

APNEA TOTAL

INSTRUCTOR MANUAL

ADVANCED FREEDIVER COURSE

CONTENTS

ADVANCED FREEDIVER COURSE DAY 1.....	3
WELCOME	3
INTRODUCTION	5
THE MAMMALIAN DIVING REFLEX	5
STATIC APNEA	7
Introduction to Static Apnea	7
The Warm Up	7
First Stage of Static Apnea - The Breathe-Up	8
Second Stage of Static Apnea - Relaxation.....	8
SAFETY REMINDER:.....	12
Feedback	14
Coaching in the water	15
ORGANISATION OF THE WATER SESSION	16
How to perform a Rescue:	17
Upon your return to the classroom.....	18
TRAINING FOR STATIC APNEA	19
Static Apnea Tables	19
Apnea Walks	20
Breathe-up for Static Training	20
SAFETY REMINDER.....	20
ADVANCED FREEDIVER COURSE DAY 2.....	21
OUR FOCUS FOR THE DAY.....	21
INTRODUCTION	21
FOUR-SECTION BREATHING	22
Flushes	23

IMPORTANT	23
Agitation	24
Exchange	24
Relaxation	24
Final Breath	24
EXHALE DIVES	26
The benefits.....	26
How to execute an exhale dive:	27
Plan for the water	29
ADVANCED FREEDIVER COURSE - DAY 3	30
INTRODUCTION TO DAY 3	30
Positive Buoyancy	31
Freefall	31
PACKING	33
Explanation of full deep dive preparation.....	35
EQUALISATION IMPROVEMENTS	35
GIVING ADDITIONAL INFORMATION	35
SAFETY DIVE PRACTICE.....	36

ADVANCED FREEDIVER COURSE DAY 1

WELCOME

Freediver Course level students will have **varying levels of breath-hold capabilities**. In the Advanced Freediver Course, our focus is on each student's performance as an individual. Provide the information according to each student's level. With experience, you will learn that if you apply the correct teaching methods,

you will be able to push students to their maximum (or close to their maximum) physical and mental free diving capabilities.

This is a **very challenging and rewarding course** to teach and one that will give you a lot of satisfaction once you have mastered the correct way of teaching it. By teaching this course, you will realise the true human freediving potential.

If you were the Freediver Course Instructor for your Advanced Course group, you will already know the type of divers they are. If not, you need to gain this information either from their previous Instructor, from the Apnea Total database or by asking them a few questions about their previous experience.

INTRODUCTION

Always start the class by getting **feedback** from the students and remind them of the great time they had during the Freediver Course. Give them the plan for the Static day, and what they will experience over the following days of the Advanced Freediver Course. As some students will continue and others will choose to stop after the STA Clinic, you'll want to feed their curiosity and get them excited about the rest of the course so that you've maximized the chance of them continuing.

Welcome to the Advanced Freediver Course. During this course, you will learn to increase your breath-hold abilities and performance beyond your imagination. You will be guided in maximising your Mammalian Diving Reflex and in advanced breathing techniques and chest flexibility exercises to increase your performance in freediving as well as in any other sports that you pursue. This course will introduce you to the discipline of Static Apnea, where you will discover that your body can suspend respiration for several minutes without feeling the urge to breathe. You will also learn and practice Exhale Dives - freediving after exhalation - where you will discover a new world of sensations and personal potential underwater.

Explain the schedule of the course and the plan for the day.

THE MAMMALIAN DIVING REFLEX

Firstly, introduce the four different adaptations that the body makes with the **Mammalian Diving Reflex** during apnea. The aim is for students to understand that the physical changes they experience during breath-hold are *positive* bodily adaptations that play an incredibly important role in their ability to dive and hold their breath. This means that they should mentally label these changes as positive.

Remember that these explanations should be **logical and easy to understand**. Remind your students that all of this information is in the Advanced Freediver Manual which is available to them on our website once they've completed the course.

The Mammalian Diving Reflex consists of a series of physical adaptations of the body that occur in mammals, during apnea, when in contact with water and when under pressure. The purpose of this reflex is to conserve oxygen, and even prevent barotrauma (pressure-related injuries). The Mammalian Diving Reflex varies from person to person and although generally weak in humans, can be induced to make it occur more quickly, and with regular training can be made much stronger.

The following describes the four major physical changes that occur in our bodies due to the Mammalian Diving Reflex:

Bradycardia - This means slowing of the heart. The heart is one of the strongest muscles in our body. Each time the heart beats, it uses oxygen. During breath-hold our body will naturally slow down the heartbeat to conserve oxygen.

Vasoconstriction - This means the constriction of the blood vessels. When our blood vessels constrict, blood flow to our limbs is slowed, increasing the concentration of oxygen-rich blood towards our core and brain when needed.

Spleen Contraction - The spleen is an organ that stores red blood cells. When oxygen is needed, the spleen contracts by up to 20%, thereby releasing red blood cells into our system. This means that more oxygen can be carried in our blood. After roughly 30 minutes into a freediving session this effect will reach its peak.

Blood Shift - This is a very unique physical change discovered only within the last 50 years. The Blood Shift is what allows freedivers to dive beyond the residual volume of their lung capacity, which is normally reached between the depths of 30 to 40 meters. As we dive deeper and pressure increases, the alveoli and capillaries in our lungs become engorged with oxygen-rich blood. This blood replaces the air space in our lungs, and as blood is a liquid (and therefore incompressible) it acts as a cushion, preventing our lungs from collapsing.

IMPORTANT

Don't make these explanations too complicated, particularly the blood shift, but let them know that the blood shift is something that they will be able to experience during the exhale dives in the following days of the Advanced Course.

Make sure that the students understand that without the proper training and instruction, they can easily hurt themselves, especially when they get closer to their limits. Different breathe-ups and different warm-ups are factors that can influence the success of exhale dives. Make them curious.

