

- Check the jacket for leaks when fully inflated.
- Check oral inflation.
- Check the emergency vent holes.
- Check that the tank is secure in the back pack.
- Check the position of the inflate and deflate buttons, test them and practice emergency venting of the jacket.
- Perform the same inflate and deflate procedure on your buddy's jacket.

All buoyancy compensation devices (BCDs) need to be carefully and critically looked at. Poor ergonomic design of the inflator/deflator mechanism needs attention. Even more basic, however, is the testing to see if the vest will float an unconscious diver face down in the water. I know of no such testing that has been done on all the current buoyancy vests/devices. BCDs are supposedly "safety devices", however as these data show, if there are problems, then statistically the diver is likely to be involved in a harmful incident.

When a buoyancy compensator is bought or hired from a dive shop, it would be prudent for the dive shop to ensure that:

- 1) the diver knows how the jacket works;
- 2) that all the inflate and deflate mechanisms work correctly;
- 3) that the jacket fits the diver correctly and is comfortable.

REGULATORS AND CONTENTS GAUGES

- 1 Visually inspect all hoses before connecting the regulator to the tank. Inspect the hoses again after connection to the tank and when the air supply turned on.
- 2 When the air supply is on note the full position on the contents gauge.
- 3 Switch the air supply off.
- 4 Purge both second stages and check purge buttons.
- 5 Note the empty position.
- 6 Switch air supply on. Note full position again. Check that it correlates with No. 2.
- 7 Check, with the air supply turned fully on, that the diver is able to breath through both 2nd stages (if an octopus is fitted).
- 8 Check that breathing does not cause oscillation of the pressure gauge needle. If it does then the air supply should be checked to make certain that it is turned on fully.
- 9 Check that there is no positional free flowing of either second stage.
- 10 If the contents gauge is bumped before getting into the water, these checks should be performed again.
- 11 Check that the diver and the buddy knows where both second stages are, particularly the octopus.
- 12 Once in the water, do a surface check for any positional free flowing of the regulators.

WEIGHT BELT

- 1 Check the quick release.
- 2 Check the "tongue overlap".
- 3 Check whether the weights will fall off if the weight belt is handled incorrectly.
- 4 Think again about the "correct weight" and adjust the weight belt accordingly. Has there been a change of wet suit? Has there been a change of water environment, salt v fresh? A rough guide to weighting is:
 - 1 kg weight for each mm thickness of wet suit;
 - 1 kg extra for hood and "Long John" additions;
 - 1 kg for aluminium tank;
 - 1-3 kg for individual variation in buoyancy.

MEDICAL FITNESS

There is still a need for more medical practitioners trained in diving medicine. Courses are available at the Royal Adelaide Hospital (2 per year), HMAS PENGUIN, Fremantle Hospital (one a year) and the Diving Medical Centre, Brisbane, organises courses in the Eastern States. As more and more medical practitioners are trained, there will be little excuse for a diving candidate not seeking a knowledgeable opinion.

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DIABETES MELLITUS AND THE SCUBA ENVIRONMENT

Mark Sullivan

Diabetes mellitus has been recognised as a lethal malady since the beginning of recorded history. It was first recorded in writing in the 1st century A.D. by Areteus, who described an illness characterised by a "melting down of the flesh to urine". He named the malady *diabetes* derived from the Greek word meaning "a siphon". The word *mellitus* was added in the 5th century by Susruja, to describe the sweet-smelling urine so often associated with diabetes mellitus. Until 1921, when Banting and Best first introduced insulin for the treatment of diabetes mellitus, there was no substantial remedy for this malady, and worsening cachexia and death were the inevitable result.

Before the advent of insulin therapy, any form of physical activity was rare, given the increasingly cachectic state of the patient. Following the introduction of insulin in 1921, the risk of sudden hypoglycaemia and seizure activity was generally deemed to preclude these patients from any major physical endeavours. However, when blood glucose monitoring sets became widely available in the 1970's, recommendations about these patients undergoing physical activity became sharply divided. This state of affairs has continued throughout the 1980's, often with blanket exclusions applied to many activities still common. For example, in 1986, Bove and Davis, in the textbook *Medical examination of the Sports Diver*,¹ made the comment that at that time, despite little justification, a complete exclusion of all patients with diabetes mellitus was appropriate, but that there would be likely to emerge in the future, a small sub-set of these patients suitable for recreational scuba diving. In this regard, the current SPUMS position paper² on this topic seems squarely rooted in the past, and fails to address the current aspirations of otherwise highly suitable fit patients with diabetes mellitus genuinely interested in recreational scuba diving.

My interest in diabetes mellitus is fourfold.

