

INFLUENCE OF REPEATED DAILY DIVING ON DECOMPRESSION STRESS



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DISCLOSURE INFORMATION

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Neal W. Pollock, PhD

- ♦ I have no financial relationships to disclose
- ♦ I will not discuss off-label use or investigational use in my presentation

INTRODUCTION

- ♦ Acclimatization is adaptive change to repetitive natural exposure
- ♦ Repetitive diving could influence decompression stress
 - positive - protective effect
 - negative - sensitizing effect
- ♦ Published data are ambiguous
 - confounder may be typical human behavior
 - ❖ e.g., shift in profile pattern over a dive series
- ♦ **Our Purpose**
 - to evaluate identical dives conducted over consecutive days

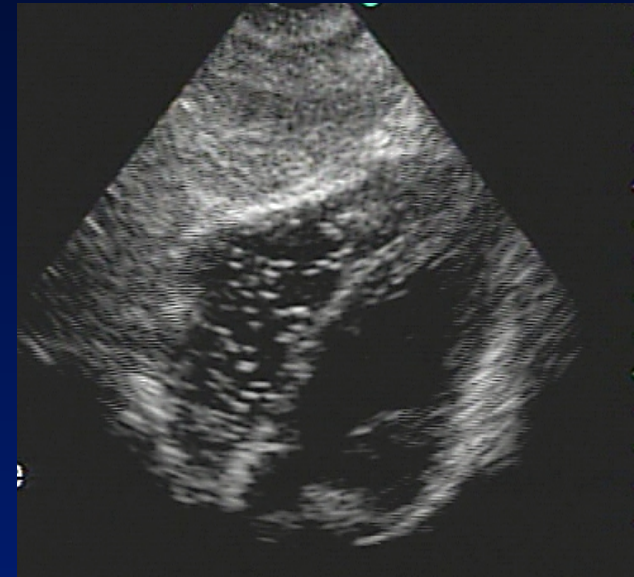
METHODS

- ♦ Sixteen experienced male divers
- ♦ Identical no-decompression air dives on 4 consecutive days
 - 18 msw (60 fsw) / 47 min bottom time
 - ❖ moderate exercise throughout
 - controlled ocean environment (16 °C/61 °F)
 - ❖ pressure profiles captured electronically



METHODS

- ◆ Post-dive bubble monitoring
 - transthoracic echocardiography (TTE)
 - ❖ GE Vivid q
 - every 20 min for 2 h
 - ❖ rest, post-arm move, post-leg move
 - technician pair consensus scoring



METHODS

- ◆ Bubble grade differences evaluated with cumulative logistic proportional odds model for multinomial data
 - diver-to-diver and time-to-time basis using generalized estimating equations (GEE) for repeated measures
 - All days of diving for all bubbles
 - Day 1 vs. 4 for all bubble grades
 - Day 1 vs. 4 for grades >III



RESULTS

- ♦ There were no signs or symptoms of DCS.

