ing gas from HeO2 to air at depth. Severe clinical deterioration of a diver recompressed on air to treat DCS after a 600 fsw (183 msw)/30 minute dive has also been reported. This type of adverse effect of air is believed to be most likely after deep bounce dives or saturation dives in which HeO2 is breathed throughout the entire decompression.

No global recommendations are made on the use of HeO2 versus air for treating HeO2 diving operations in which decompression time is not excessive, air/O2 recompression appears adequate. For DCS associated with HeO2 saturation dives or extremely deep bounce dives, some participants believe that HeO2/O2 recompression may be most prudent, particularly in the event of DCS occurring before surfacing, or if significant amounts of decompression time have been missed or serious symptoms occur. In addition to considerations of gas diffusion, the use of HeO2 will allow return to a greater ambient pressure than air or nitrox. In the experience of the U.S. Navy, cases of Type I DCS arising after surfacing from saturation dives in which no decompression time has been missed, have not shown any signs of clinical deterioration when recompressed in air, and the U.S. Navy continues to use that option.

Inert gas considerations are most relevant when the depth of recompression is greater than 60 fsw (18 msw, 2.82 ATA) or saturation treatment is used. Otherwise, the mainstays of treatment are pressure and oxygen. The inert gas, breathed for only brief intervals during standard oxygen therapeutic tables (e.g., U.S. Navy Table 6), is a secondary consideration.

ANTICOAGULANTS

There is no scientific evidence at the present to support the use of any anticoagulants, including aspirin, in the treatment of diving injuries. Some forms of decompression sickness, for example, inner ear DCS and spinal cord DCS, may have associated hemorrhage, which could be worsened by the administration of anticoagulants.

FOLLOW-UP HYPERBARIC TREATMENT

It is recommended that after the initial hyperbaric treatment, follow-up treatments be administered on a daily or twice daily basis until there is no further stepwise improvement in the patient’s clinical condition.

4 It is recommended that a consensus on terminology and disease classification be developed in order to remove one possible impediment to multi-centre trials.

References

the Diving Emergency Service expressed difficulty in obtaining the statistics as many did not have the luxury of computerized data normally accessible at the touch of a key stroke. Also, time was a critical factor, many reports were not completed and forwarded until September and October, 1990. For future access, it is hoped that the central coordinating point of the Diving Emergency Service (Royal Adelaide Hospital) could provide a full data base service and produce accurate statistics for the 1990’s and future years. This will obviously require extensive cooperation between all DES operations.

At first glance, there appears to be a disturbing trend towards an ever increasing number of DCS. cases being treated with each progressing year. Most cases reported, involve certified recreational scuba divers (average approx. 90%). It is true that the recreational scuba diver certification numbers have boomed, particularly in the 1980’s, resulting in more scuba divers frequenting the waters. It is also true that the scuba diving training associations have implemented a number of changes to their respective training standards in the 1980’s to make the sport safer (e.g. changes to dive tables, safety stops and general procedures). It seems that students involved in scuba training are rarely involved in DCS. accidents, as they are largely controlled by their instructors who monitor depth/time limitations closely. Once certified, the “student” divers then build up their experience by planning and making regular dives in accordance with their training. If involved in charter boat diving or club diving, these dive activities are largely co-ordinated and controlled by qualified divemasters.

Then, if diving is safe, why do these accidents occur?

The U.S. Navy tables (or their derivatives) were commonly used by recreational sport divers in the 1980’s being taught by the major training agencies. These tables were “modified” to include “safety factors” or “fudge factors” in order to maximize the safety of the diver using them. Much attention was also paid to “predisposing factors” to DCS., but probably the greatest cause of DCS. is due to repeated exposure, i.e. repetitive diving. Many divers may not be aware that repetitive diving is tiring and sometimes leads to chilling. It certainly drains the energy resources (everybody has felt hungry and tired after a dive). Combine this with the dehydration effects of continually breathing dry compressed air, the effects of spending time out on a boat (seasickness, heat exposure etc), and the diver would certainly be increasingly predisposed to DCS. - more than what the individual may think.

Dive tables in the late 1980’s and 1990’s have evolved somewhat to reduce “bubble-forming” dives, however it is vitally important, that whatever dive table is used, it has to be used conservatively - and particularly so for repetitive diving! Those adjusted dive time limits calculated for repetitive dives must be planned for very carefully - you may have been fit and ready, physically and mentally on your first dive - but do you feel the same way for your first repetitive dives? Remember - there can never be a ‘perfect’ dive table that gets you out of trouble every time. The latest tables take into account many factors - however they do not take into account the many physiological changes that our bodies go through day after day.

It appears that most diving accidents are attributed to human error - that element that seems to affect everything we do. Some people call it “Murphy’s Law”. We take ‘calculated risks’ in just about everything we involve ourselves with; however the ‘calculated risk’ is usually a rational decision based on our own experiences and knowledge of the potential dangers. But, as the old saying goes, “accidents can happen” - all it takes is a split-second of wrong timing in some cases - doing the wrong thing at the wrong time- and we certainly hear of the resulting accidents via media sensationalism. Some of the decisions we make may not have been rational in hindsight, nor were they really based on knowledge or technique, (or lack thereof) - many of us have been there - yet some of us have ‘escaped’ the consequences. Some suffer the consequences and worst of all - don’t admit it ( isn’t denial the real number one symptom of DCS.?)

