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From inside out – diving medicine

[Hans Örnhagen](#) is a physician and PhD in hyperbaric physiology and probably the most renowned Swedish “diving doctor”. In 1981 he started working for the [Swedish Defense Research Establishment](#) (Totalförsvarets forskningsinstitut – FOI) as senior research officer while, at the same time, being the consulting doctor for the [Swedish Sports Diving Federation](#) (Svenska Sportdykarförbundet – SSDF). From 1992 to 2004, when he retired, Hans Örnhagen worked as director of research for the Department of Naval Medicine. In 1998 he received the [SSI](#) (Scuba Schools International) [Platinum Pro5000 Diver Award](#) and the [DAN Europe](#)’s Award (Divers Alert Network) for “*outstanding contribution to diving safety and medicine*”. He has published several books and articles, with his “Hyperbaric physiology and diving medicine” book, primarily aimed at the education of diving doctors for the Swedish Navy, being used as a study material by SSDF. He is also “responsible” for the development of the FTD examination form presently used by all diving schools in Sweden. After 2004 Hans continues to work as a consultant in diving medicine for the SSDF and for other scuba training organizations in Sweden; he also continues to be at “the other end of the line”, answering the free consultation phone, a service financed by SSDF, PADI Nordic and the Swedish diving magazine DYK, where divers can receive answers to diving medicine related questions. Amongst his other interest, Hans Örnhagen is a member of the [Swedish Historical Diving Society](#) (Svensk Dykerihistorisk förening – SDHF), an organization with about 200 members which was founded in 1979 with the idea of saving the old Navy escape training tower, located on Djurgården in central Stockholm, for future generations. Following, Hans shares with mydive.ro how he came to work in the diving medicine field.



When and how did you get involved in diving medicine? What attracted you to this particular field?

I got involved during my studies of physiology at the Faculty of Medicine at Lund University in 1967. A lecture about liquid breathing given by Professor [Claes Lundgren](#) caught my interest. The liquid breathing technique was later used by Lundgren and me for compression experiments to study the narcotic effects of gases. This then led to a deeper interest in diving. In 1977 I defended my thesis about hydrostatic and inert gas pressure effects on the heart.

You worked for the Swedish Defense Research Establishment. Which were the studies you worked on (if, of course, it is allowed to make this information public)?



We were working on projects that followed my experiments in Lund. One of my students, Mikael Gennser, continued my work on effects of high pressure on the heart. “The narcotic effects of hydrogen” was another project. Hydrox [A/N Hydrox is a highly explosive gas mixture of hydrogen and oxygen, used as a breathing gas in very deep diving] diving was in the early 80s still a hot topic. We were working together with COMEX and made one saturation dive with Hydrox exposures ourselves in Sweden.

“The optimum PO₂ [oxygen partial pressure] in Nitrox and multiple Nitrox exposures” was another project. “The physiology of free escape from submarines at great depth” was one series of experiments that led to improved knowledge and hence safety during submarine operations. Survival at sea after submarine escape led to development of and tests of escape suits and later also survival suits for surface ships. During my last years before retirement the submarine environment and air quality was also studied.

What involved your work as a consulting doctor for the Swedish Sports Diving Federation (SSDF)?

The first task was to redesign the FTD examination form for SSDF in 1981, together with the previous doctor who worked at SSDF. Later, a free of charge telephone consulting service to sports divers became an important part of my work. I also give my advice regarding training procedures and texts in teaching material.



You’ve written several books (Oxygen in the case of a diving related accident – Oxygen vid Dykeriolycksfall, 1996; Compendium of Hyperbaric Medicine – Kompendium i Hyperbar Medicin, 1996; Hyperbaric physiology and diving medicine – Hyperbar Fysiologi och Dykerimedecin, 1998) and articles on diving medicine. Which is your dearest subject in this field?

The knowledge that diving tables are just approximations and the good effect of oxygen on bubble reduction and wash-out of nitrogen after diving is what I think is the most important knowledge to divers and thus, this is what I lecture about and very often bring up as a topic when I discuss with divers.

In 1998 you received the SSI Platinum Pro5000 Diver Award (given to someone who has logged +2500 dives and has documented a “significant contribution to the recreational

scuba diving industry”) and the DAN Europe’s Award for “outstanding contribution to diving safety and medicine”. These awards confirm and reward your work of many years in the diving medicine and hyperbaric physiology fields. How does it feel to receive such recognition?

What can I say? It feels good and I am honored.

How has the diving medicine field evolved since 30-40 years ago? Is it keeping pace with the developments in scuba diving equipment?



Over this time span most of the deep offshore diving research has been conducted. Today, this research is almost non-existing. Many of the research centers have closed and others have changed the research field towards recreational diving and problems with bounce diving [N/A [bounce diving](#) implies a descent to a maximum depth and then an ascent back to the surface with the least delay, in a dive profile resembling a spike].

Are you still conducting studies? What are you working on now?



Yes, I support a project to make diving for people with diabetes safer. I intend to present a paper regarding this at the [EUBS](#) meeting in Gdańsk [Poland] in August 2011.

I further support the development of an [automatic valve to rescue divers](#) who can not retrieve their lost mouthpiece or who have used up all air before surfacing.

How can diving medicine further help conventional medicine?

The understanding of inert gases in bubbles and the beneficial effect of oxygen in certain medical conditions can be used in conventional medicine.

Which are your future plans?

My plans are to continue as previously, if I can.



Which are the most often met problems (diving related) people come to you with or inquire about via the free consultation phone?

The most common questions regard diving with different medical drugs, diving with different medical conditions like asthma and diabetes, pressure equilibration of the middle ears and sinuses.

Can you tell us some “doctor’s recommendations” when it comes to scuba diving?

Do not dive if you can not jog 3 kilometers in less than 15 minutes. Do not forget the safety stop at 3-5 meters. Be careful with your choice of table or computer and planning if you dive deep. If you do not feel well after a dive, take oxygen, drink water and call a diving doctor.

You are a CMAS diver since 1972. Are you still diving?**

<http://www.mydive.ro/en/de-la-interior-spre-exterior-%E2%80%93-medicina-scufundarii>

No, not really. I use scuba sometimes when conducting underwater exercises for my diving medicine students.

Which was/is your favorite dive spot?

My favorite dive spot is in Norway, west of Stavanger.

The free telephone number at which you can reach Hans Örnhammar in Sweden is 0046 (0) 8-500 30 111 and there you can ask your diving medicine related questions on Thursdays between 18.00 and 20.00 or you can send an e-mail to Hans at hans@ornhammar.se. Keep in mind that this service is not an emergency service and if you've suffered a diving related injury you should contact the closest hospital in your area!

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