



AIDA2 FREEDIVER

OPEN WATER FREEDIVER COURSE

Your AIDA Instructor

Name

Age

Background / Profession

AIDA Instructor since

Who are you?

Please introduce yourself to your buddies and to your instructor!

Introduction to Freediving

Freediving can be learned!

Recreational vs. extreme freediving

Freediving = Apnea

Very diverse activity

A way of life

A social activity

AIDA International

Association Internationale pour le
Développement de l'Apnée

Non-profit Organization

Founded 1992

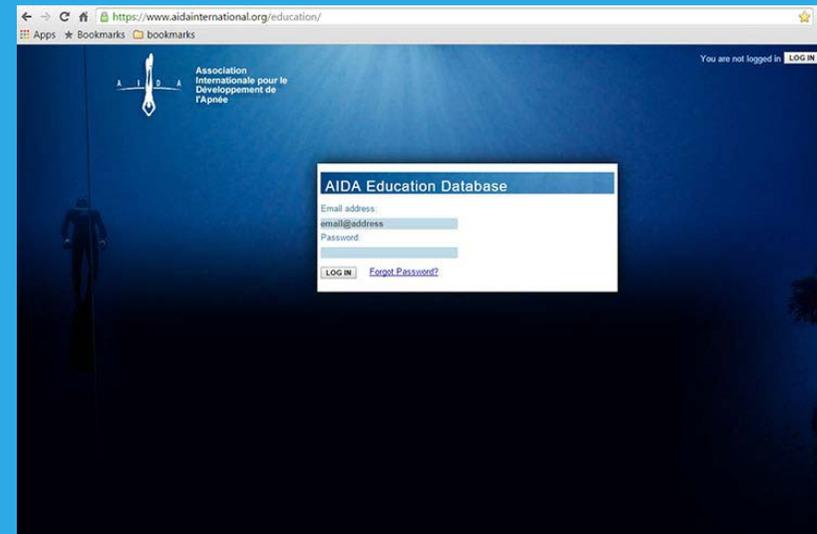
- Education Program
- Safety Standards
- Competitions and World Records

Paperwork

Medical statement

Liability release (where applicable)

Registration with EOS





THE BREATHING CYCLE

Introduction

Oxygen saturation

96%-98% at all times

**Hyperventilation does not
store more Oxygen**

Relaxation saves Oxygen

Freedive Breathing Cycle

1. Relaxation Phase
2. One Full Breath
3. Breath Hold
4. Recovery Breathing

Relaxation Phase

Reducing physical activity

Mental focus

Belly Breathing

Relaxation Exercise

- Body Scan
- Or any other exercise you know



One Full Breath

Comfortable, focus on relaxation

Inhale slowly

Two stage full breath (yogic breath)

- First belly
- Then chest

There can be only one!

Breath Hold

Relaxation

CO₂ build up

Contractions

Mind game

Video: "Urge to Breathe"

Recovery Breathing

Safety concept

Relaxed passive exhalations

Quick full inhalations

Repeat 3 times (or more)

Make it a habit!