The signs and symptoms of DCS. are taught at the basic level to all divers. In spite of this, most divers would only admit to the possibility of having CD.C.S. if the pain was profound or disabling, and, even then, only if the dive profile was severe. Modern research has shown that the risk of DCS. exists on almost all dives. The belief that “I cannot be bent at the dive was safe and according to the tables” seems to be widespread in the diving community, but held to be misguided by the hyperbaric medical profession. The truth is that even severe DCS. can be pain free. The symptoms could be loss of feeling or an abnormal sensation.

How do you avoid getting Decompression Sickness?

Well the honest answer may be - don’t dive! However, as we have a sizeable recreational diving industry (it is conservatively estimated that 500,000 dives take place in the Cairns area alone each year), it may not be practical. The following recommendations are provided:

* Understand first of all what Decompression Sickness really is. How and why it is caused. If you have forgotten or you have not kept up to date with the latest research - do so.

* Be ready and prepared (physically and mentally) for the dive - how you feel for the dive is vitally important for your safety in the water. Avoid being over weight, and drinking alcohol prior, between and after dives. It is always a good idea to drink non-alcoholic fluids (water, juice etc) after a dive to replenish lost fluids.

* Use dive tables and/or dive computers conservatively. Don’t put absolute trust in them. Never dive them to the limit and avoid dives that require staged
Safer diver tables here
Safer diver tables here
decompression stops.

* Commence your dive to the deepest point first and work your way gradually towards the surface in a step-ladder fashion, always ascend slowly no faster than 18 metres per minute (ideally 9 to 10 metres per minute) - you really should avoid bounce diving or making “yo-yo” dive profiles.

* Perform a safety stop prior to surfacing at a depth range of 3 to 6 metres (5 metres is usually best) for a period of 3 to 5 minutes. This is not an actual decompression stop, but a precautionary one.

* Limit the number of your repetitive dives. Always make your repetitive dives shallower than the last. Avoid repetitive dives in excess of 30 metres (100 feet). NAUI defines a repetitive dive as any dive made within between 10 minutes and 24 hours of a previous dive. NAUI also recommends a minimum of 1 hour for your surface interval time between dives and only dive when you feel well enough to do it safely. If involved in extended charters, it is always best to give yourself a “day off” diving and do some sight-seeing on land if possible. Consider all dives shallower than 12 metres (40 feet) as 12 metre dives when planning repetitive dives.

* When flying after diving, allow yourself at least 24 hours non-diving relaxing activity prior to the flight.

* Remember - the human error factor. We are all human and we do make mistakes at times. However, we can go a long way to minimize these. Know and understand your limitations - if it doesn’t feel right - don’t do it. Knowledge is strength and experience is a powerful teacher.

It is important to note that the most common symptom of decompression sickness is general weakness, lethargy and fatigue - not joint pain as was once believed !!! It is also important that if any Decompression Sickness symptoms are being experienced, that you should contact the Diving Emergency Service right away. Don’t let ego get in the way of obtaining treatment early. Instructors must also be aware of the danger of too many multiple ascents during a single dive. For example, NAUI recommends Octopus Assisted Ascent training to be staggered to allow for example, one student to act as donor on one dive and recipient on another separate dive (and vice-versa). Most training activities which may involve repeated ascents during a single dive (e.g. Controlled Emergency Swimming Ascents, Buoyancy Control etc) can be planned to minimize these problems. Careful planning and common sense can go a long way to prevent problems.

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**PANIC AS A CAUSE**

Forty-two-year-old Fredrick Swatman and his wife Barbara Ann, of Redmond, Washington, got certified last June.

On November 19, the Swatmans and a family friend decided to dive near the Keystone Harbor ferry dock on Whidbey Island, in Puget Sound. Their first dive about 10 a.m. had them admiring octopi.

“Usually it’s a safe area”, Mrs Swatman said. “The first dive was mild. But when we went down a second time the current was very turbulent. We were trying to hold on to each other. I wasn’t used to the turbulence, and I think I got a panic attack. My chest froze. I couldn’t breathe.”

“I bolted for the surface. I was drowning. My husband saw me and caught up to me. He got behind me and got my regulator in my mouth. Then the current pulled us apart.”

Mr Swatman was pulled out of the water by a boater and taken to the ferry dock where he was treated by paramedics before being flown to Seattle. Mrs. Swatman was pulled out of the water by a boat crew from a nearby ferry. She, too, was flown to Seattle. Both Swatmans were placed in Virginia Mason hospital hyperbaric chamber. She survived. Her husband did not.

“He was a wonderful man”, Mrs. Swatman said. “He was very special and he saved my life.”

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