The more often you dive, the more you develop and strengthen your Mammalian Diving Reflex. Simple acts like submerging the face in cold water before diving will stimulate our body to trigger this diving reflex. However, pressure changes are what stimulates the diving reflex the most - the greater the pressure, the stronger the diving reflex. Also be aware that the greater the pressure, the greater the risk of injuring oneself. Only with the right tuition and training can one adapt their body to reach deeper depths without injury.

NOTES:

STATIC APNEA

Introduction to Static Apnea

In this fantastic discipline you will realize the true potential of the human body. The sensation of suspending the act of breathing for several minutes can be extremely satisfying and surprisingly relaxing. Practicing Static Apnea will increase your confidence and the duration of your deep dives, as well as your stamina in other water activities such as spearfishing, underwater photography or surfing.

Static Apnea is practiced on the surface of the water, either in a swimming pool or the calm shoreline of the sea. Our body is motionless and as relaxed as possible with our airways submerged under water.

As with any form of freediving, we **never, ever practice static apnea alone**.

Ask your students if they have ever tried to hold their breath, and if so, for how long? Assimilate this information and make good use of it later.

The Warm Up

There are different approaches for warming up for Static Apnea. Some freedivers feel more comfortable doing a few breath-holds before going for their longest attempt, while others prefer to complete their maximum breath-hold from the very first go.

During this course, we will find out what is more suitable for you. Due to the fact that there is no diving involved; there is no pressure change and no muscle use. This means that with the right frame of mind, no warm up is needed in order to perform a long breath-hold on the very first try.

Explain the warm up to the students by following the manual. Let them know that it is most likely that with us they will be able to reach their very best breath-hold so far, although it is by no means going to be their limit. Over time, with experience and the guidance of an Instructor, students will be able to experiment and tweak the warm up individually to find out what works best for them.

STAGES OF STATIC APNEA

First Stage of Static Apnea - The Breathe-Up

It's important to emphasize **concentration and relaxation** during the breathe-up, but, at this point, do not tell the students which breathing technique they will use. Follow the manual below to **explain the breathing, but not the two-section 5/5 breathe-up**.

The breathe-up for static apnea is different to the breathe-up that we use for diving. When we are at the surface, our physical perception of carbon dioxide will be much higher than on deep dives, therefore making our breath-holds more uncomfortable. This is why our breathe-up for static will be slightly different in speed and thus only suitable for disciplines where depth is not involved, i.e. static, dynamic and dry exercises.

During our breathe-up, we want to focus only on our breath, and the feeling of the air flowing in and out of our body. A wandering mind will dramatically and negatively affect the duration of our breath-hold.

After the breathe-up, we will take a final breath and submerge the airways under water. It is at this point that the second stage begins.

Remember not to explain the two section, 5/5 breathing technique for the static yet - this will come later after the first exercise.

Second Stage of Static Apnea - Relaxation

This should be our only focus when we start the breath-hold. We have to relax our muscles and most importantly, our mind.

The Body

During Static apnea we remain motionless, focusing on our body position and relaxing all the muscles in our body. Muscles like the neck and shoulders tend to be a bit tense the first few times we try static apnea.

The use of **a mask is not recommended** as it will cover most of our face particularly around the eyes and the upper lip. These areas are the main triggers of the facial immersion technique that stimulate the Mammalian Diving Reflex when they come

into contact with water. Instead, we use only a nose clip and small goggles if necessary.

The Mind

The mind will be **our main tool** in increasing the duration of our breath-hold. The brain when active, consumes between 30-40% of our available oxygen. Negative thoughts, stress and fear will greatly increase our oxygen consumption and therefore greatly reduce our breath-hold times. A common mistake is to worry about the time of our breath-hold. Looking at a watch or thinking about time will negatively affect the relaxation of the mind.

The ideal situation is to have a **blank mind**; however this is usually not so easy to do. **Visualisations** of positive experiences and the reaffirmation of positive thoughts will be effective towards achieving a relaxed mind.

Suggestions are to visualise a walk in the park, family and friends, or to visualise our heartbeat. Try to imagine as much detail as possible with these thoughts, but don't force your mind into a particular thought as our mind will be more relaxed if we let it choose.

Other mind-relaxation techniques are a **slow body scan** to ensure that we are not tensing any muscles, **letting your mind fly freely**, or anything else that helps you to relax, such as listening to your heartbeat, playing a song in your head, etc. etc.

For relaxation, **focus on the common mistakes made by students** and how these mistakes affect the length of their breath-holds, i.e. looking at or thinking about the time, being nervous, moving too much, etc.

Following the manual, describe what the best way to achieve relaxation is.

In the classroom it's important to focus on explaining the relaxation of the mind. Body positioning and how to relax the body are explained once in the water.

Third Stage of Static Apnea - Contractions

Introduce the students to contractions. The main purpose of this chapter is to **remove all negativity and discomforts associated with contractions**, and explain to the students even while having a lot of contractions, their breath-holds can be long and not at all unpleasant.

Follow the manual.

Our relaxation will sooner or later be disrupted by **diaphragmatic contractions**. The diaphragm is the muscle separating the thoracic (chest) cavity from the abdomen,

and is the primary muscle of respiration. Contractions of the diaphragm are involuntary movements and a natural physical reaction. The function is to force extra oxygen into the bloodstream by circulating the air in the lungs and increasing the pressure of the lungs, thereby increasing the amount of oxygen available for our brain.

Contractions can vary from person to person and from day to day. Sometimes the contractions will start strongly and other times they will start so softly that they are barely noticeable. They can come in a fast rhythm separated by only 1 or 2 seconds, or much slower; as far as 15 seconds apart.

Our breathe-up will also determine how early or late contractions will occur. The objective is to have a good balance of relaxation and the number of contractions.

Try not to worry about or anticipate your contractions during the relaxation phase, as this can lead to a negative attitude towards static apnea. Instead, understand that contractions are here to help, and should therefore be welcomed. The onset of contractions will induce a stronger bradycardia and a slowing of your metabolism. With practice and training you will learn to maintain maximum relaxation even with the strongest contractions, allowing your body to function naturally and therefore maximising your oxygen availability.

