Pool Induction

Christchurch Freediving Club

This is a written summary of Christchurch Freediving Club's pool induction. You should have received a copy when attending a pool induction. Reading this document alone (without attending an in-person induction) does not qualify as an induction to the club. Neither this document nor the pool induction itself are a complete introduction to freediving; we recommend you take a course from a qualified instructor.

The sport of freediving

Freediving is the sport of diving while holding your breath (apnea). There are pool and depth disciplines: in the pool, divers try to maximise either distance (dynamic apnea) or time (static apnea). In competition, there are four pool events: dynamic apnea (using any fins), dynamic apnea no fins (swimming underwater breaststroke), dynamic with bifins (i.e., using two fins and a flutter kick, rather than a single monofin with a dolphin kick), and static apnea.

Freediving for depth is more well-known, but harder to train year-round in NZ. In competition (and in training) we dive down a weighted line to a pre-nominated depth. Like in the pool there are events for any fins, no fins, and bifins, as well as pulling yourself up and down the line (called free immersion). There is a more extreme version using a weighted sled to descend and a large balloon to ascend, but this form is somewhat out of fashion nowadays.

The rest of this induction only covers pool freediving and won't prepare you for freediving in open water.

Is freediving safe? Yes (and no). You are underwater without breathing equipment, so there are risks, however, freediving has a strong safety culture and as long as you stick to safe practices, it is a relatively safe sport. There have been only two fatalities in competition in 30 years, which compares well to many other sports (both were depth competitions). Pool freediving is obviously safer than depth. As with anything potentially dangerous, if you ignore the safety practices, you can very easily die or get seriously injured.

People train freediving in the pool for a number of reasons:

- For fun!
- To compete.
- To improve their depth freediving or spearfishing.
- To meditate.
- To be more confident when snorkelling, diving, or surfing.

Some of the current AIDA world records (from https://worldrecords.aidainternational.org/):

	Men	Women
Static (STA)	11:35	9:02
Dynamic (DYN)	300m	257m
Dynamic no fins (DNF)	244m	191m
Depth (CWT)	130m	107m

Freediving in NZ

Freediving has been popular in NZ for a while now. Spearfishing is a popular activity and the early freedivers were mostly converted spearos. The first club was the Lazy Seals in Wellington. The national body is Freediving New Zealand which is affiliated with AIDA (International Association for the Development of Apnea). There are FNZ clubs in Northland, Auckland, Waikato, Whanganui, Wellington, and Queenstown.

As with Rugby, we punch above our weight in freediving. Will Trubridge (based in the Bahamas) currently holds the men's CNF (no fins, depth) world record and recently the men's FIM record. Kathryn Nevatt, Dave Mullins, and Guy Brew have all held world records. Many more Kiwi athletes have competed at international level.

Christchurch Freediving Club

We're a sports club, we train together for fun and to improve. We are not a training or education organisation. We share advice and experience, but it's not the same as taking a course. We recommend that everyone who freedives takes a freediving course.

We train at Graham Condon pool on Mondays, 6:30 till 8. Hopefully, we'll add another pool session soon. We don't do any depth training yet, but we will try to run an occasional snorkelling trip or depth training session.

You must be a member to train with the club long-term. Our fees are $100 per year. The fees pay for lane hire, membership of AIDA via Freediving NZ (we are in the process of becoming an affiliated club), and equipment.

Safety

Safety is really, really important in freediving. If we dive sensibly, following safe practices it is a safe sport. If we don't, we risk death and severe injury. Deliberately diving unsafely will get you removed from the club.

The main risks in freediving are:

1. Drowning, nearly always following blackout. Could also be caused by exhaustion.
2. Health issues occurring while underwater (e.g., heart attack, stroke, etc.).
3. Injury by some kind of collision (e.g., crashing into another diver, or hitting another diver with fins or a monofin).

We'll discuss blackout in more detail below. To mitigate the other risks:

1. Be aware of your physical condition, don't overdo it, don't be negatively buoyant.
2. Don't freedive if you're unwell or under the influence of alcohol or drugs. Be aware that some medications can have side effects which can be dangerous when combined with freediving. If in doubt, consult a doctor or just don't dive.
3. Be aware of your surroundings (including the ends of the pool and lane ropes), other divers, and other pool users. Be careful with your fins. Don't swim too close to other divers. Let others know what you are planning to do (e.g., whether you will turn at the end of the lane or come up).
4. Dive within your abilities and listen to your body rather than pushing for numbers.

