

The Campbell D Mode ventilator provides an alternative to the Penlon 200 for the average adult patient. However it does not achieve the desired maximal inspiratory flow rate of 80 l/min at depth (2.8 bar) where its maximum flow is only 35 l/min. At 2.8 bar tidal volumes above 600 ml cannot be achieved. It would be unable to provide clinically acceptable tidal volumes in some clinical circumstances (e.g. the morbidly obese) and further studies are needed to identify its clinical limits.

The PEEP function has not been evaluated. Controlled ventilation in the hyperbaric chamber presents a variety of challenges and risks that require further evaluation.

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This paper formed part of the thesis submitted for the Diploma of Diving and Hyperbaric Medicine awarded to Dr M W Skinner in 1997. When the Diploma was awarded he was Provisional Fellow in the Department of Anaesthesia and the Hyperbaric Medicine Unit at the Fremantle Hospital, Fremantle, Western Australia 6160.

THE WORLD AS IT IS

1997 ANNUAL MEETING OF THE AUSTRALIAN HYPERBARIC TECHNICIANS AND NURSES ASSOCIATION

Eric P Kindwall

Key Words

Hyperbaric facilities, meeting.

The Coogee Beach Hotel was the venue for the 5th Annual Scientific Meeting of the Australian Hyperbaric Technicians and Nurses Association (HTNA) 28-30 August 1997. Coogee Beach is a pleasant seaside suburb of Sydney, which in August was welcoming the beginning of spring "down under". There were well over 100 participants from the nine hyperbaric facilities in Australia, all hospital-based units with multiplace chambers. More than 30 papers were submitted to the meeting; slightly over half of them dealt with clinical hyperbaric medicine and the remainder with diving-related subjects. Laura Josefson, RN, President of the BNA, and I were guests of the HTNA and were given ample time to speak on the program.

The clinical hyperbaric subjects were broad and varied. They included impaired neutrophil adhesion in

patients with diabetes, the problem of claustrophobia in the chamber, injury mechanisms in carbon monoxide poisoning, psychiatric profiles of patients with carbon monoxide poisoning, a survey of middle ear barotrauma in unconscious patients, an update on the results of hyperbaric incident monitoring (the HIMS Study) and the use of tympanostomy tubes.

The divers dealt with the treatment of decompression sickness, DCS at very shallow depths, technical diving subjects and the practicality and utility of square hyperbaric chambers.

We were met at the airport by Dr Ian Unsworth, literally the founder of HBO therapy in Australia, who turned us over to the capable hands of John Kershler and Barrie Gibbons of the Prince of Wales Hospital HBO unit, who had made all our travel arrangements.

The highlight of the trip for me and my family was a grand tour of the hyperbaric facilities in Australia, starting in Sydney with the Prince of Wales Hospital and HMAS PENGUIN, the Royal Australian Navy Diving Training Facility. Our travels then took us to the Royal Hobart Hospital in Hobart, Tasmania; the Alfred Hospital in

Melbourne; the Royal Adelaide Hospital in Adelaide; the Fremantle Hospital in Western Australia; to the Townsville General Hospital, which handles diving casualties from the Great Barrier Reef; and finally back to Sydney for the meeting.

One of the most impressive looking chambers was the multiplace facility at the Royal Hobart Hospital founded by Dr Peter McCartney, who remains as consultant. Co-directors Dr David Smart and Dr Margaret Walker are currently running the chamber. Their unit featured 60 cm (23.6 inch) circular view ports in a chamber capable of 6 ATA. These were literally like dramatic picture windows. The Alfred Hospital in Melbourne at the present time has a circular-doored multiplace chamber but has just received approval for a 3-lock rectangular chamber capable of 6 ATA, which will be constructed beginning in 1998, according to Dr Ian Miller, the director.

In Melbourne, Dr Miller treated us to an Australian rules football game, best described as a form of "guerilla warfare" with goal posts. The Adelaide Hospital already had a rectangular chamber with unbelievable space for positioning patients and using critical care equipment. Dr John Williamson and his charming wife were our genial hosts.

