

RESCUE



RAIDTM 

**OPEN WATER FREEDIVER +
FOUNDATION FREEDIVER**

TABLE OF CONTENTS

INTRODUCTION TO THE OPEN WATER FREEDIVER RESCUE MODULE.....	3
HYPOXIA AND ASSOCIATED RISKS	3
Hypoxic Fit/Loss of Motor Control (LMC)	3
BLACKOUT	4
Surface Blackout	4
Shallow Water Blackout (SWB)	4
Signs and Symptoms of Hypoxia	6
THE BUDDY SYSTEM	8
Surface Buddying	8
DEPTH BUDDYING	9
BLACKOUT RESCUE.....	11
Blackout Rescue from Surface	11
Blackout Rescue from Depth	12
HYPOXIC FIT RESCUE	15
TIRED DIVER TOW	16
UNCONSCIOUS DIVER TOW	17
CORRECT WEIGHTING	18
Surface Buoyancy	18
Neutral Buoyancy	19
Negative Buoyancy	19
Salinity:	19
Wetsuit Wear and Thickness:.....	19
Body Composition:.....	19
Weight Belt:	19
DECOMPRESSION SICKNESS (DCS)	19
Symptoms and Signs	20
Prevention	21
SCUBA DIVING AND FREEDIVING	21
RISK MANAGEMENT AND HOW TO AVOID A HYPOXIC INCIDENT	21
CRAMP REMOVAL.....	22
Cramp Removal on your Buddy	23
Cramp Removal on Yourself	23
EXOSTOSIS	24
LICENSE AGREEMENT	25
ACKNOWLEDGEMENTS	25
DISCLAIMER.....	25

INTRODUCTION TO THE OPEN WATER FREEDIVER RESCUE MODULE

Welcome to the RAID Open Water Freediver rescue manual. The material in this manual provides knowledge and skills that will empower you to feel at ease underwater. As we gain confidence and become increasingly comfortable, it's important to keep in mind that we're entering an environment where there is very little margin for error.

This manual provides insight into the risks of freediving, strategies for minimizing those risks, and techniques for responding to emergencies.

HYPOXIA AND ASSOCIATED RISKS

Hypoxia occurs when there is a deficiency in the amount of oxygen available for our tissues.

Symptoms range from looking a little pale or feeling low-energy to complete loss of consciousness. In the following sections we'll describe how to recognize symptoms of hypoxia in yourself and others, as well as how to respond to a diver experiencing a severe hypoxic event.

HYPOXIC FIT/LOSS OF MOTOR CONTROL (LMC)

A hypoxic fit is a Loss of Motor Control caused by a lack of oxygen to the brain. Severity ranges from almost unnoticeable tremors in the hands to whole body convulsions.

After a severe hypoxic fit, a diver may be disoriented and have no recollection of what happened. Hypoxic fits normally resolve on their own with the assistance of a safety diver. Without assistance the diver is at risk of drowning.

Hypoxic fits normally occur immediately after a diver has surfaced.

Symptoms include:

- Trembling.
- Shaking.
- Jerky head movements.
- Inability to control the body.
- Inability to keep the head above the water.
- A glazed look.
- Reduced responsiveness.
- Confusion.
- Slurred words or inability to speak.

IMPOTANT: After experiencing a hypoxic fit, a diver's energy reserves are exhausted. They should stop diving for the day (24hrs) and, if possible, should breathe pure O2 for 5 to 15 minutes.

In the event of a hypoxic fit, the diver needs rescuing without delay to prevent a blackout.

HYPOXIA AND ASSOCIATED RISKS

- **RESCUE** – Bring the freediver to the surface. Keep them securely on the surface with their airways out of the water.
- **RESPONSE** – Remove any facial equipment. Clearly and firmly coach the freediver through their recovery breathing.

BLACKOUT

All breath-hold related loss-of-consciousness has the same basic cause - lack of oxygen to the brain.

When oxygen levels fall below the threshold required to maintain consciousness, a blackout occurs. This is the body's way of protecting critical brain tissue by reducing the brain's demand for O₂.

The dynamics that contribute to this happening vary with depth. In Freediving we categorize blackouts according to the depths at which they occur; 'deep', 'shallow', or 'surface'.

The response to any blackout, regardless of depth is the same. There are 3 main parts to a rescue.

- **RESCUE** – Bring the freediver to the surface. Keep them securely on the surface with their airways out of the water.
- **RESPONSE** – Remove any facial equipment. Blow air across the eyes and cheeks. Gently tap the face. Loudly instruct the freediver to breathe, using their name.
- **REVIVE** - If the freediver remains unresponsive after thirty seconds, begin rescue breaths. If they do not revive within another minute, call for help, remove from the water and commence CPR.

Surface Blackout

Surface Blackouts are the most common and, as the title indicates, it happens as or shortly after a diver surfaces. A series of factors occurring in the last 10m/33ft of a dive, and at the surface, create conditions that put us at greater risk of a blackout than at any other time.