There are many risks associated with deep freediving which are not covered here since they are not an issue in the pool.

The buddy system

The most important safety precaution is: **never dive alone**. You must always dive with a buddy who is trained in identifying and handling freediving emergencies and is able to rescue you. This basically means there must be at least two of you freediving together.

A pool lifeguard is not your buddy. A friend or partner who doesn't freedive is not a safe buddy. Someone new to freediving is not a safe buddy. If you're training for the club, but no specific person is safetying your dive, you don't have a buddy. Someone who is injured and just watching is not a safe buddy. Other folk swimming or playing in the pool are not your buddies. When we say 'never dive alone' all those situations count as diving alone. Even if you are doing really easy dives well within your limits, **do not dive alone!**

Communication

It is important to let others know what you are doing and what kind of safetying you need. Even if you have a safe buddy, if they don't know that you're diving, or what kind of dive you are

doing, it is not safe. Good communication also helps others optimise their sessions and prevents collisions and other accidents.

Other stuff

When you come up, remember to come up on the lane rope or against a wall, not in open water. Aim to finish long swims at the shallow end of the pool.

Exhale dives are an advanced technique and should not be performed without proper training.

If you have a blackout or LMC or any pressure-related injury (coughing blood or a rasping cough, ear pain, nose bleed, or low O2 reading on pulse oximeter), stop diving for the day and seek medical advice.

Wear a mask or goggles; ensure you stay in your lane, including your fins and other equipment, especially when turning. Be aware of other pool users at all times. When waiting at the end of the pool, leave divers plenty of room to turn.

Be safe when you're diving outside of club sessions. **Never dive alone**, make sure you have a **safe buddy**. If you're training in a pool, it's unsafe to train in a lane with other swimmers. You might have to hire a lane. You should follow club rules and if you're in a CCC pool, you must abide by their breath holding policy. Even if you are not breath holding, it is unsafe to use long fins or a monofin in a lane with other swimmers.

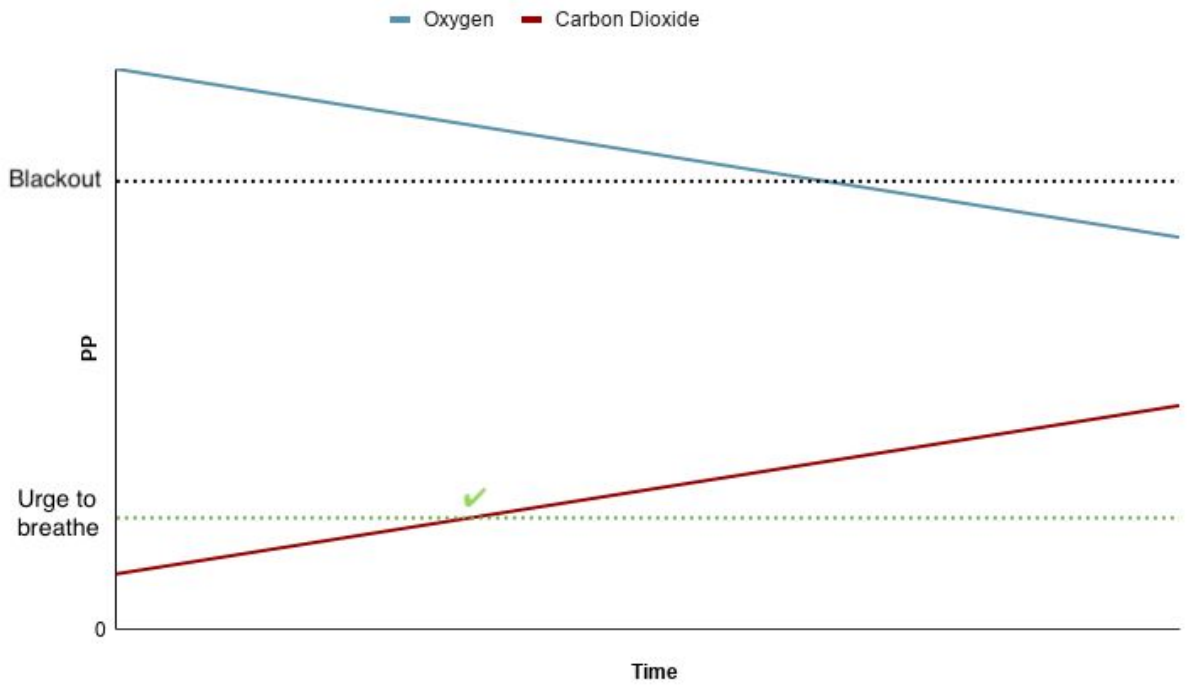
Understanding blackouts

We blackout when our brain does not get enough oxygen from the blood. In the freediving context, that happens when we have used up the oxygen in our blood and lungs to the point that blood oxygen falls below the necessary level.