During our visit to the Fremantle chamber run by Dr Harry Oxer, we were privileged to visit the ultra-modern Royal Australian Navy Submarine Escape Training Tower located there. The Fremantle chamber facility and the Royal Australian Navy work closely together with regard not only to training but also to management of diving casualties. While there, we had a delightful dinner overlooking Fremantle Harbour with Harry and Sharon Keetley of the Fremantle Hospital HBO Unit. Sharon is president of the HTNA.

The Townsville chamber is very active in the treatment of diving casualties, as well as having a vigorous clinical hyperbaric program. Dr David Griffith is the energetic director of the unit there. If a new hospital facility is built, which is now being actively discussed, they are hoping to get an even more user-friendly clinical chamber. While in Townsville, we had the opportunity to spend a day at the Great Barrier Reef, where we snorkelled amid giant clams and colours that I had never seen in the Caribbean.

The most impressive thing my family and I experienced in Australia was the wonderful hospitality and generosity of everyone when it came to their time and willingness to arrange our travel. We made many new friends and hope that we may reciprocate the warm welcome we received.

We found Australian medicine to be absolutely first-rate. In many ways, the Australians seem to be less bound

by tradition and quicker to adopt new methods that work. Their no-nonsense approach to problem-solving is impressive. It appears that their protocols for the treatment of decompression sickness, for example, are somewhat more advanced than those used commonly in the United States, with all the chamber having helium-oxygen available on the manifold.

The Australians face many of the same problems we face here concerning money for chambers and equipment and insurance reimbursement, in many ways it sounded like old home week.

Uniform regulation associated with hyperbaric treatment is in the final planning stage, and a committee is about to establish nationwide minimal standards for training of physicians and chamber personnel.

In summary, it was an enlightening educational experience and a most enjoyable 18-day tour under the Southern Cross.

Dr Eric Kindwall is the Director of Hyperbaric Medicine at the Medical College of Wisconsin, 9200 W Wisconsin Avenue, Milwaukee, Wisconsin 53226, USA.

Reprinted, by kind permission of the Editor, from PRESSURE, January/February 1998; 27 (1): 17-18.

ROYAL NEW ZEALAND NAVY DIVING MEDICINE COURSE

A 5 day course in Diving and Hyperbaric Medicine is offered by the Naval Health Services on an annual basis.

The program is aimed at medical practitioners and other health professionals with a special interest in diving medical as well as dive instructors and dive boat operators.

Dates	August 3rd to 7th 1998
Venue	RNZN Hospital, 91 Calliope Road, Devonport, Auckland
Fees	\$NZ 750 (includes GST). Cheques to be made payable to NZ Defence-Navy
For further details contact	Mrs Anne Powell, RNZN Hospital, Private Bag 32901, Naval Base, Devonport, Auckland 1309. Telephone +64-9-445-5972. Fax +64-9-445-5973

SPUMS NOTICES

SOUTH PACIFIC UNDERWATER MEDICINE SOCIETY DIPLOMA OF DIVING AND HYPERBARIC MEDICINE.

Requirements for candidates

In order for the Diploma of Diving and Hyperbaric Medicine to be awarded by the Society, the candidate must comply with the following conditions:

- 1 The candidate must be a financial member of the Society.
- 2 The candidate must supply documentary evidence of satisfactory completion of examined courses in both Basic and Advanced Hyperbaric and Diving Medicine at an institution approved by the Board of Censors of the Society.
- 3 The candidate must have completed at least six months full time, or equivalent part time, training in an approved Hyperbaric Medicine Unit.
- 4 All candidates will be required to advise the Board of Censors of their intended candidacy and to discuss the proposed subject matter of their thesis.
- 5 Having received prior approval of the subject matter by the Board of Censors, the candidate must submit a thesis, treatise or paper, in a form suitable for publication, for consideration by the Board of Censors.

Candidates are advised that preference will be given to papers reporting original basic or clinical research work. All clinical research material must be accompanied by documentary evidence of approval by an appropriate Ethics Committee.

Case reports may be acceptable provided they are thoroughly documented, the subject is extensively researched and is then discussed in depth. Reports of a single case will be deemed insufficient.

