

Validation of a Three-Compartment Interconnected Parallel Decompression

Model for Nitrox

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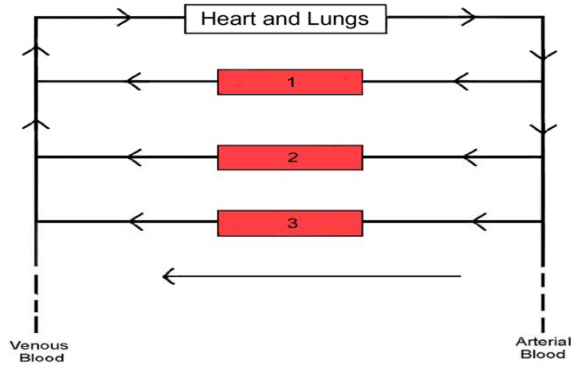
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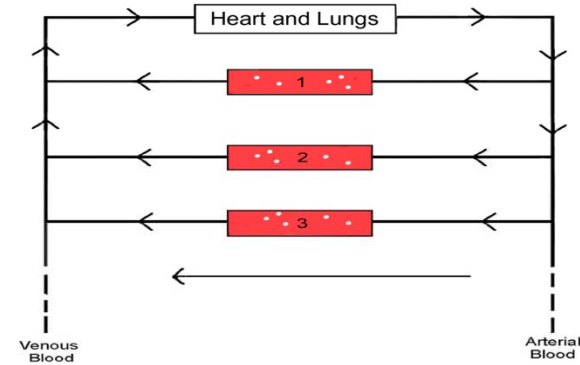
Independent Parallel Models, With and Without Bubbles

no bubbles



e.g. USN 93, BUHLMANN

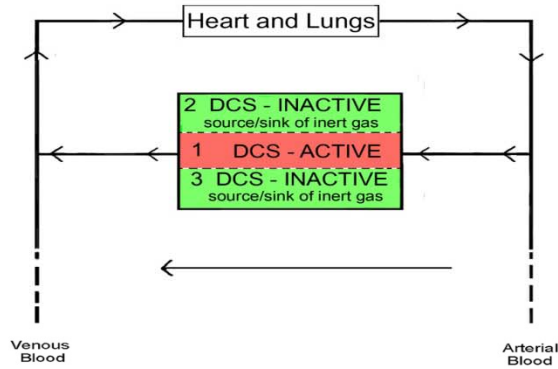
bubbles



e.g. LE1, RGBM

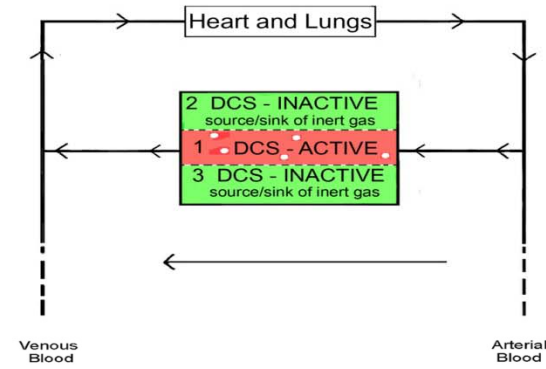
Interconnected Three-Compartment Models, With and Without Bubbles

