How Cold is Too Cold?

Whether you're using a drysuit, a thick wetsuit, or warm thoughts and some shivering to stay warm in the water this winter, it's important for you to understand exactly how cold is too cold. Diving on a blistery winter morning can be fun, but pushing your body and the limits of your exposure protection too far can lead to serious consequences. Letting your core temperature drop too far – leading to hypothermia or near hypothermic conditions that can affect your dexterity, decision making, and your body's ability to washout gas. Because one of the first symptoms of serious hypothermia is a reduced level of consciousness, many individuals fail to recognize the symptoms in themselves until their buddy draws attention to them. Know what to look for in yourself and your dive buddies this winter and keep diving safely year 'round.

What is hypothermia?

You've likely had some exposure to hypothermia in merit badge courses, or while getting ready for hiking or camping trips – it's the result of a drop of core body temperature. It can happen in the arctic, or in warm tropical waters with inadequate exposure protection – given a long enough exposure. It's of particular concern for those lost at sea, divers in remote areas, or those diving in extreme conditions. As a baseline, a typical adult maintains a core temperature of about 98.6°F. When this core temperature drops below 95°F, hypothermia begins to set in and the body begins to lose function. To keep the core warm, the body will begin to shunt blood to the core, and you'll feel the initial symptoms of hypothermia – shivering, dizziness, nausea, and feelings of hunger. If that core temperature is allowed to continue dropping, many individuals will stop shivering at 86°F, and their pupils will dilate. At 82°F, their muscles will become rigid and they'll be at a serious risk of cardiac complications. These symptoms will worsen as core temperature continues to drop, so it's vital that individuals suffering from hypothermia be identified and brought to qualified medical care as rapidly as possible.

Learn to beat the cold

Hypothermia can be serious, but it's not something that a well prepared diver should have to contend with in all but the most extreme situations. Plan ahead with appropriate exposure protection, heat sources, and a well thought-out emergency action plan for if things get a little too chilly. Bringing hot water to make a warm drink, or fill your wetsuit between dives, is one way that you can make yourself

more comfortable, and keep yourself warm on a day when it looks more like a winter wonderland than a diver's paradise outside. If you or your buddy begins shivering before, or during a dive, terminate your dive in a safe manner, and warm up while reconsidering whether or not you'll be warm enough on your next dive. You can always come back on a warmer day - there's no sense in subjecting yourself to risk for the sake of one more dive.

For more information on safe cold-water diving practices, visit DAN.org/Health

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Irritating Injuries and How to Treat Them

Sustaining minor injuries on dive trips is fairly common, but that does not make them any less irritating, especially when they can prevent you from diving. Whether it is a sunburn, a bad case of seabather's eruption, or a surprise case of gastrointestinal distress, even the most minor of mishaps can wreak havoc on a diving schedule or cause more serious complications if left unchecked. Address minor injuries and annoyances early so you can get back to diving safely and without distractions. Do you know how to treat these common mishaps and maladies?

Sunburns

Sunburns are some of the most common conditions afflicting divers travelling to warmer destinations. While it is best to entirely prevent being sunburned, managing the symptoms of a sunburn and preventing further damage can often be done easily. After recognizing a sunburn seek shelter to prevent further exposure and cover the affected area. Take aspirin, acetaminophen, or ibuprofen to relieve pain, and drink water and apply a topical moisturizer to hydrate yourself and the sunburned skin.
The use of an aloe gel may provide additional relief. If the sunburn blisters, cover the area with gauze or a light bandage to prevent infection, but do not break blisters. If a blistering sunburn covers more than 20 percent of your body, seek medical attention.

Blisters

Whether it's a hot spot caused by a tight fin strap, or a wetsuit that doesn't fit quite right, a serious blister can bring your enjoyment of a dive to a stop almost immediately. Prevent blisters by addressing hotspots as they appear – cover them with moleskin or medical tape to protect them from friction. If a blister does occur, leave it intact and make a "doughnut" out of a moleskin or gauze to protect the area from contact. It can be difficult to get tape and bandages to adhere in wet environments, so try using a medical adhesive to apply moleskin on a wound that might be submerged. If you have no choice but to break the blister, use a sanitized needle or sharp blade to make a small puncture near the blisters bottom edge and apply antibiotic ointment and a bandage to the wound after it has drained.

