Alert Diver **Digital Magazine** # 50

DAN

THE STORY OF DAN EUROPE:

A Timeline of Our **Achievements** For Over 30 Years

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ARE PRE-EXISTING MEDICAL CONDITIONS COVERED OR NOT?

EUROPEAN EDITION

DAN **MEDICS ANSWER** YOUR QUESTIONS **ABOUT DIVE** MEDICINE





YEARS

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EDITORIAL



Alessandro Marroni President of DAN Europe President of International DAN

Thirty Years of DAN

Celebrating Three Decades of our History, Between Continuity and Innovation

When DAN Europe was founded in **1983**, compact discs had just been invented, the Kilauea volcano began slowly erupting on the Big Island of Hawaii, and divers finally had their own emergency hotline.

30 years later, people work with tablet computers, the Kilauea is still flowing, and divers can still rely on a strong organization caring for their health and safety.

From its very beginning, DAN has been an organisation propelled towards the future. Considered a huge challenge when it launched, IDA (International Diving Assistance, later named DAN) was the world's first emergency hotline for divers to be chartered as an association and to include insurance benefits for its members. Its constant growth met the ever-increasing requests from divers. Our keywords have always been *innovation* & *continuity*. DAN has evolved, always following its mission, values and principles.

Over the years, DAN has launched training programs that are standard today, conducted research projects that involved thousands of divers, contributed to hundreds of scientific publications. Above all, DAN helped divers facing emergencies and accidents. We feel that providing this help is still our primary duty.

We never really had the time to look back and celebrate. However, it would be terribly unjust not to celebrate this anniversary... So we took a look at what we've accomplished so far, and started collecting pieces of our history that are worth remembering (see our timeline).

What you are reading now is also the **50th Alert Diver issue**. Stars aligned this year, so it's twice the celebration in 2013! In this issue you will find, as usual, all the interesting articles that make Alert Diver: frequent medical questions answered by DAN professionals (*Medical Line*); stories about how DAN made a difference in helping divers, even in the most remote corners of the earth (*DAN Was There for Me*); the most recent studies DAN researchers presented at the last EUBS meeting (*Research column*); some useful tips on dive insurance (*Insurance Matters*), and much more.

What's next? You can keep playing your part in our future developments. Support us in our 30th year with your membership and donations. With your help, we are one step closer to accomplishing our mission: safer diving for all.

Clear waters to all of you!





Updates on ongoing projects – – –

The Story of DAN Europe: A Timeline of Our Achievements For Over 30 Years







Winter 2012. Heaviest snowfall ever at the DAN offices

• DAN signs partnership with Cousteau Divers, to cooperate in Participative Science projects • DAN partners with 13 European research institutes for PHYPODE (physiopathology of decompression), a project funded by the European Union

DAN officially recognized as Research Institute by the Italian institutions and by the European Union

2012 -

2011

• Agreement with the Italian National **Emergency Services** (118) by which DAN is recognized & used as an expert referral hotline (AREU Lombardia 118 Ovest Liguria) Launch of the Nuts & Bolts course, for Recompression Chamber Maintenance Training



Updates on ongoing projects

DAN Training Achievements



DAN courses are recognised and accredited by many **ORGANISATIONS AND INSTITUTIONS** SUKELTAJA (asj O Ċ æ lanes Assedems Selar mile Island X3:518 100 اifras Prote KNRM Kivits) (Noyal Distor Line Cautra Groamsatori RORD (gam) NO. UF5AS 100 SEI 22/ ۲ Đ NCISID 20 2949 251 A030 moket Pagate ADC AN. NO. LEGOLAND >lsc

DAN Europe in numbers

- \bigcirc More than **0 0 0 0 0** members worldwide: worldwide: the largest organisation in Europe, Africa and Middle East promoting diving safety
- Some 6.000 emergency calls handled every year by experienced staff through the emergency hotline
- Over **6 0** DAN doctors leading diving medicine and hyperbaric specialists in their home countries and worldwide - available on a 20/17 basis to assist divers in case of need
- Hundreds of Hyperbaric Chambers included in the DAN network, selected according to their reliability and safety standards
- Over **4 0** renowned scientists and researchers work for DAN and with DAN on a number of projects involving diving medicine and physiology.
- Over **1 5 0** publications in international scientific journals
- **1** S Training Courses, with more than **1 1 5**.**0 0 0** DAN Providers certified. The most complete educational offer on first aid and diving safety.
- \square **© 0** years at the divers' side!





Updates on ongoing projects

The Claudius Obermaier Fund: Ten Years of Solidarity

by Franca Di Muzio

In 2003 **Claudius Simon Obermaier**, a young, German diving expert, dies during a technical dive. His parents preferred not to have flowers and other expenses at the funeral; instead they are asking donations for the safety and support of diving accident victims. As an international non-profit foundation dedicated to diving safety, DAN Europe was selected as the beneficiary of the sum raised, and will back the fund founded in his name.

Created to sustain divers and their families who find themselves in economic difficulty, the **"DAN Europe Claudius Obermaier Fund"** also provides support for the use of hyperbaric chambers or institutions of dive medicine located in remote areas. In its ten years of activity, the Obermaier Fund has raised and allotted over 175,000 Euros towards a diversity of cases of people in need around the world.



To make a donation or inform us of situations in need of attention, write to us at: mail@daneurope.org



#50 (4th Quarter 2012)



Bulletin Board

Updates on ongoing projects

Partner of the Year Awards

The Partner of the Year awards recognize those Partners who deliver outstanding results and have successfully promoted DAN products and services during the previous year.

Both divers and dive operations can join the DAN Europe Partner Program. They obtain credits through points or commissions, promotional materials, the use of the DAN Partner logo, and of course prizes and rewards!

We will continue to collaborate with our Partners to let divers know the good services DAN has to offer to the dive community. DAN congratulates and deeply thanks this year's winners, as well as all active Partners for their work and commitment.

The winners of the 2012 DAN Europe Partner of the Year awards are:





Second award in two years for František as well. He promoted 17 memberships during the past year. An example to be followed by all DAN Friends!

He received a free Sport Silver membership.

Born in Cheb (Czech Republic), František had his first contact with the underwater world at the age of 12, when he enrolled in a diving club in his home town. Completed his first OW course in 1996 and became a CMAS* diver, diving mainly in the dams and rivers of Czech Republic: his first scubadiving experiences thus were in cold, dark waters with scarce visibility.

Started working as a Dive Master in Croatia in 2000, then certified as OW Instructor with SSI. Opened his own diving school (DiversDream, based in Prague) in 2004, focusing on recreational diving and organising trips to dive sites worldwide. At the same time, he has been gaining relevant experience in commercial diving as well.

Certifications:

- SSI DCS Instructor (Divecontrol Instructor)
- Freediving Diver Level 2 (Apnea Academy)
- Commercial Diver



2012 Winners

The Hyperbaric Centres of the DAN Europe Network: Sharm el Sheikh

Interview with Dr Adel Taher, DAN Egypt by Claudio De Iuliis



Q: Can you summarise shortly the history of DAN Europe in Egypt?

A: This is a very difficult question, and the reason it is a very difficult question is because that DAN Europe was already in Egypt even before DAN Egypt was in Egypt. Since the start of DAN Europe's existence, we saw divers here who were DAN Europe insured. Before we opened our own chamber, and along with it, DAN Egypt, foreigners had been diving in Sinai since 1982, and in the late 80s we began to witness accidents; only there were no chambers. The MFO, the Multi-National Force Observers, used to come when we summoned them, and we'd help them with the examinations and determine if it were a critical diving accident, in which case, the patient would be sent by helicopter to Eliat in Israel for treatment. The only problem was that when the Egyptians had diving accidents, we could not fly them to Israel due to the Camp David agreement, and that is when it became very compelling to have a chamber here. So, we managed to get the hyperbaric medical center started on the 10th of March, 1993, and a few months later we founded DAN Egypt. Of course, it was only natural that DAN Egypt would be affiliated with DAN Europe. DAN Europe was like our big brother, giving us all the support and training we needed, and we were always very grateful to them for taking us under their wing. One day we hope to have enough DAN offices in the Middle East, so we can start a DAN Middle East and take others under our wing. We will always be extremely appreciative of the assistance, understanding and help we receive.

Q: Dr. Adel, having looked at some of our statistics, I've noticed after the last 5 years most of the accidents in the Northern African area, or even in the Middle East, are in Egypt. How long after you started running your chamber did the increase in tourism occur? And what is the situation today?

A: Let's start from the very beginning. When we started getting tourists from Israel in 1982, the diving tourism in this area was still very limited, and it increased in very small increments until the chamber arrived in 1993. And as much as I love Sharm, I have to admit that the hyperbaric chamber is what greatly contributed to its popularity as a spot for dive tourism. As soon as the chamber was up and running, there were two incidents that set the stage for what was to follow... the first was that the initial

cases we treated had a very good resonance abroad, especially in Europe. Our activities were aired on television, making it known that there was a new chamber operating in Sharm el Sheikh, and that they seemed to be doing a pretty good job. The second factor was that due to the war in former Yugoslavia, many Europeans (especially Italians that previously went to the Adriatic sea) were looking for a nearby destination offering sun, sea, and a low cost of living. So they "discovered" Sharm el Sheikh. From that day onward, we watched investors come and take pictures of the chamber, go and get a piece of land from the government, take a few more pictures of the land, go to some of the major Italian tour operators, getting them to sign a 5... 6... 7 year contract, then get a bank loan, and start up their resorts.