Exercise

Freedive Breathing Cycle: Summary

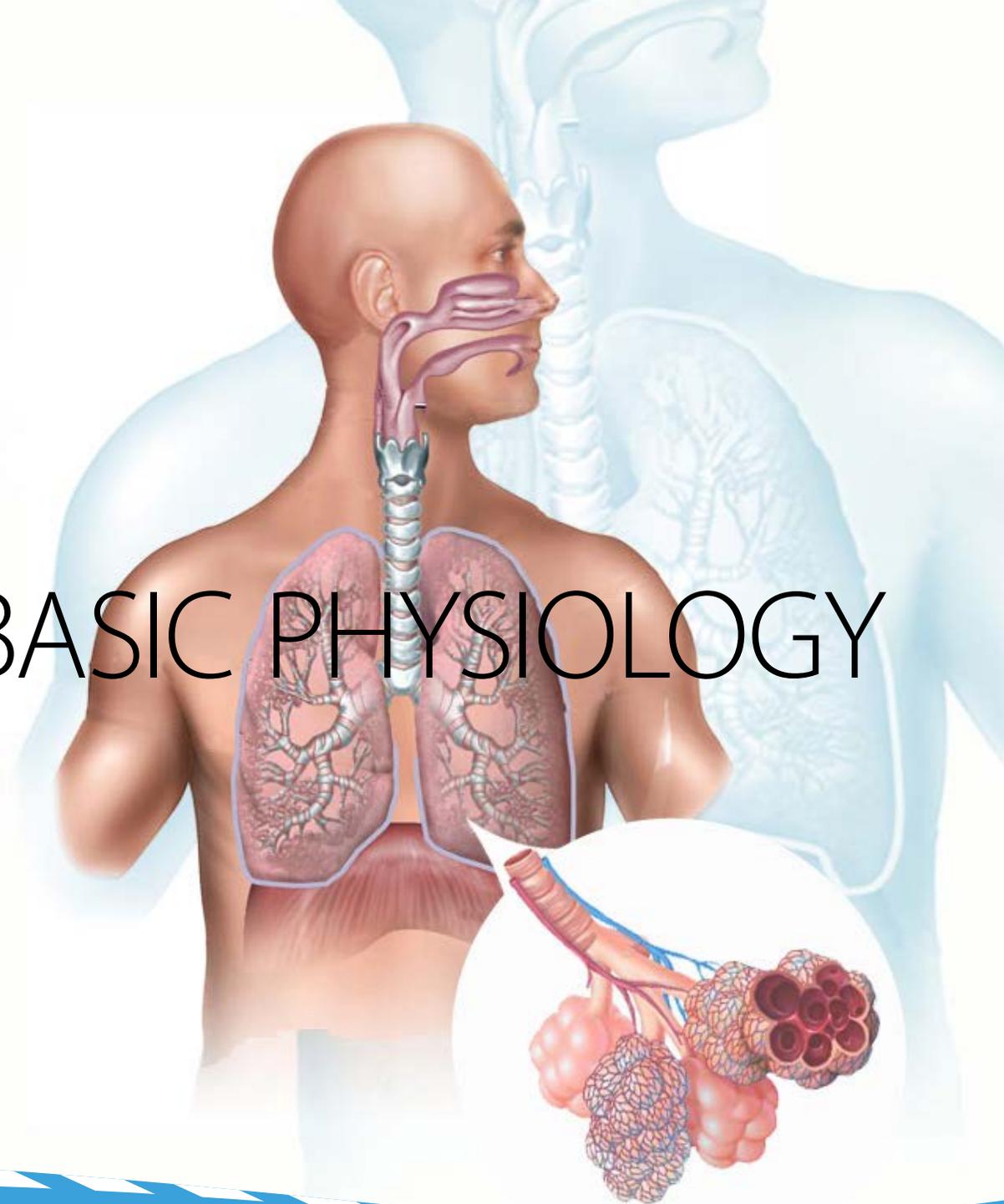
Relaxation Phase

One Full Breath

Breath Hold

Recover Breathing

BASIC PHYSIOLOGY



Basic Physiology

Respiratory System

Circulatory System

Mechanics of Breathing

Regulation of Breathing

Hyperventilation

Safely prolong Breath-Holds

Respiratory System

