the medical and instructor organisation arms of the diving community. The power of the legal system to subpoena incident reports and confidential medical records has, naturally, played an important part in perpetuating the habit of avoiding a written record of misadventures. We hope that some day the Law will recognise the value of research to identify and reduce dangers and seek to reward safety efforts rather than hamper them.

What is the answer to this potential problem? The same one that was required when the hyperbaric world was put in turmoil by the paper which questioned the claims that hyperbaric oxygen therapy was useful, or even an effective, modality. Only then was it realised for the first time that clinical impressions might be a good guide but lacked conviction without a sufficiency of hard facts to back them up. Indeed the situation can best be managed by the diving community taking seriously, and actively supporting, the creation of a diving data bank with input from all the various groups involved in recreational and commercial diving. It would be nice if this proposal could be implemented before someone or some organisation is called upon to appear in a Court to face a well prepared legal cross examination concerning the factual basis for some long held and cherished beliefs, and on the documentation and data justifying past actions and opinions.

References

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3 Low back X-rays and diving fitness. *SPUMS J 1980*; 10 (4): 4-8
4 BS-AC on trial. SPUMS J 1981; 11 (4): 10-11
5 BS-AC medical standards. BS-AC, 1990

Dr Douglas Walker is the founder of Project Stickybeak, from which the Provisional reports on Australian diving-related deaths, which appear regularly in the Journal, are compiled. His address is PO Box 120 Narrabeen, New South Wales 2101, Australia.

DIVING DOCTOR'S DIARY

DIAGNOSIS OF A DIZZY DIVER

Carl Edmonds

Case report

A 30-year old male, of artistic nature, but also a gentleman adventurer, took up diving in 1994. He completed 16 non-decompression dives in 5 months. He was also an aviator, sky diver, hang glider, snorkeller, swimmer and sailor.

One month previously, in calm seas, he performed two beach dives on the one day, both to a maximum of 10-15 m and with a surface interval of 90 minutes. He was nowhere near decompression requirements. The total time of each dive was about 35 minutes, of which the last third would have been spent at depths of less than 5 m.

He felt a slight tendency to unsteadiness after the first dive, but only in retrospect. On the second he felt nauseated and vomited after he ascended, whilst swimming back to shore. He made the interesting observation that, if his eyes were closed and he tilted his head, he would notice a spinning sensation. The dizziness only lasted for an hour or more, but he then felt tired and exhausted.[1]

He was seen by a general practitioner who observed haemorrhage on the tympanic membrane, and noted the presence of nystagmus. Despite the relatively minor dive exposure, it was felt prudent to dispatch the diver to a recompression chamber, and a full course of treatment was given, presumably because of the possibility of decompression sickness (DCS) causing generalised and cerebral symptoms.[2]

A month later he returned to his diving and descended to 12 m for 35 minutes. Again, about a third of this would have been spent doing a very slow ascent. On the surface swim, when returning to shore, he noted that if he looked to his left he would become dizzy. He then observed that he was unsteady while walking. The dizziness increased if he closed his eyes. “This was not my normal balance, and it stayed like that for an hour or so”. His hearing felt “not clear”, and muffled.[3] He was also aware of a high-pitched continuous sound on the left side. He then slept for hours, being tired and exhausted. By the next morning the tinnitus had gone.

He took aspirin,[4] on medical advice, and stayed in bed.

When he was seen two days later, he had decided not to undergo another proposed recompression treatment, as the previous one didn’t seem to do much good. He then

visited the Diving Medical Centre.

On examination, apart from the Grade I - II middle ear barotrauma effects, there was no abnormality to be detected at the time I examined the diver, and he was quite capable of performing the Sharpened Romberg test.[5] One would have been forgiven for assuming that this was a fairly simple case of middle ear barotrauma, as there was only objective evidence of Grade II barotrauma of the left ear, Grade I on the right.

Unfortunately the pure tone audiogram revealed the following.

