understanding of out of air emergency drills offered by the various instructor agencies would clear this one up once and for all.

The instructor agencies would appreciate it if their members did not become the focus of potential debates with prospective students on fitness to dive. That surely is the domain of the patient and the physician.

At the beginning of this presentation I stated that some of the content may not be popular with all those attending. It was my intention however to create healthy debate within the arena of a professional conference, rather than allow totally unnecessary misunderstandings to exist. If we do not know clearly what the problems are and address them accordingly, we will all suffer from poor information.

The instructor agencies generally are very conscious of their obligations to safety. What we now want is to commence a new era where diving doctors, instructor groups and other elements within our industry can work together for a common goal.

Only by the inclusion of other dive industry participants in the SPUMS Conference can we ensure that is discussed becomes useful. For example, Dr Chris Acott can deliver as many papers as he likes for the next 10 years on incident reporting but if those reports are not used by instructors, dive stores and equipment manufacturers to make constructive changes his efforts are unfortunately nothing more than an academic exercise in futility.

I see the five major areas of potential conflict I have outlined as a starting point for this new age of co-operation. The benefits to us all of creating sound working relationships are immeasurable. Let us start building on it today.

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Terry Cummins is the Chief Executive of PADI Australia Pty. Ltd. His address is PADI Australia Pty. Ltd., Unit 1/1-7 Lyon Park Road, North Ryde, New South Wales, 2113, Australia.

The Committee of SPUMS considered that Mr Cummins was misinformed on a number of topics and authorised Dr David Davies, the Education Offier, to write the reply which follows.

A DIVING MEDICAL VIEW OF A TRAINING AGENCY PERSPECTIVE

David Davies

The paper,[1] presented by Mr Cummins at the SPUMS Annual Scientific Meeting in the Maldives, was most interesting as it brought into the open the innuendo and misinformation circulating in the diving community that has been the bane of diving medicine for some years. I have been asked to try to explain why and where Mr Cummins' perceptions vary from reality.

It has been stated before but obviously needs to be repeated that **only the President and the Honorary Secretary of SPUMS may speak on behalf of the Society**. In some circumstances, the Executive committee may nominate a specific person to be the spokesman on a particular subject at a specific time.

The article quoted from Underwater Geographic[2] is the personal view of a prominent Queensland doctor and should in not, in any way, be construed as being either SPUMS policy or even the beliefs of many members of SPUMS. In fact, a number of SPUMS members took exception to the sentiments expressed in that article.

The problem of conditional medical certificates has been with us for a long time. It is a consequence of the diving medical being done by a doctor not properly trained in diving medicine. Many of the conditions imposed reflect a lack of understanding of the physics and physical requirements of diving. This problem could be overcome by insisting that all diving medicals are done by doctors with the appropriate training. It is unfortunate that the CS/83 Committee of Standards Australia saw fit to remove this requirement[3] from the proposed standard for recreational divers. There is a reactionary element in the medical community with the misguided belief that once a doctor graduates he is trained for everything. The attempt of the Australian Medical Association to be everything to everyone led to the AMA representative on the CS/83 Committee being instructed to vote against compulsory further training of doctors doing diving medicals.

I believe that the training organizations, and the diving instructors themselves, can help with this problem by suggesting to their students that they attend, for their diving medical, only those doctors with the appropriate training. It does not take long for an instructor to ascertain which of the doctors in his area supply the best service to his students. By so doing, the instructors can exert pressure and stimulate their local doctors to seek the necessary training. SPUMS has no way to apply such pressure.

Mr Cummins appeared to believe that a basic training course in diving medicine turns a doctor into a specialist in the field. Nothing could be further from the truth. The basic

course at the School of Underwater Medicine lasts for two weeks, in Adelaide it takes a week, and in Queensland it is conducted over a weekend. These courses provide an introduction to the subject and what to look for, and why, during a diving medical. They explain why conditions such as asthma, epilepsy and congestive cardiac failure are not compatible with safe diving but they do not cover the intricacies of treating a severe decompression illness.

The specialists in diving medicine are relatively rare in Australia. Holders of the Diploma in Diving and Hyperbaric Medicine are the only people recognised as Diving Medical Specialists by SPUMS. Almost all are attached to hospitals with recompression facilities and it is on their shoulders that the burden of treating injured divers falls. They are available for consultation in difficult cases and if problems arise. Very few of them do routine diving medicals.

We all appreciate that there are areas of the country where there are no doctors with training in diving medicine. With the amount of diving that is being done in Australia it is inevitable that every GP at some time in his career will encounter a patient who either wants to dive or has been diving and now has a problem. Dr Edmonds' paper[4] reporting the lack of knowledge about diving medicine in a survey of Queensland GPs confirms the need for instructors to exert pressure on their local doctors.

When the National Safety Council (Victorian Division) collapsed the funding of the Diver Emergency Service (DES) needed urgent CPR. In the heat of the moment a compromise was engineered by Des Gorman which required the marriage of DES with the Australian Patient Safety Foundation (APSF). Among its many fund raising activities the APSF has included the sale of products such as the DCIEM decompression tables. Without entering into a discussion about the merits of the various tables it is fair to say that the experimental evidence behind the DCIEM Tables is vastly more than that behind any other. They also appear to be safer.[5] Doctors have difficulty understanding the belief that making available a set of tables that is not promoted by any training organization can be seen as competition when no advertising of these tables is undertaken.