Seabather's Eruption

Often called "sea lice," seabather's eruption is most commonly the result of contact with the larvae of thimble-jellyfish or other organisms with stinging cells that results in a rash of itchy red bumps. Identifying whether the rash is caused by contact with a stinging larvae or another source of irritation like sunscreen, sand, sweat, sun, or saltwater, can be difficult. If stinging bumps appear on covered areas of the body (like under the cuffs of a wetsuit) soon after exposure to seawater, the rash may be caused by seabather's eruption. Treat the rash like you would a jellyfish sting, by rinsing the area with vinegar, applying heat to relieve symptoms, and washing the affected area. Keep the rash clean, dry, and uncovered as much as possible to promote healing.

For more information on first-aid skills visit DAN.org/Health.

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Focus on the Fundamentals: Monitor your Air

The importance of monitoring your air supply is a foundational concept in safe SCUBA diving, but it can be easy to lose sight of in the excitement of a busy dive boat, or amongst constant reminders to "check your air". Managing your air on a dive is not just about watching your pressure gauge and ending your dive before you run out of air but planning your dive ahead of time and constantly monitoring your air consumption, possibly modifying your dive plan as a result. Proper air management will make you not only safer as a diver, but more relaxed and better able to enjoy your dive with the knowledge that you have adequately prepared for emergencies.

Check your gauges

It may seem obvious if you've been diving before, but it is critical to regularly check your gauges during the course of a dive. Monitoring your air, depth, and dive time can give you not only an idea of your air consumption and when you might have to end a dive due to air supply or dive time limits, but also whether or not your equipment is functioning properly. A slow leak from a first stage O-ring, for example, might not be obvious on the surface, but you may be able to detect the existence of an equipment problem due to an abnormally increased air consumption rate during the dive.

Factors influencing consumption

There are many factors that can affect your air consumption during a dive, but chief amongst them are depth, weighting, workload, and personal fitness. Keep in mind that your air consumption will increase the deeper you dive, the harder you work, and the more equipment you carry. A weight check before a dive to remove extra weight can improve your air consumption, as well as diving in horizontal trim to decrease drag and make the effort of breathing easier. Improving your personal fitness, decreasing the amount of equipment that you carry in the water, and minimizing your workload can also improve your air consumption, but keep in mind that site conditions like currents or wave action are out of your control, but will increase your efforts in the water.

Plan your dive, dive your plan

Planning your air consumption is not difficult. A common method is known as the "Rule of Thirds". The rule of thirds is applied by dividing your tank, minus a 500 PSI reserve, into thirds. The first third is used for the descent and the working portion of the dive, the second third is used for the return to the boat or point of ascent, and the final third is used during the ascent and safety stop. By planning with this reserve final third in reserve for the ascent, you can add a level of conservatism to a dive, although you should remember to take factors like current, workload, and depth into consideration, as they may warrant additional conservatism.

For more information on safe diving practices, visit DAN.org.

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Oxygen First Aid for Divers

Emergency oxygen is the first line of treatment for all cases of both decompression sickness (DCS) and arterial gas embolism (AGE) that do not require CPR. As divers we need to understand not only how to provide oxygen first aid, but when to use different methods of oxygen delivery, and why oxygen can help an injured diver. Like any first aid skill, oxygen administration requires proper training, specific equipment, and regular knowledge and skills updates. Prompt and effective delivery of oxygen first aid can alleviate or eliminate symptoms of DCS, improve patient outcomes, and save lives. Take a moment to refresh your knowledge of oxygen first aid and prepare yourself to respond to any diving emergency.

How

The most important aspect of responding to any emergency is providing for your own safety. Before approaching any injured diver, assess the scene and make sure that rendering aid will not put you at risk. Then, follow these steps:

1. Send for help
2. Verify that your oxygen cylinder is full and get the injured divers consent to render aid. If a diver is unresponsive permission to help is assumed, but a conscious diver must consent to oxygen administration.
3. Begin to administer first aid. If a diver is not breathing on their own, they may require ventilation. This should not be attempted by an untrained rescuer, and you should begin CPR immediately.
4. Deliver oxygen in the greatest concentration possible. A demand valve can deliver a fraction of inhaled oxygen of up to 95%, but not all divers may be able to tolerate it. A constant flow system like a non-rebreather mask may be easier to tolerate but can only deliver a fraction of oxygen up to 80%. Remember that it is more beneficial to provide a diver a high inspired fraction of oxygen that depletes your supplies on the way to the hospital, than it is to breathe a lower inspired fraction of O_2 the entire way to medical care, as long as that supply lasts 30 minutes or longer.

