

Swimmer Discovers Dangers of Shallow Water Blackout

By Laura Elder
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GALVESTON - When Ball High swim team member Stephanie Scofelia was floating face down in the school's pool during practice, her teammates thought it was a joke.

Scofelia, 15, was just finishing a 50-meter swim under water the evening of Nov. 12, when her teammates saw her floating near the wall of the pool, her arms and legs hanging limply. "I swam to her and flipped her over," said teammate and friend Anna Hyatt. "That's when I knew there was a problem". Hyatt, 15, and teammate Marissa Streck, 16, pulled a blue and unconscious Scofelia out of the water and called for swim coach Hope Trevino. Trevino, according to the girls, called for Scofelia's brother Steven, 17, a trained lifeguard and swim team member, who revived his sister using CPR.

"The last thing I remember is almost being to the wall," Stephanie Scofelia said. "I had no idea why I was laying there".

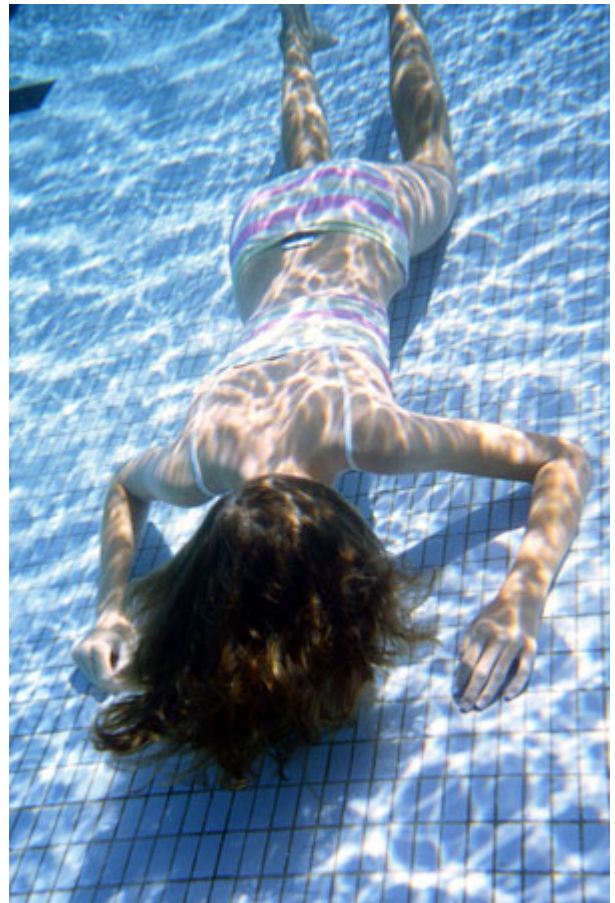
What had happened to Scofelia was a little-known but deadly phenomenon known as shallow water blackout. The teenager's near-death experience underscores the need for more awareness about the problem that is mostly associated with free diving.

Shallow water blackout, according to the Norfolk, Va.-based U.S. Naval Safety Center, which trains Marines and sailors on safety issues, happens when a swimmer such as Scofelia hyperventilates or takes a series of short breaths before going underwater. Scofelia, ever competitive, wanted to match Streck, who had successfully completed her 50-meter swim underwater. On the evening she blacked out, Scofelia said she hyperventilated in an effort to hold her breath longer under water.

Shallow water blackout, according to the Naval Safety Center, is caused by oxygen starvation. By hyperventilating before going under water, Scofelia had inadvertently manipulated her brain's automatic breathing-control device. Hyperventilation, according to the center, washes carbon dioxide out of the lungs. Carbon dioxide signals the brain to breathe. Without the signal, Scofelia never got that bursting feeling in the lungs that sends underwater swimmers to the surface gasping for air. As Scofelia was swimming underwater, she was burning up oxygen through exertion and blacked out from hypoxia, or a lack of oxygen to the brain. Scofelia was unconscious nearly three minutes say witnesses. The Naval Safety Center says that swimmers in a state of unconsciousness often will fool observers because they don't appear to be in danger and sometimes appear to be making coordinated movements. Brain damage from a lack of oxygen is only minutes away and often irreversible.

