EFFECTS OF DIVING ON THE HUMAN COCHLEOVESTIBULAR SYSTEM

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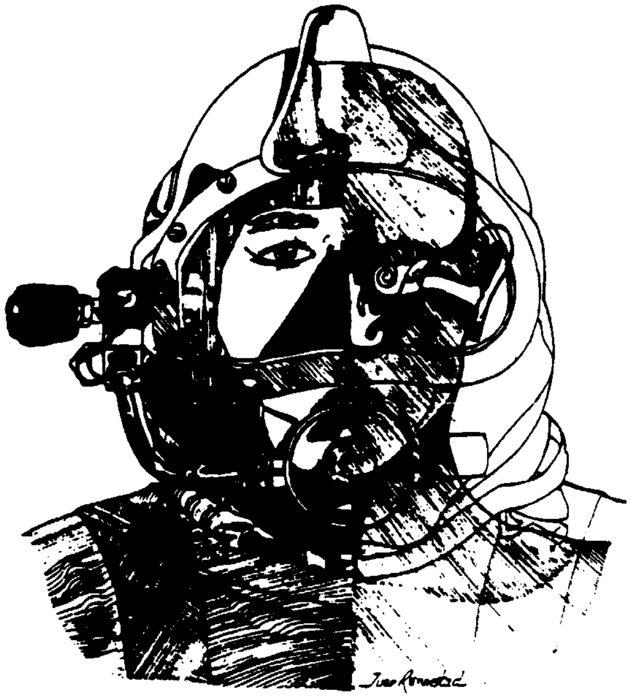

Dissertation abstract

Cochleovestibular barotrauma was seen in all types of divers. A retrospective analysis of 76 cases (83 injured ears) is reported. It is hypothesized that middle ear gas may enter the perilymphatic space of the inner ear during ascent in cases of perilymphatic fistulae. The cochlear injury was classified as permanent in 58% of the cases.

The sound pressure level from the breathing gas in standard hard hats was measured to about 96 dB(A) (re 20uPa), while the level from high pressure water jet lances reached about 145 dB(A) close to the divers' head gear. In living chambers for saturation diving sound pressure levels reached about 106 dB(A). After the environmental control units were moved to the outside of the chambers the highest recorded levels were about 96 dB(A).

Significant temporary hearing threshold shifts were demonstrated in divers participating in two saturation dives of 19 and 34 days duration to 300 and 500 msw respectively. The recovery took up to three days post-dive.

Young, highly selected professional divers had lower hearing thresholds than age-matched randomly selected (standard) controls, but higher than the normality curves of the International Organisation of Standardisation. However, divers in their fourth decade of life had thresholds comparable to the standard controls. Divers who smoked had significantly higher thresholds than their non-smoking colleagues. After an observation period of about six years the divers' hearing had deteriorated faster than that of both otologically normal subjects and of the unscreened controls.

Transient vestibular imbalance was detected by ENG in 25% of the divers participating in four dives to 300-350 msw, but normalisation occurred within a year. The vestibulo-ocular reactivity to bithermal caloric stimulation was significantly reduced in six divers at 250 msw as compared to surface values. Alternobaric vertigo was reported by 33% of 194 professional divers. Although the symptoms usually were mild, in some cases they caused serious disorientation, nausea and vomiting.

By Ed. SPUMS J

The above is the abstract of a doctoral dissertation which was successfully defended by Dr Molvaer (a member of SPUMS) on September 30th, 1988. Readers wishing for further information should contact Dr Molvaer whose address is the Norwegian Underwater Technology Centre A/S (NUTEC), P.O. Box 6, N-5034 Ytre Laksevag, Norway.

DIVE COMPUTERS

John Lippmann

Since decompression sickness in humans first reared its ugly head back in the mid-1800s, scientists and others have sought ways to improve and simplify decompression calculations and procedures.

Haldane introduced his model and schedules at the beginning of this century, and since then many decompression tables have been published. Although some of the very latest tables include methods for compensating for parts of a dive spent shallower than the maximum depth, most tables require a diver to choose a no-decompression or decompression schedule according to the maximum depth and bottom time of a dive. The calculation assumes that the entire bottom time was spent at the maximum depth, and that the diver's body has absorbed the associated amount of nitrogen. However many dives do not follow that pattern. A scuba diver's depth normally varies throughout a dive, and often very little of the bottom time is actually spent at the maximum depth. In this case a diver's body should theoretically contain far less dissolved nitrogen than is assumed to be present when using the tables in the conventional manner. Some divers feel penalised for the time of the dive not spent at the maximum depth.

The ideal situation is to have a device that tracks the exact dive profile and then calculates the decompression