Hz	500	1000	2000	4000	6000	8000
Right	15	10	10	15	10	10
Left	10	10	5	10	25	30

Why did we not compare the pre-incident (pre-diving) audiogram, which should have been performed during his recreational diving medical, that same year ?

Unfortunately the original audiogram, as recommended (**should** was used rather than **shall**, which in Australian Standards implies **must be done**) in the Australian Standard 4005.1, was not performed. Another one of the Mickey Mouse Diving Doctor examinations characteristic of North Queensland!

The treatment, seeing him two days after his second diving accident, was to

1 avoid all medications including aspirin, and middle ear equalisation manoeuvres,
2 avoid any exercise or activity, straining (defecating, coughing, sneezing, sexual activity etc.)
3 spend most of the next week in a sitting up position, optimal for the repair of a possible round window fistula,
4 repeat pure tone audiograms to ensue that the hearing loss did not progress.

The pure tone audiogram performed a week later appeared to have improved considerably, so that even the presumed high frequency hearing loss had disappeared, suggesting that it was a temporary threshold shift, and thus indicative of inner ear damage.

The diver was sent to one of the top vestibular function laboratories in Sydney and the results showed no evidence of spontaneous nystagmus (verifying the observation that he had compensated for the damage, or inhibited it). Caloric stimulation showed no response to hot or cold water on the left side, and a slightly impaired response on the right. Iced water calorics produced exactly the same negative result.

Diagnosis: Vestibular damage especially affecting (L) side.

Prognosis and advice

WHAT TO DO WITH HIM AS A SCUBA DIVER?

Well he is obviously one of those people who are not particularly sensitive to the effects of middle ear barotrauma. On closer questioning it did appear as if there had been evidence of muffled hearing after diving, and occasionally he would notice pressure on his ears during descent. He certainly descended slower than most of his companions.[7]

The diagnosis was inner ear barotrauma. He has now had two episodes, and he is likely to have many more with diving, with the main initial threat being vertigo and vomiting and the delayed effects the recurrence and persistence of tinnitus and possible high frequency hearing loss. As he is a musician, this can be catastrophic to his occupational future. Cease scuba diving.

FREE DIVING?

This is likely to cause more problems than scuba diving. Unfortunately with snorkel or free diving it is easy to not notice lesser priorities, such as middle ear pressures and the need for auto-inflation, when larger priorities such as the need to descend, dominate the diver's attention. Many free divers do not even attempt middle ear auto-inflation whilst diving, and most of them are not aware of the importance and value of a positive pressure middle ear auto-inflation technique such as the Valsalva, employed before the descent. There is no problem with surface swimming or snorkelling.

HIS ACTIVITY AS A PILOT?

This is somewhat hairy. If you have one vestibular system inactive, then expansion of the middle ear space during ascent is likely to produce a "alternobaric vertigo", which could be catastrophic. I would certainly advise these people not to pilot a plane, even though there is no clinical evidence of vestibular dysfunction (without provocation tests). Even though he has no vertigo or nystagmus normally, the inequality is seen with the ENG during the caloric tests. It can also become evident during ascent in recompression chambers and aeroplanes. I do not want to be a passenger in the plane if he is a pilot.

SKY DIVING?

This could be a problem. As he so much loves this sport, I have assured him that he could use a nasal decongestant before he enters the plane. He should also forcefully equalise his middle ear spaces, using a Valsalva technique, before the jump. This will ensure that he starts off his jump with the middle ear fully inflated and the tympanic membrane protruding. He was also advised to attempt middle ear auto-inflation during descent, and probably as soon as he lands. Considering most of the jumps

are from a height of 10,000 feet, this should probably he adequate to prevent further middle and inner ear damage.

PARACHUTING?

No problem, if similar restrictions and advice are applied as with sky diving.

LEGAL IMPLICATIONS?