Once contractions start, they will not stop until we start to breathe again.

The final stage is the Recovery Breathing. Emphasize the importance of this stage, especially due to the fact that we are attempting longer breath holds during static. Students should understand that Recovery is the number one priority when they start breathing again. They should keep totally still without talking or removing equipment until the recovery is completed.

NOTES:

FIRST EXERCISE

Let's get ready for our **first exercise** with the students. The objective here is to gain your students' trust and build their confidence by getting them to perform an easy breath-hold. This way you will be able to get a clear idea of whether each student is relaxed towards the breath-hold or not, and what type of contractions they are having.

The first exercise is as follows:

In a seated position, ask the students to **breathe exactly the same as they learned in Day 1 of the Freediver course for 1 to 2 minutes**, (long inhale and passive long exhale with no flushes). We are not looking for an improvement in their breathing.

After they take their final breath, ask the student to **hold until you instruct them to start breathing again**. Remind them that **they cannot quit before you have told them too**. As soon one student begins to hold, the next starts with the breath-up.

This sentence is important, as we will be repeating this throughout the explanation of the exercise. However, let them know that the exercise itself will be *really easy* to complete, sometimes as short as 20 seconds, sometimes up to 1 and half minutes.

During the 1st exercise, talk to the students periodically throughout the relaxation phase. Don't let them spend more than a few seconds in silence during this exercise.

Stop the breath-hold when you see the first contraction (with a quick countdown) the student will most likely not even feel the contraction and will therefore have a very comfortable breath-hold.

The **purpose of this exercise** is to give confidence to the student and to encourage them to follow your instructions. You should also focus on removing any kind of mental pressure when they are holding their breath - time is not important, we do not care about the length of the breath holds. Remind them that the purpose of this course is *to learn*, not to break records.

In this first exercise, you as an Instructor will gain the trust of the student, as your aim is to ensure that everything goes just as you've explained and planned for them, without any struggle.

Two section Static Breathe-Up

Proceed to explain the breathe up for static but do not demonstrate and practice it yet.

We use two-section breathing and our breathing technique will be as follows:

Diaphragmatic Breathing (also known as Stomach Breathing)

We start our breathing with the lower section of the lungs and performing only diaphragmatic breathing, without moving our upper chest. This is the same technique learned in the Freediver Course, however the speed of the breathing is now different, as we take 5 to 6 seconds to inhale and 5 to 6 seconds to exhale.

This diaphragmatic breathing will continue for the first 2 minutes of the breathe-up. Remember; do not over exhale, as we want to have maximum comfort during the exhalation. As we are not using a snorkel during the breathe-up for static, we can control the speed of the air that goes in and out much more easily with the 'O' shape that we create with our lips, to restrict the flow of air.

Diaphragmatic & Chest Breathing

Following two minutes of diaphragmatic breathing we will start to perform full breathing cycles that consist of the stomach and chest. Starting with the stomach, we will move up to the chest, taking a relaxed full breath in, for 5 to 6 seconds, followed by a short pause of half a second and then the exhalation which lasts for 5 to 6 seconds. We continue this breathing for 2 to 3 minutes.

The total duration of our breathe-up should never exceed 5 minutes, as we would be running the risk of expelling too much carbon dioxide.

The Final Breath

The final breath should be taken with our two sections, always 100% of our lung capacity but without tensing our muscles, as this would both negate the relaxation that we have achieved during the breathe-up, and have a negative effect on our breath-hold.

SAFETY REMINDER:

This type of breathing is **only suitable for static apnea, dynamic apnea and dry exercises** and only after the correct tuition. It can be dangerous if this advice is not followed.

It is very important to remind the students that the technique that they will learn today is **only for static apnea, dynamic apnea and the dry exercises, and only after the correct tuition**. This is in their Advanced Freediver Manual, but it is your duty as an Instructor to ensure that this is reinforced.

SECOND EXERCISE

This time the breath-hold relaxation period can be a little longer due to the fact that it is a new breathe-up; however the length of the breath-hold is not important. It is important, however, that they complete the exercise and that you enforce that they **cannot quit their breath-hold until you tell them to.**

The **purpose of the exercise** is for you as the instructor to count 5 to 10 contractions. Tell the students that they will most likely have up to 10 contractions, even if they don't feel them.

Students usually have a tendency to slow down the inhalation and exhalation during the breath up due to high levels of relaxation. Remind your students the importance of maintaining the 5/5 breathing rhythm which will allow them to have longer more comfortable breath holds.

Explain to the students to listen and follow the instructions without interrupting the breathe-up at any time. Ensure they will also be in silence during their relaxation period so they can maintain maximum concentration with no distractions.

Tell your student what you will do during the breath-hold; what you will say to them, and when and instructing them to listen but not reply to you.

Place special emphasis on the following points:

- Relaxed body position.
- 'O' shape and consistent sound.
- Stomach and chest expansion.
- No over-exhalation or pushing the air out - just deflate the lungs naturally without effort.
- Final breath - 100% with no stress.

Remind students that the discomfort that some of them may feel at the beginning of the breath-hold due to the chest being full of air, will disappear after the first 10 to 15 seconds.

At the end of the breath-hold students must perform the **recovery breathing** as learned in the Freediver course. Tell students that they must remain lying down without standing up until totally recovered.

PLEASE NOTE

Be sure to **keep track of the time when the first contraction begins.** Once the student has had at least 5 contractions, give a (quick) countdown from 10. You want to get an idea of the students' willpower, so, at your professional discretion; they can continue the breath-hold as long as they please.

In some rare cases you may have to start talking to the student before the 1st contraction if they are displaying signs that they may give up (tensed muscles, body movement, repeated swallowing etc.) before the contractions begin.

First, show the phases by demonstrating an excellent version of the breath-hold, so that the students know what to expect.

