

Establishing the Risk of Decompression Sickness for a “Yo-Yo” Dive

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Background

- In certain situations, both professional and recreational divers may make frequent ascents to the surface (“peeps”), also known as “yo-yo” or “saw-tooth” profile diving.
- In the recreational diving community, however, “yo-yo” dives are regarded as taboo.
- When a gas mixture containing inert gases (nitrogen, helium, etc.) is used, a “yo-yo” dive may act as a double-edged sword: on the one hand it contributes to gas bubble clearance, but on the other it might increase the risk of decompression sickness (DCS) in the central nervous system, even following dives that are defined by the tables as “No decompression” dives.

To be continued

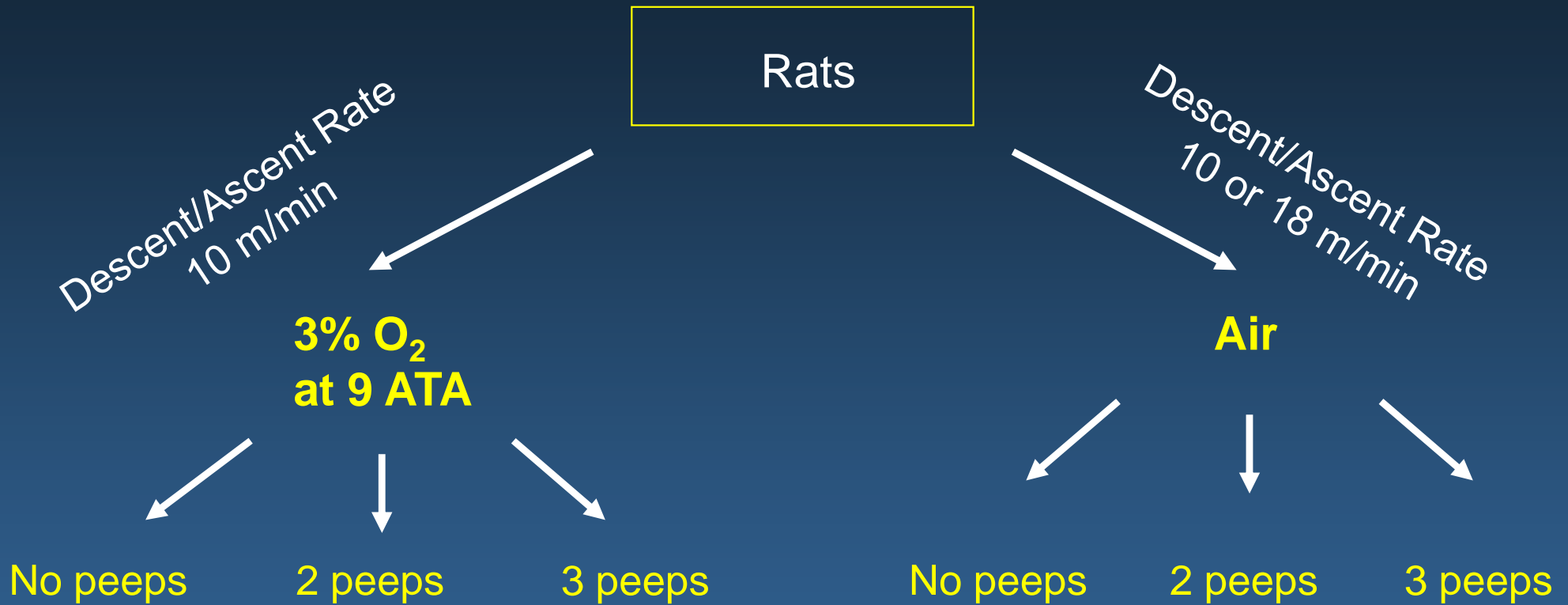
Background (continued)

- However, despite the widespread use of “yo-yo” diving in fish farming and among combat divers, and the considerable increase this involves in the risk of DCS, the scientific community has contributed little to our understanding of the problem.

Purpose

To evaluate the risk of DCS following “yo-yo” dives in a rat model.

Methods



Breathing air, 32 min bottom time
yields 89% N₂ saturation.

Results

Fig. 1. Rate and severity of DCS in rats exposed to 9 ATA for 32 min, with a descent/ascent rate of 10 m/min. Rats were breathing either air (Control) or a high-N₂ gas mixture.