Review articles may be acceptable only if the review is of the world literature, it is thoroughly analysed and discussed and the subject matter has not received a similar review in recent times.

6 All successful thesis material becomes the property of the Society to be published as it deems fit.

7 The Board of Censors reserves the right to modify any of these requirements from time to time.

1999 SPUMS ANNUAL SCIENTIFIC MEETING

An International Workshop on the Treatment of Decompression Illness

will be held on the island of **Layang Layang**, Malaysia
Friday April 30th to Sunday May 9th 1999

The Guest Speakers will be Dr Richard Moon (USA), who was a guest speaker at the 1997 ASM at Waitangi in New Zealand and Dr Alf Brubakk (Norway), who attended the 1998 ASM in Palau.

The Convener of the Annual Scientific Meeting is Dr Chris Acott.

To present papers contact: Dr Chris Acott
Hyperbaric Medicine Unit, Royal Adelaide Hospital,
North Terrace, Adelaide, South Australia 5000
Telephone +61-8-8222-5116. Fax +61-8-8232-4207.
E-mail guyw@surf.net.au

Speakers at the ASM must provide the printed text and the paper on disc to the Convener before speaking.

The Official Travel Agent for the meeting is:
Allways Dive Expeditions
168 High Street, Ashburton, Victoria, Australia 3147
Telephone + 61-(0)3-9885-8863.
Toll Free with Australia 1-800-338-239
Fax +61+(0)3-9885-1164.

DIVING MEDICINE COURSE

The School of Public Health and Tropical Medicine, James Cook University, Townsville, with the staff of the Hyperbaric Medicine Unit, Townsville General Hospital, will be conducting a course in

Diving Medicine

from Monday 6th to Saturday 10th October 1998.

For further details contact

Dr Peter Leggat
Senior Lecturer,
School of Public Health and Tropical Medicine
James Cook University,
Townsville, Queensland 4811
Australia
Telephone +61-(0)7-4722-5700

CONSTITUTIONAL AMENDMENTS

At the Annual General Meeting held in Palau on 15/5/98 the following amendment to the constitution was passed.

That Rule 22 (b), which reads "Each officer of the Association shall hold office until the annual general meeting next after the date of that person's election but is eligible for re-election.", shall be changed by replacing the word *next* by the words *three years*.

The new wording would be: *Each officer of the Association shall hold office until the annual general meeting three years after the date of that person's election but is eligible for re-election.*

The amendments will not come into effect until approved by the general body of members. Any member who objects to the amendment should notify the Secretary of SPUMS, Dr Cathy Meehan, C/o Australian and New Zealand College of Anaesthetists, 630 St Kilda Road, Melbourne, Victoria 3004, Australia, in writing before September 1st 1998. If any member objects a postal ballot will be held. If no objection is received it will be assumed that the membership has voted in favour of the amendments.

Cathy Meehan
Secretary of SPUMS.

Key Words

Constitutional amendment, notice.

MINUTES OF THE

SPUMS EXECUTIVE COMMITTEE MEETING

held at the Royal Adelaide Hospital Hyperbaric Unit on
November 1st 1997

Opened

1045 Central Summer Time

Present

Drs G Williams (President), D Gorman (Immediate Past President), C Meehan (Secretary), T Wong (Treasurer), J Knight (Editor), D Davies (Education Officer), C Acott and R Walker (Committee members).

Apologies

Drs M Kluger (NZ Representative) and V Haller.

1 Minutes of previous meetings

- 1.1 Minutes of previous meeting (14 September 1997) read and accepted as a true record after minor adjustments. Proposed John Knight, seconded Chris Acott.
- 1.2 Minutes of the Annual General Meeting (April 1997) read and are to be published in the Journal

for the information of members.

