



# Diving research and medical tests on the spot

DAN Europe is a multi-faceted organisation. Most people know it as the reliable insurance organisation, that it is, ready to provide assistance no matter where, no matter when. However, DAN is also at the spearhead of diving research and medicine. Its mission is diving safety for the entire diving community and to reach this goal it has an impressive multinational Training and Research network. To make sure, divers get to know every aspect of DAN, all these elements are brought to the scene at dive shows all over Europe. This article shares how DAN brought its mission for diving safety to the European Dive Show in such a way that the concept became tangible for the audience. They could see, feel and experience what the diving community means to DAN.


DAN's top people held a conference on "DAN Europe and the diving world: safety, medicine, research and education". Prof. Alessandro Marroni, President of DAN Europe, Danilo Cialoni, DAN Europe Research Techniques Developer, and Massimo Pieri, DAN Europe Research DATA Collection Coordinator, presented studies and results of special DAN projects, such as on flying after diving and on genetics, diabetes, epilepsy and diving.  Laura Marroni, DAN Europe Executive Vice President Administration and HR shared with the public, the guidelines on how to dive safely and DAN Europe's Head of Membership, Umberto Giorgini emphasised the concept of responsibility when managing recreational diving activities. Also a second conference took place with the contribution of DAN, entitled "The law of scuba diving: the process and perspectives". Mario Cavallaro, a lawyer and a member of parliament who is also a diver; Luisa Cavallo, responsible for the Italian state police's Divers; Giovanni Cozzi, secretary ADISUB; Michele Geraci, a diver known for his records in diving at impressive depths and Alessandro Marroni president of DAN Europe, took part in the debate moderated by Leonardo D'Imporzano, a journalist and free-diver. In this conference, the Balduzzi decree on sport certificates was discussed. Professor Marroni explained his vision on the fact that the certificate of a general practitioner can't suffice to decide whether a person is apt for diving and if this GP does not know the basics of diving medicine, he won't be able to forward the patient to the right specialist. Furthermore prof. Marroni asked for a segmentation of recreational and commercial diving, which is necessary to issue reliable rules, to assess the risks and to ensure safety.

Thanks to the availability of the Hyperbaric Centre of Bologna and of its director Dr Ferruccio di Donato, DAN organised two Hyperbaric Chamber Dives, with in total 24 people participating.  Requests to participate went over the roof with more than 150 people on the waiting list. The first tests were on equalisation during compression. On the way down in the Hyperbaric Chamber to a depth of 35 meters, various exercises were performed by the participants, such as Valsalva, Marcane-Odaglia, Toymbe, Hand Free and Otovent. The tolerance to hyperbarism was measured by neuromotor coordination exercises and a memory test. Both tests were performed at 35 meters depth and at the safety stop depth to understand the individual reaction to compression. The tests demonstrated that with an increase in pressure, there is still a lot we can do to improve the equalisation process and the control of the organs responsible for this process. During the DAN conference on Saturday, live images from the hyperbaric chamber were shown.

The medical area of the DAN stand was also staffed by professor Paolo Marcolin together with other ear specialists of OTOSUB, a research group that studies diving medicine and otolaryngology. 172 Divers came to the DAN stand for specialised consultations to check the auditory system and to receive advice on

equalization. A few special cases were ascertained. There were two cases of sudden hearing loss because of an inner ear barotrauma that wasn't properly treated. One man suffered from Ménière's disease that affects the inner ear and can cause problems with hearing and balance. Two others had Fibroadhesive Otitis, a disease of the ear caused by the filling of the middle ear with fibro-inflammatory tissue. But overall, only, a very small percentage had a pathology related to equalization. EUDI was the perfect opportunity for doctors and managers of Hyperbaric centres, to meet up with DAN experts to discuss the project on the therapeutic effects of Hyperbaric Oxygen on sudden idiopathic deafness. This is an ongoing study in which the Italian Society of diving and hyperbaric Medicine, Otosub and DAN all collaborate.

DAN Europe is at the spearhead of research in diving with innovative projects and three DAN projects that have already obtained impressive results, were presented to the EUDI public. First of all, in the context of our research on diabetes and diving, everyone could admire the underwater monitor that measures the glycemic level while diving, developed by DAN Europe, MOVI and DIVE SYSTEM, which is truly one of a kind in the world. Not only is this device great news for divers suffering from diabetes it is also a first step in developing underwater computers that can read and reproduce physiological data. The DAN Safety Campaigns were promoted and attracted a lot of interest. Umberto Pelizzari, a breath-hold champion that has broken numerous records, honoured the DAN stand with a visit. Pelizzari was truly impressed with DAN's Safety Campaigns and fully supports the Propeller Injury Prevention Campaign, exclaiming it is vital to build visibility around this theme as to create a safe diving environment.

DAN is performing a study on the predisposition of Free Divers to develop Breath-Hold Diving Induced Pulmonary Edema (BH-DIPE). Tests were performed live and exclusively on Breath-Hold Divers.  Fifty-seven Instructors of the Apnea Academy school underwent a non-invasive test called Flow Mediated Dilation (FMD). This test measures, indirectly, the individual ability to produce a substance called Nitric Oxide (NO); this is an important factor in the regulation of blood vessels' function, and is involved not only in the genesis for Pulmonary Oedema, but also in the complex mechanisms regulating individual resistance to Decompression Stress. The purpose was to measure the individual capacity to produce NO in subjects who had already been genetically tested to detect the variants of the specific gene that regulates NO production, and to assess its functional level under diving stress conditions. In fact the correlation between the presence of NO and BH-DIPE positive subjects had been already demonstrated by recent work of DAN Europe Research and the preliminary analysis of the tests performed at EUDI seems to confirm this hypothesis, thus offering a simpler and more direct assessment modality than the genetic test to define the individual level of susceptibility to diving induced pulmonary oedema.

Last but not least, all interested divers could join in on the orthodontic tests to check their bite. Scientific research performed by DAN showed that there is a correlation between orthodontic problems and difficulty in ear equalization. The tests performed in the mobile laboratory at EUDI left no margin for doubt and the hypothesis stands after testing 140 volunteers. During the EUDI dive show, DAN gathered over 1.000 data in total, which will be used by DAN Europe Research and will be published in detail on scientific papers and on our online journal AlertDiver.eu.

In addition to all the traditional elements that DAN Europe normally brings to dive shows, this year at the European Dive Show the activities went far beyond. DAN coloured this 22nd edition with its attractive stand and participative initiatives. The entire diving community got to know and experience first hand, the numerous activities of DAN and expressed their enthusiasm. DAN has got every aspect of diving safety covered and can't wait to share it with you at the next dive show.