I'm positive that no other city in the world has witnessed development as fast as Sharm el Sheikh between the years 1994 to 1999 (after that period it started to slow down a little bit). So with this "magical" influx, hotels started popping up like mushrooms. The city started dealing with divers in huge volumes, and likewise we began to witness a major increase in the number of accidents. Keep in mind that diving spots in Egypt are not not only in South Sinai; there is also Hurghada, and the whole coast down to Sudan. Just Sharm (or South Sinai) alone receives between 700,000 to 800,000 divers each year, and if you calculate







that most of them stay about a week and go diving an average of 2-3 times a day, you can understand why Egypt is at the top of the dive-accident list.

What is also really important here, not only to us, but to the insurance companies that we deal with, is that is that in Sinai we have maintained our reputation for never "over-treating" patients or giving treatment where treatment was not needed. This has given us a lot of credibility, especially in our relationship with insurance companies.

Q: What was the name of your first chamber?

A: Adel's baby 'baric.

Q: After several years operating without failure, I have seen that your baby has received a very nice big sister.

A: So... putting things into the right perspective. Yes, my little baby 'baric has a big beautiful sister, and this sister is a Haux-Starmed 2000/200, capa-

ble of handling up to 12 patients, with a very well-equipped, ante-chamber (outer lock), and all built to specially-customised specifications. It is one of the few chambers in the Middle East treating sport divers that has a Siaretron 1000 Iper ventilator, a special model, together with a highly advanced and versatile vital signs monitor. The chamber is also equipped with the best hyperbaric fire-fighting system in the world, and not only that, it has also got a gas-mix capability that is rarely found in other chambers - we mix our own Nitrox 40/60, Nitrox 50/50 and Heliox 50/50, giving us a wide spectrum when choosing treatment tables... ample bank for air, two wonderful high pressure compressors... it's altogether a piece of art; it's a magnificent thing. And we've used it five times so far, so we are very happy with it. Though, as I said in the beginning about putting things into perspective, baby 'baric is still working and performing very nicely, and to me baby 'baric is an old, nostalgic love story, and I'll never forget the ones I've loved. So I'm very happy to announce that both chambers are in operation, and we expect both of them to continue in operation for another 10 to 15 years before we begin to think of any alternatives.

The new Haux chamber was fully installed in Sharm by the end of March, 2011. We were delayed a bit because of the "glorious revolution" that took place on the 25th of January that year, and after which, we've been suffering because the number of tourists has dropped remarkably, and we've lost a huge number of visitors. This year it is estimated that we have lost about to 80 to 85% of tourism, which is greatly affecting us. We hope this will get better soon as stability sets in, as we are not run by a regime that is unwelcoming toward tourism, and we hope that tourism will remain one of the main sources of national income for this country. It would be a pity to lose all that.



Interview by Claudio De Iuliis -Claims Dept. Head, DAN Europe



DAN medics answer your questions about dive medicine

by John Lee, EMT, DMT, CHT



Q: When I go on a dive vacation, we often have beers or cocktails after diving. Some in the group are even suggesting drinks between dives — is that a bad idea?

A: Simply put, alcohol and diving are not compatible. Alcohol causes depression of the central nervous system, which impairs judgment and reduces reaction time and coordination. Often the individual is not even aware of the degree of impairment.

A review of more than 15 studies on the effects of alcohol on performance found that alcohol was involved in roughly 50 percent of all accidents in people of drinking age. In Diving and Subaquatic Medicine (Edmonds C, et al., 2002), the authors report that alcohol is associated with up to 80 percent of all drownings in adult males.

It takes time for alcohol to be metabolized and its effects to wear off. M.W. Perrine and colleagues studied a group of experienced divers and the impact of alcohol consumption on their performance. Their investigation found that the ability to perform skills while scuba diving was significantly compromised at a blood alcohol concentration (BAC) of 0.04 percent, which can be reached by a 180-pound man who consumes two 12-ounce beers in one hour on an empty stomach. The study went on to state that even at a lower BAC, situational awareness and protective inhibitions may be reduced.

Recent alcohol intake (along with seasickness, traveler's diarrhea, excessive sweating, diuretic medications and air travel) is a potential cause of dehydration in divers. Dehydration, particularly when severe, is a potential risk factor for decompression sickness (DCS). Diving can also contribute to further fluid loss through breathing dry air and diuresis caused by both immersion and cold. Some symptoms of dehydration, such as fatigue or drowsiness, can even mimic DCS, leading to possible diagnostic confusion.

Alcohol ingestion may also enhance the effects of nitrogen narcosis. Elevated BAC, dehydration and nitrogen narcosis together may result in otherwise preventable accidents due to decreased problem-solving ability.

Many divers appreciate a cold beer, but drinking and diving can turn a safe activity into a nightmare for both the diver and all those impacted by a rescue or fatality. Think twice before combining alcohol and diving.

A: Ear drops are not necessary postdive for most divers.

The purpose of most ear drops is to prevent external earcanal infections (known as otitis externa or swimmer's ear). Infections of the ear canal are associated with persistent moisture as well as local skin trauma, which can result from insertion of cotton swabs or other objects into the ears. (These can damage the thin skin that lines the ear canal. As DAN medics are fond of saying, "Don't put anything smaller than your elbow in your ear.") These factors can enable bacterial overgrowth and infection.

Q: I have been getting advice from lots of people about what kind of drops to put in my ears after diving. What does DAN have to say?

Difficulty equalizing, clicking or crackling sounds and feelings of fullness or fluid in the ears probably indicate a mild or moderate barotrauma of the middle ear. Middleear barotrauma is neither treated nor helped by drops

placed in the ear canal, as the injury exists on the other side of the eardrum. An intact eardrum forms a barrier that will prevent the drops from reaching the middle ear. A perforated eardrum might allow drops to enter the middle ear, but this would not help and could be harmful.

For divers plagued by swimmer's ear, gently rinsing the ears with fresh water after each dive may help. Drying the ears with a hair dryer (taking care the air is not too hot) may also be helpful. If these methods are not effective, the next step is using commercially available eardrops to limit persistent moisture. Common ingredients in these formulations can include acetic acid (the active ingredient in vinegar), boric acid, aluminum acetate, sodium acetate, isopropyl alcohol and glycerin. The acids alter pH, which retards bacterial growth; aluminum acetate and sodium acetate are astringents, which shrink tissues. Isopropyl alcohol helps dry the tissues, and glycerin may help lubricate the skin and prevent excessive drying.

Any diver who experiences ear symptoms after diving — especially pain, hearing loss or tinnitus (ringing/ buzzing sound) — should discontinue diving and be evaluated by a doctor. Prompt treatment may prevent further irritation or infection and may expedite a return to the water.

Q: Last fall I underwent a pulmonary vein ablation for atrial fibrillation. Five months later my cardiologist ordered an echocardiogram with bubble study to confirm closure of the puncture in my interatrial septum. Unfortunately, the hole persists. The cardiologist admitted to an incomplete understanding of the relevant issues but recommended I refrain from diving until closure of the hole can be confirmed or it is surgically repaired. What can you tell me about my fitness to dive?

A: Atrial fibrillation (a-fib) is one of the most common rhythm disorders encountered in clinical cardiology. Basically, the atria (upper chambers of the heart) quiver rather than contracting in an organized fashion. This leads to a very rapid and irregular heart rhythm that can be quite uncomfortable (though some people do not

experience symptoms) and may put patients at a significantly increased risk for stroke. Risk factors for the development of a-fib are hypertension, underlying coronary artery disease, increasing age and valvular heart disease.

In the past, the intention of therapy was to either slow the rate of the fibrillation (using drugs or catheter-based radiofrequency ablation) or control the rhythm with drugs. Success rates at maintaining normal rhythm over the next year were generally less than 50 to 70 percent.

Atrial fibrillation can now be treated in selected patients with catheter-based isolation of the pulmonary veins in the left atrium. This procedure has a long-term success rate of about 80 percent, but it requires the cardiologist to puncture the interatrial septum to get from the right atrium to the left atrium. The hole or holes usually close spontaneously over time, but they don't always. Until they are closed the patient is left with an atrial septal defect of sorts — similar to a congenital "hole in the heart." This means venous bubbles might bypass the lungs (which act as bubble filters) and cross into arterial circulation. This would put a diver at an increased risk of decompression illness (DCI). Information is limited, but the increase in risk seems to be about fivefold and is likely related to the size of the hole or holes. Although

that may sound like a dramatic increase, the risk of DCI in recreational diving is about 2 per 10,000 dives. Thus, a fivefold increase in this risk is only 1 per 1,000 dives still a very low absolute risk.

The primary concern with respect to one's risk of DCI isn't the hole, it's the bubble load. Thus, the cautious thing to do is to minimize your bubble load by diving conservatively. If you were my patient, I would support recreational diving on the richest nitrox mix allowable for your depth with prolonged safety stops using the same mix or a richer mix if your level of certification allows. I definitely would NOT recommend closing the hole before returning to diving; the risk of significant complication from that procedure is around 1 percent, which is much higher than the risk of DCI with leaving it alone (0.1 percent).

While it is reasonable to wait and see if it closes spontaneously before you return to diving, it is also reasonable to resume diving (with the caveats listed) despite the defect, knowing there is an increased, albeit small, absolute risk of DCI.

— Douglas Ebersole, M.D.

Q: I do a lot of diving; as a result of handling tanks, lines, ladders and other gear, I usually have a cut or two somewhere — typically on my hands. Should I be concerned about getting an infection while diving?

A: Skin is the body's primary barrier against infection. Breaks in the skin, therefore, enable skin bacteria and the abundance of microscopic life in seawater to contaminate vulnerable subdermal (beneath the skin) tissues.