When

Oxygen therapy poses no real risks to those not suffering from DCS, and prompt delivery of oxygen can immediately alleviate some symptoms and increase the likelihood of a positive outcome for the injured diver. Typical symptoms of DCS are joint pain, discoloration of the skin, numbness or paralysis, headache, nausea, weakness, vertigo, impaired mental status, and difficulty breathing. These symptoms do vary greatly and some cases of DCS can be difficult to recognize, so oxygen first aid should be provided if there are any suspicious symptoms.

Why

Breathing high concentrations of oxygen at the surface may alleviate or entirely resolve some symptoms of DCS. The partial pressure gradient created by oxygen first aid effectively speeds the rate at which inert gas is passed into the lungs, and slows and reduces bubble formation. The benefits of oxygen for decompression, elimination of inert gases, and oxygenation of hypoxic tissues significantly outweigh the minute risk of oxygen toxicity out of the water. Oxygen is provided in the highest fraction available from the time of injury until the time that qualified medical care is reached to temporarily reduce the symptoms of DCS and improve the likelihood of a positive treatment outcome following hyperbaric oxygen therapy.

For more information on oxygen first aid, or where you can take emergency first aid courses, visit DAN.org.

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Listen to Your Ears

Almost half of all divers will report some ear or sinus related complaints over the course of their diving careers. If this sounds serious, it can be – the good news is that not all ear related injuries are serious. Compared to the much lower numbers of injuries caused by trauma or decompression illness, ear and sinus related troubles are the most common diving injuries by a long shot. Ear equalization is a constant process that begins before we ever get in the water, and ear health is something that we must always stay on top of. Keeping your ears happy and healthy on a day to day basis is vital to keeping you fit for diving, and while it's not difficult, it does take a little education and understanding of the ear.

Listen to your ears

Failure to equalize is one of the leading causes of injuries in divers. Equalization is a fundamental skill but one that is sometimes overlooked – effectively equalizing your ears can mean the difference between a safe and relaxing dive, and having to deal with an ear injury. Appropriate equalization begins before you even leave for the dive site. Make sure that you've had no cold or allergy symptoms for several days before diving – these could swell the mucus membranes in your sinuses or cause congestion. Swelling in the ears, nose, and throat can make equalization difficult or impossible, and increase your risk of injury. Being able to breathe through your nose only means that your nose is not congested; your paranasal sinuses can take much longer to decongest and become less irritated, and their condition can be difficult to assess. Take it slow and give yourself time to heal following an illness.

Equalize, equalize, equalize

Appropriate equalization is gentle, frequent, and persists throughout the dive. A good rule of thumb to live by is to "equalize early, and often." Equalization must be performed consciously throughout the entire descent portion of a dive, and whenever your depth changes, or you feel pressure on your ears during the dive. Equalization is the process opening your Eustachian tubes and allowing air to enter your middle ear cavity, to match the pressure on the inner ear with pressure exerted by the water surrounding you. There are four common methods used by divers:

The Valsalva Maneuver:

This is a common move taught to divers in their open-water courses. Pinch your nostrils close and blow gently through your nose. The resulting pressure in your throat usually opens your Eustachian tubes and allows air into your middle ear cavity.

The Toynbee Maneuver:

A very similar maneuver to the Valsalva, the Toynbee is performed by pinching your nostrils closed and swallowing. The movement of swallowing opens your Eustachian tubes while the movement of your tongue compresses air against the tubes.

Voluntary Tubal Opening:
This can require some practice to perfect, but it is possible to achieve hands free and constant equalization with this method. Tense the muscles of your soft palate (the soft tissue at the back of the roof of your mouth) and your throat while pushing your jaw forward and down, as if you're beginning a yawn. Performed correctly, this will open your Eustachian tubes and allow your ears to equalize.

Regardless of how and when you equalize, you should never feel pain in your ears. If you do feel pain on descent, you must ascend until the pain dissipates, and attempt to equalize again. If you cannot equalize, slowly ascend and end your dive.

For more information on ear health and diving, take the Prepared Diver course or visit DAN.org/Health.