**The Dangers of Shallow Water Blackout**

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**We tell you how you can reduce your risk of blackouts the next time you get in the pool**

In Gatineau, Quebec in 2007, Christian Doyon, a strong swimmer, was enjoying his father-in-law’s swimming pool. As his wife stepped inside, Doyon attempted to beat his own underwater record of swimming five lengths of the pool underwater without taking a breath. Upon his wife’s return, she found him passed out on the bottom of the pool. He was pronounced brain dead the next day. The following year, a renowned Canadian free-diver, Mandy Rae Cruikshank, passed out while practicing for a planned record dive. As a result, she aborted her attempted record dive. These extreme breath-holders experienced shallow water blackout (SWB). In addition to prolonged or extreme breath-holding, strenuous exercise, cold water, and stress can also trigger Shallow Water Blackout in breath-holding swimmers. In triathlons, studies show a significantly higher number of deaths during the swimming portion of the competition than the biking or running. Breath-holding, even on the surface of the water, can precipitate genetic drowning triggers, sudden death resulting from cardiac arrest and arrhythmias (among other conditions), and shallow water blackout.

Since World War II, breath-holding and hypoxic training have been an integral part of working out in the water whether for military training, competitive swimming, triathlons or some other competitive aquatic activity. While the benefits of breath-holding and hypoxic training in the water have yet to be proven, the risks have certainly been brought to the forefront. Extreme breath-holding and hypoxic training conducted in swimming pools have led to a significant number of unconsciousness, drowning, and sudden death victims due to cardiac arrest. As sports like triathlons continue to grow, so will an increasing number of shallow water blackout (SWB) tragedies, unless athletes understand the hazards.

Here are just a few heart-breaking stories of athletes attempting to improve their performance through extreme breath-holding, but died instead:
While typical profiles for shallow water blackout victims include athletic males, competitive athletes, and experienced swimmers, children playing breath-holding games and others have also been victims.
Three causes of SWB include competitive, repetitive, and prolonged breath-holding and hyperventilation (voluntary or involuntary) prior to breath-holding. Breath-holding competitively includes swimmers attempting to hold their breaths underwater the longest or swimming the most lengths underwater without taking a breath. Repetitions of breath-holding do not allow the body to recover enough oxygen and the swimmer can pass out underwater due to oxygen deprivation. Examples that are especially practiced with swim teams include either sprinting 10x 25 yards swimming on the surface or kicking underwater with no breaths and little rest in between. Hyperventilation prior to extreme breath-holding is a third key risk factor for SWB. Strenuous exercise and voluntary or involuntary hyperventilation prior to or during prolonged breath-holding or underwater swimming creates a hazard for SWB. Triathletes often experience stress, are exercising strenuously, and can involuntarily hyperventilate from cold water.
The common tragedy amongst all these victims is they learned how to swim early in life to prevent drowning but as they attempted to improve their competitive swimming performance, they killed themselves unintentionally.

Education is the key to reducing incidences of SWB. All swimmers, triathletes, and the public at large should never push past their limits underwater. Individuals who pass out on land from overexertion or medical conditions may be revived in some cases. However, when individuals pass out underwater, the chances of survival are greatly diminished. Water can quickly enter the lungs, rapidly leading to brain damage and death. While practicing breath-holding training, SWB survivor Brian LaRue was trying to persist past his discomfort and urge to breathe just before passing out underwater. Fortunately he was resuscitated by a buddy. Not all breath-holders experience an urge to breathe prior to passing out underwater. Sometimes unconsciousness comes with no warning. Not everyone is as lucky as LaRue and other survivors to be noticed, rescued in time, and successfully resuscitated. Extreme underwater breath-holding also triggers a myriad of medical maladies (e.g. RYR2, Seizure Disorders, Long QT). Cardiac arrest, arrhythmias or sudden death are a few examples that may result from extreme breath holding, in which resuscitation would not be likely or not even possible. The City of Ottawa released a statement, “The City has a policy against sports and activities that involve holding one’s breath underwater for prolonged periods of time” (Pierosara, 2013). Other jurisdictions also have statements on the practice.

Suggestions for Professionals and Associations:
Every pool should ban extreme breath-holding, including competitive and repetitive breath-holding. Swim coaches, synchronized swim coaches, and others training in the water should be warned. Rules should be enforced by lifeguards and coaches alike. It is critical to always swim with others and never swim alone. Hyperventilation easily and often goes unnoticed. NO BREATH-HOLDING signs utilizing warning shapes and colors are important and should be posted separately from other rules and regulations.
Breath-holding is a not worth the risk. It should not be a game. Remember - the risks are known when it comes to extreme breath-holding, but true benefits have yet to be proven. As Dr. A.B. Craig taught back in the 1960’s after witnessing his teammate die after three underwater lengths of the pool, when it comes to underwater swimming “one breath, one time; one length, one time.”

See www.shallowwaterblackoutprevention.org for more stories and education.

Dr. Tom Griffiths is the President and Founder of Aquatic Safety Research Group, LLC. Recognized as an international leader in water safety, he has spent 38 years teaching, coaching and managing aquatics at three major universities. Griffiths has produced videos, textbooks, articles, and presentations in various areas of aquatics focusing his efforts on safety. He has also conducted hundreds of aquatic facility and beach inspections across the nation and abroad and teaches full day Aquatic Risk Management seminars. Perhaps his most significant contributions are the Five Minute Scanning Strategy©, Griff’s Guard Stations©, Disappearing Dummies, his research on Shallow Water Blackout, and the National Note & Float program. He has been an aquatic safety expert for more than 40 years and shares his knowledge, expertise, and experience worldwide.

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