

With practice all mammals can improve their performance by acquiring increased oxygen stores, increased lung capacity, and increased efficiency of ventilation, better tolerance of hypothermia and of oxygen debt, a decreased shivering threshold and better subcutaneous insulation. These allow better resistance to thoracic squeeze, increased dive duration, and tolerance of cold water.

On top of this the specialised aquatic mammals have a rounded body contour which streamlines them, lungs which collapse so that at depth the air is in the major airways, special blood vessel adaptations to allow for filling the lungs and middle ears, and changes of renal function. As their air containing spaces are able to be filled with expanded blood vessels they avoid barotrauma. As the lungs are empty of air there is no extra nitrogen uptake so they avoid decompression sickness and nitrogen narcosis. They are able to maintain cerebral perfusion, and can use the venous oxygen stores. Due to their insulation and streamlining they have better tolerance to cold and excellent swimming powers.

While man can hold his breath for 3 minutes the beaver can last 15, the porpoise six and the seals from 20 to 40 minutes depending on species. The whales are the winners, with the bottlenose whale lasting 120 minutes underwater. On the basis of predicted oxygen stores man is only marginally longer than expected, but the porpoise, which is expected to breath hold for 2.5 minutes can actually dive for 6. While the bottlenose, which should in theory last 36 minutes underwater can last 120. When we consider depths, man has recorded to 305 metres, the Weddel seal to 550 metres, the bottlenose whale to 825 metres and the sperm whales entangled with submarine cables have been retrieved from the site of the break in this depth.

Turning to respiratory function, the aquatic mammals breath much less often than terrestrial but with a much larger tidal volume. Although the aquatic mammals have less lung volume per kg body weight than man, they use it more efficiently, and have a lower oxygen usage per kilo of body weight.



Clinical Decompression Sickness

John Knight

Twelve cases of decompression sickness occurring on the island of Nauru were discussed. One died before decompression. Of the others treatment was successful in all except one, who had been treated two months before for pain in the shoulder and weakness of that arm. This time he emerged from two treatments a paraplegic and was then given six days hyperbaric oxygen without any improvement. He was later transferred to the Royal North Shore Hospital in Sydney, and by the time of the meeting was said to be walking again. The common feature of the Nauru cases was great depth, over 200 feet, and omitted decompression. The cause of this diving pattern is the overfishing, using scuba, of the redfish (a local delicacy) from the upper layers of the water. Now one had to go to 200 feet to find the large ones. The standard treatment in the Nauru chamber has been USN Table 5, which was in-appropriate in the presence of neurological symptoms (Table 6 should be used).

An interesting case treated at Truk during the last SPUMS Annual Conference was presented. This man presented on Sunday, having been diving on Wednesday and Thursday, omitting decompression. Following Wednesday's dive, he got a pain in his back, which was not affected by Thursday's dive. His main problem started on Friday afternoon, with sciatica and bladder problems. Being a true diver he treated this with beer. Although he had numbness below the knees, he continued the beer treatment through Saturday and Sunday. He had diagnosed his own condition and mentioned it

to some SPUMS members. It was agreed, in consultation with the hospital authorities, to treat him at the hospital in the single man chamber. The ride of about two miles over one of the worst potholed roads in the world changed him from an ataxic with anaesthesia below mid calf into a paraplegic with a paralysed left arm. Such is the power of shaking. He was almost completely cured when he came out of the pot at 1.30 am with a residual weakness in his left leg and some minor anaesthesia of his toes. But by 9 am he was again almost completely paralysed below the waist and was retreated with oxygen. He improved but was still weak in his left leg and this worsened over the next day or so. He was not treated again as we were using oxygen to compress the pot and did not wish to expend the island's supply. No one knew when the next ship would arrive with oxygen on board. He was transferred to the USN hospital at Guam and from there to USN hospital at Bethesda Maryland where he received hyperbaric oxygen without much improvement. He has now been lost to follow up.

MINUTES OF THE AGM OF SPUMS HELD AT SUVA

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The accounts had been audited by RG Goddard ARMIT AASA.

As there had been considerable expenditure after the books had closed, there was a need to increase subscriptions by \$5 to \$20 and \$15. Proposed by Rehfisch and seconded McCartney. Carried.

Committee Elections: There being no further nominations the following were declared elected.

President	Ian Unsworth
Secretary	John Knight
Treasurer	Bill Rehfisch
Editor	D Walker
Committee members	Victor Brand
	Ray Leitch
	Chris Lowry

Appointment of Honorary Auditor: Proposed W Rehfisch, seconded J Knight that RG Goddard be appointed Honorary Auditor. Carried unanimously.

No further business the meeting closed 1930.