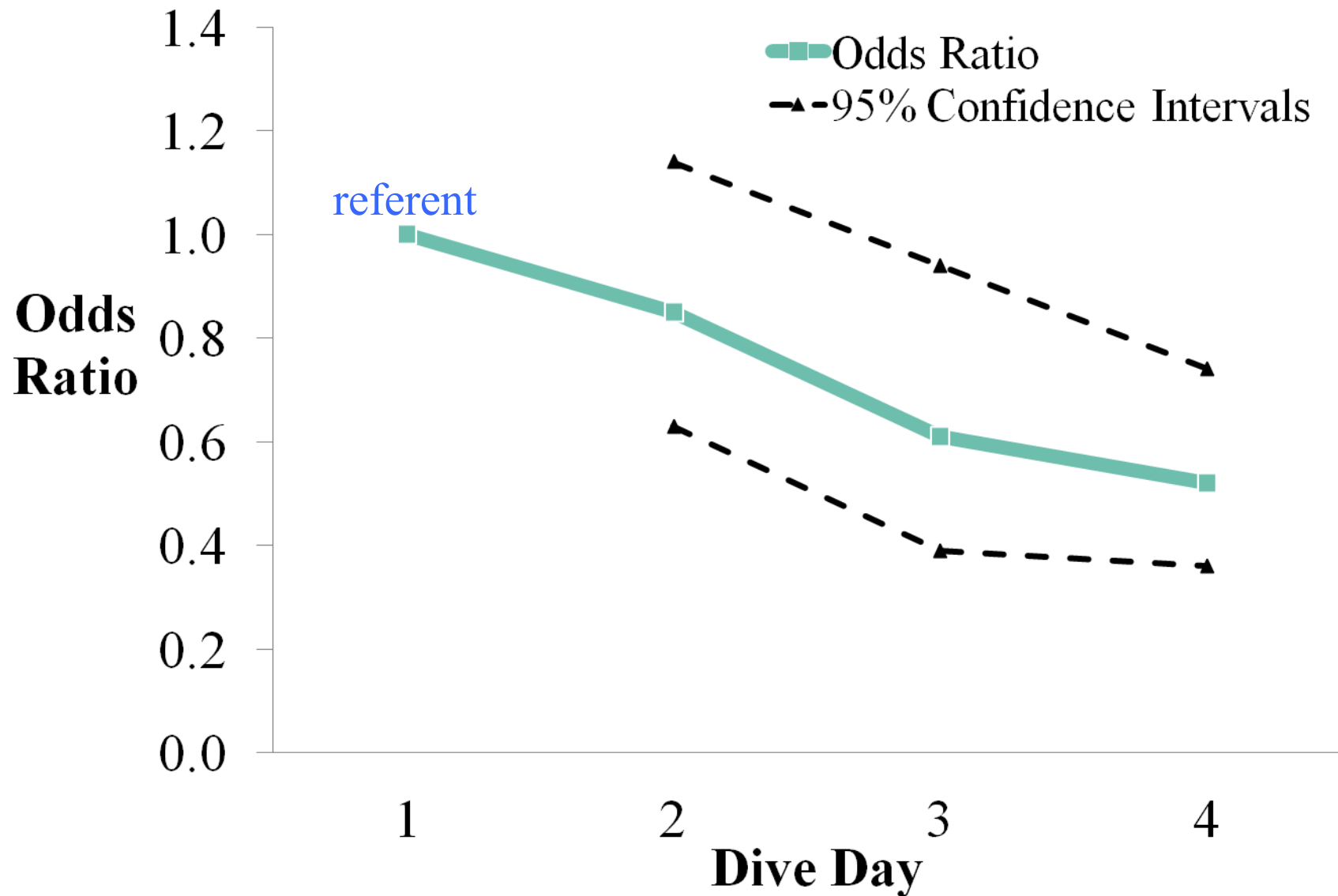


Figure 1. Assessment of a linear dose-response relationship for the odds (logit-risk) of having a higher-grade bubble over four consecutive days of diving referent to Day 1 (Zanchi et al., in press).