One would hope that the diver would not take action against the physician who did the diving medical examination. Certainly, if he were to do so, the patient would probably win. Not only did the examining doctor not perform the pure tone audiogram, as required, but also he did not ensure that the diving candidate could equalise his middle ear spaces. A very good case could be made for the incompetence of this doctor. Certainly, if the diver had been advised of his physiological inadequacies, then he would have been much more reluctant to expose himself to the hazards of inner ear barotrauma, with its complications regarding his occupational and recreational activities, which are extremely important to him.

Footnotes

1 Vertigo induced by eye closure and head tilting strongly implies a peripheral (vestibular) more than a central (brain) lesion.

All diving physicians are aware that tiredness and exhaustion are manifestations of DCS. They are also very, very common manifestations of a vestibular disorder. It takes a lot of effort to maintain one's balance in the presence of a vestibular abnormality.

Also associated with vestibular disease is a feeling of disorientation and other psychological reactions such as irritability and depression. People with vestibular disease also find it hard to concentrate. They do not have to have DCS for this to be so.

2 I would have thought the signs and symptoms were much more consistent with ear disease due to barotrauma, than DCS. But often it is very difficult to send a diver away from the chamber, while he still has symptoms.

If middle ear barotrauma is observed, the possibility of inner ear barotrauma (with damage to the cochlea in 40% of the cases, vestibule in 10% and both in 50%) is to be considered. Tinnitus is, however, often the major symptomatology.

3 The history of muffled sound, followed by cracklings as the gas bubbles mixed with the middle ear effusion and are affected by jaw movements, is also fairly common in middle ear barotrauma. Tinnitus, high frequency hearing loss (a temporary or permanent threshold shift) and/or unilateral ENG verified vestibular dysfunction all point to a peripheral lesion of the 8th nerve, not usually a brain lesion

4 The pathology of inner ear barotrauma can be either a round window fistula (not rare, but certainly not the commonest), inner ear haemorrhage, air bubbles traversing the stretched round window and entering the perilymph, or possibly some internal membrane rupture within the inner ear. One thing for certain, aspirin with its haemorrhagic complications is not a recommended form of treatment. Nor are vasodilators, but thank heavens people have stopped using them.

5 I am worried that the Sharpened Romberg is too often used as an investigation of exclusion. This is not valid. It is quite possible for the diver to have received damage, which was more or less being compensated by him allowing a normal Sharpened Romberg assessment. This test does not exclude vestibular damage.

6 This is the most dubious of all results. By any normal standards, the pure tone audiogram was acceptable, but if the left side had originally been the same as the right, as it usually is, then he may have lost 15 to 20 decibels in the high frequencies (6000 - 8000 Hz), consistent with inner ear barotrauma.

7 This is a very common feature with people who have Eustachian tube insufficiency. They descend slowly so that their middle ear effusion can replace the gas space contraction due to Boyle's law. The muffled hearing, and occasional crackling sounds in the middle ear, following the dive is evidence of this middle ear effusion.

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Continued from page 58

problems in diving. An up to date list of the names, addresses and telephone numbers of these doctors can be found on the back of the Medical Form.

Dr Sandra Domizio is the Secretary of the UK Diving Medicine Committee.

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SPUMS NOTICES

S0UTH 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.

ACKNOWLEDGMENT OF DONATION TO SPUMS

13/12/94

Ms Christeen Buban, Vice-President of Marketing
Submersible Systems Inc.
18072 Gothard Street, Huntington Beach
Californina 92648, USA.

Dear Ms Buban

Thank you for your generous contribution to the costs of the 1993 SPUMS Workshop on emergency ascent training and practice. Your support is greatly appreciated by the Society's Committee and members.

Des Gorman
President

MINUTES OF THE EXECUTIVE COMMITTEE MEETING OF SPUMS

held in Cairns on 21-23 October 1994

Present

Drs D Gorman (President), Tony Slark (Past President), C Meehan (Secretary), J Knight (Editor), D Davies (Education Officer), C Acott, G Williams, and J Williamson.

Apologies

Dr S. Paton (Treasurer), connected by speaker telephone for specific parts of the meeting.