2 Matters arising from the minutes

- 2.1 North American Chapter. Jeffrey Bertsch will be the SPUMS North American chapter representative. He will be asked to contact the previous representatives Dr Lori Barr and Mr Steve Dent and update us on the present financial situation.
- 2.2 Indemnity Policy update. Dr Guy Williams is awaiting further advice on this issue.
- 2.3 The job descriptions of the Secretary and Education Officer have been completed. The Treasurer and Editor are updating their list of duties. The role of the convener document is still pending.
- 2.4 Oxygen equipment update. Dr Acott will liaise with Dr Mike Davis and co-ordinate transportation of the oxygen equipment to the next ASM in Palau.
- 2.5 Inventory of SPUMS equipment held by members has been passed to the Treasurer. The Secretary will also hold a copy of this. The audio equipment held by the President needs to be upgraded. Dr Williams has this matter in hand.
- 2.6 SPUMS on the Internet. It is advantageous for SPUMS to have a recognisable domain name, to facilitate easy access to the proposed SPUMS web site. The objective will be to have current information available on the Internet as well as the ability to complete and process application forms electronically. The Secretary has had a home site for some time. This has been updated and will be posted onto the Internet as soon as the domain address is formalised.
- 2.7 Update of SPUMS forms. The Editor will update the introductory form. The Education Officer will update the DDL approved medical course form. The Secretary and Treasurer have updated the application form. The new DDL and SPUMS membership application forms will be reprinted in time for the renewal notices to go out in early December.
- 2.8 Further discussion was held as to the advantages of longer terms of committee positions. It was decided that it would be beneficial to have three year terms for all the elected committee positions. A motion was presented that the constitution be changed as follows:
"Officers of Committee 22.(b) Each officer of the Association shall hold office until the annual general meeting three years after the date of that person's election but is eligible for re-election."
- 2.9 Project Proteus. There has been some response to the letter of expression of interest.
- 2.10 Letter Dr M Davis re Diploma. Dr David Davies will write to Dr M Davis with regard to this.
- 2.11 The Treasurer and Secretary have upgraded to

Microsoft Office 97. The computer used by Steve Goble to hold the DDL database runs on Windows for Workgroups 3.1. It is therefore not possible to upgrade this version of Access to Office 97. In view of this it will not be possible for that computer to hold a current list of SPUMS financial members (which is in Access 97). All correspondence addressed to the DDL will in future be directed initially to the Treasurer who will check the financial status of the applicant. The Treasurer will then forward the details to Steve who will update the DDL database and produce the information for the bi-annual DDL booklet.

- 2.12 It continues to be beneficial to hold one face to face committee meeting yearly at a time other than the ASM. The possibility of holding this meeting at the time of the annual HTNA meeting, which is usually held at the end of August, was discussed. It was decided that there would not be sufficient time available to hold a satisfactory SPUMS Committee meeting during the HTNA meeting. It was proposed that the yearly meeting be held at the end of October in Adelaide, Melbourne or Sydney, according to convenience at the time.

3 Annual Scientific Meetings

- 3.1 1998 Palau update. There were no outstanding points to discuss.
- 3.2 1997 New Zealand ASM closure report. This has been finalised and outstanding monies have gone to the ASM account.
- 3.3 1999 Layang Layang update. Richard Moon has agreed to speak. It is proposed to hold the conference in the first week of May. The proposed theme is "Bubbling".
- 3.4 2000. A family destination such as Fiji was suggested.
- 3.5 Kavieng, PNG, was proposed as a possible venue for 2001.

4 Treasurer's Report

The Treasurers report was accepted. Proposed Robyn Walker, seconded Des Gorman.

5 Correspondence

- 5.1 Dr Parker, re SPUMS WEB site. Dr Meehan will reply.
- 5.2 Letter from Tony Turner re Wesley Unit. Dr David Davies will correspond and send the requested information.
- 5.3 Phone call from Dave King re HTNA meeting. It was agreed that a flier be enclosed in the next Journal at no charge.

6 Other Business

- 6.1 The SPUMS Policy on the Initial Management

of Diving Injuries and Illnesses was adopted.