Scofelia's near-death experience got brief attention when swim coach Trevino, who could not be reached for comment, resigned two days later. After an investigation of the incident, which included interviews with parents and students, the district said there had been adequate supervision at the pool, but paramedics should have been called. Stephanie and Steven Scofelia went home together after the incident, and she didn't seek medical treatment. Scofelia's parents, Greg and Glenda, were shocked by what happened. Stephanie Scofelia has played in swimming pools she was an infant, they said. "She's been in the water all her life and she's never blacked out," said Glenda Scofelia, 40. "We started looking for answers".

Few statistics exist on shallow water blackout. But stories on the Internet, along with anecdotes from the Naval Safety Center, show even the most skilled swimmers succumb to it. In 1988, a chief petty officer, said to be a skilled swimmer, died while alone in a base pool. He was known to practice holding his breath to extend the amount of time he could stay submerged, according to Naval Safety Center. In 2001, according to the Naval Safety Center, a sophomore at the U.S. Naval Academy fell



victim to shallow water blackout while doing breath-controlled laps in a yacht club's pool. According to reports, the man was trying to go 75 meters underwater when he passed out and went to the pool bottom. Doctors were unable to save him.

The Navy is concerned enough about shallow water blackout that it has directed its commanders to inform personnel about the dangers and to post warnings in swimming areas. But not enough swim coaches and parents are aware of the dangers of hyperventilating and underwater swimming, said Keith Ozenberger, a training specialist for University of Texas Medical Branch's education lab. Ozenberger teaches CPR and all advanced American Heart Association classes.

Ozenberger has seen victims of shallow water blackout and said he believes swim coaches and parents should know the risks of hyperventilating and underwater swimming. "I would caution swimmers not to hyperventilate over two to three breaths and I would definitely caution against any extensive hyperventilation," Ozenberger said.

What happened to Scofelia is changing some policies. Greg Scofelia has spoken with Maj. Vic Maceo, director of the Galveston County Beach Patrol, who said information about shallow water blackout would be taught in rookie training school. "Most of our swimmers are competitive and we're going to go ahead and add that to their training," Maceo said. Greg and Glenda Scofelia say they want other families who are going to the beach or spending the day at the pool to also be aware of it. Stephanie and her teammates have changed the way they practice swimming. The teenagers say they are careful about hyperventilating. "Because it seemed like I was dreaming and I woke up and there was no pain, I don't really worry about what could have been," Stephanie Scofelia said.

Tips for parents, coaches and swimmers

- o Don't hyperventilate.
- o Know that any strenuous exercise while underwater will drastically limit the time a swimmer can stay submerged.
- o Include shallow water blackout as a topic prior to all training for water activities.
- o Explain in simple terms to children at a young age what shallow water blackout is and why they should never practice breath-holding diving.

- Source: U.S. Naval Safety Center

Lifesaving Resources Inc. - www.lifesaving.com - 603/563-8330



<http://www.swimmingcoach.org/articles/9903/9903-1.htm>

The Dangers of Underwater Swimming are Real

Mexican Player, Omar Ortega, Drowns at Practice

By Bruce Wigo

On Tuesday, January 27th, [end of 1990s] Omar Ortega, a nineteen year old member of the Mexican National Jr. and Senior Water Polo teams drowned during national team practice. The team, preparing for this summer's Pan American Games, was doing underwater swimming at the end of practice. Apparently, Ortega fainted and went unnoticed on the bottom of the 50 meter pool - until it was too late to save his life.

