

- syndrome. In; Bacharach A.J., Matzen M.M., eds. *Underwater physiology VIII*. Bethesda: Undersea Medicine Society, 1984: 327-339
- 5 Ferrigno M, Grassi B, Ferretti G, Costa M, Marconi C, Cerretelli P and Lungren C. Electrocardiogram during deep breath-hold dives by elite divers. *Undersea Biomedical Res* 1991; 18 (2): 81-91
  - 6 Campbell LB, Gooden BA and Horowitz JD. Cardiovascular responses to partial and total immersion in man. *J. Physiol* 1969; 202: 239-250
  7. Gooden BA. The diving response in clinical medicine. *Aviation Space and Environmental Med* 1982; 53(3): 273-276
  - 8 McDonough JR, Party BS and Saffron RN. Cardiac arrhythmias as a precursor to drowning accidents. In *The physiology of Breathhold Diving*. Eds. Lungren CEG and Ferrigno M. Washington, DC: Undersea and Hyperbaric Medical Society, 1987; 212-228
  - 9 Sem-Jacobsen CW and Styri OB. EKG arrhythmias monitored from free swimming scuba divers at various depths. *Proc.J Inter Hyperbarie et Physiologie Subaquatique*. Marseilles June 8-11 1970; 130-136
  - 10 Wilmshurst PT, Nuri M, Crowther A and Webb-Peploe MM. Cold-induced pulmonary oedema in scuba divers and swimmers and subsequent development of hypertension. *Lancet* 1989; (i) 62-65
  - 11 Galante J, Hernandez A, Colin L, Camacho B, Verdejo J and Ferez S. Continuous electrocardiographic recording during a first parachute jump. *Arch Inst Cardiol Mex* 1988; 58(4): 325-331

*Michal T. Kluger MB,ChB, DA, FRCA, is a Staff Specialist in the Department of Anaesthesia and Intensive Care at the Royal Adelaide Hospital, North Terrace, Adelaide, South Australia 5000.*

## THE WORLD AS IT IS

### LONG TERM HEALTH OF PROFESSIONAL DIVERS

**International Consensus Conference**  
held at  
Godøysund, Norway, 6-10 June 1993

Otto I. Molvær

Ten years ago an international workshop entitled "Long Term Neurological Consequences of Deep Diving", organised by the European Undersea Biomedical Society (EUBS) and the Norwegian Petroleum Directorate (NPD), took place in Stavanger, Norway. At that time preliminary results from a newly started Norwegian research program on possible long term effects of deep diving on the divers' health caused enough concern to arrange that workshop.

That time, U.S.A., U.K., France, Sweden and Norway were represented with 38 invited participants. The views on the subject varied widely, and any attempt made to reach consensus failed.

In his introduction to the proceedings<sup>1</sup> of the conference, the chairman, Professor R.I. McCallum concluded as follows: "In view of the lack of hard evidence of actual neurological damage from deep diving and the need for more data, is there a case for limiting deep diving now? Many feel that deep diving, when properly carried out, is safe and I think it is fair to say that there was little support for limiting such activity at the present time, but rather for intensifying the monitoring of those taking part in it."

And the monitoring was intensified, including also the pulmonary and auditory functions. The results of our research have been published internationally, and met with scepticism. Nevertheless, this time we optimistically called the convention a *consensus* conference in our invitational leaflet, although we knew the subject was controversial.

Now the scope was widened from possible *neurological* effects of *deep* diving to possible effects on the diver's *health* of professional diving in a broader sense, and in addition to the nations participating in 1983, representatives from Australia, Switzerland and Ukraine were included. Of the 36 persons invited, only two did not show up at all. In addition, the authorities and the oil and diving companies had observers in the conference.

The discussions were lively, to say the least, but since the conference was held in a small island on the Norwegian west coast, no one could escape until some sort of consensus was reached. Naturally, the final statements had to be rather general:

"There is evidence that changes in bone, the central nervous system and the lung can be demonstrated in some divers who have not experienced a diving accident or other established environmental hazard. The changes are in most cases minor and do not influence the diver's quality of life. However, the changes are of a nature that may influence the diver's future health.

