

MEDICAL SUPPORT FOR DIVERS IN AUSTRALIA

John Knight

Medical support for diving in Australia can be considered under the following headings: material, ie. chambers; personnel, the people responsible for treating in chambers; teaching; research; SPUMS as a whole, and individual efforts that people put in. All of these are part of the medical support for diving in Australia.

CHAMBERSTownsville

We start in the North with a chamber in Townsville, owned by the Australian Institute of Marine Science, which is a multi-place chamber with two compartments and a depth capability of 50 metres. They have treated a number of people since it was installed last year and as far as I know, with complete success. Then we go a long way south, to Sydney. That is a coastline of over 1,800 kilometres without a chamber, with a population of over one million, and many more who live in the cities and towns inland.

Sydney

In Sydney there is the Royal Australian Navy School of Underwater Medicine which has a multi-place chamber. It was brand new in 1942 or 1943 and has been updated regularly since. It has a working depth of 50 metres. It has two compartments. It is used every day for giving divers pot dips, for demonstrations and occasionally at weekends for treatment. Sports divers usually get bent at weekends.

Also in Sydney is the chamber of the Hyperbaric Unit at Prince Henry Hospital. It is a multi-place, three compartment chamber, with a working depth of 18 metres. It was bought by the Lions' Club for a keen surgeon who wanted to do heart surgery under hyperbaric oxygen. But he had got fed up with waiting for the chamber to appear and had moved to another part of the world when the money came through. Nevertheless, they put the chamber in. It is a big chamber suitable for heart surgery and Ian Unsworth was recruited to run it. He knew that the way to get things that you have not got, is to read the regulations. In the mines regulations for New South Wales, it states that if people work under pressure of more than 14.5 PSIG there has to be a chamber capable of at least 165 feet on the site. So he now has a small chamber that goes to 350 feet, attached to the larger complex. It is reputedly six-man, but there is now way you could get six ordinary sized adults in there in comfort. It has a fire fighting system installed, where the water pressure is higher than the pressure in the chamber. That unfortunately means that when they reduce the pressure in the chamber, all four outlets drip on the occupants. However, it is the deepest non-commercial chamber in Australia. It is used a lot for research and has all facilities for anaesthesia in the large, shallow, portion of the complex.

Mallacoota

Then you go another 450 kilometres along the coast to Mallacoota, where they have a number of abalone divers. These men used to get bent very regularly. They used to be flown out along the beach, going around each headland, to stay as close to ground level as possible. The road trip was 150 miles, climbing to over 2,000 feet on the way on a poor road. So they bought a two compartment chamber. They now have a better compressor than they originally had. Ten years ago two men died in that chamber following suicidal dives while poaching abalone. It is only available to those who are members of the Fishermen's Co-op. The doctor who supervises this chamber lives at Bairnsdale, which is 150 miles away.

Melbourne

Then on to Melbourne, where the Metropolitan Board of Works has a chamber for its employees, because they dig in compressed air. The compressed air is necessary, not to keep the water out, but to keep the sand from collapsing in to the tunnel. They have a multi-place chamber which looks rather like retired railway carriage it is so large. It only goes to 40 metres, which is more than the depth the men work at. However it is only immediately available when the MMBW has men working in compressed air. Non-employees have to get permission to be treated in it and provide their own doctor. Furthermore, it is a good way from the nearest large public hospital. It may well have a tunnel worker being treated when a diver would like to be recompressed.

Then there is at Prince Henry's Hospital a standard Vickers mono-place hyperbaric oxygen chamber. It is a bit claustrophobic but it does have great simplicity in operation; one knob and three dials. A number of people have been cured in that chamber. In spite of being a mono-place chamber it does have some advantages. You do get a supremely useful gas gradient as the patient is compressed in oxygen, not bathed in air, so there is no way he can take up extra nitrogen. It is in a hospital, so chest X-rays and investigations can be done before you put him in and afterwards. It only needs one person to run it instead of a team. You can clearly see the patient even if you can not touch him.

Because of the small diameter of the chamber you can not use intravenous therapy in the normal bottle-above-the-customer way. You can always put the bottle under his backside if it is a collapsible bottle and use that sort of pressure. Of course with an unconscious patient, you have got problems.