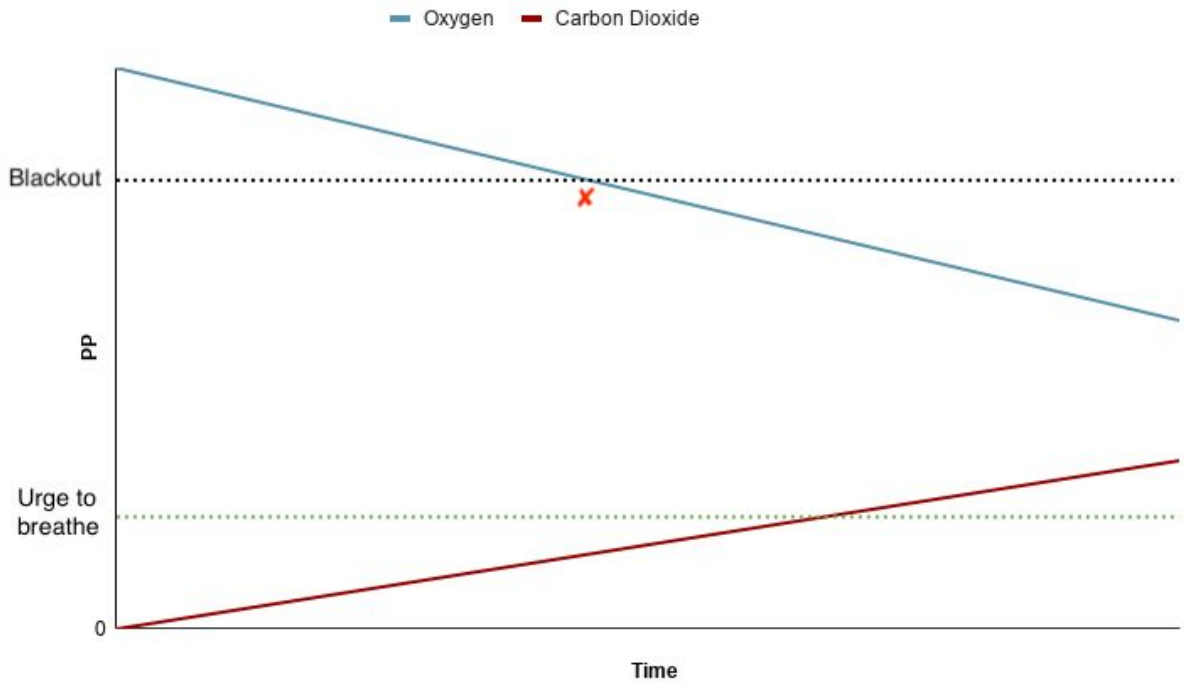
Oxygen (O2) is used for lots of things in the body (not just the brain). In our cells, it is combined with glucose (sugar) to produce energy (for all kinds of activity) and carbon dioxide (CO2).

When we hold our breath, we get an *urge to breathe*. Initially, this is psychological, but if we continue to hold our breath there is a physiological response. The urge to breathe is caused by high CO2 levels, not by low O2 levels. That means that if O2 is low, but CO2 is also low then we can blackout before we get an urge to breathe.

Hyperventilation lowers the level of CO2 in the body and thus delays the urge to breathe. That may sound good, but it can easily delay it past the point of blackout. Hyperventilation of some form is the primary cause of blackout in beginner and intermediate freedivers. **Never hyperventilate**!



Normal breathing: urge to breathe before blackout :-)



Hyperventilation: blackout before urge to breathe :-(

The most obvious form of hyperventilation is rapid, deep breathing. However, any time we manipulate our breathing, even just slowing it down, we risk hyperventilating and artificially lowering our CO2. Therefore, never manipulate breathing before a dive - don't breathe deep or slow or fast.

