EDITORIALS

HIGH TECH DIVING

Intrinsic to the Australasian attitude towards recreation is the belief that there should be absolute freedom of choice and no government or quasi-government intervention (with the exception of funding which is always eagerly sought!). Why then is SPUMS actively campaigning against recreational "High-Tech Diving" (see letter on page 37) and in particular the plans to use scuba apparatus and oxygen-helium, perhaps trimix, gas mixtures to dive beyond 50 msw, and according to some press-releases, as deep 200 msw?

There are two fundamental reasons for the SPUMS campaign. Firstly, freedom of choice, or as it should be called, risk acceptance, requires an accurate knowledge of the actual risk if either the risk is to be accepted or if appropriate support is to be provided. The risks intrinsic to oxygen-helium or trimix scuba diving beyond 50 msw are considerable, even in the context of controlled military diving operations. Consequently, and not surprisingly, commercial diving operators do not undertake such activities. For example, the United States Navy reported a series of seven scuba (oxygen-helium) divers who dived beyond 60 msw and were then subsequently unable to undertake any decompression in the water. All were immediately recompressed to the maximum working pressure, 50 msw, of the on-site recompression chamber and despite this, all seven died! It would appear that survival in this context requires a recompression to at least the depth of the dive, and often an additional 30 msw.

The decompression illness risk, using the United States Navy oxygen-helium bounce diving tables for dives beyond 60 msw and for longer than 30 minutes, exceeds 20%. The "High-Tech Diving" planned for Australian sports divers is to be based on decompression schedules especially developed by Dr Bill Hamilton, PhD. However, Bill's schedules have not been used in this context and Bill has written to SPUMS dissociating himself from deep and especially 200 msw scuba diving.

Use of helium as a diluent gas in diving causes significant thermal stress. Dry-suits are unsuitable beyond 90 msw and below 150 msw the gases supplied to the diver must be heated if severe hypothermia is to be avoided.

Decompression from deep oxygen-helium or trimix bounce-dives invariably require some breathing of 100% oxygen at 12 msw or shallower, to avoid dilutional hypoxia, reduce thermal stress, improve communications and to accelerate decompression. Oxygen toxic convulsions have been a major problem in oxygen-helium, and especially trimix diving. Indeed, such convulsions were one of the major reasons why the Royal Navy abandoned 70 and 80 msw trimix diving trials in 1981. An oxygen convulsion in the water is often complicated by hypoxia, aspiration of vomitus, pulmonary barotrauma and decompression illness (in both the convulsing diver and the other divers in the team). The risks of oxygen toxicity and hypothermia are the major reasons why many oxygen-helium divers use surface-decompression. The cost of this procedure, in the absence of a closed-bell and a transfer under pressure, is a significant increase in the decompression illness incidence.

These are the real, not imagined, risks of oxygen-helium or trimix diving. The use of scuba apparatus beyond 50 msw and perhaps to 200 msw simply exaggerates these problems. It is absolutely essential then that these risks be understood by prospective "High-Tech" sports divers/ diving candidates.

The second reason for the SPUMS policy on such diving is related to the cost of the medical care needed for successful treatment of the inevitable accidents. Unlike the United States of America, the majority of injured divers are treated in Australasia at government (i.e. our taxes) expense. These governments then are inevitably and appropriately part of this risk-acceptance process, hence their legitimate involvement in deciding if recreational "High-Tech Diving" should occur. Many divers developing decompression illness after oxygen-helium dives beyond 50 msw will respond well to 18 msw oxygen treatments. However, among those that do not, compression on oxygen-helium (never air) to at least the depth of the dive will be necessary to control symptoms. The majority of Australasia's therapeutic recompression chambers can not undertake such treatments, and for those that can the cost is considerable. For example, a 41 hour oxygen-helium treatment just conducted by the Royal New Zealand Navy (the only body in Australasia involved in the treatment of recreational divers which has any real experience in oxygen-helium diving and its related decompression illness) cost $9,725 in personnel costs alone! This contrasts with typical treatment costs for decompression illness following air diving of about $1,250 for a treatment in the same facility. Also, the recompression chamber is unavailable for several days, at least, with consequent effects on the treatment of other patients, some of whom are paying customers. It follows that the community, and especially the hospitals involved, has every reason to expect "High-Tech" sports divers to pay for the cost of their own treatment.

Recreation should be fun. For some people to have fun, some element of risk is essential. Regardless of the psychology and mentality involved, it is essential that those undertaking high risk activities such as recreational "High-Tech Diving" understand these risks, especially students paying for tuition, and that they accept these risks and can be self-supporting. The inevitable impact on the limited hyper-

baric health resource in Australasia is such that these divers must also have adequate insurance-cover (if they can get it) or be able to privately recompense hospitals and Navies.