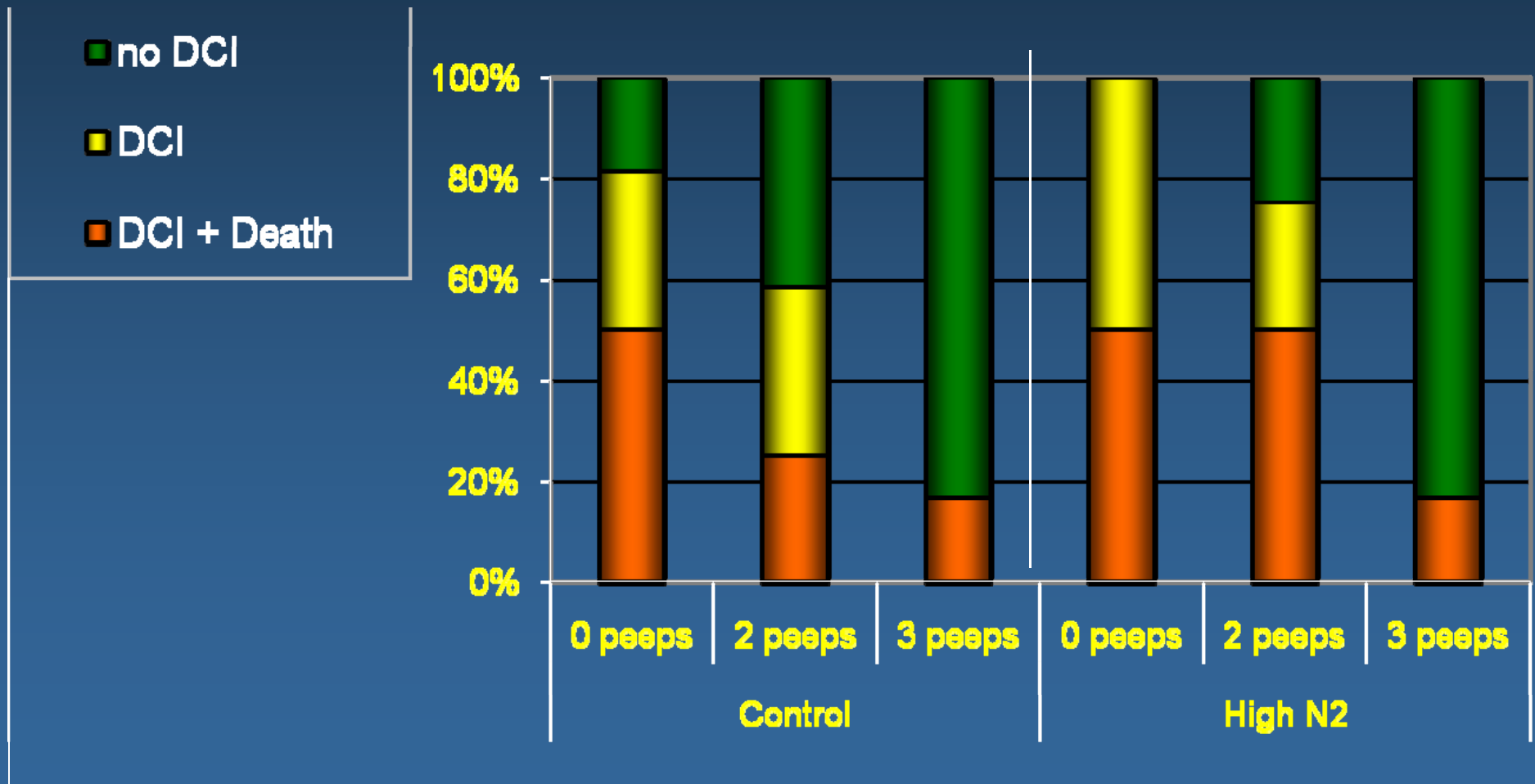
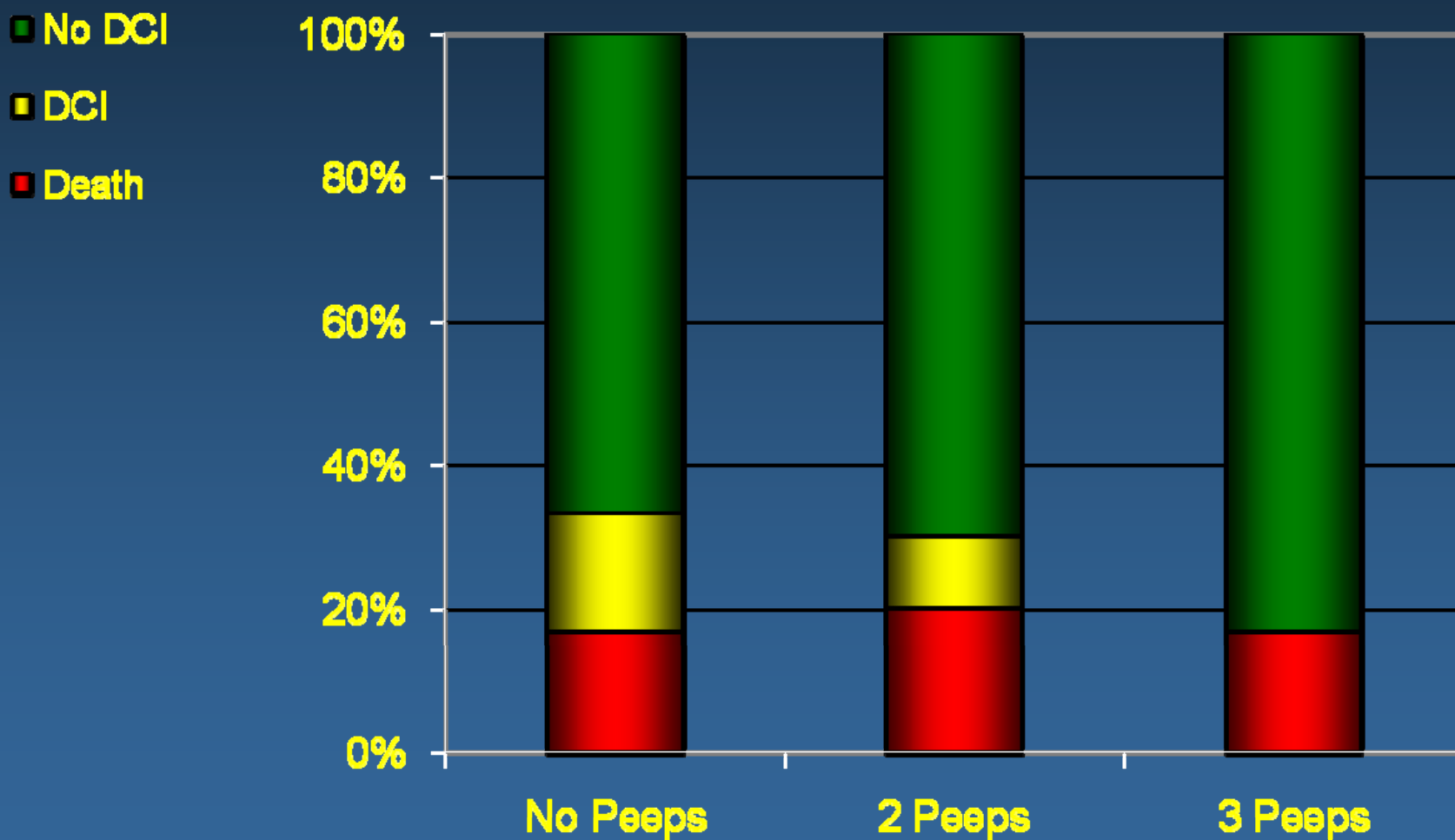


Fig. 2. Rate and severity of DCS in rats exposed to 9 ATA for 32 min, with a descent/ascent rate of 18 m/min. Rats were breathing air.



Summary and Conclusions

- In the rat, “peeps” during a dive significantly reduced the risk of DCS (the number of cases of DCS).
- Such protection was demonstrated in rats breathing either air or an N₂-enriched gas mixture, and for two different rates of descent/ascent.
- In all the experimental groups, “peeps” increased the severity of DCS (percentage of cases in which outcome was death).
- These results are in agreement with the prediction of Dr. Valerie Flook, made on the basis of her calculations and experiments using a pig model.

Thank you