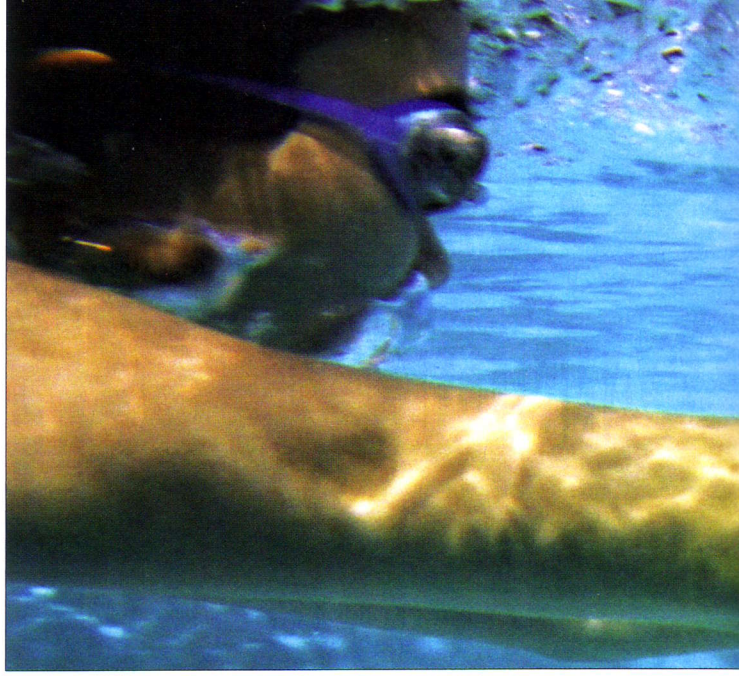
# Dying for Air



**Prolonged underwater breath holding is a silent, often overlooked, killer. Here's why the practice should be banned. | by Walter Griffiths and Tom Griffiths**

More than a decade ago, Stephen Praisner, a collegiate triathlete and experienced SCUBA diver, swimmer and lifeguard, died at the University of North Carolina at the young age of 19 during a public swim in his university swimming pool. He was found in a lap lane in just 4 feet of water with his swimming goggles in place, the next day. His logbook indicated that he would be pushing his limits doing hypoxic training (competitive and repetitive breath-hold swimming) that evening.

His killer? A condition known as "shallow-water blackout," which causes swimmers to lose consciousness underwater during competitive and repetitive breath holding. Although Praisner's death happened more than 10 years ago, the industry still seems to be in the dark about the dangers that killed him.

Statistics about shallow-water blackout deaths are difficult to come by, but anecdotally, we have seen a significant increase in these types of deaths in recent years.

Unfortunately, many aquatics professionals don't seem to understand the risks. When we encourage them to ban the activity, the most common response is "why?" Indeed, many professionals and coaches believe that this extremely dangerous activity is actually good for swimmers, that it is a shortcut to endurance. Some Web sites even encourage breath-holding competitions and advocate the therapeutic effects of holding your breath underwater for more than five minutes!

Part of the problem is the typical profile for repetitive breath holders. Competitive swimmers, Navy Seal divers, free divers and just well-rounded, high-achieving student athletes are typical hypoxic trainers. Not only are they good athletes but they are usually good students as well. In short, they do not fit the profile of an at-risk swimmer, and lifeguards are more likely to ignore these individuals and rarely appreciate how dangerous the underwater swimming activity is.

That danger happens when lower levels of carbon dioxide combine with diminished levels of oxygen in the bloodstream. Basically, the $CO_2$ levels in the bloodstream are what tell humans when to breathe. When exercising strenuously we exhale forcefully, lowering $CO_2$ levels.

Athletes, coaches and military personnel have also learned that if they hyperventilate voluntarily for an extended period, they can virtually eliminate the urge to breathe underwater. Whether performed voluntarily by sustained forceful expiration or involuntarily by lengthy, strenuous exercise, hyperventilation can greatly enhance breath-holding ability.

Couple this with the fact that the longer swimmers hold their breath, the quicker the oxygen levels are reduced in the bloodstream. And the longer swimmers stay underwater, the more they use $O_2$.

The typical scenario is that swimmers move through hypoxia (reduced $O_2$) to the near total absence of $O_2$, which is called anoxia. This leads to unconsciousness and potential drowning. A cardiac arrhythmia that can happen when the blood's pH drops below 7.2 can also outright kill breath holders.

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The siren song for breath holders may be endorphins, which are released at low levels of $O_2$ and $CO_2$. These endorphins, sometimes called the body's morphine, can make swimmers believe they can hold their breath forever.