Then, proceed with the **complete breathe-up** with the student lying down and performing the breath-hold exercise.

Feedback

After each student completes the exercise, interact with with them. Talk through the exercise with the student stage by stage. This will give you vital information on how to coach each of them in the water.

How was their breathe-up?

Tell them how their breathe-up was from your point of view. Did they slow down or lose rhythm once you stopped counting for them?

How was the final breath?

How was the relaxation?

How relaxed did they feel during the relaxation stage?
Which technique were they using during the relaxation stage? – *Establish whether they should try another method instead.*

How were the contractions?

Ask, how were you feeling when I began talking to you? Were you still very relaxed? Or were you starting to transition out of the relaxation phase? (This will help you to get a better idea of when to start talking to them in the water as well.)

How did the contractions feel? - *“They’re not too difficult, are they?”*
-- *Make it positive. Perhaps point out their similarity to a hiccup.*

How was their Recovery?

Talk to them about their recovery breathing. If it was good – tell them so. If not, show them how to improve.

Finally;

How long do they think they held their breath...?
Then, show them the timer. This is a very rewarding part of the session – both for you and for the student.

Coaching in the water

(What to do, what to say and when to say it, during the static holds)

Upon completion of the dry exercises, you will have ascertained when a student's contractions begin and will have a good idea of when to talk to them in the water.

Many students' contractions will begin slightly later in the water due to higher levels of relaxation. If they seem less relaxed in the water you may consider talking to them slightly sooner than you would a student who seems very relaxed.

When you spot the contractions ask for the first OK and take their arm. This is the 1st means of communication. Progressively talk to them more and more as they transition out of the relaxation phase into the contractions phase.

Tell them to slowly bring their arms to the wall of the pool. Ask for an okay, or maybe two, then tell them to bring their legs down to the pool floor. This is where you can give encouragement and push the student. **Do not stop talking to them at this point.**

Continue to encourage them by saying things like "You're doing really well. You can do it. Keep holding your breath just a little bit longer. You will be really happy with your results, just keep holding a little bit longer - make it worth it", always asking for an 'okay' between each encouraging phrase. Eventually you may decide to tell the student, "I'm going to count down from ten and then I want you to breathe". Count down slowly, but not too slowly as the student may become agitated and start breathing before the countdown is over. You may count a few seconds and then say "Give me an okay. You're doing great job".

VERY IMPORTANT!

It is your responsibility not to push the student to have a blackout or samba. We want the student to achieve their maximum breath hold potential, safely, with **NO hypoxia**. Always err on the side of caution and watch closely for any signs of hypoxia.

ORGANISATION OF THE WATER SESSION

The water session portion of the class can be performed in either the shallow end of a swimming pool or in the shoreline of a calm ocean. Safety, as well as comfort for the student(s) is imperative here, so you must therefore use due diligence to establish whether the ocean is the best choice.

Your Instructor Trainer will teach you how to position your students in the water according to your location.

Equipment

- Water resistant timing device - Such as a WR wrist watch or stop-clock.
- Noseclip - Use a noseclip, not a mask so that the facial receptors are in contact with the water.
- Wetsuit - A wetsuit will aid in relaxation as the student can float more easily and will help to keep them warm. Ensure the suit is not too tight so that the student's breathing isn't restricted.

Note that in some rare cases, a student might not be comfortable wearing a noseclip and having their eyes exposed to the water. If this is the case, bring a mask with you to the water that they can use instead. This should be a last resort.

SAFETY AND RESCUE FOR STATIC APNEA

At the end of the water session, explain the roles of safety and how to perform a rescue for Static Apnea. First, explain the role of the 'Safety' or coach and the signs they should be looking for (LMC and Blackout, as on the Freediver course), then explain how to perform the rescue. Finally, have the students practice on each other, including the communication.

Static Apnea should never be practiced alone in the water. You must have a 'Safety' with you at all times, as shown and explained during the Static Apnea Course.

The Safety should stand in front of the diver and have one hand on their back, to prevent them from drifting. During the breath-hold they should be paying full attention to the diver.

At a pre-determined point, the Safety should begin to communicate with the diver, as practised, for example by holding forearms and squeezing, and/or by asking for pre-arranged signs, such as an 'OK' sign.

If at any point the diver does not respond, or responds incorrectly two consecutive times, the Safety should perform a Rescue.

How to perform a Rescue:

- Hold the diver by the sides and swiftly roll them onto their back.
- Rest their head on your shoulder, thereby opening the airways and keeping the face clear of water.
- Remove their noseclip or mask.
- Perform BTT (Blow, Tap, Talk). Blow air towards the nose, gently tap the cheeks, and call the name of the unconscious diver, firmly instructing them to "breathe".

DYNAMIC APNEA

After completing the static apnea session, proceed to take 20-30 minutes to explain demonstrate and practice Dynamic Apnea disciplines.

Explain the following points:

- The logistical set up needed to perform Dynamic. Dynamic Apnea can be practiced in the shoreline of a calm ocean or lake or most commonly in a swimming pool. The diver will move horizontally, about 1 meter below the surface of the water.
- Equipment for Dynamic Apnea consists of a nose clip and swimming goggles (or mask). Neck weights are most commonly used in Dynamic apnea to adjust the body position in the water and to keep the diver in a streamlined, horizontal position. A wetsuit can be used to stay more comfortable during a session, however this will need to be compensated for with extra weight.
- The breathe-up for Dynamic Apnea is exactly the same as what we used for the static session.
- Safety for Dynamic consists of the 'Safety Diver' on the surface following the diver for the duration of their dive, ready to perform a rescue when the diver is displaying any signs of hypoxia.

Explain the basics of technique for DYN and DNF including streamlining, body positioning and turning. Demonstrate what each technique looks like then allow students to practice. After this; proceed to have the students perform safety and rescue for you (or each other) during a Dynamic dive.

Upon your return to the classroom

Upon returning to class, explain the dry training techniques – Static Tables, and Apnea Walks. (See following pages).