The diving environment can compromise skin integrity. Prolonged immersion and high humidity may alter the skin's pH and soften the outer layer of the epidermis, causing peeling (desquamation), further reducing the skin's natural defenses and enabling infection — overgrowth of bacteria or other microorganism within a wound. For cuts and scrapes that occur in or around water (including lakes, streams and oceans) thorough cleaning with soap and water is recommended, followed by the application of a protective dressing. People with open wounds should refrain from entering the water until healing is complete. Maintain an up-to-date tetanus vaccination to minimize risk of infection by that pathogen.

To Stop or Not To Stop...? And Why

by Dr. Saul Goldman and Ethel Goldman

This is when it happens. You're coming up from a great dive, approaching safety-stop depth, when internal conflict begins. What you really want is to be back on the boat as quickly as you can (as in right now, if not sooner). Maybe it's the cold water, too much coffee before the dive, or maybe those refried beans for breakfast. The boat's head, grungy though it may be, looks increasingly attractive. A prolonged safety stop will likely result in a grossed-up wetsuit to clean. The easiest thing for you is to not do the stop, just this once. But there's a reason for safety stops - isn't there? Should you take a chance and skip the stop? How lucky do you feel? How lucky do you need to be to skip it without problems?

(This brings to mind an iconic movie scene where Harry Callahan, pointing a gun, which may or may not be empty, says "You have to ask yourself 'Do I feel lucky?' Well, do ya, punk?" In the movie scene, the "punk" has enough information to consider his odds and make a decision.)

Back to real life. Do you have enough information to make a sound decision on the safety stop? What would you need to know? At the very least, you would want some estimate of your risk of decompression sickness (DCS, or "the bends") if you completed your safety stop, and some estimate of your risk if you went straight up instead. Only then could you compare them and make a reasoned choice.

Right away, we're running into problems. Dive computers in use today don't operate on principles of reasoned choices or levels of acceptable risk. They operate on a straight "yes/no" basis. (as in "Yes, you may continue this dive at the present depth; no, you may not continue this dive at the present depth.) It's true that many current dive computers do allow you to initially select your preferred level of risk, but what you are choosing is a relative degree of risk (i.e., more risky or less risky). Nowhere is it specified what level of actual risk any of these different settings represent. Personally, I find such generic categories unhelpful. Compared to some people I know, I'm a major risk-taker; compared to others, I'm not only a stick-in-themud, I've sprouted roots.

Back in the eighties, a serious attempt was made by Dr. Paul Weathersby, a U.S. Navy scientist, to develop a probabilistic model for predicting the likelihood of decompression sickness. It recognized the obvious fact that, like most natural processes, decompression stress increases progressively, so that no single point exists below which everyone is 100% safe, while above it everyone will get bent. In 1993, the U.S. Navy solicited members of DEMA (The Dive Equipment Manufacturers Association) for a cooperative program that would get this probabilistic algorithm incorporated into an established dive computer. There was apparently some interest expressed, a lot of objections, and, in the end, no equipment manufacturer was willing to sign on. Some of the objections had to do with then-current microproces-

sors being unable to handle the computations required. (Another interesting objection will be dealt with below.) Now, almost 20 years and several generations of microprocessors later, there are still no probabilistic models in current dive computers.

So we've run into a small roadblock in our decision process. Maybe it will help if we re-start by looking at safety stops themselves.

What effect do safety stops have on diving safety? First, a little background. Unlike the dive tables, or the algorithms that lie at the root of dive computers, the safety stop is basically an "add-on". When dives were a little close to the limits for no decompression diving, it made intuitive sense to do something that resembled a decompression stop, just as a precaution. The feeling developed that this was probably helpful, although, initially, there was no scientific evidence and no real theory that supported this.

The earliest evidence in support was provided by a small, Doppler-monitored study by Dr. Andrew Pilmanis. This demonstrated significant decreases in detectable venous bubbles with safety stops, which might indicate that such stops are useful. Unfortunately, while bubbles detected by Doppler-monitoring do seem to have some correlation with decompression sickness, it's

not a very strong relationship. So we're still left with a common sense idea about safety stops, anecdotal evidence (observations by the dive community that stops are helpful), and a limited amount of scientific support.

Where do safety stops fit into theory? Or, more practically, into the theory and algorithms that underlie current dive computers? All dive computers in use today, although different from one another in various ways, are structurally based on the Haldane model of decompression. The Haldane model would predict only minimal benefit to safety stops. So, what's going on here? Are safety stops just some sort of uninformed superstition, like knocking on wood, or not letting a black cat cross your path? Or do we need to look deeper for answers?

Now would be a good time to revisit the meeting between the U.S. Navy and DEMA, and a very interesting objection made by the equipment manufacturers to the proposed probabilistic algorithm for dive computers. The manufacturers were not willing to make and sell a dive computer that would tell divers their risk of getting "bent" was in the (somewhat unsettling) neighbourhood of 2.5%. And who can blame them for that? For one thing, it could scare off potential divers and, for another, it doesn't seem to correspond to what divers actually experience. With a DCS risk of 2.5%, a diver with, for example, even 200 logged dives would likely

have been bent 5 times. As for dive guides with thousands of dives, they would be almost as familiar with the inside of a recompression chamber as with their favourite bar.

Refusing the Navy's algorithm would seem almost a "no-brainer" for the manufacturers. Except for a couple of inconvenient details. One is that the Navy figures were based on solid experimental evidence. The other is that the manufacturers in fact use the same Navy dive tables (or similar PADI tables) in calibrating the Haldanean models that underlie their own algorithms. If the equipment manufacturers were to turn their own algorithms into probabilistic ones, their estimates of DCS risk would be roughly the same as those in the U.S. Navy's proposed algorithm. It's not that they disagreed with the estimated risk; they just didn't want to declare it.

But we're still left with two very different risk estimates. On one side is the experimental evidence of a 2.5% DCS risk. On the other side is the real-life experience of the diving community, where the probability of getting bent amounts to a very tiny fraction of the experimental DCS risk. Clearly, they can't both be right. Or can they?

There is one key difference between the studies conducted by the U.S. Navy and what happens in the

Can safety stops account for the apparent discrepancy between the U.S. Navy results and divers' experience?

day-to-day diving world. Divers in the study were brought to the surface with no safety stops. In normal diving circumstances, safety stops are always recommended, even insisted on. Of course, this can only amount to a difference if safety stops are in fact being used. Recent data provided by Project Dive Exploration (PDE) supports our general observation that the vast majority of recreational diving really does include some version of a safety stop. Specifically, out of 102,642 dives on air, we found that 95.7% of ascents from 20 fsw involved a safety stop - which is pretty good. But when we widened our search a little by looking at all ascents from 30 fsw, we found that fully 99.3% of ascents involved some form of safety stop. In effect, what we found was that, while considerable liberty may be taken with recommended parameters for a safety stop, the overwhelming majority of recreational dives include some sort of safety stop. So, we do have an actual difference between the U.S. Navy studies and the everyday diving world: direct ascents vs. safety stops.

Not according to decompression models based on the Haldanean structure - which means not according to the algorithm in your current dive computer. (If Feature

it requires you to do a safety stop, as most now do, it's because experience has shown its effectiveness, not because of anything the model would predict.) For the first time, there is a new, patented model of decompression, one not based on Haldanean structure, which predicts the risk of DCS in a more accurate way. This model is SAUL - Safe Advanced Underwater aLgorithm. (Okay, so the acronym's not perfect.)

The diagram below shows how each of three different algorithms would predict the risk of DCS for one typical recreational dive without a safety stop and for the same dive with a safety stop. The algorithms used are a typical Haldane model ("Haldane"), a bubble-based model currently in use by the U.S. Navy ("Bubble") and the author's model ("SAUL").

To what extent can we now answer our original guestion? How lucky do you need to be to skip your safety stop? It depends on the specifics of the dive and on whose model you believe. Lets suppose your dive was the one in the diagram - 60 feet for 40 minutes.

According to "Haldane", you don't need to be particularly lucky to skip your stop. (Although you might need luck just to continue to dive on a regular basis.) Your risk of DCS would be 2.3% with a stop and 2.5% without one not a huge difference.

According to "Bubble", your risk of DCS would be 0.7% with a stop and 0.9% without one. Again, not a huge difference.

With "SAUL", skipping your stop would increase your risk from about 0.1% to 2.5%. Or, to put it another way, your dive without a stop is 25 times as risky as that same dive with the stop.

So, what should you do? If you accept the Haldane or the Bubble model as being accurate, it wouldn't make a whole lot of difference if you skip your safety stop this one time - or, in fact, any time you felt inconvenienced by it. But, if that idea makes you as uncomfortable as it does me, you might want to accept that SAUL has the right idea. You would be increasing your risk enormously. You might still

"You might still get away with skipping your safety stop just this once. On the other hand, you've been in similar situations before, and likely will again. If you skip your safety stop each time, count on getting bent."

get away with skipping your safety stop just this once. On the other hand, you've been in similar situations before, and likely will again. If you skip your safety stop each time, count on getting bent. If you don't plan to skip your stop every time it happens, why skip it even once?

What else should you do? If you accept SAUL as being more accurate in the matter of safety stops, you might want to take a closer look at the model and learn more about it by reading some of the articles below or by visiting one of the author's websites.

While there is no SAUL-based dive computer on the market at present, we're collaborating with Liquivision to get SAUL into a dive computer. No release date has been projected as yet.