Recently the funding arrangements of the two organizations has altered enabling the temporary marriage to be dissolved so they are now completely separate entities. The suggestion that DES is in direct competition with the dive organizations no longer applies.

During the crisis, SPUMS and some of the members of the Executive Committee were the first to make significant donations for both time and money to enable DES to continue. In addition, SPUMS has recently made a further donation to support the DES network. To suggest that the medical profession is not doing enough to support the DES network is both inaccurate and misleading.

Mr Cummins states that the most common cause of diving accidents is "diver error" and that is certainly the impression one gains when we treat these patients in the hyperbaric chamber. The paper by Wilks and O'Hagan[6] demonstrated that divers do not fully understand how to use tables and often have to rely on the divemaster to calculate their repetitive dive times. Every failure to use the tables correctly is a failure of education and of reinforcement of that education.

Very few divers have problems during their basic course when they are under close supervision, the learning curve is steep and they are concentrating intensely. However, once "trained" and left to their own devices many run into problems and forget their basic instruction. It is these recently qualified divers who make up the bulk of those presenting for treatment at our recompression facility in Fremantle. Is this a deficiency of the education, the training organization, the instructor, the student, or is it a reflection on the brevity of the course? At the Annual Scientific Meeting in 1991, Glen Egstrom spoke of the need to overlearn each skill until it becomes an automatic reflex. Such training is not possible with the brief courses, especially resort courses, that are being offered by all the training organizations.

Most diving doctors consider that, as instructors train divers and most diving accidents are due to human error, it is fair to say that these human errors may well be due to inadequate training, which reflects on the standard of teaching. This is the view medical educators take to avoid repetition of medical accidents.

It seems unreasonable to me that, whenever a funding crisis occurs, everyone expects that the government will step in and pick up the tab. I would prefer to see the diving community helping itself by placing a levy on every trainee diver (say $10.00) at the beginning of every course or at the time of certification. In addition, a levy of $0.50 could be put on every tank refill. The proceeds of both these levies would go to support DES. Neither impost would make a significant difference to the cost of a dive or a course and the money would be contributed by those actively diving and therefore most likely to need the services of the DES organization.

Membership of DES could well be another source of income as it is with the Diver Accident Network (DAN) in the United States. There, such membership automatically includes insurance cover for retrieval and treatment of diving accidents. Currently Dr Acott is negotiating with the Australian insurance companies for a similar arrangement. Unfortunately the local insurance companies are demanding about twice the US premium for a much lower standard of cover and this is unacceptable to the DES negotiators.

Despite what Mr Cummins perceives, hyperbaric units are not installed for the benefit and convenience of the diving community. In fact, divers make up only a small

proportion of the workload in a civilian chamber. At Fremantle[7] for instance in 1990, 41 divers received 119 treatments in a total of 1808 patient treatments, i.e. 6.6% of the total workload. In Adelaide[8] over the same period, 20 divers required 69 treatments in a total of 792, a strike rate of 8.7% of the total workload.

In the reports from both these units, the figures for divers are quite separate from the other conditions treated. To suggest that treatments for divers and non-diving conditions are grouped together to boost the figures is grossly misleading.

I am grateful to Mr Cummins for bringing these problems into the open where they can be discussed. The problems have arisen because of a lack of communication between the agencies, the instructors and some of the outspoken diving medicos.

After a week of being incarcerated with the SPUMS group in the Maldives last year, both before and after he presented his paper, I believe that Mr Cummins returned with opinions significantly different from those he presented in this paper. All these problems were discussed and many points of mutual agreement were reached. If he was now asked to present such a paper I expect its content would be vastly different. Unfortunately I fear that others may still harbour his original misconceptions, which is why this reply has been written.

There has always been a standing invitation to all Associate Members of SPUMS to attend the Annual Scientific Meeting of the Society. In this they are no different from the full members. The response to date has been disappointingly poor and has perpetuated the "us and them" mentality. Those few Associates who have attended have enjoyed the meetings, achieved some benefit and have reconciled many differences. I exhort all members of the diving fraternity to join us this year in Port Douglas or next year in Palau. It must be remembered that we all have the same goal, safe diving.

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DIVING FITNESS

Glen Egstrom

Introduction

I am by profession a kineseologist. We study how people perform in a variety of different circumstances. Diving fitness has been discussed from a variety of points of view for many years. Strength, endurance and the specificity of training are cornerstones for fitness and have justifiably been given the lion's share of the attention. People make remarkably specific adaptations to the imposed demands of the environment and continually seek to gain equilibrium with the stresses applied in training programs. That is a long winded way of saying that just because you are in good physical or medical condition for a particular activity it does not mean that you are in good condition for some other activity. Specific adaptation takes some time. It is not something that happens immediately. The barriers which face the scuba diver, who wishes to perform safely, are biomechanical, physiological, methodological and psychological.

Biomechanical fitness

The Japanese Ama (breath-hold) divers have strength in the functional muscle groups that enable them to force themselves down in the water. They take some incredible kicks and drive themselves down until they become negatively buoyant and then they work their way to the bottom. As young adults, these females work in water depths of 10 m for periods of 6 hours a day in water temperatures similar those off the coast of New Zealand and California. As they become more proficient, they develop the strength to be able to go down to about 30 m on breath hold dives. On the 10 m dives they do one dive about every 2 to 3 minutes, on the 30 m dives they do one dive every 4 to 5 minutes. They do that for 6 hours and they take 30 minutes off for lunch. It is a