Hits Happen

Remember Harold Kushner's 1980s bestseller, When Bad Things Happen to Good People? This inspiring book explored why ordinary people – ourselves and people around us – should have to bear extraordinary burdens of grief and pain. Kushner, a rabbi, looked at instances when "neither extraordinarily good nor extraordinarily bad" people are faced with life's challenges. We often hear of divers who push the limits or make some error in judgment, an obvious precursor to a dive accident: they sustain a "hit," or get decompression illness. Other times, though, we find ourselves wondering why a particular diver experienced a dive injury. Given the experience, skill level of the diver or the details of a particular dive or series of dives, it may not seem right that an injury occurred.

Even though the likelihood of experiencing a dive injury is low, there are inherent risks associated with scuba diving that all divers must take into account (see "Just the Facts: Addressing the Inherent Risks of Scuba Diving," in the III 2008 issue). Ultimately, it's a matter of being a responsible diver: reducing these risks through education and training, undergoing proper dive planning, adhering to established dive guidelines and using the tools of diving appropriately. It's not just the divers with minimal experience, or those whose skills aren't current, or divers who make bad decisions underwater who experience dive injuries. At times, bad things happen to experienced divers who follow the rules, too.

Susceptibility to Injury

Consider this: who is more susceptible to a dive injury – the inexperienced or the experienced diver? The 2004 Report on Decompression Illness, Diving Fatalities and Project Dive Exploration concluded that "40 percent of the men and 50 percent of the women injured in 2000 had made fewer than 20 dives in the previous 12 months." Some would argue that inexperienced divers, especially those with limited, recent experience, may be more susceptible to injury: they haven't had enough time to develop or refresh their skills, or they don't have enough confidence to handle more than ideal environmental conditions. Any change in these conditions may lead the neophyte to make mistakes, compounding what starts out as a simple nuisance – a gradual but continuous mask leak, for instance – into something more serious. Theoretically, seasoned divers are better prepared to deal with these things during a dive. According to the 2004 Report, approximately 22 percent of the reported injured men and 10 percent of the women had "in excess of 80 dives in the previous 12 months," with more than 12 percent of the injured men and 4 percent of the women reporting they had "more than 120 dives in the previous year."

Others would argue that seasoned divers are more prone to injury due to more aggressive diving tendencies; they're more likely to push the limits, in terms of depth, time or both. They assume that they have the experience and confidence to handle "anything that comes up." The Report also identifies that 34 percent of Type I DCS injuries – itching, rash, joint or muscle pain – in 2000 were reported by certified entry-level divers, 36 percent were advanced divers, 11 percent were instructors, 9 percent were specialty divers and 5 percent were technical divers. Because DAN's injury data is based on voluntary notification and recording of dive injuries, these data are not complete enough to generalize to the wider diving community. The data do, however, demonstrate that injuries happen across the spectrum of certification and experience. Divers who have more experience probably are less susceptible, but they are still at risk. Diving is safe, but no diver is totally immune from injury. Responsible diving habits – slow ascents, safety stops, diving with a buddy, sufficient surface intervals, and most importantly, not pushing depth and time limits – can decrease this risk further.

Computer Dependency

These days, you don't need to be versed at writing HTML code to be able to use a computer. In fact, home

and business computers continue to improve the way we do things as they get faster and more powerful, and even amateur computer users find today's systems more intuitive and easier to use. During the last decade, divers have benefited from the increased availability of reasonably priced dive computers. More and more divers turn to these handy devices to better track their dives. This simplicity, though, can lead to complacency in dive planning: assuming that the "computer will keep track of all the important details." Computers should be used in conjunction with preplanning of projected dive profiles. Keep in mind the old axiom, "Plan Your Dive and Dive Your Plan."

In addition, dive computer users should be proficient in using dive tables. Not only should tables be used during predive planning, but they may become essential if the computer fails. Just like any other piece of equipment, computers can fail, and this redundancy and self-sufficiency could prevent a problem from turning into a dive injury. Before making any dives on a computer, carefully study the manufacturer's guidelines to make sure you're using the computer appropriately and that you're taking advantage of all the appropriate options. It would be worth participating in a structured course as well. The goal of any computer is to allow divers to have access to greater amounts of information about any given dive. Ultimately, these tools may provide a greater degree of safety as long as they are used appropriately.