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An International Overlook on Diving: Excerpts from the DAN Day 2012 in Japan

by Franca Di Muzio

Each year, DAN Japan hold discussions on safe diving, with renowned specialists coming from all over the world, sharing their experience and studies. What follows is an overview of their talks, held in Tokyo on November 2012.

Dr. Yashiro Mano, **DAN Japan Founder and President**

Around 800 professional diving companies exist in Japan, with about 3000 fishermen and marine harvesting divers working. There are 2000 research divers, with roughly 20,000 divers making their living from the sea. In the past, deep fishery diving with long bottom times was common in Japan, but this is being done away with and shorter dive times and shallower depths are being observed.

Types of diving being done: scuba, full-face mask and helmets, most using full-face mask. Helmet diving is being reduced and becoming more obsolete, though it continues to have its advantageous. Fishery diving usually do not exceed 60 meters, with a maximum of 80 meters. Offshore diving is usually around 30 meters. If the diving is to exceed 40 meters, trimix or heliox gas is used. The diving is mostly maintenance work and the time stress underwater is low.

Work diving has to be supported by employer and surface support as opposed to recreational diving. Recreational diving is usually only buddy diving, buddy being a similar certified and experience level diver as yourself for proper diving. Have back up tanks and rescue divers available with life lines and communications on site. Never dive alone! Never dive below 40 meters (divers are more accident prone at that depth) with 30 meters being the limit. Beyond that CCR, Trimix and Heliox is recommended. A stable surface gas supply line must be assured.

Whereas decompression diving should never go beyond the threshold and always within the decompression tables. Extended dive times must be supported with a chamber on site or on a stand-by basis.

The annual meeting of International DAN (DAN America, DAN Europe, DAN Japan, DAN Southern Africa, DAN S. E. Asia Pacific) in 2012 was held in Tokyo at the School of Medicine and Dentistry of the local University, headquarters of DAN Japan.

The mission that DAN has brought to an international level has aroused great interest on the part of the Japanese media.

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Dr. Nick Bird, **DAN America CEO**

Management of diseases in remote locations requires us to do the most we can with the resources we have on hand.

DCS is a probabilistic disease: it depends on the probability of it happening based on the dives we take to what depth and time and the inert gas loading.

Most symptoms appear within the first 8 hours after surfacing, all cases appear after 24 hour upon surfacing.

Meaning: any sympton diagnosis after this time period should be questionable. Neuro symptoms, the more severe ones, appear immediately and within a few hours after surfacing, while the less severe up to 10 hours after surfacing. This has implications to the treatment management of diving accidents, with severe case treatment being most important.

Treatment modalities and recommendations:

- Surface level oxygen and administration of fluids before chamber treatment
- Use of portable chamber (when available) which provide complete treatment of divers
- Evacuation Matching the urgency of patient condition with proper diagnosis and local treatment availability prior to calling for an outside evacuation. Remember, evacuation teams put themselves at risk fetching injured patients!
- HBO therapy
- Last resort would be in-water decompression, which requires lots of air supply, support divers tending patient, planning and proper diagnosis. Weather, water temperature and evacuation time to advanced medical facilities are all vital factors when deciding on in-water decompression.

Remote location diving requires elevated safety precautions and conservative diving!

John Lippmann, OAM, **Executive Director DAN Asia-Pacific**

Australia hosts some of the most dangerous marine creatures in the world: the blue ring octopus, the box jelly-fish, sea-snakes... but the most dangerous creature to the diver is ourselves, mainly through lack of care and knowledge.

Starting from 1972, looking at statistics of diving fatalities we've had about 4 to 19 deaths a year but there is no real trend with no significant increase or decrease

they don't plan.

of fatalities over the years, with the diving population remaining at a steady pace and 7 deaths per million dives. For non-Australian divers, it is around 4 deaths out of every million dives, which does not mean Australian divers are worse divers, but that non-Australian visitors dive in a more controlled environment.

Between 1972 and 2005 I have examined 315 deaths. And 250 were scuba diving related including or CCR. 15% is attributed to equipment. Another 15 % by gas supply, 13 % by rough sea conditions in 9 % it is triggered by divers panicking. Divers get themselves in a bad situation and don't think. They don't look and

In my view medical fitness is a primary requisite for safe diving, then there is training, to learn more, have adequate and serviced equipment which work properly. Planning, think about where you're going, diving conditions, marine life, currents are all factors that will affect your safety. Take your brain with you to make common sense decision. Do not relax completely by not taking responsibility for your diving. Though there are circumstances beyond our control which may cause an accident to happen.

Dr. Alessandro Marroni, M.D., Founder and President of DAN Europe, President of International DAN

While 40% of DCI accidents may happen through not observing the "rules", 60% DCI accidents happen while respecting the rules. Therefore a look into the "rules" was in order, which is why DAN Europe started the participatory research program in 1995. Since then, we've collected over 75,000 fully monitored dive profiles. We have taken research to the field where the diver and diving is located, training divers not only to become technicians and collect Doppler signals but to interprete them as well.

We monitor hydration through urine. We monitor hematic blood rates, as well as heart and lung function underwater with echograph. We also do bioimpedence, which measures the shift of fluids in your body which is important to how you hydrate or dehydrate during a dive. As diving causes you to dehydrate. So we looked at different parameters. What surprised us through hematic monitoring was that blood was denser though the fluid in the body remained the same. We looked at the same measurements during repetitive diving, monitoring the bubbles.

Another factor in play is surface tension, the force which keeps bubbles compact and together. When the surface tension decreases the bubbles become larger. The easiest way to measure the surface tension of our body fluids, is through a sample of our urine. As surface tension is related to hydration and hydration counter-acts bubble formation. Measuring hyperhydrated divers we found bubble reduction. **So the take-home message we leave you is, drink, drink, drink, not vodka but water, before, between and after diving.** Reduce risk factors by being fit, healthy and hydrated. Using Nitrox also helps to reduce your chance of becoming a statistic.

We also adopted procedures to reduce risks of decompression stress, by increasing our resistance through preconditioning divers before a dive, such as taking a sauna a couple hours before a dive, which helped circulating protein in the blood help fight off decompression stress. Or put a diver on a vibrating mat, which we discovered helped bubble elimination. We also found chocolate intake being an antioxidant as a help against decompression stress. Intervening through human physiology and biology through preconditioning divers increased resistance to bubble build up.

We also looked at water build up, pulmonary edema or comets in the lungs during breath hold diving. We do all this to help make diving safer.

Dr. Folke G. Lind, M.D., Ph.D, *Karolinska University Hospital*

Sweden is the size of Japan and we do a lot of diving. We dive in cold waters and therefore divers wear heavy equipment, which disposes them to accidents.

I have been a diver since 1973, teaching dive doctors for 20 years and would like to share some of my diving experiences. My chamber, the Karolinska chamber, is located in Stockholm. It has a big adjacent ICU Room. We are equipped to evacuating injured divers compressed in a mono chamber via helicopter. We do US Navy 6 Treatment which is considered the best treatment in the world. There are also a chamber in Gothenburg, one in Uddevalla and one in the south, where most of the diving is done.

All divers have to be familiar with Boyles law as well as being mindful of Henry's gas law. When making dive plans, you must take into account Murphy's law.

Stay hydrated, is the main thing. Drink a lot so you pee a lot is my recommendation as an intensive care physician. All dive tables should be buffered, you should never reach the threshold of the tables. Risk assessment has to be planned for. As a diving physician, you quickly learn that it is drowning which kills during dives. Guard against panic and hyperthermia, a big risk factor.

Watch out for stupid diving or stupid behaviour. You can be stupid, get lucky to an unsafe dive; you can also be unlucky from a safe dive and develop DCS.

Rest before diving. Plan your dive and dive your plan.

Photos (Top-down): Dan Orr - DAN America Francois Burman - DAN Southern Africa

THE PURPOSE:

DAN's Perspective

- Relationships
- Assessment of Need
- Networking
- Chamber Database
- Research Opportunities
- Risk Reduction (quality, safety and cost)

CURIOSITIES AND FACTS ABOUT APAN

THINGS OF INTEREST IN JAPAN

The food

For the Japanese, the sense of sight is the first of the senses that comes into play at the table. Every plate must fulfill precise rules of harmony and grace; juxtapositions of colours and forms that are complementary and balanced. Even the takeaway is a real work of art!

For diners not used to using chopsticks (*hashi*), eating chicken wings can become an arduous task!

Make sure you use the chopsticks the right way! They are not used to cut nor, by any means, to spear pieces of food. Poking the hashi in your dish is considered one of the worst possible blunders at the table.

In traditional restaurants in areas outside of the city, you can find fascinating grillcooking, where each person at the table, kneeling and equipped with heat-protective gloves, cooks the food (meat, fish, tofu, corn and vegetables) him/herself.

The tatami

Tourists from the West will be surprised when entering a reserved room at a traditional hotel. There are no beds; only a small, low table and chairs with no legs. In fact a tatami, a type of mat kept in the wardrobe, is unrolled on the floor right before going to bed. A rather "hard" experience, but worth trying!

Shoes are taken off at the door when entering a room. One walks on mats with slippers or a typical style of socks.

The toilets

Japanese toilets are fantastic and very high-tech. The toilet seat is always nicely heated. The buttons located on the side offer the user various possibilities like turning on relaxing music, or playing natural sounds like birds whistling or running water; the purpose being to cover up the "other sounds." It's even possible to project pretty images. To finish things up, when tending to personal hygiene, one can push a button and stream of warm water shoots out to wash the private areas.