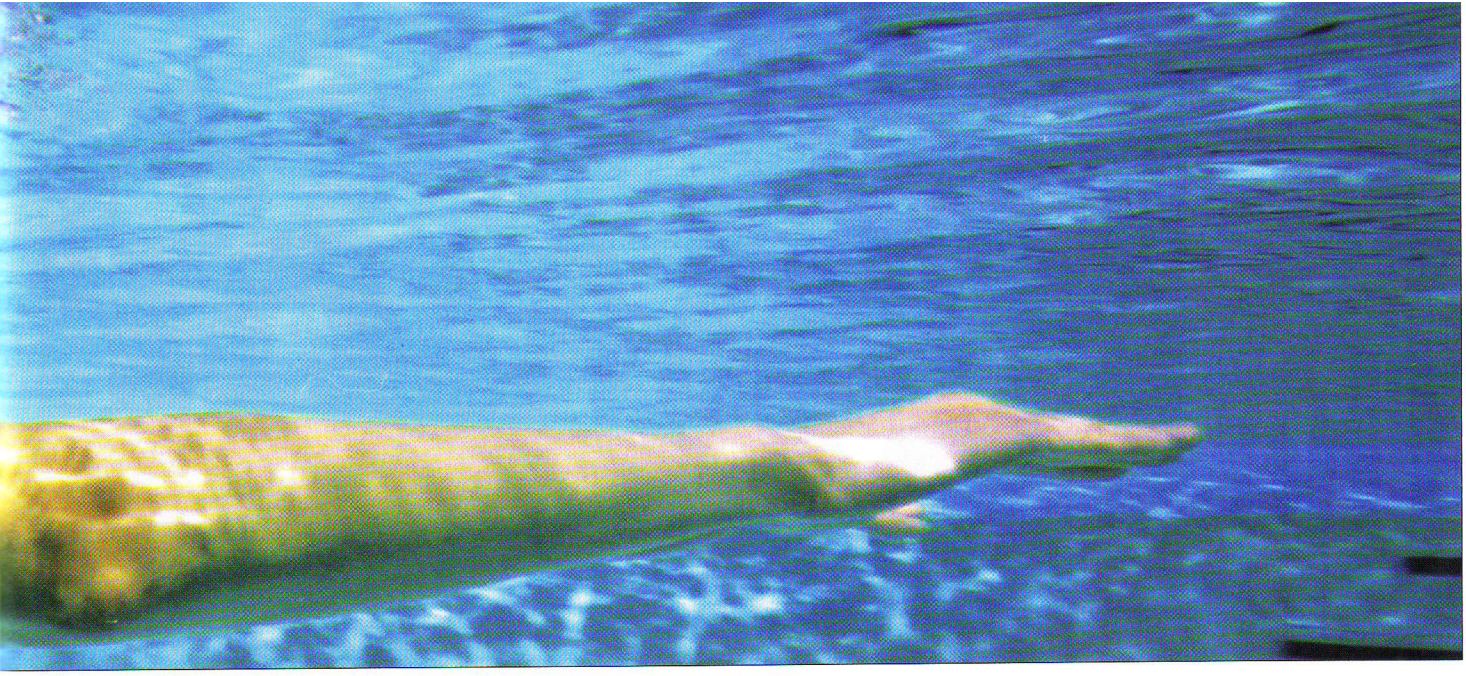
Shallow-water blackout is much more likely to occur in a competitive, rectangular, rather boring swimming pool instead of a waterpark or at the beach. This is because in a standard, competitive pool, the underwater swimmer has a very specific predetermined underwater path and distance to follow.

Having said that, many underwater swimmers kill themselves by sitting underwater with their backs against the pool wall, in less than 4 feet of water, holding their breath.

Meanwhile, the industry offers precious little education about the hazards of shallow-water breath holding. Though both the YMCA and the American Red Cross lifeguarding manuals mention its dangers, the message is not getting through.

In addition, this breath-holding death/drowning scenario begins on the bottom of the pool rather than on the surface, once again tricking the lifeguard and making it more difficult to detect. Most lifeguards who have missed victims on the bottom thought the body was a blemish, or "smudge" or even a towel, not a human being. So when in doubt, pull them out.

Breath control and relaxation go hand-in-hand with many beneficial aquatic activities. Controlled breath holding and rhythmic breathing are essential for



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swimming, snorkeling, synchronized swimming and can have positive results.

However, when prolonged breath holding, underwater swimming and hypoxic training become too competitive, repetitive, forced and aggressive, it can and will be deadly. This malady most often occurs when the swimmer resists the urge to breathe.

Clearly, the way to prevent shallow-water blackout deaths is with a vigorous educational campaign aimed at both pool patrons and staff. Pools should ban this activity routinely in the same way they thwart shallow head-first entries.

Lifeguards must also be taught to understand and appreciate that the most talented people in the pool can quickly and quietly kill themselves by holding their breath.

Whenever staff sees anyone performing this dangerous activity, it must be quickly stopped. In addition, when someone is sitting or lying on the bottom, even in shallow water, they must be recovered immediately.

Finally, lifeguards, competitive swimmers and others must never be allowed to compete underwater. All aquatic staff must be made to understand the inherent risk in breath holding underwater. A seemingly innocent trick, game or competition can quickly become deadly. AI