- 6.2 Relationship between the HTNA, ANZHMG and SPUMS (Drs Williams, Walker). The ANZHMG is a standing committee of SPUMS. This was discussed.
- 6.3 Secretariat (Dr Knight). Discussion was again reopened on having a secretariat. In the past this has turned into an expensive option. It was thought that it may be possible to find an individual in Melbourne to work part time. Duties would include collecting and sorting the mail, dealing with the general inquires as well as coordinating those that need to go through to Committee members. Such as person is being sought.
- 6.4 SPUMS Diploma and possible affiliation with a tertiary educational institution. (Dr Walker). During the discussion it was pointed out that this had been tried in the 1970s and no New South Wales University was interested in adopting the SPUMS diploma. Dr Walker to investigate if there has been a change attitude.

Closed 1600

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Key Words

Diving operations, tables, treatment, underwater medicine.

The USN Divers Handbook has been modified to reflect the error corrections and changes evident in the latest reprint of its big brother, the USN Diving Manual.

It has been published and issued as a pocket sized ready reference for diving supervisors with quick access to all USN air diving tables, therapeutic recompression tables and procedures, diving medicine, neurological examinations and first aid. It reaches its objectives admirably if the prime purpose of its existence is considered. That is, to provide USN Master Divers, Diving Officers and Diving Medical Officers with readily available information that can be carried in their pockets.

If one further considers the intense pressure and very high expectations placed upon USN Master Divers during their certification evaluation and in upholding the very high standards of the USN diving community during any form of diving duty the existence of this publication is more easily understood.

Having said that, there is some very good information included that is of direct benefit to diving supervisors, chamber operators and medical personnel within the non-military occupational diving sectors. The use of the USN air decompression tables for repetitive dives is forbidden in AS 2299 so the practicality of their use can be basically discounted except where single dives with a little longer duration are required.

The medicine section is ideal for diving supervisors and so is the first aid. Both are probably too simplified for the Diving Physician. The therapy section includes many options of changing to various deeper tables if a patient's condition deteriorates. This information is probably relevant for Diving Medical Physicians but I think it is lost to the average occupational diving supervisor. The continued use of Type I and Type II decompression sickness terminologies, however, distances the handbook from local directions.

The complexities built into the USN support documentation and their continued policy of allowing on site diving supervisors to make complex decisions with

access to 10 therapy tables further distances this handbook from our local occupational diving policy. The handbook appears to fit somewhere between the knowledge required by the Diving Medicine Physician and that required by the Diving Supervisor. It does not quite achieve either objective because it is too basic on the one hand and too complex on the other.

There is some very good information regarding pneumofathometer correction factors, general chamber use and limited emergency procedures, all of which are valuable diving supervisory tools.

The effort to include metric values within the air decompression tables is partially lost with the lack of metric conversion in the therapeutic tables and elsewhere in the text.

Perhaps one day in the future when the Australian diving community finally comes to terms with the implementation of a suitable diving supervisors qualification, which reflects the real responsibilities expected of them, the information contained in this publication will be of more practical value.

When diving supervisors, on site, can conduct a thorough neurological examination, in accordance with the information provided in this handbook, and report accurate findings to qualified medical support the Australian diving community will have made a quantum leap forward.

Larry Digney

Larry Digney has been a Royal Australian Navy Clearance Diver and a trainer of occupational divers.

TACTICAL MANAGEMENT OF DIVING CASUALTIES IN SPECIAL OPERATIONS

The 46th workshop of the Undersea and Hyperbaric Medical Society

Editors. Frank K Butler and David J Smith.

Undersea and Hyperbaric Medical Society, 10531 Metropolitan Avenue, Kensington, Maryland 2089-2627, USA

Price from UHMS \$US 20.00. Postage and packing extra.

Key Words

Diving operations, mixed gas, occupational diving, trauma, treatment.

The proceedings of this conference, held in Anchorage, Alaska, on 30/4/96 was published in 1997. As

a window to a secret world it is well worth reading. Very few doctors who dive face the problems of covert approach to a coast, getting ashore in the face of the enemy, completing an attack mission or removing an agent, returning to the beach and rendezvousing with a vessel, usually a submarine out at sea.