1 Minutes of the previous meetings

Read and accepted as a true record with minor corrections.

2 Business arising from the minutes:

2.1 Job description of the SPUMS journal editor was reviewed and discussed. An Honorarium for Dr John Knight of $12,000 per annum for producing the quarterly journal was agreed on. This is to be reviewed annually. Proposed by Dr Slark, seconded Dr Davies.

2.2 The use of a secretariat was discussed at length, and it was decided to not follow this avenue with the ANZ College of Anaesthetists at present because of the possible high costs. The pro-

posed service was also not yet available. To ease the burden on the Treasurer it was decided that the Diving Doctors List be produced bi-annually, in December and June. The compiling and updating of this list is to be taken over by Dr John Williamson at the Diving Emergency Service. Further more the Treasurer and Secretary were encouraged to make more use of a wage-slave to help with the routine work involved in their jobs. This they were to organise themselves as the need arose. In addition the Treasurer was asked to consider the need to upgrade or replace her computer system with the view of increasing the efficiency and ease of the management of her job.

2.3 It has been decided that two face to face committee meetings should be held during each year. The first would be held at the annual ASM. This meeting would be attended by all the committee members who were in attendance at the ASM. The second would preferably be in Adelaide when Dr Gorman is there. This committee meeting would be attended by all the committee members. The aim of this meeting would be to look at the tenders for the travel arrangements of the ASM in one and a half years time. A protocol has been formulated and submitted by the Treasurer to cover the travel expenses that are likely to be incurred at this meeting. This protocol was accepted, contingent upon review being a courtesy. Proposed by Dr Slark and seconded Dr Meehan

3 Treasurers report

Received.

4 Fiji ASM 1995

Dr Davies gave a brief report on arrangements for this.

5 Venues for future ASMs

It was decided that the venue for the 1996 ASM be the Maldives. This was because of the ease of assess for the Europeans. It was hoped that a combined workshop with the European Undersea Biomedical Society would be possible. Dr Acott was to co-ordinate this. Dr Williams is to be the convener. The proposed theme is technical diving. The bulk of the meeting may take place as a workshop. A proposed speaker for this was David Elliott. Bill Hamilton from the USA was also suggested. The meeting should take place in early may when the weather is more favourable, and the venue should be as far away from Mali as possible.

Tenders are to be put out immediately. The tender documents are to delivered to the ANZ College of Anaesthetists by the 31 January 1995. The successful tenderer will be announced on the 1 March 1995.

Dr Williamson is to research further into the suitability of Kota Kinabulu as a future venue.

6 Correspondence

6.1 Project Proteus, from Dr D G Walker for our comments. The Committee supports the project. Dr Gorman is to sign the attached statement, which can then be returned to Dr Walker.

7 Other Business

7.1 ANZHMG
Dr Williamson gave an update.

7.2 SPUMS Policy on Diving Medical Officer Courses, pending production of a template for the Diving Officer Courses. It was decided that the 3 day courses were acceptable for inclusion on the Diving Doctors List for carrying out recreational dive medicals, but that completion of a full five day course which was internationally recognised was required for doing occupational diving medicals. AODC approval is required for recognition of DMT courses. Proposed by Dr Gorman, seconded Dr Knight.

7.3 Upgrade of the facsimile for the Secretary was approved. Proposed by Dr Davies, seconded Dr Slark

7.4 New recording device for the ASM to be looked into by Dr Williams.

7.5 The pulse-oximeter for PNG has been purchased. Dr Acott to establish contact with Vonapope Hospital and organise transportation of this to them

7.6 It was decided that Dr Mike Davies, as chairman of the New Zealand chapter of SPUMS, should be included in all the committee meetings.

NEW ZEALAND CHAPTER OF SPUMS

ANNUAL GENERAL MEETING 1995

The NZ Chapter meeting will be held on 7, 8, 9 April 1995 at The Pacific Harbour Motel, Tairua. As usual this will combine a scientific meeting, annual business meeting, and practical diving activities, principally at the Alderman Islands.