Fuji-San

Considered the most beautiful volcano in the world, the image of Fuji-San is found everywhere in Japan. The last major eruption was in 1707. In ancient times it was revered as sacred, and women were forbidden to visit it until 1868. Every year in July and August, the season of ascending the mountain, over 250,000 pilgrims of all ages reach the peak. The climb takes five to seven hours. For millions of people the ascent to Mount Fuji is something to do at least once in one's life, even if an old Japanese expression says, "everyone climbs Mount Fuji at least once, but only the crazy ones come back."

The masks

One thing that most strikes tourists from the West is the number of Japanese with their faces covered by masks; used to prevent the spread of viral illnesses, like the common cold. Also, the Japanese do not blow their nose in public because the practice is considered very improper, thus the mask makes it possible to hide the bothersome dripping from one's nose.

The dives

Scuba diving is written like this in Japanese:

スキューバダイビング

Dive centres in Japan are very well organized. The centres closest to Tokyo (about 100 km. away) are found on the Izu Peninsula, can be easily reached from the capital by means of high speed train (Shinkansen), such as the so-called "bullet train." Here, the weather conditions for diving are excellent in every season.

The price of two dives is around 19.000¥ (about 160€). This includes the trip by boat, the air tanks and weights, one meal, the dive guide, and transport from the station.

The only problem can be the language because the majority of Japanese only speak their native tongue. The pre-dive debriefing may require a translator. Many of the translators who work in the dive centres are women (according to certain sources, 90% of Japanese divers are female).

Even though Christianity is not widespread, the Japanese really like Christmas, mostly for the decorations and its consumerist spirit. Christmas trees are already put up during the first few days of November and are exhibited in hotels and shopping malls.

How To Exorcise Seemingly Complicated Diving Problems

Perception of Reality and Hydration in Divers

by Claudio Di Manao

One notable accomplishment of Steve Jobs (editor's note: the late founder of Apple Computers) was the creation of Reality Distortion Fields (RDF). It appears that entering in one of these fields allows one to design a new concept of computer in three days, and makes life lose all its worth without an iPhone.

Though I've discovered that the ability to distort reality can be done by looking creatively at technology. This can be guite common among divers, especially when we're talking about depth and one's quantity of air. It seems that hiding the manometer in the pocket of the BC, for example, can keep the air at a constant level, or even increase it.

The maximum point of reality distortion happens at around 30 bars. It's interesting to note how this number reoccurs: a case similar to this one is another point of reality distortion that happens, in fact, at 30 meters. 36 meters are often perceived as 29.8; 38 as 29.9. On the contrary, 30 bar are perceived as almost 50.

Yet its one's opinion of his physiological limits that allows him to touch the highest peaks: the important thing is to choose a variable that fits well and to adjust it according to one's needs, using it as a means to distort reality - to flatten and smooth out the zigzag, saw-toothed pattern of a dive profile. Everyone knows perfectly well what a "sawtooth" dive profile looks like... it looks like something that "all the other guys" do. Among these variables, the most "variable" of all is the perception of the concept of hydration. Each one of us is different in his/her physiology and that's why it's better to stay well within the limits of the dive table and dive computer. There's some people who can be sufficiently hydrated by a coffee or a glass of Coca-Cola, and others who, already from the night before, have imagined the sound of beer and chips.

When it's 45° in the shade, I remind everyone that they need to ingest liquids and stay hydrated by drinking a lot of water. Inevitably, there are those who pounce on bottles of orange soda and Coca-Cola. "Why?" they ask. "There's water in all drinks, isn't there?" I begin to explain, "There's an alkaloid in coffee. There's sugar in soda... to metabolize these substances the organism needs to use the water it has and... " As usual, a trip to the other dimension begins when I reach the third syllable, "Me-ta**bol**..." and the diver is no longer with us; he has cancelled out reality as you know it, and has fallen back into a parallel universe; the one that he has distorted.

This single phrase is enough to get divers and dive masters to travel back and forth along this invisible line, "Aerodynamic studies have shown that the giant hornet cannot is not able to fly due to the relationship of its wingspan to its corporeal mass." It's a quote from Igor Ivanovič Sikorskij, a pioneer in aviation, but I've heard it uttered by a diver who was attempting to continue his dive with 30 bars. Dealing with someone like that is like having a devil on board.

A diver who was a civil engineer tried to

convince me that if you hold your breath for a certain period of time, you don't absorb nitrogen. He said this, obviously, to justify the fact that he had breached the fateful limit of 30 meters with only a watch and depth gauge on him. "If that's not true, then all free divers would suffer from DCS!" Words such as these, uttered under tropical skies, were enough to catalyse all the attention and brainwaves of those on board. To have held his breath and ignored the dive table and instruments was trivial: he was the genius, the smart one, the innovator... and us, the guides... we were the self-righteous defenders of old-fashioned moral convictions. My motto, "You can't trust in something that you can't measure!" had the ring of an outdated expression. Everyone listened, fascinated - to him; not to me. Under a picturesque cotton puff sky, my objections sounded dumb. He obviously was in perfect form, and I couldn't just send him back down underwater with the excuse of an emergency recompression; it wasn't part of our standards, in fact... it is a procedure absolutely prohibited.

Fortunately, the devil doesn't come on board so often. Yet the reality distortion field isn't always efficient; dehydration continues to send divers in the hyperbaric chamber, and ship boats back to shore for false alarms. All the same, they continue to make "yo-yo" dives and other "creative" interpretations of dive instruments. I've met very few "Steve Jobs"s underwater, and not even Steve could make magic happen every time.

"There's some people who can be sufficiently hydrated by a coffee or a glass of Coca-Cola, and others who, already from the night before, have imagined the sound of beer and chips... When it's 45° in the shade, I remind everyone that they need to ingest liquids and stay hydrated by drinking a lot of water."

 $PPN_2 \times P-1 \times \sqrt{t+2}$

preventing DCI.

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Send us pictures of you and your buddies while using the DAN bottle, we will publish them on the official DAN Europe Facebook page. The best pictures will be chosen to represent our safety campaign at an international level!.

The new DAN Europe safety campaign promoting the importance of hydration among divers

Throughout its numerous research studies, DAN has demonstrated the importance of drinking water and staying hydrated for a diver. Good hydration can play a significant role in

Stay hydrated, dive safe!.

A SPECIAL ALU BOTTLE SUPPORT OUR CAMPAIGN

0.75l bottle made of Aluminium. Light and trendy! Customised with DAN logo Includes carabiner, for easy attachment to your dive equipment

"The feeling of being under water on a breath hold, there is no comparison" - Michael Board

by Gustaf Lundskog

Can you go from "dabbling" in something to setting national records in only four years? Most people would probably say no, but that is exactly what Michael Board has done.

On the sixth day of Suunto Vertical Blue 2012 Mike broke the old UK Constant Weight Freediving record when he reached 94 meters on a single breath of air. On the seventh day he went down to 96 meters!

Those who know Mike are probably not too surprised, though. He seems to have a knack for realizing dreams. When he is not in the Bahamas setting records Mike runs Indonesia's first and only freediving centre on the island Gili Trawangan.

In 2001, on his way back to the UK after a long journey through Australia, Mike decided to visit "The Gilis", three coral fringed little pearls in the middle of a cobalt blue ocean, where adventurous travellers have laid down their backpacks since the early 70's. Mike was already a PADI Scuba Diving instructor as well as a TDI Technical Diving Instructor when he got there and could easily have stayed, but other challenges beckoned. He left and did not come back for seven years.

It was during those years that Mike's interest in freediving became a passion.

"Once I started there was no going back," he says.

We are sitting in front of his office a few meters from the warm waters of the Lombok Strait. Mike seems calm and relaxed, and how can you not be on a small island where no motor traffic is allowed?

"I felt that there had to be something more I could learn about freediving to do it better, so I searched for courses. The first one I did was in Thailand and that opened up a whole new world to me. I realized people were doing it all over the place so I ended up taking courses in Egypt and many other places."

With time and practice Mike became a SSI Freediving Trainer and an Apnea Total Master Instructor. In 2008 he went back to Gili Trawangan to teach scuba diving, but instead he found that the time was right to take his passion to the next level and make it his livelihood. A few months later, in 2009, he opened up the region's first freediving and yoga centre.

But what is it about diving deep on a single breath of air that makes it so alluring? Is it very different from scuba diving?

"The feeling of being under water on a breath hold, there is no comparison. The way you are moving through the water. You glide. With just a few fin kicks you are flying through the water. It really is a totally different feeling. You don't feel as much as a spectator in an alien world, you feel part of it because you are doing it in a very natural way. Since you know your time is limited your senses are heightened by the fact that you are holding your breath deep under water."

an extra safety net:

"DAN is very important to us as freedivers, there is no dedicated insurance for freediving so we have a DAN Pro Gold insurance that covers us for everything," he explains just before it is time for me to run to the speed boat that will take me back to Bali.

As I say goodbye to Mike and Gili Trawangan I can't help but feeling a bit envious of his life on the paradise island, but it is a good kind of envy, the kind that is also inspiring. Mike Board's freediving adventure has only just started, and there are adventures waiting for all of us out there, we just have to make them happen...

Mike gives freediving courses on all levels, from beginners to aspiring instructors, and DAN are happy to provide both him and his students with

"DAN is very important to us as freedivers, there is no dedicated insurance for freediving so we have a DAN Pro Gold insurance that covers us for everything."

DCS in the Maldives

by Tessa Berghout

Imagine enjoying a well-deserved holiday on the exotic Maldives and being able to go on diving trips to see the beautiful coral reefs...This is what a 60 year old DAN member from France was doing, until he found himself one day coming up from a dive feeling ill and disorientated.