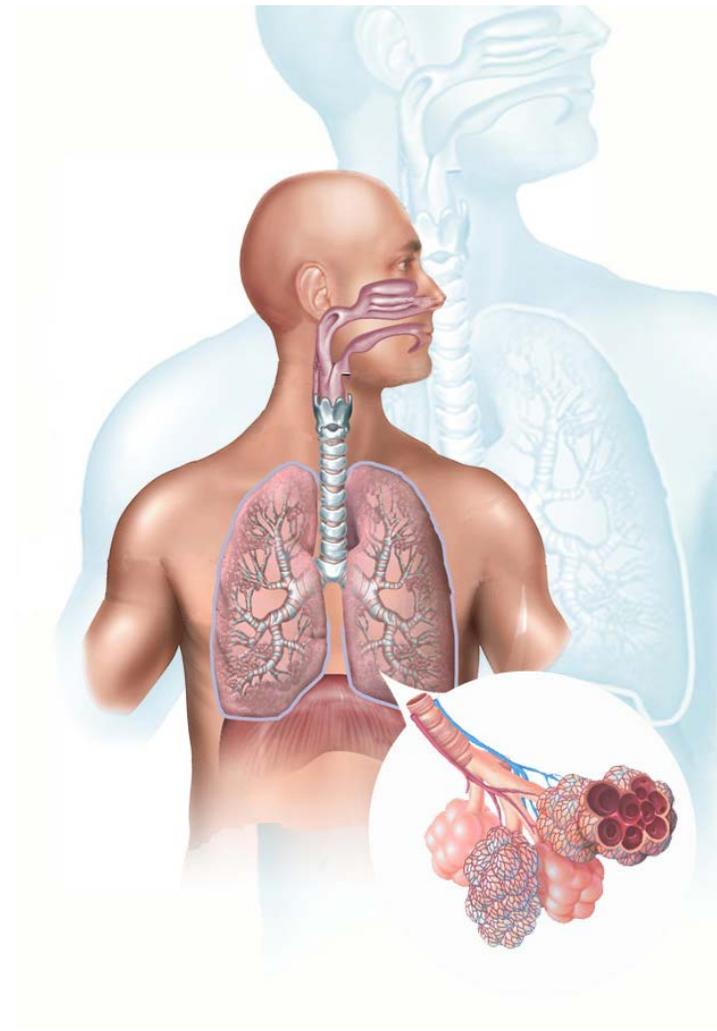
Elements

- Nose/Mouth
- Trachea
- Bronchi
- Bronchioles
- Alveoli

Gas Exchange in Alveoli

- O₂ (Oxygen)
- CO₂ (Carbon Dioxide)

Video: "Respiratory System"



Circulatory System

Two cycles

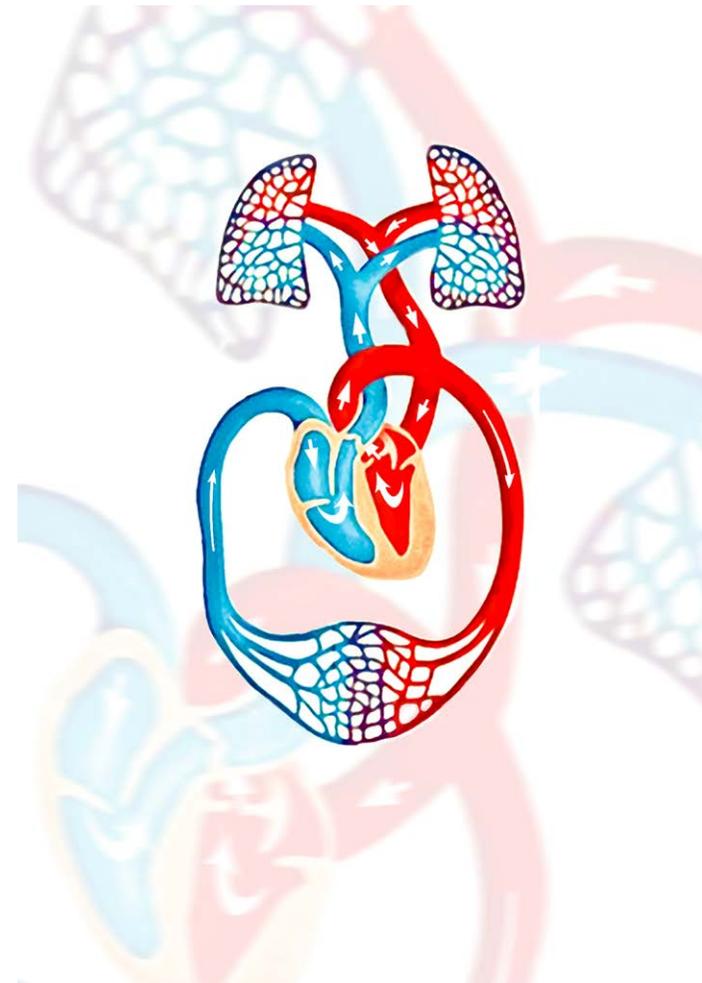
O₂ (Oxygen)

- transported on red blood cells
- bonded with haemoglobin

CO₂ (Carbon Dioxide)

