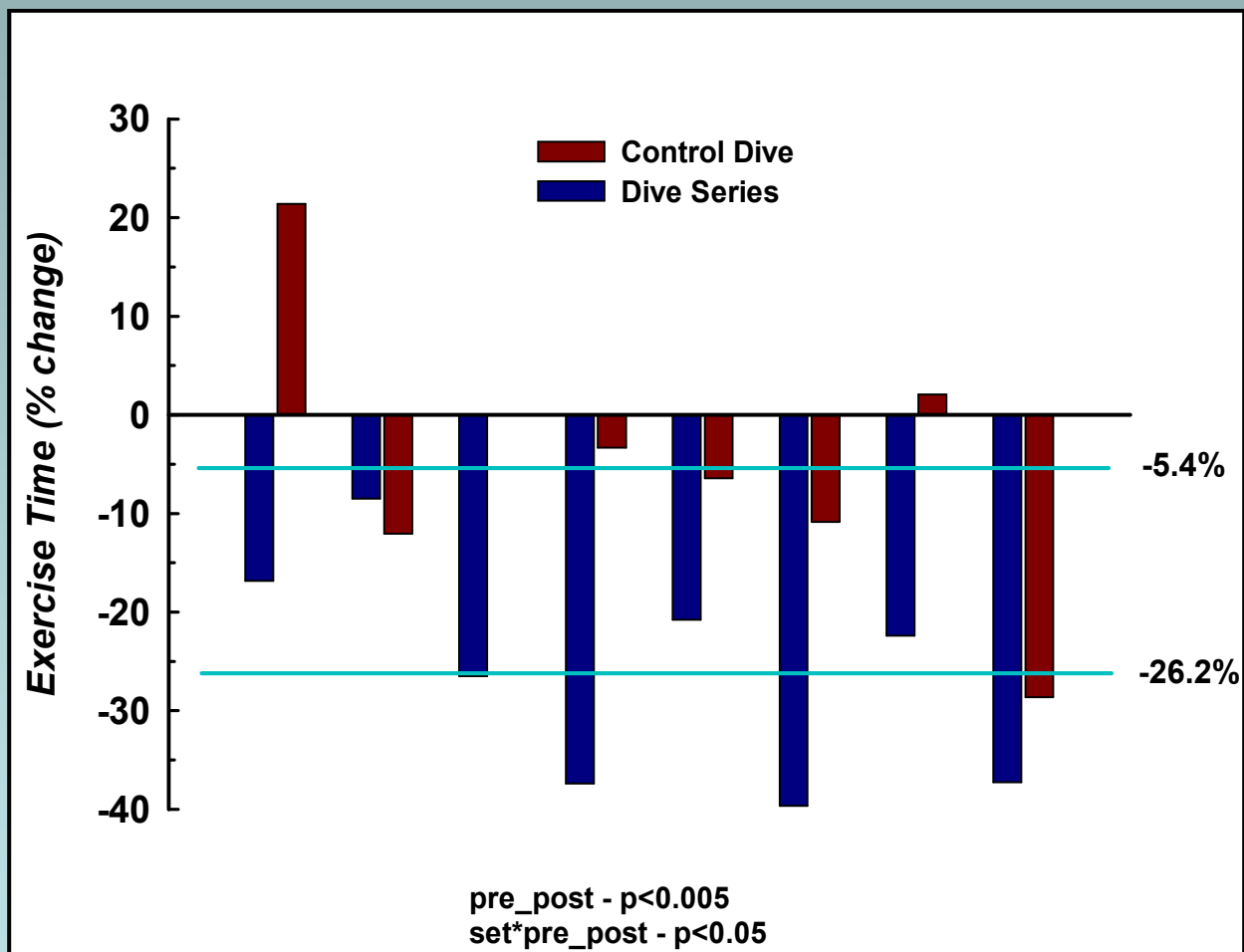




- Heart rate and systolic pressure responses intact
- Increase in DBP suggests a greater basal and reflex constrictor response to compensate for reduced blood volume
- No effect of dive day after the first dive

