

THE INFLUENCE OF BODY FAT ON BUBBLE FORMATION IN RECREATIONAL DIVERS MEASURED BY DOPPLER MONITORING AFTER DIVING

N. A. Schellart¹, T. P. van Rees Vellinga², F. J. van Dijk², W. Sterk³

¹ Biomedical Engineering and Physics, Academic Medical Center, and Foundation for Dive Research (SDR), Amsterdam

² Coronel Institute of Occupational Health, Academic Medical Center, Univ. of Amsterdam, The Netherlands
³ Dacodot, Zuidwilde, The Netherlands, n.a.schellart@amc.nl

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Introduction/background/objective

In spite of many studies it is still uncertain whether body fat (BF) is a predisposing factor for venous gas embolism (VGE) and decompression sickness (DCS). BF (range 16-44%) is studied in relation to the bubble grade measured by precordial Doppler monitoring. To prevent bias, the effect of age (range 34-68 years), body mass index (BMI; range 17-34 kg.m⁻²) and a model estimate of VO₂max (maximal O₂ uptake; range 24-54 mL.kg⁻¹.min⁻¹) were taken into account.

Methods

Bubble grades (Kisman Masurel) were determined in 43 recreational divers after an open sea air dive (20msw/40min). Doppler bubble grade scores were transformed to the logarithm of the number of bubbles/cm² (logB) and to the logarithm of KISS (Kisman Integrated Severity Score), to allow numerical analysis. Statistical analyses were performed with Pearson's regular and partial correlations, and uni- and multivariate linear regressions.

Results

The partial correlations strongly reduced the collinearity between age, VO₂max, BMI and BF, allowing for a clear view on the contribution of body fat after correction for confounding factors. For divers in their midlife (and older), the analyses indicate that neither BF nor BMI stimulate bubble formation, since the correlations were highly non-significant. In contrast, age and especially VO₂max, appeared to determine bubble development of. For these types of dives and divers it was found that $\log B = -1.1 + 0.02 \text{age} - 0.04 \text{VO}_2\text{max}$ (variance inflation factor only 1.2).

Summary/conclusions

We conclude that BF and BMI do not influence VGE. We recommend that in medical examinations more attention is paid to VO₂max and age, and that international institutions come to a consensus regarding VO₂max criteria. A poor VO₂max also restricts the physical reserve (only a pace of 1800 m/h while diving requires 25 mL/min.kg). We recommend a VO₂max of 25 mL/min.kg as the minimum value for recreational divers.