- transported dissolved in blood plasma

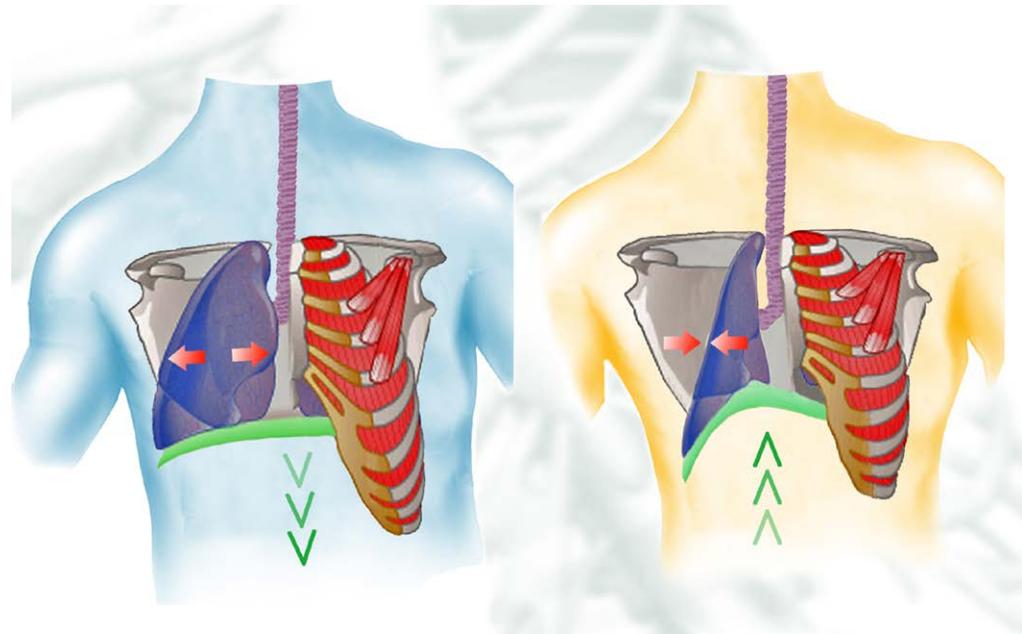
Video: “Circulatory System”



Mechanics of Breathing

Main Muscle: Diaphragm

Belly Breathing



Mechanics of Breathing

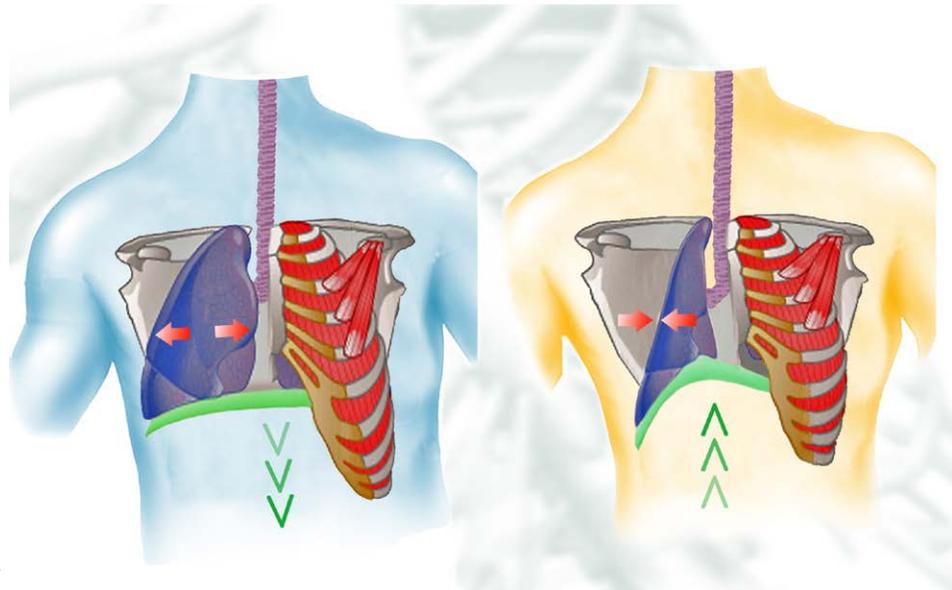
Supporting breathing muscles:

- Intercostal muscles
- Accessory breathing muscles
- Chest Breathing

Inhale: active

Exhale: passive

Video: “Mechanics of breathing”



Regulation of Breathing

Neutral level of CO₂ is maintained by intensity of breathing

Breath hold: Rising CO₂ level

Mental aspects of breath holding

Physical aspects of rising CO₂

- Burning sensation / tightness in chest
- Contractions

Hyperventilation (Hv)

Moving more air than needed to maintain neutral level of CO₂

Does not store more O₂

Lowers the level of CO₂

Delays signals of rising CO₂

Raises heart rate

Reduces blood flow to the brain

Hyperventilation

Symptoms of Hyperventilation

- Euphoria
- Tingling in the extremities
- Lightheadedness
- Dizziness
- Numbness around the mouth
- A metallic taste in the mouth
- Semi paralysis of the hands