The Benefits of Early Recognition

Decompression illness (DCI), decompression sickness (DCS) and arterial gas embolism (AGE) are terms that can make divers flinch (see sidebar for their definitions). Often subtle, signs and symptoms can be ignored, and they often are. Interestingly enough, divers don't call DAN because they have symptoms of DCS; they call DAN because their symptoms won't go away.

Consider this case history

On the final day of a week's worth of diving, the buddy team completed a series of three deep dives. The first was to 95 feet (29 meters) for 30 minutes followed by a 90-minute surface interval. They then made a dive to 90 feet (27 meters) for 36 minutes, followed by a three-hour surface interval. The final dive went to 79 feet (24 meters) for 49 minutes. That evening one of the divers felt a sharp pain in his right hand and thumb, followed by an aching right forearm and shoulder. He thought it was simply muscle strain from a long week of diving and decided not to mention it to anyone. The next morning all the symptoms were gone, so the diver felt sure it wasn't DCI. The diver flew home two days later. On the initial flight, all pain symptoms returned. On the second flight the symptoms worsened. Two days later, when the symptoms persisted, he made a call to DAN.

A Trip up the River, or, Denial

This is an example of how divers might try to "wish away" the possibility that they're suffering from a dive-related injury. A diver might offer any of the following justifications to explain away what is suspected:

- "I'm just sore from lifting tanks."
- "Maybe it'll just go away."
- "It's too much trouble."

Several issues might make divers hesitant about reporting symptoms: they may seem too mild to risk ruining a dive trip or vacation. Embarassment over the episode, concern about the expense of evacuation and treatment, the fear of not being able to dive again – all these issues may override the decision to seek medical care. Of those injured divers included in the 2004 Report on Decompression Illness, Diving Fatalities and Project Dive Exploration, divers in 14 percent of the cases reported having experienced the initial symptoms of DCI before the final dive. "This indicates that the diver either knowingly returned to the

water with symptoms of DCS or did not recognize the symptoms prior to getting back in the water," the Report states.

Denial is the most common reason for delay in seeking assistance. Such delay can make complete recovery more difficult. It's important that divers seek immediate treatment if they or their dive leaders suspect a dive injury. This starts with field oxygen administration and conducting an on-site neurological assessment of the diver. See your local DAN Trainer or Instructor for training opportunities in both. Approximately two-thirds of all cases of DCI involve the central nervous system. Mild symptoms might be dismissed as insignificant or not dive-related. Conducting an on-site neurological check of the diver will provide a reliable way to judge the urgency of a dive emergency. In the event of diver denial, it also may demonstrate to the diver that there is a problem and help convince him or her of the need for first aid treatment such as oxygen first aid. The stigma of being "bent" creates a feeling that the diver did something wrong. In fact, it's possible that the diver did everything right, but still experiences DCI. Divers need to stop feeling guilty if they end up with a diving injury. An old saying reminds us that "admitting you might have a problem is the first step to recovery." Don't be afraid to be cautious; don't hesitate to get help.

Differentiating The Diagnoses

Decompression Illness (DCI)
The broad term that encompasses both decompression sickness and arterial gas embolism, DCI is commonly used to describe any disease caused by changes in ambient pressure. It is used because the symptoms of DCS and AGE can be similar.

Decompression Sickness (DCS)
DCS is a disease caused when the total gas tension dissolved in a diver's tissue exceeds ambient hydrostatic pressure and gas bubble formation occurs. The symptoms may include itching, rash, joint pain, muscle aches or sensory changes such as numbness and tingling. More serious symptoms include muscle weakness, paralysis or disorders of higher cerebral function, including memory and personality changes. DCS can be fatal, although it's very rarely in modern times*. See also Type I DCS and Type II DCS.

Type I DCS (DCS I, Musculoskeletal DCS)
This is decompression sickness in which the symptoms are felt to be non-neurological in origin such as itching, rash, joint or muscle pain.

Type II DCS (DCS II, Neurological DCS)
This involves decompression sickness where there is any symptom referable to the nervous or cardiovascular system.

Arterial Gas Embolism (AGE)
AGE occurs when there is air in the arterial circulation. In divers this may be caused by a sudden reduction in ambient pressure, such as a rapid ascent without exhalation that causes over-pressurization of the lung and pulmonary barotrauma. The most common target organ is the brain, and the usual signs and symptoms include the onset rapid (less than 15 minutes) of strokelike symptoms after reaching the surface.

* For example, there were many deaths in 19th-century caisson divers who descended to great depths while building bridges.