DO BUBBLE GRADES DIFFER AFTER A FIRST AND IDENTICAL REPETITIVE DIVE WITHOUT AEROBIC SPORT DURING THE PRECEDING DAY?

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Background/Objective
Precordial Doppler bubble grades (BGs) of a 1rst and 2nd identical air dive (20 msw, 40 min, 7 min stop-time, 4 or 4 and 10 msw) will be investigated. Endurance sport 24 hours preceding diving reduced bubble counts 4 times (Dujic et al., 2004). The effect is assumed to be caused by reducing the number of nuclei from which bubbles are formed. For our condition (no activity 36 hr preceding diving) this would result in a smaller difference between BG of the 1rst and 2nd dive than expected from decompression theory.

Materials and Methods
BGs (KM scale) of 27 divers were measured after knee bends 40 and 100 min after surfacing. For testing (paired t-test) scores were transferred to log number of bubbles/area (logBG, Nishi et al., 2003).
With interpolations (depth, durations etc.) and considering the stop(s), DCIEM air-tables prescribed an estimated reduction of bottom time of 16 min for the repetition dive (interval 2h30min). %M-values calculated with ZH-L16C showed a reduction which is halftime dependent. On average this reduction was similar as estimated from DCIEM. Without this reduction, DCS risk (rDCS) will increase. This increase can be calculated. BGs, now defined on a continuous scale, can be calculated from BG-rDCS tables (Nishi et al., 2003). From a set of diving tables with known rDCS (Hamilton and Thalmann, 2003) the mathematical relation between BG, NDL and MDD can be found. The resulting equation was applied to the 1st en 2nd dives (after transforming them to no-stop dives with equivalent severity). Without bottom time reduction BG appears to increase with the equivalent of 0.5 KM unit (bubbles/area ca. factor 4).

Results
The 2nd dive produced less bubbles, 0.1 BG at 40 min and 0.2 at 100 min, but these differences are not significant. However, compared to the theoretical expectation, the 2nd dive gives significantly smaller BGs. (P-values 0.003 and 0.049 of 40 and 100 min respectively).

Discussion
A plausible reason of the findings could be the mentioned high occurrence of nuclei, created in the 36 hours of no-endurance activity preceding the first dive. This will produce more Doppler detectable bubbles after the ascent of the first dive compared to the 2nd dive. As a consequence, the difference is reduced.

Conclusion
The effect of no aerobic activity during the day before diving seems to be of similar size as the effect of repetition of the identical 20 msw dive.

References
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