It was only about ten minutes after his first dive, in the morning at Gaaf Alif, that he had a sudden onset of dizziness, nausea and vomiting. 100% oxygen was applied by demand valve on the boat for one hour, however, without major improvement. Being aware of the fact that DAN operates through an international network of alarm centers, active 24 hours a day, DAN Europe was alerted by the dive-guide of the safari boat who asked for assistance. DAN recommended to send the patient to the nearest hyperbaric facility. Being in the middle of the sea, this was easier said than done! After checking the options of transport available, DAN arranged for an emergency speed boat to pick up the patient from the safari boat and bring him to the medical hyperbaric centre at Villingili on the Atoll of Addu. In the meantime, the medical centre was alerted by DAN and was on stand-by for the patient's arrival.

During the transfer the injured diver was administered normobaric oxygen twice an hour. Upon arrival, the patient was unable to walk on his own and continued to suffer from nausea and dizziness. After initial medical examination, inner ear Decompression Sickness was diagnosed and hyperbaric chamber treatment according to Table 6 of the US Navy was started. After the therapy the patient was able to walk on his own, but was still not 100% recovered. Another Table 5 treatment was necessary the next day for the symptoms to disappear completely.

DAN was very pleased to hear that the treatment had the desired effects. Since the diver was insured with a Sport Silver policy, the costs for the speedboat evacuation and the hyperbaric treatments were fully covered. He also had been reimbursed the cost of refuelling the speedboat (that he happened to pay for during the emergency) and the extra accommodation charges incurred during the time of therapy. The total costs added up to about 12.000 Euro.

With a DAN membership, you can count on DAN wherever you are!

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Emergency Paediatric Care in Thailand: *"a truly brilliant service."*

by Franca Di Muzio

Travelling with kids, as one knows, requires a lot of care and attention. If the trip in question is in a faraway country, well known for its natural wonders but perhaps not always equipped with great healthcare facilities, one can never take too many precautions, especially in very remote locations.

This story is about a family from England who are staying in Thailand, where the father works as an instructor during the dive season. They have decided to bring along their nearly one year old daughter. During the trip to Koh Tao, the baby gets sick; she has a fever, cough and difficulty breathing. She's initially treated with antibiotics and a nebulizer, but there aren't adequate clinics on the island for this type of emergency, and the Thai doctor who they've seen advises them to transfer her to a bigger hospital, equipped for paediatric cases.

Fortunately, all members of the family are DAN Members and covered by the Pro Gold Family plan, valid 365 days a year for dive and non-dive emergencies. The mother calls the DAN hotline, that quickly directs them to the Bangkok Samui Hospital on the island of Koh Samui, giving them information on the ferry transport and reassuring them of the coverage for the costs.

The healthcare personnel at Bangkok Samui Hospital have a long and solid relationship of trust with DAN, and after having seeing the DAN card, they immediately received the little one. The DAN Claims department did their part in asking the hospital for the necessary medical documentation, and they issued a guarantee of payment (GOP) after just a few hours, so the baby's parents could avoid paying upfront for the hospital care. Not only that, but DAN's staff also looked after the baby's father - who had remained anxiously waiting in Koh Tao, and had difficulty contacting his wife – by giving him constant updates in real time on the conditions of the baby.

DAN and the family kept in contact over the following days, until reaching a happy conclusion: the baby responded well to the treatment and, in the span of four hours, was discharged from the hospital. Yet again, DAN has provided its members with an unparalleled highly professional and personal service.

What a great relief for those parents, dedicated, long-time DAN members. Here is a letter of appreciation from the mother, who wrote us to thank us for the assistance she received:

We have had to claim with DAN Europe 3 times over the last 10 years and have never ever had any problem whatsoever. The staff are extremely helpful and always willing to do whatever they can to help. They stay in contact frequently throughout the entire situation and all medical bills are paid on time, without question. Most recently, my daughter was taken very sick with Pneumonia and as she is covered by my husband's Pro Gold package, she was covered for her entire hospital stay and all medical bills and medication. It was a totally hideous ordeal and without the knowledge that DAN Europe were our insurance company and would deal with everything, it would of made the entire situation so much worse. THANK YOU Dan Europe for a truly brilliant service.

With the Flying Bubbles project, DAN Research takes off! Ultrasounds in Flight for Further In-Depth Research

After a long and accurate phase of tests, an innovative research project on Flying after Diving and no-fly time has just taken off. The project originates from a collaboration among DAN Europe, Neos airlines, Albatros Top Boat and DiveSystem. The objective is to monitor the presence of gas bubbles in divers during a return flight after diving. For this reason, DAN researchers will be on board some of the vessels of the Neos fleet, conducting ultrasound exams.

DAN's research division, always active in the detection of post-dive bubbles, has asked Neos to collaborate in the exploration of this aspect of travelling and diving that until now has remained unknown. Divers nowadays are in fact the perfect epitomes of a globetrotter: always in movement, ready for anything in the pursuit of their passion. It may happen that some ignore or overlook the recommendations regarding no-fly time, that is to say, the minimum interval of time recommended between a dive and flying, and they embark too soon, thus increasing the risk of DCS – Decompression Sickness.

Decompression Sickness (DCS) is a pathology of decompression that is caused by the formation of bubbles within the bloodstream or in tissues that result when inert gas (nitrogen) is not eliminated, and that can have serious consequences.

To avoid the formation of gas bubbles, divers who travel by plane after a dive must respect the intervals of safety. Reliable studies in this field have been conducted by DAN, and it is advised to wait at least 12 hours after a single dive within the safety curve, and 24 hours after a series of dives or a dive with decompression. These recommendations are based on observations made pre and post-dive and on mathematical calculations. Though until now, researchers have not had access to fundamental physiological data, like that which is taken from monitoring in flight. Thanks to this development, it has become possible to conduct research and make contact with a prestigious aeronautic partner who believes in the project.

The detection of bubbles using ultrasound during flight represents a step further toward greater safety for those explorers of the abyss that are also air travellers.

photo: Marzia Ferrone

photo: Marzia Ferrone

For further information, write to: dsl@daneurope.org

EUBS Abstract 1: ENT problems suffered by scuba divers during participation in diving activities A cross sectional study from 2009 to 2011 using the DAN Europe insurance claims database

A. Gerges, R. van den Berg, T. Berghout, C. De Iuliis, A. Marroni

Background

What types of Acute ENT problems while diving make a diver visit a healthcare facility? We studied incidence of such problems in the DAN member community as probably the biggest diving community diving medical information can be collected from.

Methods

Population studied: DAN Europe active members from 2009 to 2011.

Inclusion criteria: Filed insurance claim for diving related ENT problem, defined as any acute medical condition affecting EAR, NOSE, SINUSES & PHARYNX or related functions. ENT problems might be caused by diving or unexpected illness unrelated to diving. Claims were classified into 1-Barotrauma; 2-inner ear DCI (IEDCI); 3-non diving related illness, according to medical reports submitted by treating facilities.

Areas studied: Anthropometric and demographic data, country & time of accident, certification level, area affected, percentage of diving ENT problems vs. total diving problems, previous history.

Results

Cumulative incidence of diving ENT problems per 10000 members was 21.53 in 2009, 27.60 in 2010, 26.83 in 2011. Diving ENT problems constituted 22.22%, 27.55%, 26.50% of total diving related claims filed in 2009, 2010, 2011 respectively and they increased by 36.53% from 2009 to 2010 and by 20.19% from 2010 to 2011.

Barotraumas constituted 71.04% of all ENT problems and 18.19% of all the diving medical problems in the observed period.

Conclusion

Although ENT problems are by far the more frequent medical complaint in recreational diving, and cause significant morbidity, they are too often neglected. More intensive research and educational programs to decrease their incidence and morbidity are advocated. A universal reporting form for diving ENT problems to help research progress in this area is proposed. Furthermore DAN has produced the specific Ear & Diving educational program to help improve divers safety and awareness.

EUBS Abstract 2: Prevalence and Genetic Predisposition to Acute Respiratory Symptoms in Breath-Hold Divers

D. Cialoni, M. Pieri, N. Sponsiello, C. Marabotti, F. Garoia, P. De Cristofaro, E. Pisciotti and A. Marroni

Introduction

After repetitive deep dives, breath-hold divers are often affected by a syndrome characterized by symptoms such as cough, chest constriction, haemoptysis and, rarely, an overt acute pulmonary oedema syndrome, often together with various degrees of dyspnoea (ARS).

Aim of this work is an epidemiological investigation to evaluate the prevalence of acute respiratory symptoms (ARS) in Breathhold divers; we have also investigated for possible inherent risk factor such as genetic predisposition.

Materials and Methods

A retrospective investigation has been performed using specific questionnaires filled by a selected sample of free divers.

A second specific questionnaire was used to identify other possible risk factors that could predispose to ARS.

The possible correlation between ARS and individual genetic variability in candidate predisposing genes was also investigated, with a particular focus on EPAS1 and other HIF-related genes.

Result

Fifty-six subjects (26.4%) reported previous events of ARS.

No statistically significant relationships was noted between the positive or negative reported cases of ARS and biometric data such as height and weight, age, gender, practice of other sports, smoking.

No statistically significant relationships was noted between ARS and previous diseases such allergies, asthma, or habitual use of drugs.

Important statistically significant relationship was observed between ARS and personal maximum depth limit.

Interesting data was observed between ARS and selected genes that could predispose to the condition.

Preliminary results seem to suggest interesting associations between expression of evaluated genes and ARS; analysis is, at present, still in progress.