no bubbles



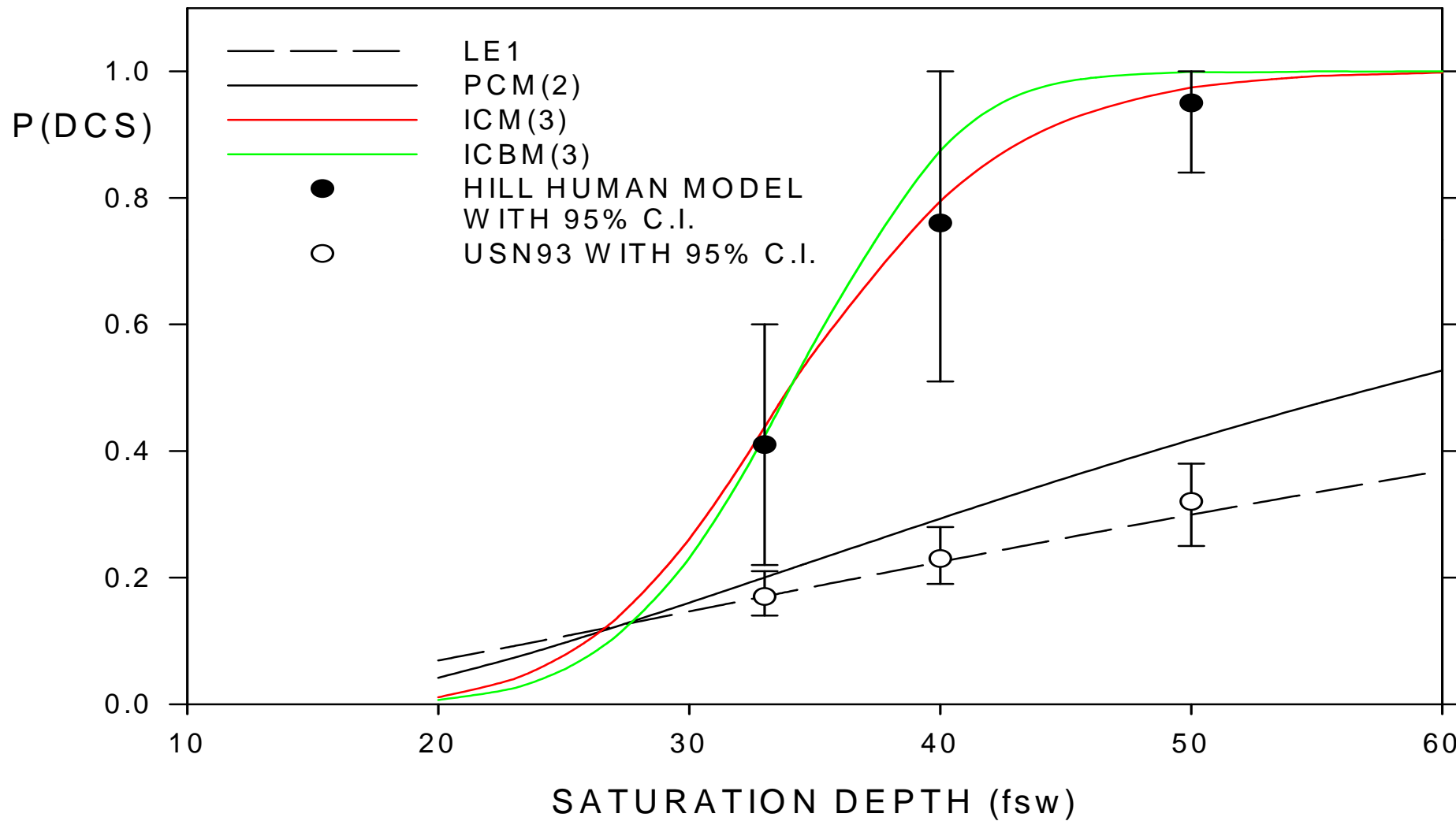
ICM(3)

bubbles



ICBM(3)