- The diver's O₂ supply is already at the lowest point of the dive.
- As described by Boyle's Law (see the Physiology manual), gas volume doubles during ascent through the final 10 meters/33ft. This is the largest and most abrupt change in pressure encountered during a dive. As lung volume increases the concentration of oxygen drops very quickly, resulting in rapid diffusion from blood to lungs.
- Oxygen dissolved in the blood expands during ascent, further increasing diffusion from blood to lungs and lowering concentration in the blood (PPO₂).
- The sudden onset of gravity as a diver's head emerges from the water can contribute to briefly lowering blood pressure in the brain.
- If recovery breaths are not performed correctly, a forced exhalation further lowers blood pressure while bringing in no oxygen.

A surface blackout can occur sometime after a diver surfaces. There are many incidents of competitive divers surfacing and performing their surface protocol only to blackout after completing it. This is why it's important to monitor a diver closely for at least 45 seconds after surfacing.

Shallow Water Blackout (SWB)

Like surface blackouts, shallow water blackouts occur as a function of the rapid change in pressure during the last 10-15 meters of an ascent.

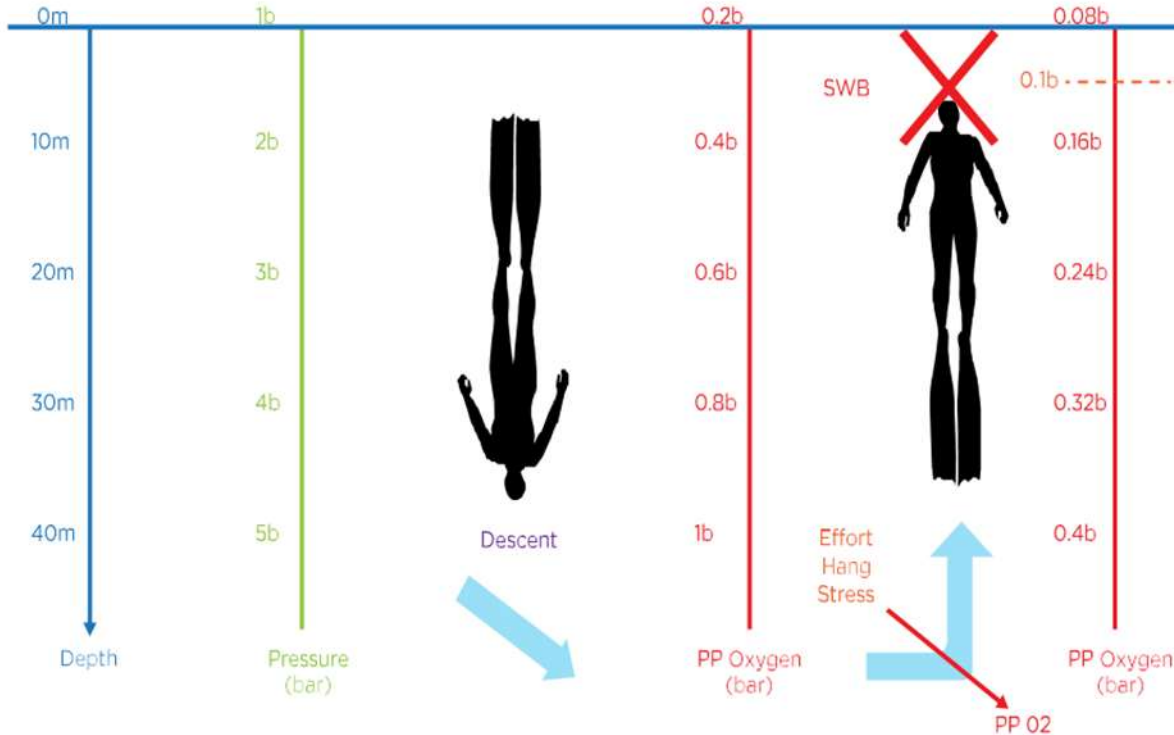
The difference is that an SWB occurs while the diver is ascending but still submerged, so only the first three points listed under Surface Blackout pertain.

HYPOXIA AND ASSOCIATED RISKS

- The diver's O₂ supply is already at the lowest point of the dive.
- As described by Boyle's Law (see the Physiology manual), gas volume doubles during ascent through the final 10 meters/33ft. This is the largest and most abrupt change in pressure encountered during a dive. As lung volume increases the concentration of oxygen drops very quickly, resulting in rapid diffusion from blood to lungs.
- Oxygen dissolved in the blood expands during ascent, further increasing diffusion from blood to lungs and lowering concentration in the blood (PPO₂).