Conclusion

enced Breath-hold Divers.

Our results allow for better definition of diving methods able to mitigate breath-hold diving pulmonary risk as the identification of possible genetic predisposition to pulmonary oedema, and may improve breath-hold diving safety through better awareness of possible risk factors by the divers themselves.

Our data show that ARS is a common condition among experi-

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EUBS Abstract 3: Preliminary Analysis of DAN Europe DSL DB And Gradient Factor Evaluations - *Phypode Project*

C. Bonuccelli, M. Pieri, D. Cialoni, A. Gerges, G. Orman, C. Balestra and A. Marroni

Introduction

The current large number of dives per year requires in-depth epidemiological analysis.

The DAN Europe DSL database (DB) was analysed aiming at comparing its data with tissue saturation values according to Buhlmann ZH16 Model.

An analysis of the relationship between ambient pressure and allowed gradient factor (GF) as predicted by Buhlmann ZH16 was completed.

Materials and Methods

An original database format (DAN DL7) was developed for statistical analysis.

Information about anthropometric data, breathing gas used, equipment malfunctions, medical history was included. An original software was developed for the analysis of GF values.

Results

3000 divers (2460 male, 540 female; mean age 37,66) completed 39.944 dives (mean depth 28,03 m +/- 13,75m - mean dive time 46,02 +/- 4,6 min)

91,30% used air, 5,14% nitrox. 0,48% trimix, whilst for 3,08% data are missing.

The use or compartimental vs bubble decompression algorithms was equally distributed (50-50 approximately).

Preliminary analysis has shown that for each tissue, at any value of the ambient pressure the supersaturation calculated on the basis of the given profile is constantly significantly lower than the maximum allowed supersaturation value as predicted by the Buhlmann ZH16 model.

181 DCS cases were recorded (0.5%), of which only 20% showed a GF > 80%, whilst the majority implied lower supersaturation and GF than expected in a DCS case.

Conclusion

Most of the analysed dives lie in the "safe zone" i.e. Divers tend to dive very conservatively.

Average ascent speed is lower than recommended by current algorithms. The reliability of current algorithms shows "grey areas" as to ability to predict DCS that need further research and a more physiological approach to decompression.

The DAN Europe DSL DB analysis is providing important data to improve safety in recreational diving.

Coming up Short What Does It Mean When You Can't Get Enough Air?

by Marty McCafferty

As DAN Members you know that DAN continuously gathers data on dive injuries. A small, but growing, number of cases reported to DAN involves what was traditionally considered a fairly rare condition. It's called immersion pulmonary edema (IPE), or pulmonary edema of diving. When this occurs, a diver or surface swimmer experiences an accumulation of fluid in the lungs. The number of IPE cases has increased. Why the increase is unclear. The condition itself is not clearly understood, but since it is occurring more frequently, divers should know about it.

How does it feel?

Symptoms include shortness of breath or the sensation of not getting enough air while at depth, often after only a few minutes in the water. Typically the symptoms start before ascent. As divers with this condition ascend, they experience no improvement. In fact, they usually cough up pink, frothy sputum: Such fluid in the lungs can reduce the amount of oxygen reaching the blood. The diver may have noisy breathing that can be heard without a stethoscope. The condition usually occurs after only a few minutes in the water at a shallow depth, so it is not usually confused with cardiorespiratory decompression sickness (or "chokes"). Chest pain is usually absent, unless the condition is due to a heart attack. If the diver lacks sufficient amounts of oxygen, he or she may exhibit confusion or loss of consciousness.

How does it happen?

Originally, IPE was thought to occur almost exclusively in cold water. While this condition seems to be more common in cold water, it has also been reported in warm waters. During immersion in water, blood is redistributed

from the legs to the heart and blood vessels in the lungs. Usually the heart and lungs compensate for this, but sometimes the resulting increased pressure within the blood vessels in the lungs causes fluid to traverse the small vessels (capillaries) and enter the gas-containing spaces of the lungs. Sometimes this is caused by an underwater myocardial infarction (heart attack), abnormalities of the heart muscle or heart valves or hypertension. Usually there is no obvious cause. Cold water may be a predisposing factor because immersion can cause the small arteries to constrict, increasing the resistance to the flow of blood. Vasoconstriction in response to cold can be exaggerated in people with hypertension or those likely to develop it. But some people who experience IPE are young and healthy, even military recruits. Records indicate that 15 cases of IPE were reported to DAN in 2006, and 12 cases in 2005. It is likely that additional cases occurred but were simply not reported. Aspiration of water (also called submersion incidents) can imitate IPE. It is also possible to have both submersion incident and IPE occur at the same time: When a diver surfaces and feels as though he or she is suffocating, a typical reaction is to remove the regulator from the mouth in an attempt to gain more air. In rough seas, the diver can also aspirate (breathe in) water. A lung overexpansion injury, or pulmonary barotrauma (PBT), is another condition that can cause shortness of breath. The treating physician can distinguish between these conditions by obtaining an accurate history from the diver about the timing of the symptoms. If shortness of breath began during descent, PBT is unlikely. Water aspiration can usually be confirmed by a conscious diver.

The treatment for IPE

Immediate treatment should include breathing oxygen while in transit to a hospital. Some IPE cases have been fatal, although most cases resolve on their own during observation in a hospital. A closer examination may reveal hypertension, a heart attack, cardiac valve disease or impaired contraction of the heart. Divers who have experienced IPE are concerned with the likelihood it will recur. Unfortunately, that likelihood is not known, so many physicians recommend that people with a history of IPE not return to

diving. Still others recommend taking an antihypertensive medication before each dive. Before considering a return to diving after IPE, DAN recommends the diver consult with a doctor knowledgeable about the condition. Additionally, DAN supports recommendations of the American Heart Association regarding cardiovascular risk assessment. Diving should be considered an exercise program. Individuals older than 40 who would like to take up scuba diving or continue scuba diving should have a medical evaluation if they:

- do not engage in at least 30 minutes of moderate-intensity (40-60 percent of maximum capacity) physical activity on most, and preferably all, days of the week;
- · have hypertension, high cholesterol, smoke cigarettes, have family members who have died prematurely of heart disease or diabetes;
- have a suspected heart condition.

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"During immersion in water, blood is redistributed from the legs to the heart and blood vessels in the lungs. Usually the heart and lungs compensate for this, but sometimes the resulting increased pressure within the blood vessels in the lungs causes fluid to traverse the small vessels (capillaries) and enter the gas-containing spaces of the lungs."

Are Pre-Existing Medical Conditions covered or not?

by Michael Mifsud - Claims Executive, DEIB

Public in general talks about health care like it's a debatable issue. We weigh the pros and cons, we take sides, we argue. The truth is, everyone is better off when everyone is healthy, especially those of us who have to face a serious health condition.

Many people think that by insuring themselves, they will be covered for anything that might happen to them in the future. Unfortunately, this is not correct as all insurance policies might have certain limitations. Furthermore, one must not forget that for anything to be insurable, it has to be of an accidental and fortuitous nature. For example one can insure himself to repair his car if he accidentally crashes in the future, because him crashing in the future is an unknown. However he cannot insure his repairs if he decides to bash his car up with a hammer, as that action was not accidental. He knew he would damage his car!

The same applies when, for example, buying an insurance policy which offers covers for medical expenses. Such an insurance policy would normally exclude pre-existing medical conditions, so when reading an insurance policy, it is quite common for people to ask: What are pre-existing medical conditions? Does pre-existing medical conditions could effect my insurance coverage? Do insurance policies cover pre-existing medical conditions? Can pre-existing medical conditions be covered?

A pre-existing medical condition is considered to be an ongoing medical or dental condition, any related complication you might have and/or symptoms, which you are aware of when you are applying for/or renewing an insurance coverage. Such pre-existing medical conditions may be of chronic nature such as heart disease, high blood pressure, cancer, diabetes, allergies, asthma, hay fever or the like or be related to a previous accidental injury.

If a medical condition arises after the date of issue of your Insurance Certificate and/or after the renewal date of the insurance policy, such condition will not be considered as a pre-existing medical condition.

Therefore coming back to the principle of "accidental and fortuitous", one would be insured if he had to, let us say suffer an injury which he never expected to suffer when he bought an insurance policy, because when he bought the policy he was healthy and expected things to turn out right. However if he was aware of say a decaying tooth before he bought the insurance, then he cannot expect the insurers to pay him the bill of the dentist after he bought the policy. Such a case could also be considered as insurance fraud. In any case, it would not be very intelligent of the insurer to sell an insurance policy for say Eur 25, when they know already that a few days later they are sure to pay say Eur 500.....at least not if they want to make a profit.

We always recommend that one refers to his / her insurance company any medical condition he / she is aware of when purchasing / renewing an insurance policy.

If you are aware of a medical condition and you are not sure if it could affect your diving activity and / or your insurance coverage, we encourage you to contact the DAN Europe Medical Referrals Helpline on +39 085/8930333 or alternatively send an email to medicalreferrals@deib.eu. Your enquiry will be handled confidentially by the referrals team and the DAN Doctors, and you will be advised on whether your medical condition may or may not effect your insurance coverage. This would avoid situations whereby one becomes aware of a discontinuity in coverage only after making a claim.

If you are aware of a medical condition and you are not sure if it could affect your diving activity and / or your insurance coverage, we encourage you to contact the DAN Europe Medical Referrals Helpline on +39 085/8930333 or alternatively send an email to medicalreferrals@deib.eu

Typical situations of persons suffering from pre-existing medical conditions:

An insured whilst applying for an insurance coverage, was aware of his high blood pressure condition. When he was abroad he suffered a urinary tract infection and went to a hospital.