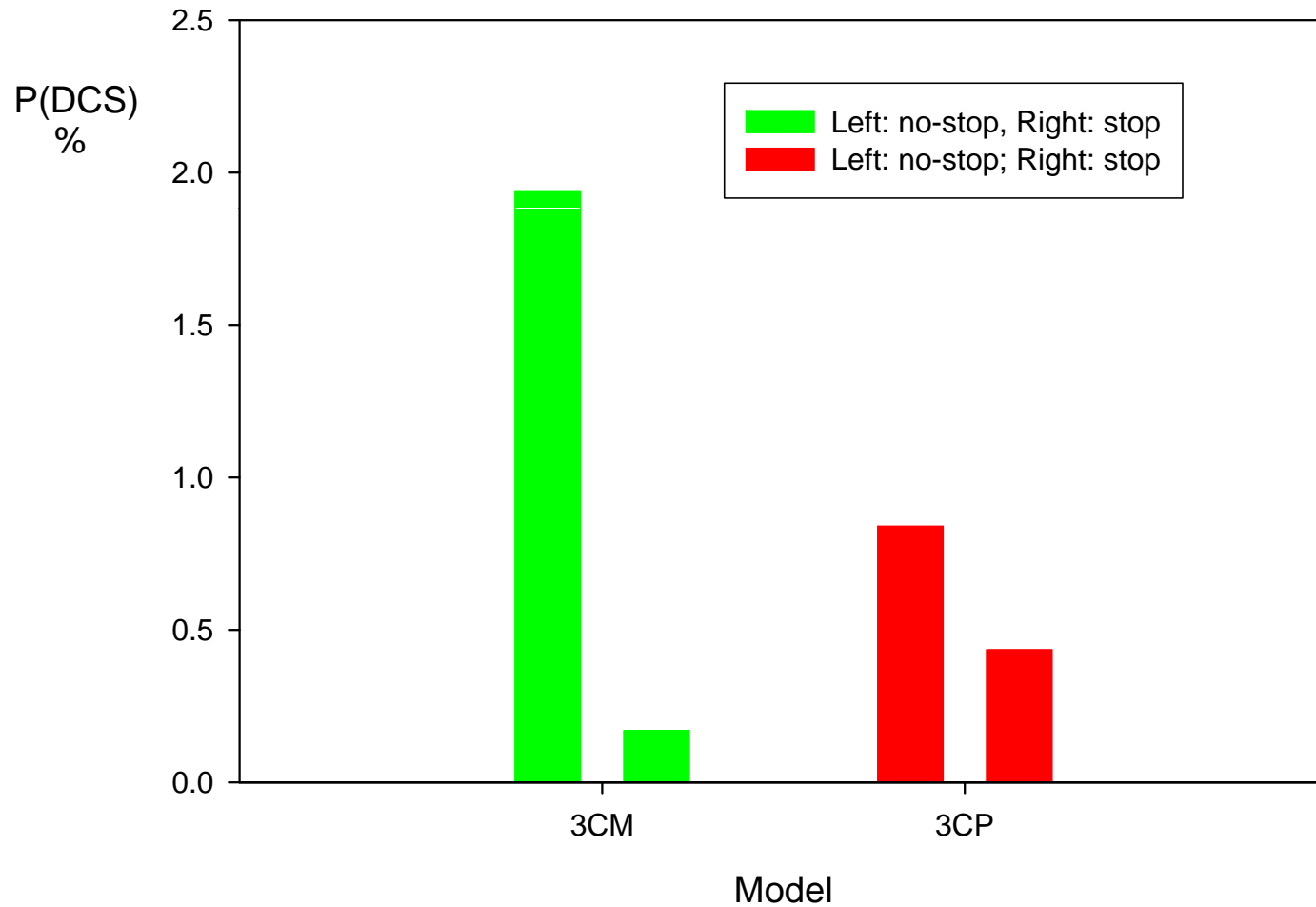
EXTRAPOLATION TO VERY HIGH-RISK DIRECT ASCENTS FROM SATURATION



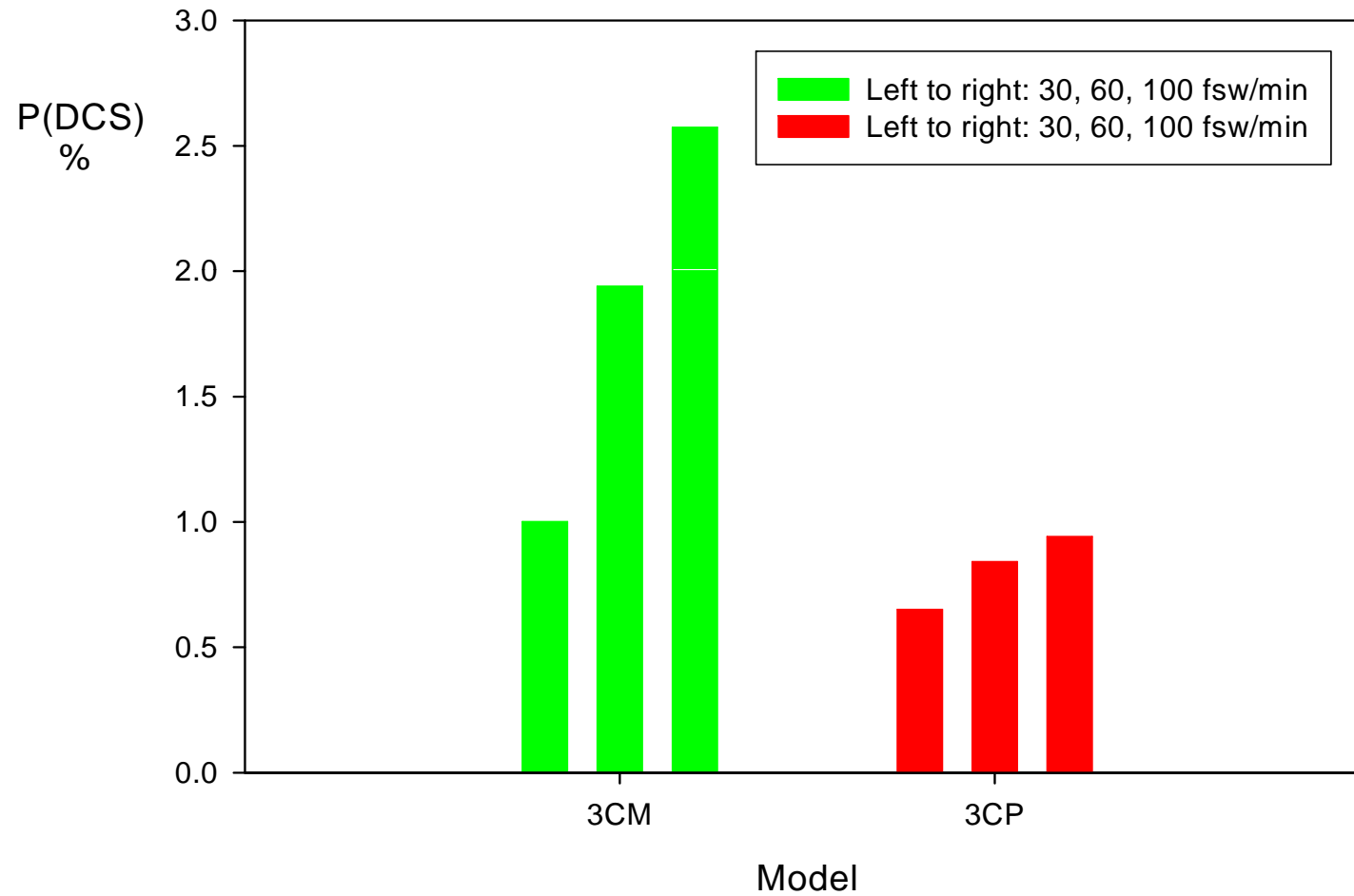
METHODS:

We first confirmed an earlier result based on simpler dose-response relationships [Weathersby *et. al.*, J.APPL. PHYSIOL **63**:2380 (1987)] that, provided the composition of Nitrox was in the range (10- 40) % Oxygen, only the Nitrogen contributed significantly to “P(DCS)” - the probability of incurring decompression sickness. This was done by applying the 3CM model described previously [Goldman, J. APPL. PHYSIOL. **103**:484 (2007); UHM **34**:229 (2007)] to the USN Nitrox dataset “NMR8697”. Using “Maximum Likelihood”, it was found that this model, calibrated for air (21% O₂), was applicable to Nitrox with (10-40) % Oxygen without further modification, provided it was generalized to the appropriate composition of the Nitrox. See poster for details.

