Epilepsy and Diving Q&A

Q: We have a boy in our class who is eager to dive but has an old history of epilepsy. This period was confined to a 12-month duration (1998-1999). His doctor subsequently completed a dive medical examination form, and the prospective diver indicated that he had experienced no further seizures since 1999. He has since gotten his driving license back from the DVLA (Driver and Vehicle Licensing Agency) and hasn't had to take any drugs since 2001. The doctor seems confident that he is back to full health, but the young man would like confirmation that, despite his doctor's notes, that he is OK to dive. Can you give us any advice on this? I'm assuming that since his doctor has cleared him for diving and the DVLA has given him his driving license back, he should be OK to dive, but, if possible, I'd like to get a second opinion from you. Many thanks for your time and help.

A DAN Member in Africa

A: The issue of epilepsy (a condition demonstrated by the development of multiple seizures) and scuba diving is a complicated one. The primary concern is that a loss of consciousness underwater is likely to result in death by drowning unless, by a turn of good fortune, the individual:

- does not lose the demand valve (regulator);
- is discovered before drowning;
- does not breath-hold during ascent with a rescue attempt as a result of laryngospasm or an inability to exhale;
- receives effective resuscitation immediately at the surface; and
- never has cardiac arrest.

Unfortunately, this is a long wish list to be met, and the death rate with unconsciousness underwater is between 30 and 70 percent. In the case of a seizure underwater, it may be even higher. Diving induces many of the stimuli known to independently precipitate an epileptic seizure: flickering lights, hyper- or hypoventilation and sensory deprivation. So, if there is even a marginal risk for seizures, this may be further increased by diving. Finally, even though an individual has not had epilepsy for a number of years or after a certain age, statistics still indicate that the probability of another convulsion is greater than in the rest of the "normal" diving population (believed to be less than 1 percent).

Certain training associations, such as the British Sub-Aqua Club, do accept medical clearance for individuals who have been seizure-free – on no medication – for five years, or after three years if the last seizure occurred during sleep only. This position, made by their medical advisory panel, is based on evidence that the chances of developing another seizure decreases exponentially over time and approaches near normal levels after five years. There are no data, however, that evaluate the risk specifically for the stresses of diving. Ultimately, the diver must decide. Most diving physicians are very reticent to encourage an individual – with a known risk factor – to face an elevated or unquantified risk, for which the adverse outcome is likely to be fatal. Two elements must be considered in summarizing the current recommendations concerning epilepsy and diving: First, that most diving physicians are of the opinion that unless the seizures or unconsciousness were due to:

1. fainting with ultimate seizure activity due to remaining upright in the presence of low blood flow to the brain;
2. other causes of acute low blood pressure, low blood sugar, medication or recreational drugs; or
3. fever, but not after the age of 5, they would not feel confident about advising a person with a confirmed diagnosis of epilepsy that it would be safe to dive.

Second, that there is scientific evidence that suggests that individuals who have been free of seizures, without medication, are unlikely to have further seizures after a period of five years1-5. This encourages continued efforts to further our understanding of the relationship between epilepsy and diving. For the moment, though, it seems that the prospective diver would not be considered fit to dive. After five years off medication, we may again be faced with this question. For more information on this topic, see the sidebar "Another Look: The Advice Is Still the Same," an excerpt from an article by Dr. Hugh Greer.

Another Look – The Advice Is Still the Same

Epilepsy: This disorder of brain function causes episodic alterations of consciousness, called epileptic seizures. Abnormal electrical discharges in the brain cause these episodes; they may occur without warning, and they may vary in character from a brief loss of attention to violent, prolonged convulsion. People may outgrow the condition; it is often, but not always, controlled by medication.
Fitness & Diving: Loss of consciousness or loss of awareness while underwater carries a high risk of life-threatening injury. Current doctrine among diving medicine physicians advises that individuals with epilepsy not dive. Those with childhood epilepsy, who have outgrown the condition and have been off medication for five years, still face a slightly increased risk of a seizure. To make an informed decision about diving, these individuals should discuss this with their personal physicians, families and diving companions.
Medication Used in Treatment: Anti-seizure medication acts directly on the brain and may interact with high partial pressures of nitrogen. This may produce unexpected side effects.

History of Seizures Without a Clear Diagnosis of Epilepsy: This is a cloudy question since many variables can cause transient alteration of consciousness. These alterations of consciousness include fainting, a reduction of blood pressure, which is very common in young people, an alteration in heart rhythm that is more common in older people, effects of medication and psychological events, such as hallucinations.
Fitness & Diving: As with epilepsy, any loss of consciousness underwater is likely to have a bad outcome. When diving using nitrox or mixed gas as a breathing gas, increased partial pressures of oxygen can increase the likelihood of seizures. Increased carbon dioxide may also increase seizure risk. The best advice is to get a precise diagnosis of the cause of altered states of consciousness: effective treatment is often available. You cannot make a reasonable fitness-to-dive decision till this is sorted out. It may take some time and a visit to a neurologist or other specialists. Ask your doctor first.

An excerpt from the May/June 1999 issue of DAN America Alert Diver: "CNS Considerations in Scuba Diving: How Your Diving Fitness Can Be Affected By Your Central Nervous System Health," By Dr. Hugh Greer, DAN Southwest Regional Coordinator.