

Automatic decompression meters

Carl Edmonds

Once again we hear of divers needing treatment for decompression sickness which occurred following routine decompression in accordance with an automatic decompression meter. There have been three such cases treated at the School of Underwater Medicine this year, and the records show many others occurring over the last few years since their general acceptance by the public as safe alternatives to the “tables”.

It never ceases to amaze me how divers place such blind faith in mechanical gadgetry! It seems that one can write almost anything in a diving magazine, and there will be gullible divers eager to accept every word as “gospel”. Such has been the sales spiel on these DCMs (see *Skin Diver Magazine* Nov. 1967 and Nov. 1970).

The DCMs in common use today make no allowances for individual variability in physiology, and strict adherence to the meter’s decompression schedule is bound to result in some cases of decompression sickness (DS). Similarly there is no allowance made for this factor with recognised RN or USN decompression tables – however, the records here are evident. Providing the table is followed exactly, the rate of development of DS in divers is never greater than 2–3%. I’m sure the record of divers on the DCMs is nowhere near as good – certainly not in my experience.

For some time, we have been asked – especially by ex-patients treated for DS after following the DCM schedules – to evaluate these meters and publicise the results. At long

last we have managed to obtain 12 such meters (10 secondhand and two brand new and never exposed to pressure/water) and have started evaluation testing. This has been conducted on a basis compatible with practical diving to depths varying in 20 ft increments from 60 ft to 200 ft. The results are far from being completed; however, several significant features are already outstanding. These are inconsistencies which are evident when the DCMs are tested in a ‘wet pot’ and show

- that the decompression schedules recommended by individual DCMs for identical dive (depth/time) factors vary considerably,
- that the decompression schedules recommended by the same DCM for identical dives vary considerably – and this followed a much longer than normal non-dive period, and
- that the decompression schedules recommended by the DCMs in some cases were more conservative (time wise) than corresponding RN or USN tables; and yet in others were far outside the limits of staging according to the tables.

These features are apparent on single (“bounce”) dives – repetitive dive testing has only just commenced, and results are unknown as yet. The fact that variables such as movement of the DCM (tapping, vibration, etc.) sunlight (warmth, etc.) are known to markedly affect the non-dive recovery period of the DCM, is sure to create interesting variations when these tests are finalised.

In the meantime, it would appear that our best advice to divers concerning these DCMs is to never rely on them for any dive in excess of 120 ft or for any repetitive dives, and to follow the most conservative regime when the DCM is compared to a recognised decompression table, (i.e.) dive with both table and meter, and decompress according to the deepest first stop and longest decompression times.

Certainly these techniques will make diving more complex for “fools” – but anyone who dives to depths in excess of 100 ft and thinks all is rosy when following a DCM is a fool. Deep diving in a hostile environment requires careful planning and thoughtful techniques, and no mechanical

mechanism exists which can always reliably predict decompression schedules for divers at various depths for variable periods. Surely, it is safer to err conservatively and stick to the “deepest depth X longest time” method. There are many ex-patients who can recommend this practice from personal experience with DCMs which failed.

The full results of the tests on the DCMs will be printed in the SPUMS newsletter when completed.

This article is reprinted from Edmonds C. Automatic decompression meters. SPUMS J. 1973; 3: 9.

Editor's comment:

Eileen Slark kindly donated all of her husband's diving medical teaching slides, papers, case records and books to the Occupational Medicine Unit, Department of Medicine, The University of Auckland. The report above was found amongst these papers, whilst Carl Edmonds' brief contemporaneous article on decompression meters was published over 30 years ago in this Journal. The SOS meter was often referred to in those days as the 'Bendomatic'!

I felt the juxtaposition of the two articles would be interesting historically, and that it highlights the common disparity between theory and practice in diving. Edmonds' research, particularly his detailed later work on the Orca EDGE™ computer, showed the unreliability of the early generations of dive computers (and made him no friends in the diving industry!). Nevertheless, divers got on with the job, utilising these tools, inadequate as they were, with seeming success. Tony's report demonstrates why he was held in high regard in New Zealand by his peers, and by military, occupational and recreational divers alike.

Mike Davis

The SOS decompression meter



Cartoon by Peter Harrigan reproduced from the cover of the SPUMS J. 1987; 17 (3)