There is also a multi-place chamber owned by United Divers in Melbourne. It was surplus for a while so they put it on the wharf in Melbourne and offered it to Prince Henry's as another treatment chamber. I do not think anyone has been treated in it. However, people are taken for joy rides in it. They will take them down to 200 feet. I will just tell you a cautionary tale. One doctor who was

in the Navy doing his underwater medicine course, was given a ride to 100 feet in that little chamber at Prince Henry Hospital, well inside the no-decompression limits, with stops on the way back. He is a good 15 years younger than I am and has not got so much adipose tissue. But he got an elbow bend. I think that United Divers are sticking their necks out giving all and sundry joy rides, for which they pay, to 200 feet.

Hobart

At Hobart they have got a multi-place, 50 metre, chamber and they treat people.

Adelaide

In Adelaide there is another mono-place chamber at the Royal Adelaide Hospital.

Fremantle

HMAS LEEUWIN has a multi-place chamber, which is limited to less than 100 feet, being a rather tired 1940's chamber. It is due to be overhauled and upgraded.

Commercial Diving Chambers

Each oil rig or diving boat, that is doing diving over 100 feet according to Victorian regulations, must have a two-compartment chamber available on the site of the dive and they have to have a depth capacity greater than the depth of the diving. It is rare for a sports diver to be accepted for treatment as this puts a stop to commercial diving at great expense to the employing company.

PERSONNEL

Doctors who treat diving accidents can be divided into groups. One are those trained in underwater medicine who have a chamber and regularly treat diving accidents. In effect that is the School of Underwater Medicine and Prince Henry Hospital. A city of two and three quarter million has lots of divers who go and do stupid things. If you dive south of the harbour it is much more sensible to go to Prince Henry Hospital. Then there a number of places where the doctors have been through the School of Underwater Medicine courses, have a chamber and occasionally have to treat people. These are Mallecoota and Bass Strait, Prince Henry's Hospital and the MMBW in Melbourne and the Royal Adelaide Hospital. We presume that the North-west Shelf will be staffed by doctors who know something about what they are doing. Then there are other places where there are interested but untrained doctors with chambers. These are the Australian Institute of Marine Sciences, Royal Hobart Hospital and HMAS LEEUWIN (in early 1981). Many other doctors treat minor diving illnesses that do not need recompression

chambers. Some know what they are doing and some do not.

TEACHING

Knowledge is available in Australia from the Royal Australian Navy courses at the School of Underwater Medicine, the hyperbaric medicine course at Prince Henry Hospital, the diving centre courses run by Carl Edmonds, and from SPUMS, which does not run courses.

The School of Underwater Medicine runs introductory courses of two weeks, and advanced courses of two weeks and a foreign medical officers course of three months.

The hyperbaric medicine course at Prince Henry Hospital lasts one week. It is run as required, not on a regular basis.

The Diving Medical Centre courses are one week, with lots of diving and a bit of education.

The South Pacific Underwater Medicine Society publishes a Journal, holds meetings and issues a Diploma of Diving and Hyperbaric Medicine. The most important requisite is six months full-time, or equivalent part-time, diving or hyperbaric medicine after having done the two RAN courses and the Prince Henry Hospital course. There are hopes of upgrading it by having it adopted by an academic institution, and including Occupational Medicine.

RESEARCH

There is not all that much research in diving medicine and physiology, but there is some. The School of Underwater Medicine has done quite a lot that has filtered gently around the world. There was work on diver selection and training. The results were largely ignored by the Navy for about seven or eight years and some results were firmly suppressed as being quite unacceptably true. The salt water aspiration syndrome appears to occur in Warrnambool as well as in the swimming pool at HMAS PENGUIN. The high oxygen treatment tables that Carl worked out. He gives the patients the risk of pulmonary oxygen toxicity in order to have the biggest gradient to get a nitrogen out of them. Investigations of inner ear barotrauma and vestibular disturbances, improved closed circuit absorber design, and surveys on the incidence of dysbaric osteonecrosis in divers have all been carried out at the School.

Prince Henry Hospital in Sydney also has done a survey on dysbaric osteonecrosis, which was discontinued when the radiologist left the hospital and went into private practice. They are doing research on hyperbaric physiology and anaesthesia. Those are the only two places where hyperbaric research is going on in Australia on humans or large mammals.