Hypoxia Threshold (Low PpO ₂)		
PpO ₂	0.21	Normal PpO ₂
PpO ₂	0.16	Hypoxic Fit
PpO ₂	0.12	Blackout likely
PpO ₂	0.10	Minimum to sustain consciousness

Changes in Lung Volume with Depth - a major contributor to Freediving Blackouts



IMPORTANT: It is important to understand that, because of the action of Boyle's law, it is possible for a diver to have more than enough oxygen in his or her blood at depth but due to the change in pressure during ascent, that level can drop abruptly below the threshold to maintain consciousness.

SIGNS AND SYMPTOMS OF HYPOXIA

Before a hypoxic event such as Hypoxic Fit or a Blackout occurs, there may be a few warning signs that a diver is approaching or exceeding their limits.

External signs of hypoxia include:

- None! - There may be no sign of hypoxia before a blackout or hypoxic fit.
- Cessation of movement.
- Slow, weak, or erratic fin stroke or line-pulling.
- Speeding up the fin stroke or line-pulling.
- Movement during static breath-hold.
- Sudden release of air.
- Unfocused eye.
- Failure to respond during static breath-hold.
- Cyanosis (blue lips).
- Anything unusual.

If you notice any of these signs, it is better to act than to wait for a hypoxic fit or blackout.

- If you are underwater, assist the diver to the surface.
- If you are at the surface, help keep the diver's airways out of the water, remove the dive mask (if they blackout) and coach them through recovery breaths. An annoyed diver is better than an unconscious diver!

Cyanosis - blue or pale lips - may also be caused by being cold and is not always a sign of hypoxia. However, once a diver becomes chilled their body is using more O₂ and producing more CO₂ - at this point it is best to end the dive session.

Internal symptoms of hypoxia include:

- None! - You may be completely unaware that you are hypoxic.
- A tingling sensation in the body (often the hands first).
- Tunnel vision.
- Heat in the body or face.
- Ringing in the ears.
- Light-headedness.
- Dizziness.
- The dive suddenly feels easier.
- Euphoria.

HYPOXIA AND ASSOCIATED RISKS

- Confusion.
- Unusual fatigue/low in energy.

If you feel any of these symptoms, remain relaxed and prepare to take recovery breaths. Indicate to your buddy that you are having a problem so that they can assist you to the surface. The sign for this is:



If you begin to feel symptoms during ascent, resist the urge to rush to the surface. Exertion can mask the symptoms of hypoxia while using O₂ more quickly.

It is possible for people to become extremely angry when hypoxic. Be aware of this and, if necessary, protect yourself while continuing to assist the diver. Such incidents normally pass quickly.

Experiencing a hypoxic event makes it more likely that one will occur again in the future. It's important to progress gradually in freediving, allowing skill and sensitivity to develop together. Hypoxic incidents occur when divers push themselves well beyond their limits.

Possible contributors to a hypoxic incident may include but are not limited to:

- Lack of sleep.
- Dehydration.
- Length of dive.
- Depth of dive.
- Nutrition.
- Change in technique.
- Feeling cold.
- Overexertion.
- Hyperventilation during Relaxation Phase (Breathe-up).
- Forcing progress.
- No recovery breaths.

If you or someone you dive with experiences a Hypoxic Fit or Blackout, take time after-the-fact to review the incident and account for all the variables that may have contributed to it.

THE BUDDY SYSTEM

Logging your dives online is a good way to begin understanding the factors that influence your diving over time, and how your ability changes day-to-day.

THE BUDDY SYSTEM

IMPOTANT: NEVER DIVE ALONE

This is the single most important principle in this course.

The likelihood of surviving a severe hypoxic event when you dive alone or do not have a trained buddy with you is very low.

You must always dive with a trained and attentive dive buddy who can assist in the event that you become hypoxic. A trained buddy can swiftly deal with a hypoxic event, and make sure you exit the water safely.

In this section, and during your confined and open water training, you'll learn safety protocols refined over many years of recreational and competition freediving. Make time beyond this course to practice these skills with your fellow divers as often as possible. Repeated training will help you remain calm and effective in the event of a real emergency.



SURFACE BUDDYING

Surface buddying is appropriate when the depth is 10 meters/33 feet or less and the diver is either in view or attached to a line using a lanyard.

If you are buddying from the surface with a float or buoy, leave space for the diver to relax, making sure that they are in the correct position and that there are no obstructions. When the diver leaves the surface move into position directly above them. Watch them for the entire dive while relaxing on the surface - so you are fully rested in the event of an emergency.



Once the diver surfaces, place one hand gently under their armpit and the other underneath the divers' hand on the line, or on top of their hand if it's resting on a buoy.

In the absence of a line or buoy, place one hand under their armpit, ready to support them if needed, with the other ready to assist keeping their airway out of the water.

Once you're both in position on the surface, talk them through the surface protocol. Using a person's name and modelling recovery breaths has been shown to help divers on the edge of losing consciousness get through the recovery protocol and avoid a hypoxic event.

After recovering, the diver should make the OK sign and say, "I am OK".

