

Drs Edmonds, McInnes and Bennett reply:

The response of Lang and Lehner to our article on “Reverse dive profiles: the making of a myth” is welcome, shedding more light as it does on the intended meaning of the Workshop recommendations.¹ We think their response makes it clear that we are in agreement about the facts. It is on the interpretation of these facts that we disagree, and the primary reason for our article was to illustrate, by documenting the statements of other delegates, that we are not alone in interpreting the final recommendations as contentious. We attempted to put the recommendations into perspective, highlighting the qualifications and doubts expressed in the proceedings of the Workshop.

Having organised and edited the Workshop, Lang and Lehner are in a position to appreciate the controversial nature of the problems of comparing the relative safety of forward dive profiles (FDP) with that of reverse dive profiles (RDP). They appreciate the limitations of the data, as described in their letter, but others who just read and accept the findings and recommendations of the Workshop may not. Interpreted literally, the recommendations indicate no increase in DCS with RDP compared to FDP, and that the no-decompression limits are the same. Lang and Lehner claim that it does not matter what the pattern of the profile is, as long as there is adequate decompression. We agree. It is axiomatic. If you decompress adequately, you are much less likely to get decompression sickness (DCS), irrespective of the profile, and without any qualification.

Our objections were not so much to the absence of evidence in either direction (safety of FDP vs RDP), but to the *implication* that the two dive profiles are equivalent. RDPs impose different decompression requirements than FDP dives. We have never proposed the prohibition of RDPs, only (like Lang and Lehner) the application of appropriate (and different) decompression. This difference in decompression obligation was unfortunately glossed over in the summarised findings and recommendations promulgated.

We believe this is the explanation for subsequent publicity in the diving literature, which we quote in our article and which uses the Workshop as authority, that dismisses the significant differences in decompression requirements between RDPs and FDPs. This interpretation is inadvertently encouraged by Lang and Lehner in their own summaries: “*There is no convincing evidence that RDP within the no-decompression limits lead to a measurable increase in decompression sickness*”.¹ There is in this statement an assumption that all readers will understand that a different (and unstated) decompression requirement will operate in the two situations. We are sure this was not an intentional omission, and that the workshop participants understood this assumption very well. Perhaps so well that it seemed to be stating the obvious and did not therefore require clear elucidation.

If the recommendations stipulated that FDPs and RDPs had different decompression obligations and that one cannot extrapolate from one to the other, there would have been no need for our article. Unfortunately the Workshop is now being quoted as indicating no difference between FDPs and RDPs.

We also agree that some decompression algorithms in dive computers attempt to make allowance for an added risk with RDPs. We just do not know which ones, if any, achieve this effectively. What is needed is good experimental research to investigate the safety of a variety of algorithms. Because of the nature of the problem, we believe this is only achievable through appropriate animal models. Such models are inevitably imperfect and require extrapolation to the human experience. They are, however, superior in some respects to anecdotal reports of human diving experience where the algorithm in use is only one of the variables influencing outcome. The best assessment of safety is likely to be a synthesis of both types of investigation.

Areas in which we must agree to disagree, and which we discuss in our paper, include the historical development of the FDP recommendations, the logistics of applying the 40 metres’ sea water (msw) maximum depth and 12 msw differential gradient as recommended, and the appropriateness of some of the data presented in the Workshop.

Lang and Lehner imply a plethora of new data on RDPs from scientific divers from 2000–2005, and the scrutinised monitoring of these with only a minor DCS risk. In fact, the 2005 article gives no data on RDPs and approximately two thirds of the scientific dives are at depths less than 9 msw.² The argument is a little circular. To support the Workshop’s recommendations for the relative safety of RDPs they refer to new scientific diver data and direct us to the *SPUMS Journal* article for the data.² In this article there are no such RDP data and the Workshop is referenced.

We suggest another revised RDP recommendation, which complies with the data available both before and after the Workshop:

“RDPs have different decompression requirements to FDPs, and these requirements should be validated for both decompression tables and decompression computer algorithms before use.”

References

- 1 Lang MA, Lehner CE, editors. *Proceedings of the Reverse Dive Profile Workshop*; 1999 Oct 29-30. Washington, DC: Smithsonian Institution; 2000.
- 2 Lang MA. The USA scientific diving medical and safety experience. *SPUMS J.* 2005; 35: 154-161.

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