Tell the students that they should not practice more than one table per day as they are very intense.

TRAINING FOR STATIC APNEA

Static Apnea Tables

Training for static is about increasing our tolerance to low levels of oxygen and high levels of carbon dioxide. A good way to do this is by training Static Apnea tables. There are **two different tables**;

O₂ Table - this table increases our tolerance to low levels of oxygen.

For example:

Hold 1 = 1:15, 2:30 rest period (Breathe-up)
Hold 2 = 1:30, 2:30 rest period (Breathe-up)
Hold 3 = 1:45, 2:30 rest period (Breathe-up)
Hold 4 = 2:00, 2:30 rest period (Breathe-up)
Hold 5 = 2:15, 2:30 rest period (Breathe-up)
Hold 6 = 2:30, 2:30 rest period (Breathe-up)
Hold 7 = 2:45, 2:30 rest period (Breathe-up)
Hold 8 = 3:00

CO₂ Table - this table increases our tolerance to high levels of Carbon Dioxide. For example:

Hold 1 = 2:00, 2:00 rest period (Breathe-up)
Hold 2 = 2:00, 1:45 rest period (Breathe-up)
Hold 3 = 2:00, 1:30 rest period (Breathe-up)
Hold 4 = 2:00, 1:15 rest period (Breathe-up)
Hold 5 = 2:00, 1:00 rest period (Breathe-up)
Hold 6 = 2:00, 0:45 rest period (Breathe-up)
Hold 7 = 2:00, 0:30 rest period (Breathe-up)
Hold 8 = 2:00

IMPORTANT

Co₂ and o₂ Tables are a very intense form of training and therefore you should not practice more than one table per day.

Tables can be personalized according to your own breath-hold capabilities. Over time you should challenge yourself by making the training tables harder, however remember that the tables shouldn't be set close to your personal best static breath-hold.

Apnea Walks

Apnea Walks are an effective training tool to increase your tolerance to very high levels of carbon dioxide (Co₂). While walking in breath-hold, a high level of carbon dioxide is produced, making this a very intense exercise.

A training routine of two or three series performed a couple of times a week will definitely increase your breath-hold and diving capabilities.

You should leave no more than 1:30min or 2:00min resting time (breathe-up) in between each breath-hold, as the aim of the exercise is to keep accumulating carbon dioxide.

Breathe-up for Static Training

The same breathe-up that you learnt for Static Apnea can be applied to the Static Apnea Tables and Apnea Walks.

SAFETY REMINDER

These exercises *can* be practiced alone when performed on dry land. However, bear in mind that Apnea Walks should be practiced with care as there is a risk of briefly losing consciousness and falling. When possible, have a buddy walk by your side.

NOTES:

ADVANCED FREEDIVER COURSE DAY 2

OUR FOCUS FOR THE DAY

On Day 2 our focus is on the students' **four-section breathing technique**. This is the most important part of the class, and as there is a lot of interaction from the students, it is enjoyable for them, and easier for you.

Start with the usual **feedback** from the day before. During this feedback, remind the students how well they performed in the Static and the importance of the different breathing technique for static and relaxation of the body. Also remind the students that this breathing technique (no matter how effectively it worked yesterday), is only to be used for static apnea, dynamic apnea or dry exercises.

Then go on to give a very **brief intro to the day**, as described below, mentioning - but not going into too much detail about - exhale dives.

INTRODUCTION

Today we will be learning a **more advanced breathing technique** that is more effective and suitable for deep dives, for staying longer at depth and for performing **exhale dives** (a new technique you will learn today, where you will exhale some air before diving).

- Explain the schedule and the plan for the day.

The students will be surprised that they will exhale before descending, but of course our job as Instructors is to convince them that no matter what they think now, this is a really great technique and will be an enjoyable way of diving that has a very advantageous effect on our bodies.

Now begin to explain, demonstrate and **practice four-section breathing** with the students. Each section is important, but put special emphasis on the *middle and top sections*, ensuring that you physically demonstrate these sections.

FOUR-SECTION BREATHING

Stomach - First Section

Demonstrate and practice.

Middle Section - Second Section

Show the students 2 exercises that will help to increase the flexibility and awareness in this particular area:

- 1) Explain, demonstrate and practice hooking the thumbs on the rib cage and touching the index fingers together near the sternum. Inhale and the index fingers will move apart. Exhale and they will touch back together. Students should use their rib cage to move the fingers apart; not their arms.
- 2) Explain, demonstrate and practice placing the hands on the ribcage, thumbs facing down. Inhale and feel the ribcage expand in your hands.

While the Instructor is usually flexible in this area, this is an unusual movement for many people and students commonly feel tight in this section. Ensure students that with practice, they will increase their expansion.

Chest - Third Section

Demonstrate and practice. Remember not to demonstrate by opening the rib cage of the second section that we just introduced. Isolate the chest.

Back (the very top of the lungs) - Fourth Section

Demonstrate and practice the movement only first. This is the most complicated section for students to perform correctly. Our aim is to remind them that this section can be difficult to perform initially but with practice they will rapidly improve.

Explain that we can not breathe into the Fourth Section in isolation, therefore we will need to be performed it on top of the first three section. Ensure that the students don't lose relaxation during this section. The first three sections are the priority.

At this point, put all the sections together and demonstrate one full breathing cycle. Remind the students that all sections should flow from one to the next, and that each section has a point at which it is "full". A common mistake you will see, is a student

putting too much air into the lower part, leaving no room for air in the upper chest and making the cycle very awkward and incorrect.

Students will discover how much to fill each section as they continue practising but to give a very general idea of how much to fill each of the four sections; we can say approximately 30% in to the Stomach section, 20% in to the Middle section, 40% in to the Chest section and 10% in to the Back section.

Practice the 4 section breathing cycle all together now.