Continue to assess the diver for at least 45 seconds. As discussed in the blackout section above, blackouts and hypoxic fits may happen after surfacing due to the delay in oxygen reaching the brain, even if recovery breaths have been performed.

Here are the steps again:

- Assist with the relaxation stage, making sure there are no obstructions, and that the diver is comfortable.
- Move into position and watch the diver for the entire dive while relaxing and breathing through your snorkel.

THE BUDDY SYSTEM

- Once a diver surfaces, place one hand under their armpit and the other either on top of their hand on the buoy or under their hand on the freediving line. If there is no dive line keep your hand ready in front of them in case help is needed keeping their airways clear of the water.
- Coach them through recovery breathing, using their name and demonstrating correct breathing.
- Monitor closely until fully recovered.



DEPTH BUDDYING

As we work our way down to greater depths, the safety diver's role becomes more demanding. When safety diving for depth, be sure and allow yourself a long enough relaxation stage to be fully prepared in the event that a deep rescue becomes necessary. Surface protocols remain identical to those described above in the Surface Buddying section, but you'll be meeting the diver during ascent, instead of remaining on the surface throughout the dive.



The depth at which you meet a diver depends on the depth of the dive. The minimum is 10 meters/33 feet for dives of less than 30m/100ft. For dives below 30 meters/100 feet, meet them at approximately $\frac{1}{3}$ the maximum depth.

For example, if someone is diving to 20 meters, meet them at 10 meters and synchronize to the surface from there.

If someone is diving to 40 meters, meet them at 17 meters (roughly one third of the target depth).

In Summary:

- For dives greater than 10m/33ft but less than 30m/100ft - meet the diver at 10m/33ft.
- Deeper than 30m/100ft - meet the diver at a third of the target depth.

It's important to time your safety dive as closely as possible. This comes with experience, but here are some basic guidelines.

Most divers swim at about one meter/three feet per second. With this in mind we can get a fairly good idea of when to begin our safety dive.

For example: For a 20m/66ft dive, you'll need to meet the diver at 10m/33ft. Once they begin ascending, it'll take roughly 10 seconds to get back to that depth. It should take you about 10 seconds to meet them there, so for this dive you'll want to begin your safety dive as the diver begins their ascent.

Determining when a diver is beginning to ascend is easy if the visibility is good and you can see the turn. Diving in poor visibility makes timing a little harder.



If you're line diving keep both hands on the rope, slightly tensioning it with the lower hand. When the diver grabs it to turn, you will feel the pull.

THE BUDDY SYSTEM

Line diving is a very controlled situation and is ideal for training and gradually increasing your limits. Prior to beginning the relaxation stage, each diver should communicate the estimated depth and time of their dive to the safety diver.

RAID NOTE: Diving in poor visibility without a fixed line is not recommended.

You'll have to time your safety dive based on the 1m per second formula. You'll need to know how deep the dive will be and where the diver will be surfacing. Poor visibility is a good reason to have a small float and line directly attached to the diver.

The diver can follow the line up to the float and the safety diver can follow it down to the appropriate depth.

RAID NOTE: For information on floats and lines, refer to the **Equipment** manual

To meet a diver at depth, perform a constant weight or free immersion dive. If line diving, hold onto the line and wait at the required depth until the diver's eyes are level, or slightly above yours.

Release the line and match their ascent rate, scanning their eyes and body for any signs of hypoxia. Maintain a distance no greater than 1.5m/5ft, matching their speed and maintaining a good position from which to assist if needed.

If using a fixed line and the diver has moved too far from it, signal to them to come closer.

Check the surface for obstructions as you ascend. Surface Protocol is described above in the Surface Buddying section.

Coach them through recovery breathing, using their name and modelling the correct recovery breaths.



To reiterate the steps:

- Decide and agree at what depth and when you will meet the diver.
- Once you have arrived at the correct depth, hold onto the line and wait for the diver.
- Let go of the line when their eyes are level with yours.
- Synchronize your ascent, keeping eye contact and making sure you are no further than 1.5m/5ft away.
- Check for obstructions as you approach the surface, and guide the diver to avoid them if needed.
- Once the diver surfaces, place one hand under their armpit and, if using a line and/or buoy, your other hand either on top of their hand on the buoy, or under their hand as they grip the line.
- Coach them through recovery breathing, using their name and demonstrating correct breathing.
- Monitor closely until fully recovered.

BLACKOUT RESCUE

Blacking out underwater triggers a survival mechanism called 'Laryngospasm', which seals the throat, preventing water from entering the lungs. The blowing and tapping procedure described below and used at the surface during rescue assists in the release of this mechanism by signaling the body that it is safe to breathe.

BLACKOUT RESCUE FROM SURFACE

In the event of a surface blackout the first priority is to get the diver's airway clear of the water.