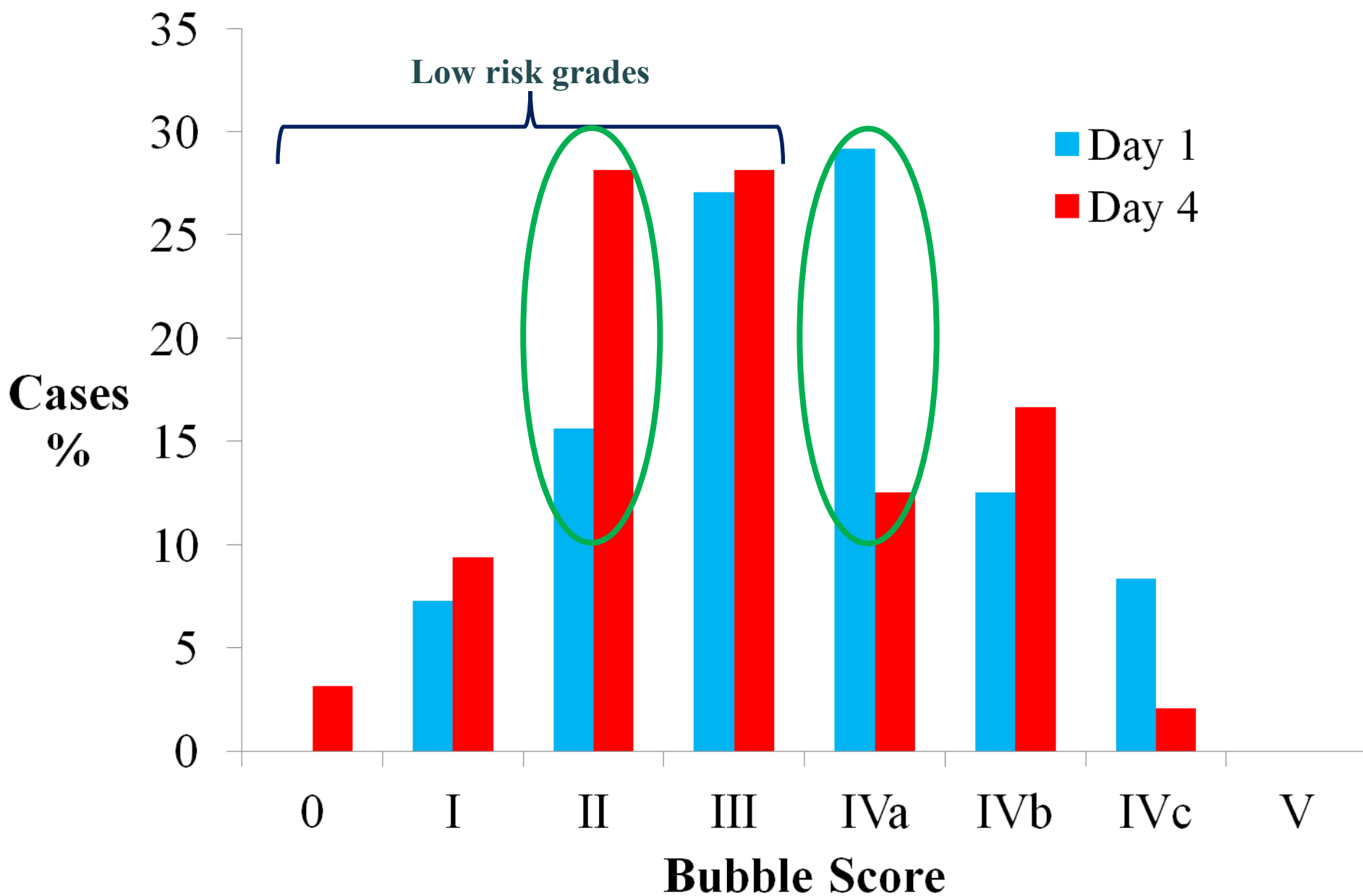


Figure 2. Distribution of bubble grades on Day 1 and Day 4 of air repetitive diving series, pooled for six sample points (Zanchi et al., in press).

RESULTS

- ♦ Odds of having a relatively higher bubble grade on Day 4 were half the odds of having a higher bubble grade on Day 1
 - OR 0.50 (95% CI: 0.34, 0.73)
- ♦ Odds of having a >III bubble grade on Day 4 were almost one-third the odds of having a >III bubble grade on Day 1
 - OR 0.37 (95% CI: 0.20, 0.70)

CONCLUSION

- ◆ Repetitive, identical daily diving can reduce bubble formation, representing positive acclimatization
- ◆ Further work needed to determine
 - if the acclimatization pattern holds true with
 - ❖ additional days of diving
 - ❖ multiple dives per day
 - ❖ variable profiles
 - if the magnitude of the effect is sufficient to alter the absolute risk of DCS
 - the absolute risk associated with left vs. right heart bubbles