Given that there was no connection between high blood pressure and urinary tract infection, the medical expenses incurred by the insured were completely covered by the insurance coverage as it was not a pre-existing medical condition.

An insured whilst diving in tropical waters with a shorty wetsuit, accidentally hit a fire coral and went to a hospital for medical treatment.

After evaluating the medical report together with the information provided, the insurance company and its in-house doctors realized that prior to inception of the insurance policy she suffered from a spread psoriasis affecting forearms and legs. In view that on the second week of medical treatment the insured had an infectious complication with local cellulitis, which was facilitated by the preexisting medical condition, the insurance company agreed to pay for the first week of medical treatment.

An insured while diving in shallow depth felt pain in his chest and aborted the dive. Insured was evacuated to a nearby hospital for a medical visit by a specialist medical doctor.

After the medical reports and required information were assessed by the insurance company and its in-house doctors, the medical visit expenses incurred by the insured were not covered for the following reasons:

- It transpired that the insured was suffering from a heart disease before inception of insurance coverage;
- The medical expenses incurred were related to the heart disease (i.e. to a pre-existing medical condition).
- Before buying insurance coverage, the insured was already advised by his medical doctor not to undertake diving activities.

Everyone at one point or another suffered from sickness or injury. So, you may be asking yourself...."Is such sickness or injury considered as a pre-existing medical condition?" If the answer to your question is still unclear, we urge you to contact us and we will be more than happy to answer any questions you may have.

SPORT DIVING INSURANCE FOR DAN MEMBERS

Therefore coming back to the principle of "accidental and fortuitous", one would be insured if he had to, let us say suffer an injury which he never expected to suffer when he bought an insurance policy, because when he bought the policy he was healthy and expected things to turn out right

Robojelly: The Underwater Robot Jellyfish that Produces its own Energy from Hydrogen

by Marta Albè

Robojelly is the name of the newly invented underwater robot jellyfish prototype, capable of refuelling itself using hydrogen present in ocean waters, producing the necessary energy to perform its movements.

The system that allows the robot to move autonomously was developed and realized by Virginia Tech University after having closely observed the movements of real-life jellyfish, which are able to flex their tentacles by means of a propelling action in the muscles, controlled by the upper region of the organism, which contracts and expands in a way that makes it possible for these unique marine animals to move through water.

en es "What this means for the robot's

The jellyfish robot was realized using performance is that it special materials, chosen for their flexible qualities, so as to imitate the hardoes not need to resort monious real-life movements of these to external energy invertebrates in their course through the water. To obtain a satisfactory result, sources or use fuel." Yonas Tadesse and his colleagues used nickel-titanium parts to create tentacles that retain their original form after contraction. In addition, they constructed a covering made of metallic nano-particles, able to generate heat, thus producing energy, once exposed to the hydrogen and oxygen present in ocean waters.

Thanks to this exothermic reaction, the tentacles of the jellyfish robot are potentially able to contract and protract continuously because of the constant presence of hydrogen and oxygen in ocean waters. What this means for the robot's performance is that it does not need to resort to external energy sources or use fuel. The next step in research for this invention – a direct source of inspiration is the movement patterns of the jellyfish species, Aurelia aurita, or common jellyfish - is the creation of a system that makes it possible to control the direction of the robot's movements, an aim that, if realized, would make the device of potential use to highly relevant fields, such as the military and strategic operations.

The DAN Europe Photocontest as we know it has come to an end. Our Editorial Board is currently working on a renewed version: in the meantime, all underwater pictures received will be published in this Portfolio section.

You can e-mail your photos to: portfolio@alertdiver.eu

- 1. Vincenzo Marotta
- 2. João Miguel Roque
- 3. Florence Poncelet

DAN **Mission Statement**

DAN Europe (Divers Alert Network Europe) is an international non-profit medical and research organization dedicated to the safety and health of recreational scuba divers.

Founded in 1983. DAN Europe exists to provide expert information and advice for the benefit of its members and the diving public.

DAN provides emergency medical advice and assistance for underwater diving injuries, works to prevent injuries and to promote diving safety, supports underwater diving research and education, and strives to provide the most accurate, up-to-date and unbiased information on issues of common concern to the diving community.

Our Vision

DAN Europe's vision is to be the most recognized and trusted organization worldwide in the fields of diver safety and emergency services, health, research, and education by its members, instructors, supporters and recreational diving community at large

DAN EUROPE FOUNDATION

DAN Europe Balkans

(Serbia and Montenegro, Bosnia and Hezegovina) DAN Europe BeNeLux (Belgium, Netherlands, Luxembourg) DAN Europe Česko DAN Europe Croatia **DAN Europe France** DAN Europe Germany, Austria & Hungary **DAN Europe Hellas** DAN Europe Ibérica (Andorra, Portugal, Spain) DAN Europe Italia **DAN Europe Malta DAN Europe Polska** DAN Europe Skandinavien (Denmark, Norway, Sweden, Finland) **DAN Europe Slovenia DAN Europe Portugal DAN Europe Suisse** DAN Europe Türkiye **DAN Europe United Kingdom** Gibraltar & Ireland

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DAN Maldives DAN Egypt **DAN Israel**

THE OTHER **INTERNATIONAL DAN ORGANIZATIONS**

DAN America **DAN America - Mexico** DAN Japan **DAN Asia-Pacific** DAN Asia Pacific - Philippines **DAN Southern Africa**

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Regions of coverage include geographical Europe, the countries of the Mediterranean Basin, the countries on the shores of the Red Sea, the Middle East including the Persian Gulf, the countries on the shores of the Indian Ocean north of the Equator and West of India and Sri Lanka, as well as the related overseas territories, districts, and protectorates.

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SCUBADOLPHIN VIA MONTECASSIANO, 15 - 00156 ROMA Italy Telefono +39 3476447821 http://www.scubadolphin.it

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DUIKPUNT OOSTENDE BRUGGE torhoutsesteenweg 551 - 8400 Oostende -Belgium Telefono +32 59800951 info@duikpunt.be

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CMAS DIVING CENTER BUK JESENJINOVA 1 - 78000 BANJA LUKA -Bosnia-Herzegovina Telefono +387 51 203400 buk@blic.net

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ZPV - PIRANHA DRIENERLOLAAN 5 - 7522 NB ENSCHEDE -Netherlands opleidingen@zpv-piranha.nl

This "Explorer " necklace is made of Bronze (leadfree) while its coloration is obtained during a galvanic process with gold and Ruthenium. The polishing of this necklace was carried out with Nickel free materials.

The EEZYCUT TRILOBITE Emergency Cutting Tool

The unique cutting mechanism of the EEZYCUT TRILOBITE provides the cleanest, sharpest, most effortless cutting action available. It is rated to cut line with ease, repeatedly, up to 8mm thick, and can easily cut through larger line. With replacement blades, this cutting tool provides you with the best cut, every time.

Whether you are a diver or a sailor, the BC Rescue knife is a perfect knife to be used in emergencies. Easy and fast to deploy, thanks to the perfect grip (also in wet conditions) and the attachment hook, which can be attached practically everywhere you want (including on your BCD). The high quality

If it is difficult to make your choice or you may want different bags for all your materials, the set of 3 different dry bags (15, 60, 90 lt) will

This set is sold at a special packet price.

€77,39

+ VA1

DAN Europe Product Selection

Visit the online catalogue today and discover the complete range of DAN products!

Display SpO₂, Pulse Rate ,Pulse bar and Plethysmogram - High resolution, easy to read Color OLED monitor with 6 display modes and 10 levels of brightness control. The SPO₂ wave can be displayed in 2 ways. Compact sized with only 50g including batteries.

Prestan Adult CPR-AED Training Manikin with CPR Monitor

Realistic to the eye and the touch, the Prestan Professional Adult Manikin is unlike any other on the market. Prestan's revolutionary CPR Rate Monitor allows for instant feedback to both instructor and student regarding the rate of chest compression. This allows each student to gauge their rate of compressions on their own as well as allowing the instructor to monitor several students quickly and easily. In addition, the manikin incorporates a mechanism ("depth" clicker) to help them use the correct force to compress the chest to the correct depth.

Intelligent Power light (yellow-orange)

This multiple use safety light with dual lighting function (constant burning or flashing) can be used in and outside the water; is waterproof until 100m and impact resistant. The included Lithium batteries last over 250 hours (flashing).

€ 32,23

+ VAT

Summer jacket men – SLAM

Wind and waterproof jacket from the technical sportswear company "SLAM", personalised for DAN Europe with an embroidered DAN logo on the chest. This easy-to-wear, modern and sportive Jacket is ideal for day-to-day use in the spring and summer time and will provide you the needed protection wherever you are.

Long sleeve DAN polo

This black, 100% cotton, modern and stylish Polo Shirt for men is made exclusively for DAN Europe. The polo represents the DAN colors, while the number "83" refers to the year DAN Europe was founded.

The ICE-KEY® is a pvc bracelet with an internal USB flash memory containing a software program (ICE K one®) designed specifically for the inclusion of personal and Emergency Medical information.

The ICE-KEY® is used in all those cases of emergencies, where you need to know your personal and medical data to assist and simplify the operation of medical first aid and treatment.

Standard "Pin Index" DAN Oxygen **Unit (with empty cylinder)**

This standard DAN Oxygen unit is specially developed to treat injured divers and includes a 2,5 liter Pin Index Oxygen cylinder.

DAN ICE-KEY "In Case Of Emergency"

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