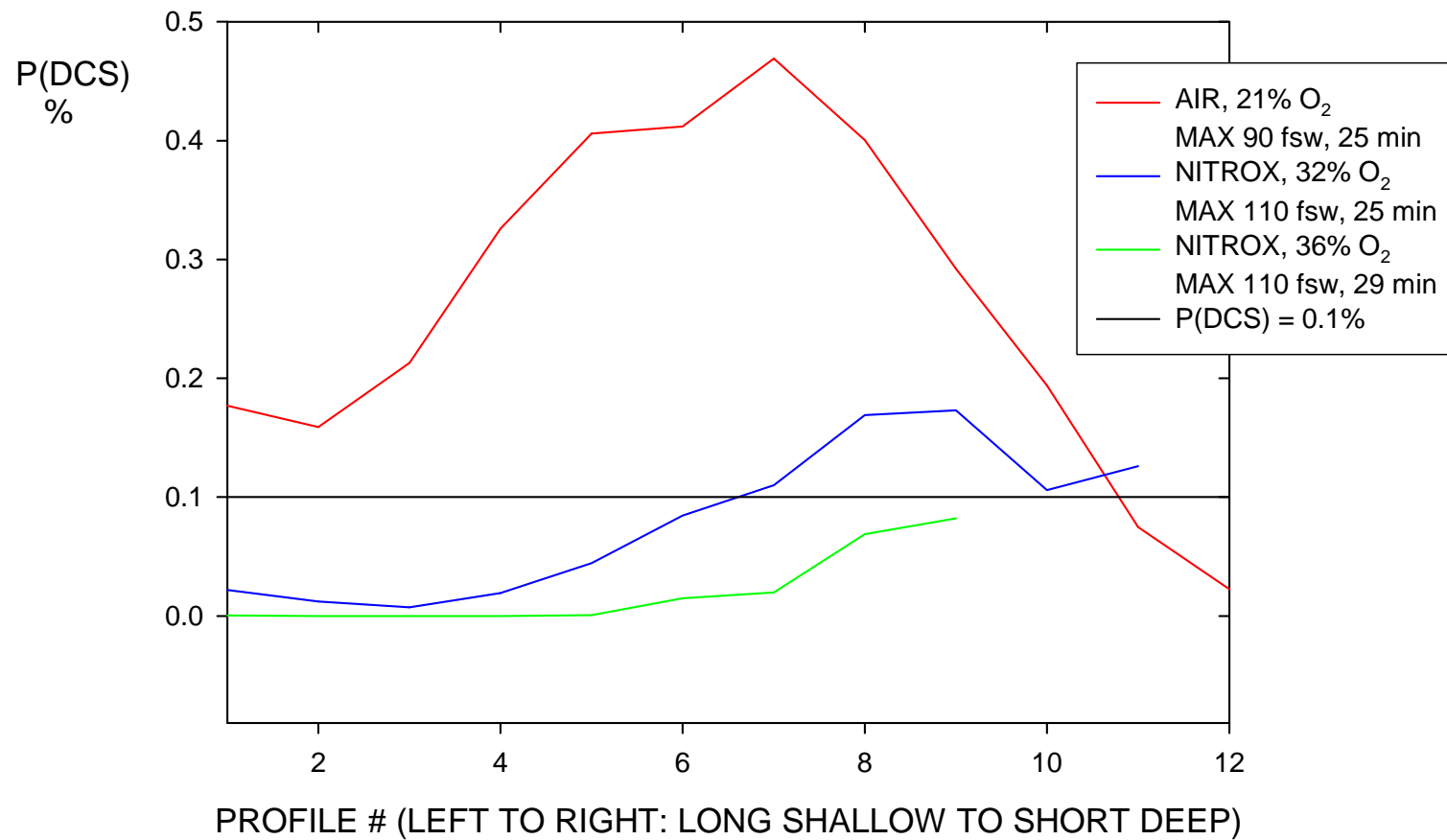
Effect of a stop (15 fsw; 3 min) on Nitrox
(32% O₂) for a dive to 100 fsw for 30 min,
for an interconnected and a parallel model.
Ascent rate = Descent rate = 60 fsw/min



Effect of ascent rate on Nitrox (32% O₂)
for a no-stop dive to 100 fsw for 30 min ,
for an interconnected and a parallel model.



CONSISTENCY WITH RESPECT TO
THE PADI RDP NDLS FOR AIR AND
NITROX; **ALL WITH A STOP AT
15 fsw for 3 min. MODEL: 3CM**



ACKNOWLEDGEMENTS

I would like to thank the Natural Sciences and Engineering Research Council of Canada (NSERC) for financial support in the form of a discovery grant, NEDU Panama City, Fl. for an electronic copy of the full USN dataset, and Samuel Campbell for his help with some of the calculations.