The conference discussed what should be the management of those injured during such proceedings. The Editors' Summary of Key Points and Research Issues is daunting reading. Item 1 is penetrating chest trauma. Item 2 is that damage to the underwater breathing apparatus may not be survivable without a back up breathing source. Item 3 points out that the injured diver's survival depends on his buddy who is unlikely to have specialised knowledge. It is considered that a medic with a "medical bag suitable for both diving accidents and combat trauma" would be an asset in the pick up boat for these operations. Sensible comments take the reader up to item 40 and on to the Introduction.

Here Captain Butler (USN Medical Corps) points out, among other things, that Special Operations will provide the team with medical and tactical problems in the case of injury and that doing the right thing medically can lead to the enemy killing both the injured diver and his tender or in the failure of the operation. Another problem is how to train the battlefield workers. The USN uses the Advanced Trauma Life Support (ATLS) system introduced in 1978, and updated continually ever since as the basis of their care. However ATLS is designed for doctors, not medics, and assumes that hospital diagnostic and therapeutic equipment is available. So the US Armed Forces developed their own generic combat trauma management plan, and then modified it to fit Special Operations combat trauma scenarios. This plan is divided into three periods, Care Under Fire, Tactical Field Care (while in the field but not under fire) and Casualty Evacuation (CASEVAC) which starts when they have been picked up by a "helicopter, naval craft or other evacuation asset". This workshop was held to discuss some scenarios of Special Operations and discover what changes would be needed to the generic management strategy to best deal with these scenarios.

There are 6 Combat Swimmer scenarios, and three each for Dry Deck Shelter, SEAL Delivery Vehicle and Submarine Lockout systems. Each scenario is presented by an medical expert in that field. The format is to present the military plan first. Then the management plan, broken into Care Under Fire, Tactical Field Care, CASEVAC Care, Equipment Considerations, Additional Considerations and References. Most scenarios are followed by a short discussion. Unfortunately a number of the discussions were not printed as gremlins got into the recording system.

Although it is not always mentioned, it is clear that the surface swimmer scenarios are for after dark operations. Any operation launched from a coastal patrol craft 12 miles

out with a one hour transit in two Zodiacs to put 7 swim pairs, using closed circuit rebreathers, in the water is only possible under cover of darkness. Swimming the last mile, half on the surface and half underwater may well not be the surprise it should be as outboard motor noise carries nicely across calm water. With a high oxygen partial pressure in the breathing mix oxygen toxicity becomes a real risk as maintaining depth is more difficult in the dark.

A Dry Deck Shelter (DDS) is a garage for a SEAL Delivery Vehicle (SDV) which can be fitted to modified ballistic missile and fast attack submarines. They have three compartments; an outer floodable hanger, a transfer trunk, which also communicates with the submarine interior, and a treatment chamber. It sounds like a quick method of releasing a SDV but the workshop was told that "with a good crew the launch process takes about 45 minutes". The DDS scenarios cover hypothermia, with or without loss of consciousness, a crushed leg, and a bullet wound to the chest. These are much easier to handle with the availability of a recompression chamber and crew members other than the diver's buddy.

SDV scenarios include a chest wound and pursuit by the enemy, sudden unconsciousness of the SDV navigator, who will be needed to get home, and loss of SDV buoyancy an hour before it is due to rendezvous with the submarine. In this case the two divers escape from the vessel but one has inflated his buoyancy device and is unconscious at the surface.

The Submarine Lockout scenarios are fascinating with unconsciousness from unknown causes to the recovery and treatment of a diver, who has lost consciousness after a rapid ascent, in the escape trunking.

It becomes quite clear as one reads the scenarios that the logical thing to do with many of the bullet injured divers is to abandon them to prevent the others of the team being discovered and attacked. This is, of course, the opposite of the philosophy of the men, which is never abandon a buddy.

Sorting out what should be done is reasonably straightforward in the comfort of the lecture hall but what to do with an unconscious buddy, who has just been shot as he surfaced to check their position, is a different matter. Towing an unconscious buddy underwater, with both divers in bulky closed circuit equipment, is physically demanding and quite possibly impossible to achieve over half a mile or more. Added to this is the almost certainty that depth control will not be possible for the pair so oxygen convulsions are likely and may claim both lives. Some participants suggested that the injured should be put ashore rather than risk the difficulties of finding the transport a mile or more off shore.

John Knight