

Extreme Breath-Holding: How It's Possible

The new record in breath-holding recently went to a Swiss man who didn't breathe for nearly 20 minutes. Scientists explain how he did it.

By [Emily Sohn](#) | Wed Feb 17, 2010 08:04 AM ET

THE GIST:

- The new record for breath-holding is 19 minutes and 21 seconds.
- There are tricks to holding your breath for long periods of time, but the practice can be dangerous.
- There may be long-lasting health consequences to extreme breath-holding.

A Swiss freediver held his breath underwater for 19 minutes and 21 seconds, according to news reports this week. The gasp-inducing [feat](#) beat the previous world record by 19 seconds, and blew away the record of 17 minutes and four seconds that magician David Blaine set on Oprah Winfrey's talk show in 2008.

For most ordinary humans, all that [breath](#)-holding can be hard to fathom. The feat might also bring up some basic questions about biology. For example: Is it really possible to survive without inhaling for that long? And is it healthy?

"It is, as a matter of fact, possible -- with certain tricks," explained Claes Lundgren, a physiologist at the University of Buffalo School of Medicine in New York.

It is probably not, however, good for you, and consequences can be deadly.

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"Sooner or later, kids will read this and do something silly," said Lundgren. "It's not recommendable at all. Anything written about this should be accompanied by a strong admonition not to try this without someone knowledgeable present."

Breathing is obviously an important way to stay alive, and our bodies have a built-in system of sensors and signals to make sure we keep doing it. When you hold your breath, carbon dioxide builds up as your body uses up oxygen. After a minute or two for most people, the result is an overwhelming urge to breathe.

"All sorts of alarms go off," said Ralph Potkin a pulmonologist and hyperbaric physician at the University of California, Los Angeles School of Medicine. "The brain tells the body to breathe. The diaphragm gets electrical signals to stimulate breathing."

To fight those powerful instincts, a competitive breath-holder starts by hyperventilating for as much as 10 minutes while breathing from a tank of 100 percent oxygen. Breathing hard and fast expels carbon dioxide from the body, buying time before CO₂ levels get too high. Likewise, boosting oxygen stores with pure oxygen buys time before O₂ levels fall too low. After hyperventilating, if a person isn't unconscious, he'll probably feel dizzy and have extreme cramping in the arms and legs.

The next step is to [plunge into](#) a tank of water. That triggers a primitive, mammalian reaction called the diving reflex. When confronted with water, especially cold water, the body shunts circulation from the rest of the body to the heart and brain.

The reflex, which even chickens have, probably helps babies survive the trip through the birth canal, Lundgren said. By lowering how much total oxygen the body is using, the diving reflex also allows people to hold their breaths for longer stretches.

The record for breath-holding on land is around 10 minutes, said Lundgren, who can go eight or nine minutes without breathing. The new record-holder, named Peter Colat, was able to last twice as long because he was in a tank of water.

Training for competitive breath-holding often involves spending time in hyperbaric chambers, said Potkin, who helped David Blaine prepare for his Oprah performance. Like extreme mountain climbers, breath-holders want to get their bodies used to oxygen deprivation.

Many competitors also practice Zen-like relaxation exercises to cope with a variety of discomforts, including the squeezing sensation of oxygen-deprived, deflating lungs.

"Some can drop their blood pressure like yogis and their heart rates as well," said Potkin, whose personal record is four-and-a-half minutes without a breath. "There is a lot of voluntary denial of pain. It's really an out-of-body experience in a way. You really have to disconnect from your body."

Doctors used to declare patients brain-dead if they hadn't breathed in five minutes, Potkin said. Intentional breath-holding is slightly different because the blood is still circulating. Still, studies of freedivers have turned up abnormalities in brain scans and markers that suggest brain damage. No one knows what the long-term consequences will be of feats like these.

"I wish I could tell you what their brains will be like in 20 years," Potkin said. "The medical diving community is a little concerned about it."