Flushes

Following this, explain and **demonstrate** one full cycle with 2 flushes. Be sure to emphasise the **value of flushes** and to tell them that **each four-section breathing cycle is followed by two flushes**. You will notice that some students forget to do the flushes.

Ensure that students perform the flushes correctly and then proceed to practice a few cycles with flushes in between, with the students.

IMPORTANT

It is important to present the four-section breathing technique correctly as we want to emphasize the difference between the breathing of the Freediver course and the much more advanced breathing technique of the Advanced Freediver course; which is more effective, not only physically but more importantly psychologically.

Remember that this breathing practice will help students to become familiar with the terminologies as well as the breathing itself.

NOTES:

THE BREATHE-UP

Proceed to explain the breathe-up and the importance of following the correct steps. **The duration of the breathe-up** is 5 to 6 mins. Tell the students that we want to go deeper; we want to stay longer.

Divide the breathe-up into four stages:

Agitation

- Write it out on the board.
- Explain it - Deep and strong, 100%, no sections, no flushes - to prepare the lungs and release some carbon dioxide. Using the 'O' shape without restricting the airflow too much.
- Demonstrate it.
- Have them practice.

Exchange

- Write it out on the board.
- Explain it - Long inhale; slow, passive exhale, 100%, four sections, two flushes in between each cycle. This is the most important part of the breathe-up; we are balancing the levels of oxygen and carbon dioxide. Remind the students it is what they just practiced a few minutes ago.
- Demonstrate it one more time.

Relaxation

- Write it out on the board.
- Explain it - Same as the exchange cycle but the inhalation will be about 60% of our capacity, four sections. Focus the mind on total relaxation.
- Demonstrate it and remind the students that these cycles have flushes in between as well.
- Have them practice.

Final Breath

- Write it out on the board.
- Explain it – Faster than a normal inhalation, four-section breathing and always 100% of our capacity. It is the last thing we are doing before start the dive, do it fast but relaxed.
- Demonstrate it.
- Number of Final Breaths: 1
- Have them practice.

Full breathe up 5 - 6 minutes

<u>Agitation</u>	<u>Exchange</u>	<u>Relaxation</u>	<u>Final</u>
5	5	2	1
Deep and strong	Long and slow	Slow and relaxed	Faster
100%	100%	60%	100%
No sections	4 sections	4 sections	4 sections
No flushes	2 flushes	2 flushes	-

Explain that the Agitation and Exchange cycles will be performed through the snorkel and the Relaxation and Final breath will be performed on the buoy.

After explaining all of this, ask if there are any questions. Ensure that the students understand everything and proceed to do the full breathe-up with them and time it.

Have students raise their hand before they take their final breath, so that you can time how long the whole breathe-up took them. This will help you to establish an order for your students on the line. You can order the students from shortest breathe up to longest. Have each student begin their breathe-up before the diver before them finishes their dive. This will save time.

Important: When the students begin practicing the full breathe-up, particularly in the water, listen to and watch their breathing closely. *If they are over breathing*, stop them and tell them how to change the breathe-up to make it safe and correct.

NOTES:

EXHALE DIVES

Explain what exhale dives are in more depth:

The benefits

Remember to not only list the benefits as they are outlined in the students manuals. You should take several minutes to go through this section, emphasizing each point and explaining in greater detail.

- Triggers the Mammalian Diving Reflex to start earlier.
- Remind the students of the incredible physical adaptations they experienced in static and the advantages that go along with them. It should be emphasized that the MDR is conserving oxygen and the physical effects feel quite pleasant (Brady Cardia, Vasoconstriction).
- Simulates greater pressures, therefore adjusting our lungs and preparing them for deeper dives.
- Explain that we will not be needing to go too deep when we do exhale dives as we are beginning our dives with less air. Therefore exhale dives are a very effective technique for warming up. Also, it is much easier and less physically demanding to dive on exhale. We will be able to execute more exhale dives in session than we would with deep full lung dives. We are still experiencing all the same physical benefits and sensations we would normally experience at greater depth.
- Helps to improve our equalisation technique (even though we have less air for equalisation, we are physically more relaxed and therefore able to focus more on the equalization).
- Explain to your students that some of them may feel they have began to run out of air to use for equalisation during exhale dives. The equalization failure point is something students will probably be experiencing at some point when they go deeper on full lungs. Therefore training with exhale dives will better prepare them for going deeper.
- During the exhalation our heartbeat slows down, and as we are less buoyant, our descent is more comfortable and relaxed.
- Remind your students that they may recall in their Freediver Course that the 1st few meters of the decent required more energy to get through due to the positive buoyancy created by lungs full of air. This part of the dive is much more relaxing now that we don't have to exert ourselves as much.
- **Freefall** - We will begin the freefall much earlier on exhale dives. During the freefall we are able to stop moving and begin sinking effortlessly. This is one of the most relaxing and enjoyable parts of freediving.
- Greatly increase our confidence.

- Reinforce to the students that once having completed a few exhale dives, their confidence will be drastically increased. They will know that it is possible to dive on exhale so just imagine how they will feel next time they attempt to go deeper on full lungs.

Explain the benefits to your students. Making it clear to them the advantages of exhale diving and explaining that it is a fantastic way of diving and very enjoyable.

How to execute an exhale dive:

Start by completing a full breathe-up. Next take a final breath (100% of our lung capacity) and then perform a long, passive exhale (around 60%) at the surface.

The exhalation is always made **without the snorkel, with the head out of the water and whilst holding onto the buoy or line**. Never exhale underwater.

You will later tune up the student's exhalation in the water, always looking for the most enjoyable experience for the student.

We always descend and ascend slowly, and make our turn with caution, ensuring that we have enough time to equalise during our descent, and giving the lungs time to adapt to the increasing pressure.

We return to the surface while we still feel comfortable; not waiting until we feel like we are struggling.