There is some hyperbaric research being done in Melbourne on small animals at the Royal Melbourne Institute of Technology, but I know nothing about it. I think that what

John Miller told us last year about a successful dive to 2,000 feet at Duke University really means that little animals are only a good way of spending your research grant. They do not teach us all that much about what we want to know now that commercial divers are beginning to limit themselves in depth and use machinery instead.

SUMMARY

Medical support in Australia is a few chambers with a few well trained doctors, who work regularly in hyperbaric and diving medicine, and a large number of doctors who see and treat divers for common diving problems, who have no access to chambers, but have lots of contact with divers. Many have gone to one or other of these courses to improve their knowledge.

MEDICAL SUPPORT FOR COMMERCIAL DIVING OPERATIONS

David Elliott

The sort of diving vessel that I am associated with is the new MSV (multi-service vessel), a fire fighting, diving support and repair ship, being built in Finland for Shell in the North Sea. It will work only at our Brent oilfield. It is very large and supported on pontoons the size of a submarine. It has a large diving system with two bells. Divers can go down the supporting columns into the pontoons in the dry, lock into a chamber and then go straight out into the water on an air dive. It is a diving boat and is very expensive. We have to supply medical cover for people on board and for the medical crews. The principles are just the same for that as they are for any other diving operation.

To give you some idea of the Brent field platforms, there will be about 400 to 500 people on board, sleeping, working 12 hour days. The weather is not always very nice. Even with 50 foot waves the platform is 100 feet clear of the sea. That sort of weather means that the platforms have got to be totally self-contained for five days or more, as it may not be flying weather.

The divers in fact dive almost entirely from diving support ships. Rigs are liable to blow out and other accidents, such as fire, may occur. There are life boats which are roofed in and totally fireproof that can be dropped, so enabling the ship's company to get away. But divers under pressure are stuck in the chamber. So diving is done from support vessels which are quite independent of the rig.

PRIORITIES IN MEDICAL SUPPORT

First Aid, communications, trained medical practitioners, medical centres, intensive care under pressure and hyperbaric ambulance are the priorities which I wrote up

at a time when Andre Galerne and IUC (International Underwater Contractors) were trying to sell the British Government a white elephant called the hyperbaric ambulance. He was doing a rather good sales job, saying that there were all these divers in the North Sea, and no one really cared about them. He had a portable pressure chamber made of titanium, rated to 600 feet which can be flown around in a helicopter. He suggested that it would be a good idea if we bought it. This list resulted from one of the few disagreements that I have ever had with Jacky Warner, who is the Senior Inspector of Diving with the Department of Energy. He actually fell for the hyperbaric ambulance, so we produced this list of priorities for medical support in diving.

First Aid

The most important medical support is teaching the diver resuscitation and first aid. Diving first aid training goes as far as teaching the diver how to put up drips, put in catheters and if necessary put a needle in the chest. The divers will actually be trained on cadavers in hospitals to do this. The reason is that the diver under pressure can be five or six hours away from anybody else at the surface, if there was anybody else at the surface to get into the chamber. Because of the depth of some of these dives, if you take a person down too fast they are not in good shape when they get to the bottom. So first the divers have to be very well trained. We then say, that in terms of 12 or so divers, there must be one diver who is trained to the standard of the American EMTD, which stands for Emergency Medical Technician (Diver). This requires quite an extensive period of training, which is done to the American syllabus. That ideal has not yet been attained, but we do require that at least one diver in every team has been on a special course of resuscitation and diving first aid training. That is in addition to the statutory training which is laid down in the training manual for divers by the Department of Employment. That has been fairly well taken care of and the only point which is a bit tricky, is the refresher training. First aid is the most important course, because if the guy survives the first ten minutes, or hour, he may survive a bit longer. But if nobody is there to do anything during the first five minutes or so, then the next four of the priorities cease to matter.

Communications

The second priority is communications. By that I mean both what you say and how you say it. If you get a message at 2 o'clock in the morning, you can be confident only that it is incorrect or incomplete. We therefore have a check-list which is about six pages of things which the diving supervisor should check off before he picks up the telephone. The diving system is usually at the bottom of the rig, or the furthest part of the vessel, so if you ask about the blood pressure, he will go sprinting 100 yards to find out, which takes rather a long time, particularly if you are paying for the telephone call. So we like them to get all the relevant information on the check-list and then have clear