In view of the above, it is not surprising then that the SPUMS policy on "High-Tech" recreational diving is that it should be actively discouraged and that this Society will not oppose any government who consequently legislates some limit on recreational diving.

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President of SPUMS.

THE EDITOR'S OFFERING

With this edition of the Journal is enclosed a copy of the SPUMS submission for Appendices A and B to Standards Australia Committee CS/83, Recreational Underwater Diving. This gives the details of what SPUMS thinks is needed for an adequate diving medical. All members of the sub-committee which produced the document, all of whom have done many medicals, take at least 30 minutes to perform this medical, which is why a price linkage to insurance medical fees has been suggested in the past. The sub-committee was of the opinion that only be doing a less thorough, and very superficial, medical could it be done in less than half an hour.

On pages 31-32 is the SPUMS Statement on Diabetes, prepared by the Education Officer, Dr David Davies and approved by the Committee. For a variety of reasons the Society advises against diving by diabetics on insulin.

The editorial by the President, Dr Des Gorman, puts the reasons why the Society is against encouraging High Tech Diving. The reasons can be summarised as safety and cost of treatment. The Society has no objection to divers risking their lives provided they have a full knowledge of the risks involved. The letter from Rob Cason (pages 37-38) is an enthusiasts view. The magazine, AquaCorps, reviewed in the last issue, gives a more balanced view of the risks involved. What is quite certain, as shown by Edmonds et al. (pages 20-24) is that deep diving with current scuba equipment is dangerous at low cylinder pressures, as buoyancy compensators fill very slowly at 40 m, only just deeper than the recommended recreational limit, and if the diver is breathing, which is the usual practice, may not fill before the diver is out of air. To give the compensator the best chance to fill the diver should stop breathing while the compensator inflating button is pressed at depth with a low air pressure. Holding ones breath for up to 40 seconds may be difficult but a full compensator and a dropped weight belt will at least give the diver a chance of reaching the surface alive. Being at 40 m out of air and with an uninflated compensator makes it unlikely that the diver will survive.

Douglas Walker's 1989 Provisional Report (pages 3-15) makes sad reading. Not diving for over 12 months and attempted buddy breathing appear as risk factors for CAGE. Those who dive only on their annual holiday should have an orientation dive, where they consciously practice all their practical diving skills, especially buoyancy control and breathing from both primary and octopus regulators, in a non-threatening environment before doing any serious diving. If they are using their own equipment having it serviced before the orientation dive is an excellent precaution. The report of the deaths of two pearl farm divers from CO poisoning makes a chilling story. Not only were they inadequately trained but the employer condoned them diving dangerously with an inadequately equipped compressor and no one in the boat to supervise its operation. Such are the benefits of free enterprise workplace agreements, unsupervised, whether by default or intent, by those who should enforce safety regulations.

Wienke and Graver (pages 15-20) present a way to use, and the reasoning behind it, the USN tables for multi-level diving. We have to apologise for the complicated way their Table 1 reads. We added, at a late stage in preparation, the depths in m to the authors' in fsw to help those of our readers whose education was in metric and not in imperial measurements. Whether you want to use their method depends on your views about the safety of the USN tables but they have analysed over 16 million possible dives and found none ever exceeding USN M values.

Brett Gilliam's paper (pages 24-30) is certainly the largest and best data-base of sports dives and the associated decompression illnesses. A known incidence of suspicious symptoms of approximately 0.02% (2 in 10,000 dives) and an incidence of treated decompression illness of about 0.01% (1 in 10,000 dives) in tropical waters with many deep dives makes the BS-AC claim (pages 57-60) that the British incidence is steady at about one in 10,000 to 15,000 dives, in colder waters, slightly suspect. With 17 deaths in Britain in 1991 and 100 cases of decompression sickness (DCS) treated, simple mathematics gives a figure of 1,000,000 to 1,500,000 dives a year and death rate of between 0.11 and 0.17 in 10,000 dives. Put another way there was approximately one death for every 6 treated cases of DCS. On these figures the Ocean Quest should have had between 1 and 13 deaths. Here is a field for further research.

From the 1991 AGM comes a description of the development of the PADI Medical Form, a study of the DCS incidence reported to DAN with the PADI Recreational Dive Planner, an evaluation of in-water oxygen recompression therapy conducted in the Antarcticd and the report of the Royal Adelaide Hospital's year shows that divers are not the main users of that hyperbaric unit.

And again Bob Halsted gives us food for though with a case report, in Letters to the Editor, and a call to abolish the term "no-decompression dive".