The scientific evidence is limited and further research is required to obtain more definite answers to the long term effects of diving."

All plenary speeches and discussions were audio-taped, and transcripts are being made. Eventually, the proceedings will appear as a hard bound book that will be generally available.

## Reference

- 1 Shields TG, Minsaas B, Elliott DH and McCallum RI. *Long term neurological consequences of deep diving*. Proceedings of a workshop organised by the EUBS and the NPD, Stavanger 1983.

*Professor Otto I. Molvær works both at NUTEC and the Department of Otolaryngology, University of Bergen. His address is NUTEC, P.O.Box 255, N5034 Ytre Laksevåg, Norway.*

*The above is an alternative view of the conference reported on by Dr Carl Edmonds in the last issue.*

## SCUBA DIVING MEDICAL EXAMINATIONS: NUMBERS AND COSTS

Jeffrey Wilks

### Introduction

The continuing debate about scuba diving medical examinations has received attention in recent months. Essentially the debate has been about General Practitioners' (GPs) training and qualifications to conduct diving medicals. Some argue that these examinations are specialised, and that only GPs with specific training in underwater medicine should conduct them. In support of this view, a 1985 study of 364 Queensland doctors involved in the assessment, advice or treatment of divers revealed that many were unable to match eight common diving accidents with their major treatments. From the specialists' point of view, there were also a number of important screening tests not routinely performed by GPs in that study.<sup>1</sup>

Until recently, Queensland was the only state in Australia where entry level scuba diving candidates were required to undergo a medical examination prior to using self-contained underwater breathing apparatus (Scuba). This requirement was initially part of the Workplace Health and Safety Act 1989, and is now included in the Code of Practice for Recreational Diving at a Workplace.<sup>2,3</sup>

In other parts of the country divers currently comply with Australian Standard 4005.1 (published by Stand-

ards Association of Australia, 16 April, 1992) which also requires a medical examination prior to using scuba equipment as part of entry level certification training.<sup>4</sup> The difference in Queensland is that a "diving medical practitioner" is defined as a "medical practitioner who has completed a course in diving medicine approved by the Board of Censors of the South Pacific Underwater Medicine Society (SPUMS)." Under Australian Standard 4005.1 any registered medical practitioner can perform the diving medical examination, though the Standard does recommend that the doctor be one who has completed an approved course of training. Since this is only a recommendation, many dive centres continue to use medical practitioners who have experience in diving medicine, but may not have attended a formal training program.

At the present time the AMA has adopted the view, in support of Australian Standard 4005.1, that "knowledge and experience" in conducting diving medicals is all that is required from a GP, and while specialised training is desirable, it should not be mandatory.

In a letter outlining the AMA position on diving medicals, Wilkins<sup>5</sup> asked about the numbers of regular or occasional sport scuba divers throughout Australia, and how often did SPUMS believe medical examinations should be performed for them? The actual number of diving medicals that are required in Australia each year has not been discussed before, so the first aim of this paper is to provide the relevant figures.

### Australian Divers Requiring a Medical Examination

The majority of diving medical examinations conducted in Australia are for new divers entering training to gain their open water certification. This entry level licence allows them to dive in buddy pairs to a recommended maximum depth of 18 metres, in fair weather conditions, in the area where they were trained. AS 4005.1 recommends that whenever divers encounter a new diving environment they should seek orientation to the new conditions. Since certification cards do not have an expiry date, the current situation is that a recreational diver is only required to have one medical examination to obtain his or her initial licence. There is no requirement for regular check-ups thereafter.

Based on figures provided by the four main Australian scuba training agencies (NASDS, NAUI, PADI, SSI) there were 54,153 new open water certifications issued during 1991. Since all new divers technically require a medical examination, a similar number can be anticipated each year. In addition, there were 19,242 other certifications issued during 1991, ranging from advanced and specialty ratings through to leadership qualifications (eg. divemaster and instructor).<sup>6</sup> Many of these divers may be requested to gain a medical clearance before taking their continuing education course. However, as noted above,