Having talked a lot about hyperventilation, it is worth remembering that hyperventilation makes blackout much more likely, but a blackout can happen without hyperventilation. Anytime our O2 levels drop too low we will blackout. There are numerous reasons why that might happen, including: being able to resist the urge to breathe beyond the blackout point, either naturally or due to training, burning O2 faster due to stress or activity, the 'intoxicating' effect of low O2 obscuring the urge to breathe, etc.

Furthermore, although there are some signs of hypoxia (see below), these are not reliable, especially 'in the moment'. You cannot rely on any of those signs, a blackout can happen without warning. This is why it is important to never dive alone and *always* dive with a safe buddy.

How to safety another diver

There are several ways for a buddy to provide safety to a diver. The method must be appropriate to the activity. Whichever method is used, the safety diver must maintain constant watch of the diver and watch for the signs listed in the next section.

In CCC pools, a safety diver must always be in the water and in close proximity to anyone breath holding.

For dynamic apnea the safety diver can:

- Swim on the surface behind the diver. Take care to be out of the diver's way when they are turning.
- Walk along the side of the pool following the diver. (Usually in combination with another safety diver in the water for high risk dives such as max efforts).
- Watch the diver from the end of the pool (only appropriate if the safety can see the diver all the way to the end of the pool, and only for very low risk activity such as warm up dives).
- A group of divers watch each other while training (only appropriate for low risk group training (e.g., a CO2 table) where there are enough divers for a diver to never have to surface alone).

For static apnea, the safety should stand next to the diver (monitoring a maximum of two divers). The safety diver should ask for a signal from the diver at regular intervals. Note that practicing static apnea is not allowed in CCC pools.

Surfacing can be the most dangerous part of the dive since this is when the diver's O2 is lowest. Therefore, the safety should carefully watch the diver as they surface and for some time after

they surface (a minute is fine for training dives, for higher effort dives, stay longer). The safety should be close enough to the diver to support them if they lose consciousness. Ideally they should have eye contact with the diver as soon as they surface.

Signs of hypoxia (what to look for)

While diving:

- Change in body tone (going limp), change in finning (getting less coordinated), or change of motion (stopping, slowing down, becoming less coordinated, etc).
- Exhalation.
- Loss of eye contact.

On surfacing:

- Cyanosis (blue lips, pale skin, pale or blue fingernails).
- LMC (aka samba - shaking, nodding, slurred speech, or lack of coordination).

In yourself:

- Tingling in fingers.
- Feeling faint, dizzy, or light-headed.
- Feeling physically good/easy late in a dive.

In normal training you should never have a blackout, LMC, or other symptom of severe hypoxia. Listen to your body, know your limits, and don't push too hard for numbers. If you blackout in training or have frequent LMCs, then you are doing something wrong and you should examine how you are diving and talk to other club members to try and fix things.

What to do

- Get the diver to the surface.
- Ensure the diver's airway is out of the water; support the diver.
- Remove equipment (neck weight, mask, goggles, or nose clip).
- Blow, tap, talk.
- Get the diver to the side of the pool.
- Get help.
- Help lifeguards to get the diver out of the pool if necessary.
- Follow lifeguard instructions.

Equipment

Freediving doesn't require much equipment, especially in the pool, but there are a few things you'll need:

- A wetsuit, a thin swimming wetsuit is best for dynamics, a thicker suit, e.g., a 5mm freediving suit, is best for statics. Some people like to do dynamics without a suit, but it can be chilly.
- Weights: a weight belt and/or neck weight. We aim for neutral buoyancy at 1m with full lungs (i.e., you should float on the surface), adjust neck vs waist to keep the body horizontal. No weights for statics. Never be over-weighted.
- Mask or goggles and nose clip, to keep the water out of your eyes and nose.
- Fins: can be long or short, or you can use a monofin.
- A snorkel: not needed for freediving, but can be useful when safetying.

Stages of a dive

The key to everything in freediving is relaxation. Basically, the more relaxed you are, the slower you burn O2, the longer you can hold your breath. To have a good dive we need to get relaxed, then stay relaxed.

Preparation

Before we start, we need to make sure nobody else is in our way, that we have a safety diver, and that they and anyone else around knows what we're doing. Then check you've got all your gear - it's pretty annoying to spend time getting ready to dive, start, and realise you've forgotten your weight belt.

Then relax. Find a comfortable position where you don't need to spend much effort to start the dive. Close your eyes and relax.

Focussing on the breathing can help some people relax, but make sure you don't hyperventilate. Breathing using the diaphragm is more relaxing than breathing with the chest, but be careful not to breathe deeper when breathing with the diaphragm. You should feel like you're just about to drop off to sleep.

