

Theory Into Practice-Emergency Ascents: Managing the Risks

An emergency ascent is the response of last resort to an adverse event or perceived threat during a dive. Divers are trained in standard emergency ascent procedures that, when performed successfully, mitigate the dangers. However, few people practice these skills, and when called to perform them in a crisis, a diver may be at risk for serious injury or even death.

The Stats

In a recent analysis of 964 diving fatalities, we found that emergency ascents were involved in 30 percent of cases — 288 to be exact. In 189 of these emergency ascents, a rapid ascent (faster than 60 fpm) was witnessed or recorded. In 10 percent of emergency ascents, divers attempted a free ascent without using a breathing gas supply. Buddy breathing was involved in 8 percent of fatal emergency ascents. In the remaining cases, the mode of emergency ascent was not specified.

The most frequent trigger of an emergency ascent is running out of breathing gas during the dive, an entirely preventable cause. For more on this topic, see [Dive Safety: It's No Accident](#) (*AlertDiver.eu*, 2013; 52)

The most common cause of death in fatal emergency ascents is arterial gas embolism (AGE), accounting for 54 percent of cases, followed by drowning at 18 percent, acute cardiac events at 7 percent and decompression sickness at 5 percent. AGE is a stroke-like condition with sudden onset of weakness and unconsciousness that usually occurs within minutes of surfacing. It often renders a diver unconscious before he gets out of the water or soon after.

Managing the Risks

As divers, we all learn never to hold our breath underwater. Unfortunately, in an emergency situation, divers often forget this information and why it is important. As a diver ascends and the surrounding pressure drops, the air in his lungs expands. If the diver is breathing normally, this isn't a problem as the expanding gas escapes with every exhaled breath. The danger comes when the ascent is too rapid for this expanding gas to escape or when a diver holds his breath on ascent. The expanding gas has to go somewhere, and it can literally tear a hole in the diver's lung, leaking into the body. Lung overexpansion injuries include mediastinal emphysema (air between the lungs), subcutaneous emphysema (air underneath the skin) and pneumothorax (collapsed lung). But the biggest problem occurs when escaping gas is introduced into arterial circulation. At that point, there is nothing to stop it from being delivered directly to the brain, forming an embolus and blocking blood flow.

In the crisis of an emergency ascent, divers may forget their training or be afraid to exhale for fear of running out of breath before reaching the surface. When ascending from recreational diving depths, the expanding air in a diver's lungs is usually more than enough to sustain him. It's a rare instance when a diver drowns before reaching the surface.

Remember Your Training

So how do you deal with emergency ascents and the risk of injury? Like any diving emergency, the best way to deal with it is to avoid it in the first place. Keep your training current and in practice. Plan each dive carefully, and surface with a reserve supply of air. Follow your plan. And, of course, remember to monitor

your air closely.

Let's say you do everything right and you still find yourself in a situation that requires an emergency ascent. What's the best way to proceed?

First, don't panic. You received training on how to do emergency ascents in your original certification course. Remember the preferred order of options:

1. Make a normal controlled ascent, with your regulator in your mouth.
2. Find your buddy and obtain his secondary air source (or his primary if he will be taking the secondary, depending on the configuration of his gear). The goal in this scenario is for both divers to have a continuous air source, enabling you both to make a slow, controlled ascent to the surface.
3. If you cannot reach your buddy or another diver, or if your buddy is also out of air, complete a controlled emergency ascent on your own. But again, don't panic. Remember, you likely have enough air in your lungs to sustain you to the surface. Follow the procedures you learned in training: Keep your regulator in your mouth at all times; sometimes air expands and gives you one more quick breath. Exhale slowly and continuously all the way to the surface, and keep your ascent slow.

Like all other dive skills, emergency ascents should be practiced regularly. Head for the pool with a buddy to shake the cobwebs off your alternate air source breathing, and practice your emergency ascents by swimming horizontally in the pool.

Emergency ascents are a response to a life-threatening situation underwater. Despite the urgency in the circumstances surrounding them, with proper training, practice and preparation, they can and should be the safe solution they are intended to be.