- If they are face-down, place one hand on the back of the shoulder closest to you and the other hand under their armpit on the far side.
- Snake your arm under the far armpit until you are able to support the diver's chin, with your hand in a 'pistol-grip' shape. While their face is submerged this hand is used to keep their mouth closed so they do not aspirate water.
- From here, turn the diver over. Your hand should still be on their chin but is now gently supporting their airway clear of the water, while allowing the mouth to open to take a breath.
- This hand never moves, supporting the divers chin for the entire rescue procedure.
- The diver's head should now be resting on the shoulder on the side of your free hand. The free hand can remove the diver's mask. A dive buoy can also be useful for extra support.
- Remove the diver's mask or nose-clip and blow across their face near the eyes. Tap their cheek gently just below the eyes and talk to them.
- Use the diver's name and instruct them to breathe, while continuing to support them and keep their airways clear of the water.
- Tapping and blowing on an unconscious diver's face stimulates nerves that let the body know it is no longer underwater and can breathe.

In order of priority:

1. Make sure the diver's airways (mouth and nose) are out of the water.
2. Remove their mask or nose clip.
3. Blow, tap, talk
 - If the diver does not regain consciousness within 10 - 15 seconds, perform two rescue breaths in quick succession. They should be fairly forceful and repeated every five seconds until you can start proper CPR.
 - If the diver does not regain consciousness within another ten seconds, start towing them back to shore. Continue to support the back of their head while lifting the chin to keep airways clear of the water and give rescue breaths every eight fin strokes / five seconds. Provide rescue breaths until CPR can be applied on shore.

The below pictures show a Surface Rescue Sequence.

BLACKOUT RESCUE



BLACKOUT RESCUE





BLACKOUT RESCUE FROM DEPTH

First priority is bringing the unconscious diver to the surface.

Place one hand with the heel of your hand on the chin and the fingers lightly pressing on the mask. This hand should keep the mouth closed to protect the airway and prevent the mask from coming off as you ascend to the surface. Place the other hand on the back of the diver's head, this will help you control the body during ascent. You do not need to pinch their nose or hold the mask tightly.

The arm of the hand that is covering their airways should be **under the diver's arm from behind**. This sets you up nicely for the procedure we follow at the surface.

Extend your arms upward, positioning your body so that you are pushing, rather than pulling them upward. This gives you more control and better streamlining.

If using a dive line, keep an eye on it to help you stay vertically oriented and near the buoy when you surface.

Once you reach the surface, remember to take your own recovery breaths!

Switch your grip from covering their airways to keeping them out of the water. The head of the unconscious diver should be resting on the opposite shoulder to the arm that you are using to support their chin (See 'Surface Rescue' section above).

- **RESCUE** – Bring the freediver to the surface. Keep them securely on the surface with their airways out of the water.
- **RESPONSE** – Remove any facial equipment. Blow air across the eyes and cheeks. Gently tap the face. Loudly instruct the freediver to breathe, using their name.
-

HYPOXIC FIT RESCUE

- **REVIVE** - If the freediver remains unresponsive after thirty seconds, begin rescue breaths. If they do not revive within another minute, call for help, remove from the water, and commence CPR.

To reiterate the key points:

1. Bring the unconscious diver to the surface with airways closed.
2. Take your own recovery breaths and use buoy for support (if available).
3. Remove facial equipment.
4. Blow, tap, talk.
5. If the diver does not regain consciousness within 10 - 15 seconds, perform rescue breaths.
6. If they don't regain consciousness within another ten seconds, start the tow back to the shore, continuing to give rescue breaths every eight fin strokes / five seconds.



HYPOXIC FIT RESCUE

HYPOXIC FIT RESCUE

The rescue procedure for a hypoxic fit looks exactly the same as the rescue for a blackout, but there is no need to blow across their eyes or tap their cheek. The diver is still conscious but may be struggling to keep their airways above the water and take a breath.

1. Put them in the correct rescue position (as pictured and described in the blackout and surface rescue).
2. Remove facial equipment.
3. Coach them through recovery breathing.

Keep their airways above the water!

Firmly coach them through their breathing. Hearing another person telling you what to do helps the diver focus and regain full consciousness.

If you are in an area where the diver may have struck a hard object (pools, break walls / breakwaters etc.) check them for injuries after they have recovered.

Key Points to keep in mind for dealing with hypoxic rescues

- First priority protecting an incapacitated diver's airway from water entry. Underwater this means securing their mouth closed. On the surface it means keeping both mouth and nose clear of the water.
- Get the diver to the surface and remove their mask or nose-clip. What matters at the surface is having a hand free to remove the mask to stimulate the sensitive nerves under the eyes, while supporting the diver's head.
- A rescue is a high stress situation - be mindful of not using too much force or exhausting yourself. It takes very little effort to secure a diver's mouth underwater, or to hold their head as you guide them to the surface.
- Practice!