This tragic incident is by no means isolated. Coincidentally, my son, Wolf Wigo, a member of the 1996 US Olympic Water Polo team and a current US National Team player, almost suffered the same fate in our backyard pool over the Christmas holidays. Wolf was doing underwater swimming with his two young brothers and some neighborhood kids, when he fainted. At first it was thought to be a practical joke, but when the kids recognized it might be more serious they called me from the house. When I saw him on the bottom, I immediately knew something was wrong and dove in to get him. He was blue, convulsed with eyes wide open and not breathing when I got him out of the water. Fortunately, I was able to resuscitate him without any permanent physiological damage, although he was taken to the hospital for observation and his chest hurt for several days from water in the lungs.

Unfortunately, Ortega's coaches, friends and family weren't so lucky. What happened to Wolf Wigo and Omar Ortega? How could these two highly conditioned watermen faint underwater? The answer is a phenomenon known as SHALLOW WATER BLACKOUT.

Shallow Water Blackout is most commonly associated with skin diving, but the more swimming coaches I speak with, the more I have come to realize that underwater fainting is not at all uncommon in the world of competitive aquatic sports. The condition of Shallow Water Blackout is connected with the mixture of carbon dioxide level (CO₂) and the partial pressure of oxygen level (PO₂) within the lungs.

Individuals breathing under normal conditions use the partial pressure of oxygen in the lungs. Carbon dioxide, on the other hand, serves as a stimulus to breathing by informing the brain that a person's body requires another breath of air. This process occurs in any prolonged holding of breath, including underwater swimming. Normally there is no danger because the carbon dioxide build up in the blood signals the brain that you need to take a breath by giving you the sensation that your lungs are going to burst if you don't get a breath.

The problem comes when a swimmer or diver manipulates the brain's automatic breathing control device through HYPERVENTILATION. Hyperventilation is the repeated inhalation of fast, full breaths of air and rapid exhalation. The effect of hyperventilation is to wash CO₂ out of the lungs, resulting in an extremely low CO₂ level. While the underwater swimmer burns up oxygen through exertion, he never gets the signal from the brain - the "bursting lung" sensation - because of the low level of CO₂ in the lungs and blood. Without the CO₂ stimulus, the brain doesn't recognize the need to breathe and the swimmer blacks out from hypoxia, a lack of oxygen to the brain.

The blackout victim is in an extremely dangerous position at the point of unconsciousness. Seeing him underwater will fool observers as the unconscious swimmer often makes seemingly coordinated movements even after the faint comes on. He does not appear to be in difficulty. And irreversible physiological brain damage from a lack of oxygen is only minutes away, even if he's saved from death.

I do not know the circumstances behind the drowning of Omar Ortega, but my son's near drowning incident must stand as the classic example. Wolf and the other kids were having a contest for underwater distance swimming. As Wolf prepared to go, the kids were shouting, splashing, jumping and teasing in an effort to prevent him from beating their combined distance record. As Wolf prepared to start, he'd take a few deep breaths and then burst out laughing. This scene was repeated several times before he finally took off - unconsciously and by circumstance - super hyperventilated. At some point, after being underwater for about a minute, and after he had surpassed the challenged distance, I heard the kids yell, "Dad, Wolf stopped.... He's pretending to drown". This sounded logical as both Wolf and I had done this on occasion in the past. The kids then swam out to where Wolf was and proceeded to "attack" him. That's when they recognized something was wrong and called to me for help.

In talking to the kids after the incident, they thought nothing was wrong because "Wolf was moving". Wolf faintly remembers the kids coming down to him but it was like a dream. He had no recollection of being in trouble or anything after that. This dream experience and no sense of trouble has been corroborated by another "survivor" of Shallow Water Blackout with whom I spoke.

Does this mean you stop challenging your swimmers with underwater swimming? No, but if you are not warning your swimmers about the danger of hyperventilation and monitoring them while they swim underwater, you run the risk of suffering tragic and irreversible consequences.

The USA Water Polo community, and I, mourn with the family, coaches and friends of Omar Ortega and hope that in relating this tragic story, we can prevent similar incidents from happening to our athletes in the future.