Part of the meeting will be devoted to a workshop on fitness for diving so that a New Zealand consensus may then be taken to the SPUMS ASM workshop later in the year. Original papers for a free papers session are now invited from members. We would also be very pleased to hear from New Zealand members of topics they would like discussed.

Enquiries should be addressed initially to
Dr Chris Morgan, 9 Amohia Street, Rotorua, New Zealand (phone (07) 347 8350);
the Secretary, Dr Rees Jones, Northland Pathology Laboratory, P.O.Box 349, Whangarei, New Zealand (phone (09) 438 4243; fax (09) 438 4737),
or the Chairman, Dr Mike Davis, P.O.Box 35 Tai Tapu, New Zealand (phone (025) 332218 or (03) 329 6857, fax (03) 332 8562).

SPUMS ANNUAL GENERAL MEETING 1995
will be held at
Castaway Island Resort, Fiji,
on Saturday June 27th at 1800.

Motions, in writing, for discussion at this meeting must be in the Secretary's hands by April 14th 1995. Allow at least a week, and preferably longer as letters have to be forwarded to Dr Meehan from the Australian and New Zealand College of Anaesthetists in Melbourne.

ANNUAL SCIENTIFIC MEETING 1995

Castaway Island, Fiji.

Sunday 21/5/95 to Sunday 28/5/95

The Guest Speaker is to be Dr A A (Fred) Bove, Chief of Cardiology at Temple University in Philadelphia. He was the Guest Speaker at Madang in 1982. The Convener of the ASM is Dr David Davies, Education Officer of SPUMS. The theme of the meeting is Fitness to Dive. The Workshop theme is Asthma.

Those wishing to present papers are asked to contact Dr Davies at Suite 6, Killowen House, St Anne's Hospital, Ellesmere Road, Mt Lawley, Western Australia 6050 (Fax 09-370-4541) as soon as possible. The same applies to those wishing to contribute to the Workshop on Asthma, especially if unable to attend the meeting. Dr Davies intends to prepare their written submissions to distribute to those attending the meeting. This means that such contributions will need to be in his hands by the middle of April 1995. Intending speakers are reminded that it is SPUMS policy that speakers at the ASM must provide the Convener with the text of their paper, ready for publication, before they speak.

The Offical Travel Agent for the meeting is Allways Dive Expeditons, 168 High Street, Ashburton, Victoria 3147, Australia. Telephone (03) 885 8863, Toll Free 1-800-338-239, Fax (03) 885 1164. From overseas dial 61-3-before the last 7 digits of the telephone and fax numbers.

LETTERS TO THE EDITOR

ROUND WINDOW RUPTURE

118 Remuera Road
Auckland 5
New Zealand
2/12/94

Dear Editor

There seems to be some confusion over this topic and I would like to correct some of the suppositions which occurred in the SPUMS Journal.[1,2] The first letter should have the short answer "that the diver can go back diving." The only provisos are that he should observe are those which should be taught to all divers. Such items as clearing the ears, slow feet first descent, slow ascent, no diving with a cold etc. This is all standard diving technique. The PADI Safe Diving Practices should always be observed.

Two items should be appreciated by those approving or disapproving a return to diving. The risk of a re-rupture of a round window membrane is low if the repair operation has been radically carried out. It is usual to use a relatively large plug of fibrous tissue usually temporalis fascia, to repair the membrane after removal of the epithelium of the round fossa and membrane. From experience with having a second look at the stapes after operations for otosclerosis, where temporalis fascia was used, quite a thick membrane occurs as the end result. However recurrences of round window ruptures after repair are reported in the non-diving population so there maybe some factor predisposing to re-rupture not related specifically to diving.

The second item is that the round window rupture is not randomly occurring in laterality. It occurs twice as often on the right side than on the left. Because of this laterality, there is in any person some reason that causes