During your explanations be sure to clearly emphasize the following **important safety points**:

- 1) Stop descending when the equalization becomes more difficult. Explain to students if they begin to feel like they have less air to equalize; this is a good thing as they are training their equalization technique for deeper dives. Begin to make a return to the surface. Students will be performing exhales *feet first*, Free Immersion for 1st part of the session. This way we ensure that we have enough time to equalise and we also reduce the speed of the dive. If they have a very relaxed technique and are diving responsibly, they can switch to head 1st for the last couple of exhale dives in the session.
- 2) Stop descending if an increased pressure is felt on the chest. Some students may feel pressure on their chest at some point during exhale dives. This is a sign that it is time to begin a return to the surface.
- 3) Explain to the students that they will feel like they can stay underwater forever - but they cannot. (By this point in the course you should know your students, having a good idea of who is stronger or weaker; therefore adapt these instructions accordingly). Once they reach their stopping point on the descent, they should immediately begin making a relaxed and smooth return to the surface.

- 4) The first 2 - 3 pulls made on the ascent should be smaller than normal (head to heart) and very relaxed and smooth. Be sure students understand that they must be careful to not overextend their bodies as they have increased pressure on their lungs during exhale dives.

Explain that to start with, a good exhale dive is around 10 to 12 meters. Our aim, of course, is to send them much deeper, but we don't want students to have any negative thoughts feel under any mental pressure - allow them to discover the magic of exhale diving and then they will naturally dive deeper. **And in the event that they don't go deeper than 10 or 12 meters, they will still feel satisfied.**

Pay attention to explaining the technique. During exhales, we don't want to spend any extra energy on unnecessary movements.

Explain the system of holding onto the buoy.

Practice the Final Breath and Exhale with each student, one by one, with you controlling the amount exhaled. Students should raise their finger during their last 2 flushes before the final breath. This way you will know when they are performing the exhale.

NOTES:

Plan for the water

Today we will focus on doing as many exhale dives as possible, and then we will finish the day with one or two full lung dives so we can see how comfortable the full lung dives feel.

On the boat we will also do a little preparation that consists of:

Facial immersion that will trigger the Mammalian Diving Reflex, and **N.P.S.A. (Negative Pressure Static Apnea)**, both of which will help us to prepare for the exhale dives. We will explain them to you before we enter the water.

Explain the following on the boat

(Or before your students enter the water -- according to your location)

Facial Immersion – We enter the water to perform 4 to 5 minutes of Facial Immersion, which is performed by breathing through a snorkel, without a mask, so that the main receptors around our eyes and upper lip that trigger the Mammalian Diving Reflex, are in full contact with water.

NPSA (Negative Pressure Static Apnea) – We take two breaths at the surface, followed by a strong exhale, while submerging our whole body and head about 1m under the surface. We remain there for a **maximum of two diaphragmatic contractions** before returning to the surface and repeat. This exercise lasts for 5 minutes and will prepare us for our first exhale dive.

NOTES:

ADVANCED FREEDIVER COURSE - DAY 3

INTRODUCTION TO DAY 3

Start the last day of the Advanced course with **feedback** from the previous day, talking about the comfort of the exhale dives and letting them know how they can apply exhale diving to regular activities like spearfishing, underwater photography or simply snorkeling around in shallower water. The **benefits of the exhale dives** should be a clear advantage over a full lung dive in depths ranging from 0 to 15 meters. Remind the students again of the advantages of exhale diving.

Let students know that **a full breathe-up is not necessary for every dive when fun-freediving**. A few exchange cycles combined with some flushes should suffice, preparing us for less challenging dives.

Explain the schedule and the plan for the day.

DEEP DIVE PREPARATION

Firstly ask the students how deep they would like to go. (Regardless of what they tell you, you should set a depth for each student according to their performance on Day 2 of the Advanced Course). When we ask this question we are simply looking to find out what the student's psychology towards the deep dive is.

According to their answers you should explain that after 30 to 35 meters, every additional meter will feel much more challenging. We are more negatively buoyant, we have less air to equalise and the relaxation won't be the same, therefore increasing the risk of injury. Remind students that we are looking for gradual improvements, not the pushing of limits.

We want to be realistic with the depth that we are aiming for, as it is much more satisfying to complete the dive and to keep a positive attitude, than failing and creating mental blocks.

We should always warm up and train our lungs with several **exhale dives** before we aim for new depths.

DEEP DIVE PLANNING

During our deep dive we want to focus on technique. A great breathe-up at the surface, with complete relaxation, without feeling pressure on performing for anyone but ourselves, means we are diving to enjoy the dive.

Positive Buoyancy

At the beginning of the dive, and for the first 20m, we have to kick or pull our way down because our lungs are full of air and we are positively buoyant (we float).

Freefall

After this point we will become **negatively buoyant** (we sink), therefore we can **relax** and concentrate on freefalling. This means descending without kicking or pulling, therefore conserving more oxygen and trying to be in the most streamlined hydrodynamic position, focusing only on our **equalisation**.

Students may forget to free-fall on the first few deep dives, as the excitement won't allow them to think clearly, so they will likely continue to kick and pull non-stop to the target and back.

IMPORTANT

Do not allow your students to force equalisation as they get closer to their target depth.

NOTES:

Problem Solving Visualisation

Explain to the students that a helpful tool that can be used for deep diving is Visualization techniques. One technique is to visualize the perfect dive. Starting with the breathe up and mentally playing all the way through the dive to the recovery breath step by step. However in reality our dive will rarely go exactly as planned so a more valuable technique for us to use is called Problem Solving Visualisation

Use this section as way to interact with students, asking them what they might do in each of the scenarios listed below. Then talk through the solution with them and point out that if we did not go through the process of Problem Solving Visualization it may be difficult to think of the simple solutions on the spot at the time we are experiencing a problem. Remember that this is not only something that we practice sitting the classroom together but should also be done the day of a deep dive as part of our mental preparation.

A good way to prepare for our dive is to visualise how the dive is going to be. To be realistic is much more effective than to dream beyond what is actually going to happen. We call this “Problem Solving Visualisation”. As our dive is rarely going to be perfect, we should prepare for situations that could potentially occur during the dive and prepare a solution in our minds beforehand.