TIRED DIVER TOW

This technique is used to help an exhausted, but fully conscious diver get to shore. The tired diver lays on their back with their fins pointing upward. Place the tired divers' heels against your shoulders while holding their calves/lower legs. This allows you to fin, pushing the diver while controlling the direction of movement by pulling or pushing on the divers' lower legs.



UNCONSCIOUS DIVER TOW

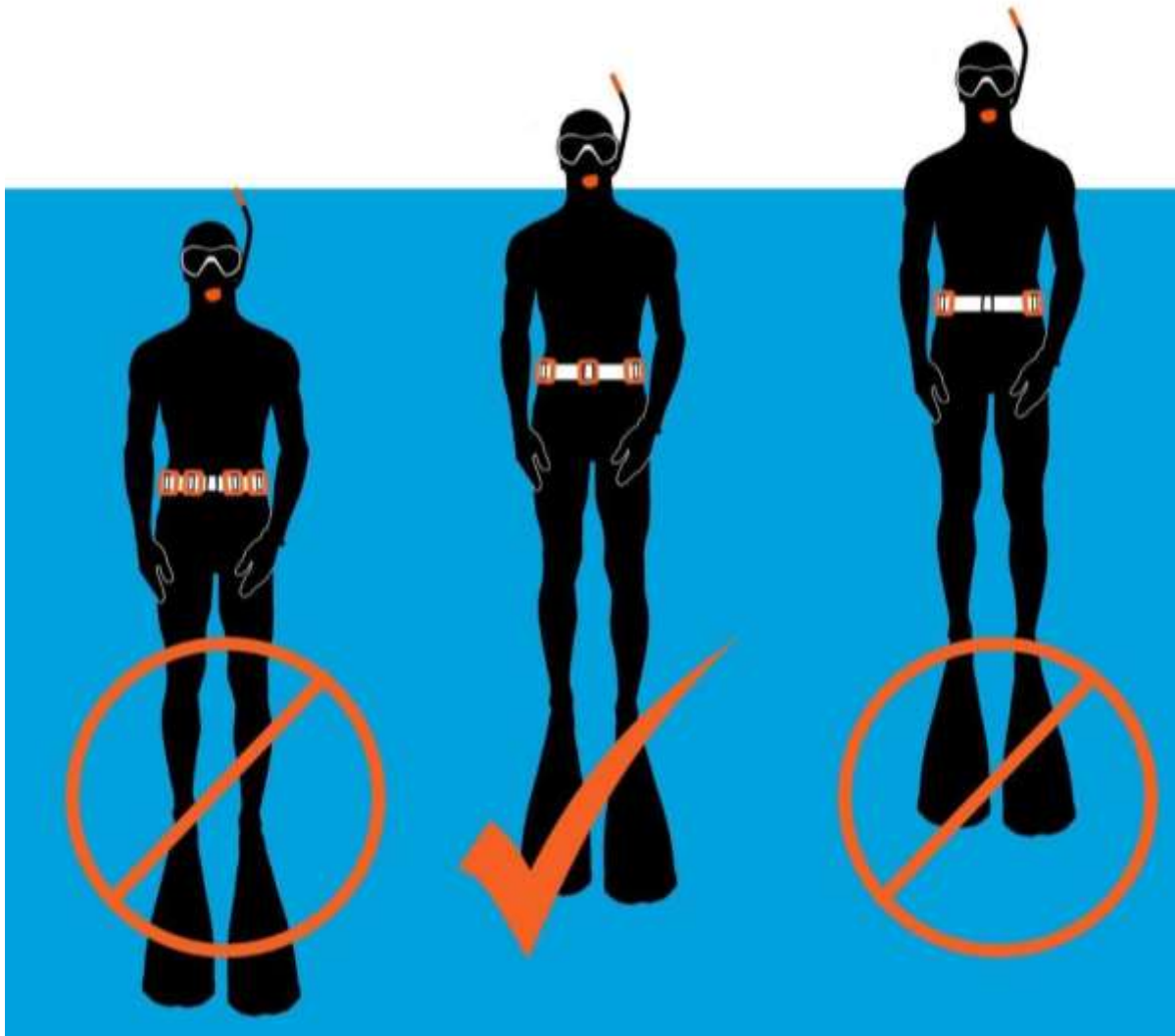
In the event of a blackout where the diver cannot be revived by the rescue protocol described earlier, the diver must be removed from the water as soon as possible. The unconscious diver tow secures the diver whilst protecting the airway and allowing for rescue breaths. One hand goes under the armpit of the diver and holds the chin in a pistol grip. The other hand goes to the back of the diver's head. The airway must remain out of the water at all times. The buddy can then swim the diver to shore / land whilst giving rescue breaths.



CORRECT WEIGHTING

CORRECT WEIGHTING

In this section we'll discuss buoyancy, and how to weight yourself safely for dives to 30 meters/100 feet or less.



SURFACE BUOYANCY

At the surface your lungs and wetsuit are uncompressed, and you should be positively buoyant.