Firstly, two of my extended family are young women, both of whom have been treated with insulin for more than 10 years. They are very stable with current therapy, and enjoy skiing, sailing and swimming, but have no interest in scuba diving. They are also both graduates of the Faculty of Science at the University of Melbourne, and regard the current SPUMS position paper as ill-informed, inaccurate, pseudo-elitist and offensive in some statements. They cannot believe that this article was ever written, never mind published in an otherwise respectable international journal.

Secondly, for some years, I have been impressed with the attitude of Dr Ken Kizer, Professor of Community Health at the University of California at Davis, who has championed the prospect of fit patients with diabetes being accepted and encouraged to undertake training for recreational scuba diving. He is a past SPUMS member and has completed over 200 dives with his wife, an insulin-dependent diabetic.

Thirdly, I am currently involved in research into the pharmacokinetics of insulin during normothermic cardiopulmonary bypass, and comparing this with the hypothermic situation.

Finally, I and my two sons are members of the Scotch College Scuba Club, a club in which the boys are BS-AC trained and use the DCIEM tables. School boys with diabetes mellitus are welcome to learn to dive, and at the recent two week school "divefest" at Scawfell Island, off Mackay, two of the boys and one instructor were insulin-dependent diabetics, and the other divers were most

impressed with the skill with which the two schoolboys managed blood testing, dietary matters and varying insulin dose to ensure that pre-dive and post-dive blood glucose levels were **always** within **normal limits**.

Given the vast improvements in accuracy, cost and availability of personal blood glucose monitoring equipment for the management of diabetes mellitus, in otherwise very fit patients, it would seem that the current SPUMS position is rather out of step with the situation in other active sporting organisations. The Australian Surf Lifesaving Association, the Victorian Ski Association, the Victorian Soaring Club and the Confederation of Australian Motor Sport all accept stable fit insulin-dependent diabetics into competitive and administrative activities. Blanket exclusion would now seem to be totally inappropriate. Following the stance taken by Professor Kizer, I have been encouraged to advocate and expand a group of pre-conditions to be fulfilled before dive training can be undertaken. In addition, a full physical examination, which must also include an exercise stress test to stage four on the modified Bruce protocol,³⁻⁶ documented 6/9 vision unaided in both eyes and a baseline audiogram, should be performed.

Despite the major advances in the last decade related to the understanding and treatment of this common malady, many diving physicians often feel very uncomfortable and "out of their depth" when attempting to assess the suitability of a particular diabetic for recreational scuba training. The current SPUMS position does nothing to repudiate the misconception that all diabetics are fat, feeble, neurological crocks! This is quite erroneous and offensive, as many young patients with diabetes mellitus have achieved international fame in a number of highly competitive vigorous sporting activities. Many diving physicians would not be aware or interested in the very high level of education, motivation, management of variations in diet, insulin dose and exercise needed to render unheralded hypoglycaemia a thing of the past, or the regular participation of many diabetics in vigorous sporting activities in the air, on land or in the water.

In addition, many diving physicians feel threatened by the prospect of medico-legal action in the event of any untoward diving injury. I have approached the Medical Defence Association of Victoria on this matter, and they are quite prepared to extend full indemnity to a diving physician so threatened, provided that a written statement verifying the stability of treatment by the potential diver's endocrinologist is available before dive training is commenced.

A number of organisations monitoring morbidity and mortality have been approached to discover if there is any proportional increase in the number of incidents in divers with diabetes mellitus. The British Sub-Aqua Club and the Diver Emergency Service have not provided any evidence of reported morbidity or mortality, and Project

Stickybeak reported a death in a breath-hold diver in the distant past, as well as a report of a young man who committed suicide when told that he was automatically excluded from recreational scuba diving. There seems to be no current compelling evidence of increased morbidity or mortality in this cohort of divers, especially as it is widely accepted that many diabetics dive, and dive regularly and conservatively.

In summary, there are many good reasons to accept and encourage a small number of otherwise very fit, stable and well-motivated patients with diabetes mellitus to train for and enjoy the scuba environment. A change in the SPUMS policy would seem to be highly desirable, especially as the most recent edition of *Diabetes Conquest*, the national journal of Diabetes Australia, to which I submitted an article on scuba diving and diabetes mellitus,⁷ was devoted entirely to highlighting discrimination against diabetics in the workplace, the sporting arena and society at large.

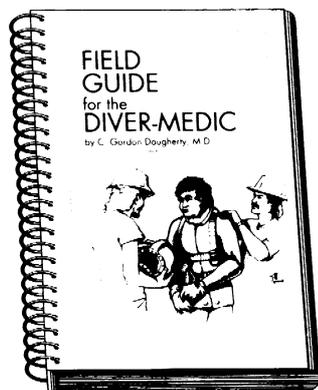
If the current SPUMS position on diabetes mellitus and recreational scuba diving does not change comprehensively, it may well be bypassed and be seen to be irrelevant, ignorant and possibly unlawful.

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