For example;

- The final breath wasn't good - Take a new one.
- Equalisation is not working on the way down. - We can only really stop once on the line and try to make it work. If we are required to stop several times during the descent the dive will be far from ideal as we'll spend a lot of oxygen on the way down and risk not having enough oxygen to make a safe return to the surface. If this is the case, abort the dive without hesitation, while still safe. You can always try again.
- Experiencing a cramp or losing a fin - Simply grab the line in front of you and pull yourself to the surface.
- Strong, heavy contractions and a strong urge to breathe on the ascent - Remain calm and focus on your technique as this will be the most effective way to return to the surface. Panicking or rushing to the surface will only make it worse.
- Let the students know that the best way to minimise their oxygen consumption on **ascent** is to **stay focused on their technique** and not to be frightened or feel rushed if they have **contractions** - they have already experienced stronger and more frequent contractions during the static day. Instead, they should **remain calm and relaxed**, as having a present mind, not thinking about the surface and not rushing, will help them to conserve oxygen. Always keep a positive mind during your dive.

PACKING

Packing is a fantastic dry training tool to **increase the flexibility of the ribcage and lung capacity**. With this technique we will be able to take extra air on top of our final breath. However, we will not use it for diving at this stage of our learning process, as the disadvantages of packing directly before a dive outweigh the small amount of extra air you might gain.

Disadvantages include:

- Physical stress after the final breath
- Increased heart rate
- Not performing an efficient technique
- Not actually packing enough extra air to compensate for the energy spent doing the packing
- Increased buoyancy (if we have managed to add air) causing a need for extra weight or more energy expenditure at the beginning of the dive as well as a deeper freefalling point.

We use packing for training out of the water, and eventually after a few months of training, the technique can start to be incorporated into our static and dynamic practice. By then, the increase in positive buoyancy will no longer affect the energy spent in these disciplines, and the extra air will help us to make longer breath-holds.

Proceed to **demonstrate packing** normally, without explaining the steps below yet.

Remind students that this exercise must be performed carefully as it can make them feel dizzy and could cause them to faint (especially if they pack too quickly). It is recommended to have cushions around you whilst practicing, just in case you do faint.

Allow the students to try packing now. It is highly unlikely that they will be able to do this, so we need to demonstrate to them the following steps to help them learn:

- Press fingers to the lips
- Pinch the nose
- Make a smoking/sipping action (do not do one after the other too quickly).
- Don't move the chest or shoulders

Some students may feel a “pop” in their ears, which means that we have to remind them to swallow the air down to the lungs. With some practice together in the classroom, you should be able to correct this technique with success.

Then go on to do **three series of the following exercise** that we recommend students practice at home in order to increase lung capacity and ribcage flexibility. This exercise should be done twice a week, with at least one day rest in between. **It**

is very important that students do not injure themselves, so remind them to be gentle, halting the packing as soon as they feel the new pressure.

We will be practicing **three series of breath-holds with packing**.

Explain that we use a slower, more relaxed version the **2 section breathing technique** learned on the static day, but that we do not need the full 5 minutes between breath holds.

First breath hold: 30 seconds

Second breath hold: 45 seconds

Third breath hold: 1 minute

Do these together in the classroom.

It is very important to remember that no packing stretches should be demonstrated or recommended during the Advanced Course. The last thing we want is for the students to hurt themselves.

NOTES:

Explanation of full deep dive preparation

Now explain the full preparation before a deep dive;

- **Stretching** – we start our preparation with a full and relaxed body stretch. This will aid to release any tension that we may have in our bodies and prepare our muscles and joints for our dives.
- **Full breathe-up** on the boat/ before heading to the water.
- **Facial Immersion and N.P.S.A** in the water.
- **Two exhale dives** to warm up our lungs and trigger our Mammalian Diving Reflex to the max.

Let the students know that with this preparation they will be ready to succeed with more comfortable dives throughout the dive session.

EQUALISATION IMPROVEMENTS

If you feel it is necessary (for students stuck using Valsalva technique or at depths shallower than 25 meters), proceed with a series of exercises to improve the student's control of the throat, tongue, soft palate etc. Review with them what is happening when they equalise using the Frenzel technique. Explain the difficulties that they could encounter when they reach depths of around 30m and beyond. Remind them of the techniques you showed them to learn the Frenzel at the end of day 1 of the Freediver Course as well as BTV and balloon exercises with an 'equalisation tool'.

(Ask your instructor Trainer if you are unclear how balloon exercises work or how to use an 'equalisation tool'.)

Explain to the students that even if equalisation is working perfectly during descent, we should only progress according to our lung pressure adaptation and not according to our ears. It is very easy to hurt ourselves if we forget these rules.

GIVING ADDITIONAL INFORMATION

If the topic should arise, you can explain how it is possible for a more experienced freediver to equalise after 35/40m (mouthfill technique). Briefly explain that around 20/25m you fill up your cheeks with as much air as possible, then, closing your epiglottis, you use the air in your mouth to equalise for the rest of the dive.

Lastly, guide the students for approximately 20 minutes through a relaxed full body stretch including Uddiyana Bandha.

SAFETY DIVE PRACTICE

Towards the end of the water session on Day 3, have the students practice doing *Safety Dives*.

Ensure students know how to escort the diver face to face for the last 10 meters of their ascent, watching the diver closely as they ascend together and glancing to the surface to ensure the diver does not ascend into an object at the surface.

Once at the surface, the student should be watching the diver closely to ensure that there are no signs of hypoxia (extremely low levels of Oxygen).

Remind the students (as per the Rescue on the Freediver Course) that the job of the Safety Diver is only complete when the diver has finished their recovery breathing. It is better to be over-cautious than too confident in your diving buddy's ability, no matter how well you know them.

All instructors are required to know how to log students in the database. Your instructor trainer will show how to do this.