To check that you are properly weighted do the following:

- Position yourself vertically in the water - fins pointed down and arms touching the sides of your body - without kicking or moving your arms.
- Remove your snorkel.
- Exhale completely.

With your head held in a level position your lower lip should remain just out of the water. If it does not you are over-weighted and should remove weights until you float as described.

Likewise, if you float too high, add a little weight until your chin is below the surface.

DECOMPRESSION SICKNESS (DCS)

Correctly weighted, you'll be able to hold a conversation at the surface without moving your arms or legs.

NEUTRAL BUOYANCY

Neutral buoyancy occurs when your lungs and wetsuit have compressed to the point that you do not sink or float. If you are descending, it's the point beyond which you enter freefall and can relax your effort to swim downward. After passing through it during ascent, you can begin to allow buoyancy to carry you to the surface.

If you've weighted yourself properly, you'll achieve neutral buoyancy at about 10m/33ft.

NEGATIVE BUOYANCY

As we pass the depth at which we are neutrally buoyant we enter the stage of a dive known as the 'sink phase' or 'freefall'. This is an opportunity to relax, conserve energy and focus on equalizing - moving only as much as needed to maintain streamline.

Factors that influence Buoyancy

- Salinity.
- Wetsuit wear.
- Body composition.
- Weight belt.

Salinity:

A diver is much more buoyant in salt water. Plan on re-calibrating your weighting when you move from fresh to salt and visa-versa. There are also variations in salinity which can affect buoyancy in different bodies of salt-water.

Wetsuit Wear and Thickness:

In addition to changing your weighting with suits of different thickness, neoprene wetsuits deteriorate over time - becoming less buoyant. You may find that as you use your suit more, you need to reduce the amount of weight you are using.

Be sure all the air is out of your suit before adjusting weights and re-check at the end of a dive session.

Body Composition:

Normal changes in body composition can cause your buoyancy to fluctuate. Logging changes in buoyancy can help you track trends over time and proactively adjust.

Weight Belt:

As described in the RAID Open Water Freediver Equipment manual, your weight belt should have a quick-release buckle. The belt should be thick enough that the lead weights do not slide when you hold it by one end, and not so long that there is danger of it getting entangled if you need to release it quickly.

Weight belts are normally worn with the buckle available for right-hand release. This makes it easier for another diver to release your belt in an emergency and is still easy to use if you are left-handed.

DECOMPRESSION SICKNESS (DCS)

Decompression sickness (also known as "the bends") is caused by nitrogen buildup in blood and tissues during either very deep dives, or multiple shallow dives with short surface intervals. The deeper you dive, the more the gas in your body is compressed (Boyle's Law). DCS occurs when more compressed nitrogen accumulates in your blood and tissues than can diffuse out of your blood as it expands during ascent. While this most often occurs only during very deep dives, nitrogen can accumulate over many shallow dives if surface intervals are not long enough.

DECOMPRESSION SICKNESS (DCS)

DCS is uncommon in freedivers, and very unlikely at the depths covered in this course, but it does happen.

In this section we will discuss why DCS occurs, how it may appear or feel, and how to reduce the risk of it occurring.

SYMPTOMS AND SIGNS

Symptoms of decompression sickness (DCS) include:

- Itching.
- Pain in the joints.
- Fatigue.
- Headache.
- Lightheadedness.
- Blurred vision.
- Chest pain.
- Stomach pain.
- Vertigo.
- Muscle Inflammation.
- Numbness in parts of the body.
- Stroke like symptoms.
- Shock.

Signs of decompression sickness (DCS) include:

- Denial - divers cannot believe they have it.
- Skin rash.
- Swollen lymph nodes.
- Confusion.
- Coughing.
- Stroke like symptoms.
- Shock.

These symptoms can occur immediately after surfacing, or a few hours or even days after you finish your session. If you experience any of these symptoms, contact emergency services immediately.

Delaying treatment for DCS increases the risk of permanent damage. Breathe pure oxygen if it is available. Drink water, avoid movement, exercise, heat, hot showers, alcohol and flying.

SCUBA DIVING AND FREEDIVING

[This link contains the account of a competitive freediver who experienced severe DCS after several deep dives.](#)

PREVENTION

Surface time is the most important factor in preventing DCS in freedivers.

Surface Interval Guidelines:

1. Dives of 30m or less - double the dive time, or the depth divided by five, whichever is more.
2. Dives between 30m and 50m - depth divided by five. For example, 50 divided by five is ten. So, a minimum of ten minutes surface time, more is definitely better.
3. Dives past 50m - only one dive per day.

While DCS is well-understood in scuba, it is only beginning to be researched in freediving. These surface intervals are educated guesses. When in doubt, err on the side of caution.

SCUBA DIVING AND FREEDIVING

Never accept air from a scuba diver under the water. If in an extreme emergency and you have to take air from a scuba diver, then you have to stay with them until you both reach the surface, sharing their air, and ascending with them observing all necessary safety stops.