Take a few minutes to relax. Take a bit longer if you're going for a max attempt. But try not to take too long if you're just training and there are people waiting.

Final breath

Before the dive we want to take one last, full breath. We want to get as much air as possible into our lungs without losing our relaxation.

Start with an almost full exhale (you don't need to squeeze out that last little bit of air, better to stay relaxed). Then breath in through your mouth (you should have your mask or nose clip on by now). First fill the belly by bringing the diaphragm down. Then fill the chest, think of expanding out to the sides and back, not just your front. Then fill the top of your chest, this feels like breathing into your shoulders.

Stay relaxed, don't rush, and don't use too much muscle.

The dive

Don't rush the start and dive in, you want to relax into the water. Once you've started, check again that you're relaxed and none of your muscles are tense.

The initial phase of the dive should be pleasant and meditative. After a while you'll get an urge to breathe. It starts weak and gets stronger and more physical. After a while you will probably get contractions in your chest and abdomen, this is your body trying to force itself to breathe and is normal. These start one at a time and get stronger and more frequent. Relax through the urge to breathe. Remember that it is the CO2 that is making you suffer, and you've got plenty of O2. Try and observe the feelings in your body and your reaction to them.

Recovery

When you come up make sure you are supported - come up close to a wall or lane rope and hold on to it. Use your arms rather than hands to hold on so that you protect your chin. Stand up if you can.

Start *recovery breathing* as soon as you surface. Don't exhale before you surface. Exhale about half your lung volume, don't empty your lungs. Inhale straight away to fill your lungs and repeat about five times.

Show the ok sign or tell your buddy that you're ok. Monitor yourself for signs of hypoxia. Take some time before swimming off (e.g., if you're returning to the start of the length), especially if you're tired from the dive or showing signs of hypoxia.

Dynamic apnea

A dynamic apnea starts with a push off the wall. Make it count, but don't use so much effort it breaks your relaxation.

Use a medium paced flutter kick. The kick should be balanced between the up- and down-kick. Don't kick too wide - it ruins your streamlining. Make sure you kick from the hips, not the knees. Keep your ankles extended; on the up kick, you should feel like you're pushing water up with the soles of your feet.

You can keep your arms over your head in streamline, or by your side. Either way, try to keep your shoulders, chest, and neck relaxed. Your head/neck should be neutral which means looking at the bottom of the pool, not forwards.

Working on buoyancy is really important for reducing resistance and effort, and thus extending your range. You should be exactly neutral at your swimming depth (roughly 1m) and the body should be flat. This requires balancing weight with your natural and suit buoyancy, and balancing the weight on your neck and waist.

Try and observe how you're feeling during and after the dive. Why did you come up? Are you tired or legs burning? Did you get contractions? Are you feeling relaxed or in a rush to finish?

When you come up, remember to come up on the lane rope or against a wall, not in open water.

Static apnea

Note that static apnea is not allowed in CCC pools.

Static apnea is done floating on the surface close to a wall (or possibly a lane rope). Use the wall for support when preparing and recovering. During the dive, your safety diver will move you around a bit to keep you close, but not too close, to the wall.

Since you're not moving there is no technique to think about, just focus on relaxation and fighting the urge to breathe.

Before the dive, you should establish with your safety what kind of dive it will be and your expected time(s). You should agree on what info or coaching you want from your safety. Some people like to know the time, some like encouragement, some like quiet. In any case, at some point your safety should ask you for a signal to check you're still conscious. You should respond by extending a finger, it shouldn't be a big movement or break your relaxation.

When you're ready to come up, stay relaxed, move closer to the wall so you can hold the wall and move your feet underneath your body, you can spend some time in this position. Exiting the water is just a matter of looking up.

Club rules

You must abide by all club rules at all times when freediving with the club. Our rules are summarised below, you can find a copy of the club rules and other relevant documents on the club website: https://www.chchfreediving.nz/resources.

- **Never dive alone and only dive with a safe buddy** who understands how to freedive, how to perform rescues, and what to do in the event of an emergency.
- **Communicate:** make sure your buddy and other divers know what you are doing.
- **Never hyperventilate**.
- **Obey all commands from pool lifeguards** and the **person in charge** of the session.
- **Obey all venue-specific rules**; including Christchurch City Council's breath holding policy when diving at CCC pools (available from https://www.chchfreediving.nz/resources).