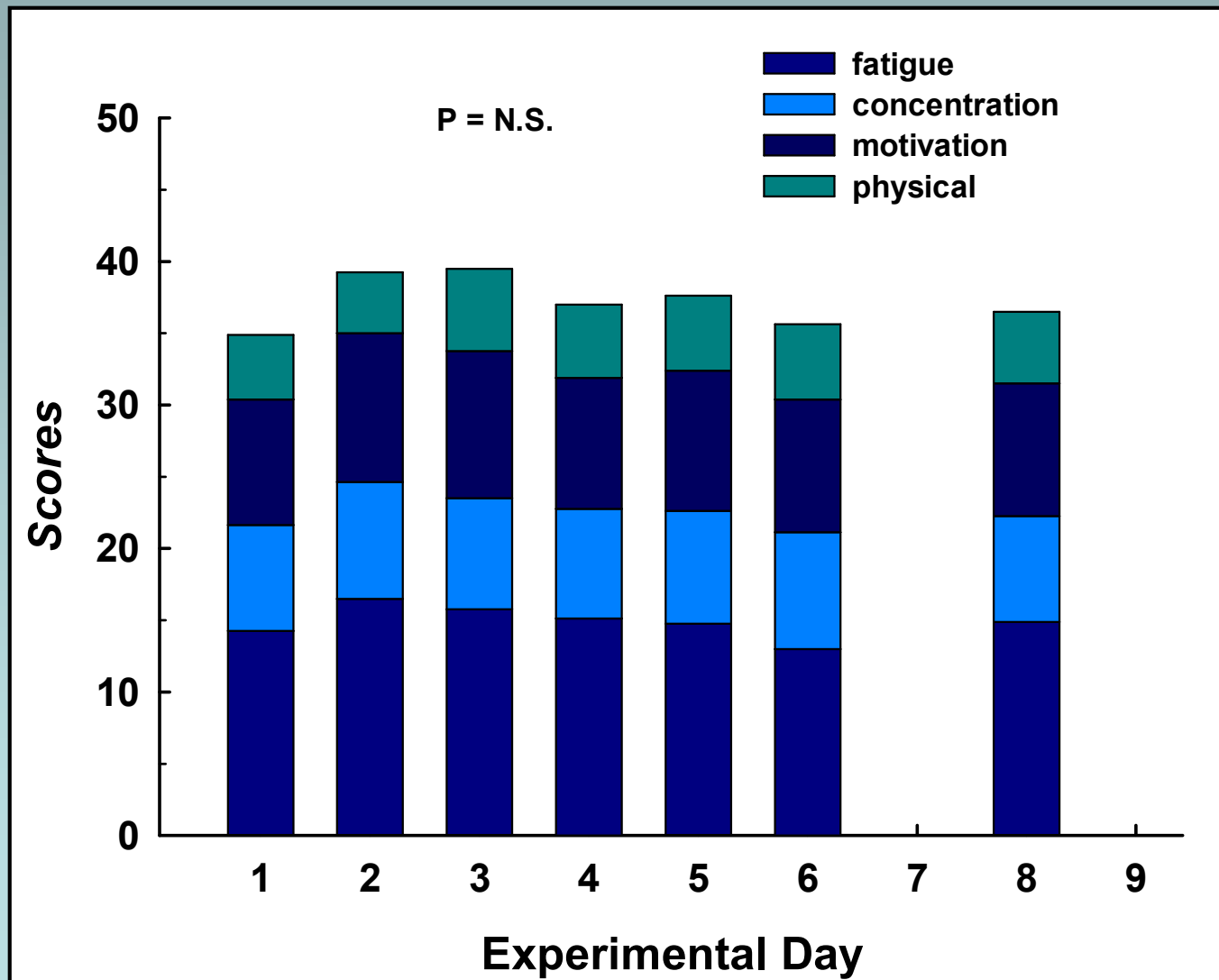


# Exercise Tolerance





# Fatigue







# Interim Conclusion



Repeated 6-hour oxygen dives significantly diminish dynamic exercise performance and isometric strength. Though the exact cause cannot be determined from the current data set, dehydration and autonomic modulation are likely key players underlying the physiological responses.



# Acknowledgements



**Thank you to all participants!**

MULLET Personnel

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