Title:	Does the time course of bubble evolution explain decompression sickness risk?
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Abstract:	A probabilistic model of decompression sickness (DCS) risk based on linear-exponential (LE) kinetics has given the best fit of the human air and nitrox DCS database. To test the hypothesis that its success may be due to the formation of a gas phase during decompression, we developed a physiologically based bubble evolution model using a numerical solution of a partial differential equation system. Because of the computational intensity of this method, it could not be used to fully explore our hypothesis. Consequently, we compared the solution with that of a computationally simpler approximation that was previously published by Van Liew and found the two approaches gave similar results. Using the simpler model, assuming bubble densities of 1 and 1,000 bubbles/cm3, we found a tissue time constant of at least 80 min (equivalent to perfusion of 1/80 ml.g-1.min-1) was required to achieve a delay in bubble dissolution comparable to the prolonged risk of DCS predicted by the LE model. We suggest that the persistence of single bubbles in a uniformly perfused homogeneous tissue alone is unlikely to explain persistent DCS risk.
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