- Do not mix scuba diving and freediving during the same day. After one scuba diving session, wait a minimum of 12 hours before a freediving session. After two or more scuba dives in the same day, wait 24 hours before freediving.
- After a shallow and recreational freedive session, wait at least 8 hours before a scuba diving session. After multiple freediving sessions, a freedive session with multiple dives and minimum surface intervals, or a freedive session involving a freedive over 30 meters, wait 24 hours before a scuba diving season.

RISK MANAGEMENT AND HOW TO AVOID A HYPOXIC INCIDENT

- **Don't hyperventilate!**

Hyperventilation is a primary factor in many freediving blackouts. The instructions in this course will help you learn to prevent it.

For more on this topic, refer to the *Breathing for Freediving* section of the **Confined Water Training** manual

- **Never dive without a qualified buddy**

Blackouts and hypoxic fits can come on quickly and unexpectedly. A trained, qualified buddy is the difference between a scary experience and tragedy.

- **Slow progression**

Acclimate gradually to longer and deeper dives. Your body adapts to longer holds and greater pressure at its own pace. Pushing yourself can lead to lung or trachea injury as well as hypoxic situations.

A driven, aggressive, approach to freediving is self-defeating and dangerous.

- **Correct weighting**

Your resources are lowest at the end of a dive.

CRAMP REMOVAL

Correct weighting makes surfacing much easier and allows you to relax and recharge comfortably on the surface.

- **Drop your weight belt if necessary**

Weight belts are quick release for a reason. Make sure any extra length on your belt is not tucked in or otherwise restricted - so the belt is free to release and fall away in an emergency.

- **Snorkel out**

The snorkel is a direct passage of water into your mouth. Always dive with your snorkel out.

- **Practice taking solid recovery breaths**

Perform recovery breaths no matter how deep or long the dive. Lives have been saved by having the recovery protocol so deeply ingrained that it is automatic.

- **Surface time**

Relaxed surface intervals make for enjoyable and safe dives. Allow yourself plenty of time between dives as you relax on the surface.

- **Dive healthy**

If you had a bad night's sleep or are feeling low and unrelaxed, it may be wise to forgo diving for the day. These factors increase the risk of a hypoxic event and affect your situational awareness and decision making.

- **Blood Sugar**

Low blood sugar greatly increases the likelihood of a blackout or LMC. Avoid snacks or food that create sudden elevations (and subsequent crashes) in blood sugar.

For example: If you eat oatmeal before a dive, avoid 'quick oats. The fiber in quick oats is partially broken down - resulting in faster digestion of carbohydrates and a spike in blood sugar.

- **Stay hydrated**

The body loses quite a bit of water during freediving. Immersion diuresis* dissipates not only water, but electrolytes. Divers also often sweat due to overheating or exertion while wearing a wetsuit. A sugar-free electrolyte solution helps with rehydration, fatigue, and cramping.

For more on this topic, refer to the *Mammalian Dive Response* section of the **Physiology** manual

- **Rehearse rescue techniques and scenarios**

If a difficult situation ever arises, you'll want to be able to deal with it calmly and efficiently. Practicing rescues with new diving partners also gives you confidence in them as well as yourself.

- **Use safety equipment**

A dive buoy that can support your weight in the water will make surface recovery easier, in addition to marking your location for boat traffic and other divers. Using a lanyard when line diving helps keep the diver near the line and allows for deep rescue from the surface.

CRAMP REMOVAL

If you are prone to suffering from cramp, stretching before the dive session is a good idea.

CRAMP REMOVAL

Common reasons for cramps include dehydration, cold, fatigue and a lack of potassium (potassium is lost through immersion diuresis).

CRAMP REMOVAL ON YOUR BUDDY

When a diver is experiencing a leg cramp, have them extend the cramped leg as much as possible. Using the opposing muscle group to try and counteract the cramp sends signals to the cramped muscles to relax and extend. Assist them by gripping the cramped leg and helping extend it, while pushing the fin-blade toward their body - flexing the foot.



CRAMP REMOVAL ON YOURSELF

Grab the middle/top of your fin and pull it back towards your chest while extending your leg. 'Breathing into the stretch' can help you focus and relax.



EXOSTOSIS

Exostosis, commonly known as 'surfers' ear', occurs because of repeated exposure to cold water and wind. It can cause hearing problems, pain, and increases the likelihood of outer ear infections. Severe exostosis may require surgical intervention.

Using vented diving earplugs (for example Doc's Proplugs) helps prevent this. They allow a small amount of water into the ear canal and keep it warm.

CONCLUSION

When practiced correctly, freediving is an extremely safe and enjoyable sport. It is a nice way to explore our underwater world without the need for lots of heavy equipment. In order to get the most from your freediving, refer back to these manuals frequently, and work with an instructor to refine your technique and skills.



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