Safely Prolong Dives

CO₂ Tolerance

Relaxation

Efficiency (Technique)

Basic Physiology: Summary

Respiratory System

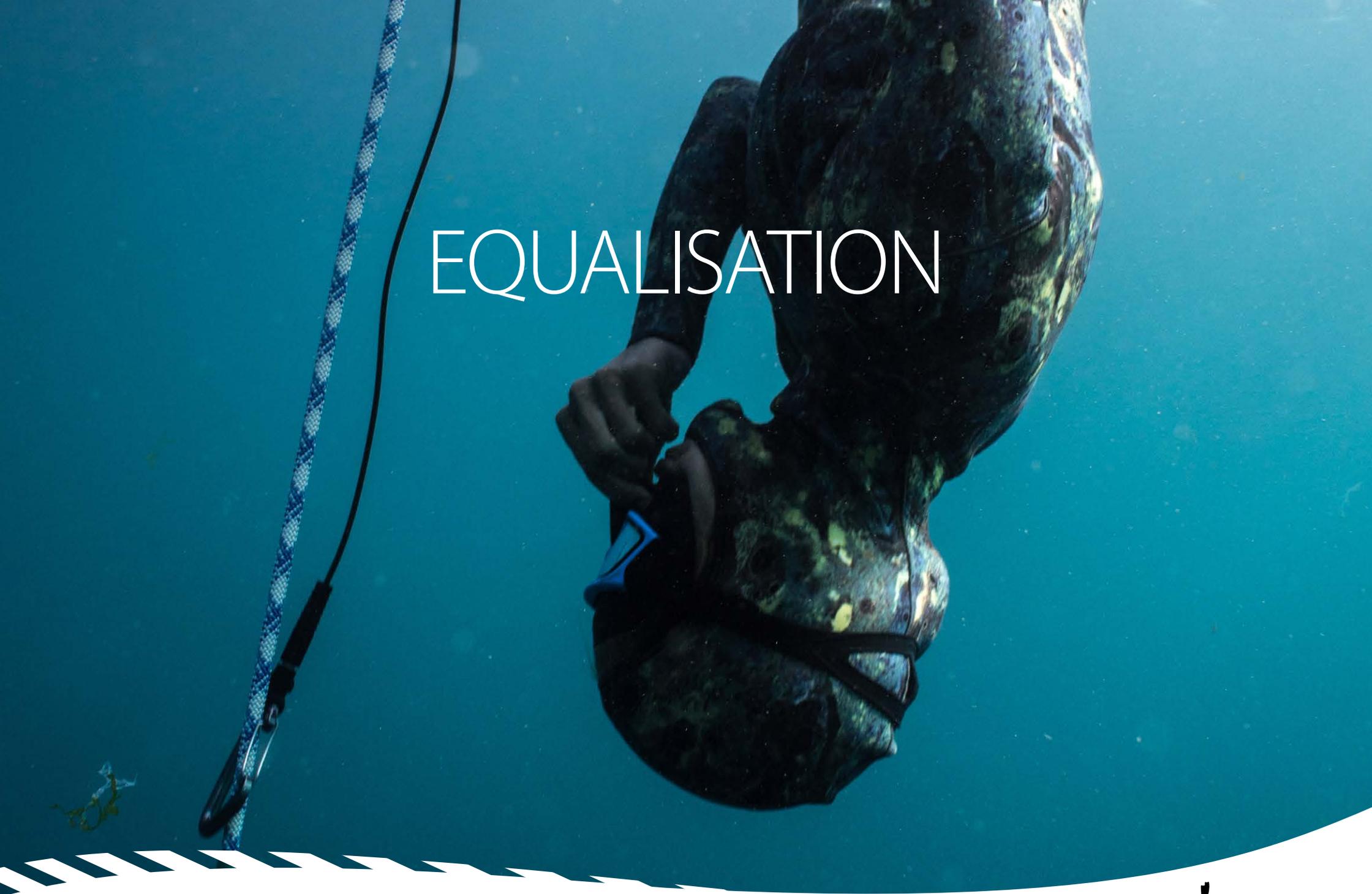
Circulatory System

Mechanics of Breathing

Regulation of Breathing

Hyperventilation

Safely prolong Breath-Holds



EQUALISATION

Equalisation

Pressure: Boyle's Law

The Body's Air Spaces

Equalisation Technique

Facilitate Equalisation

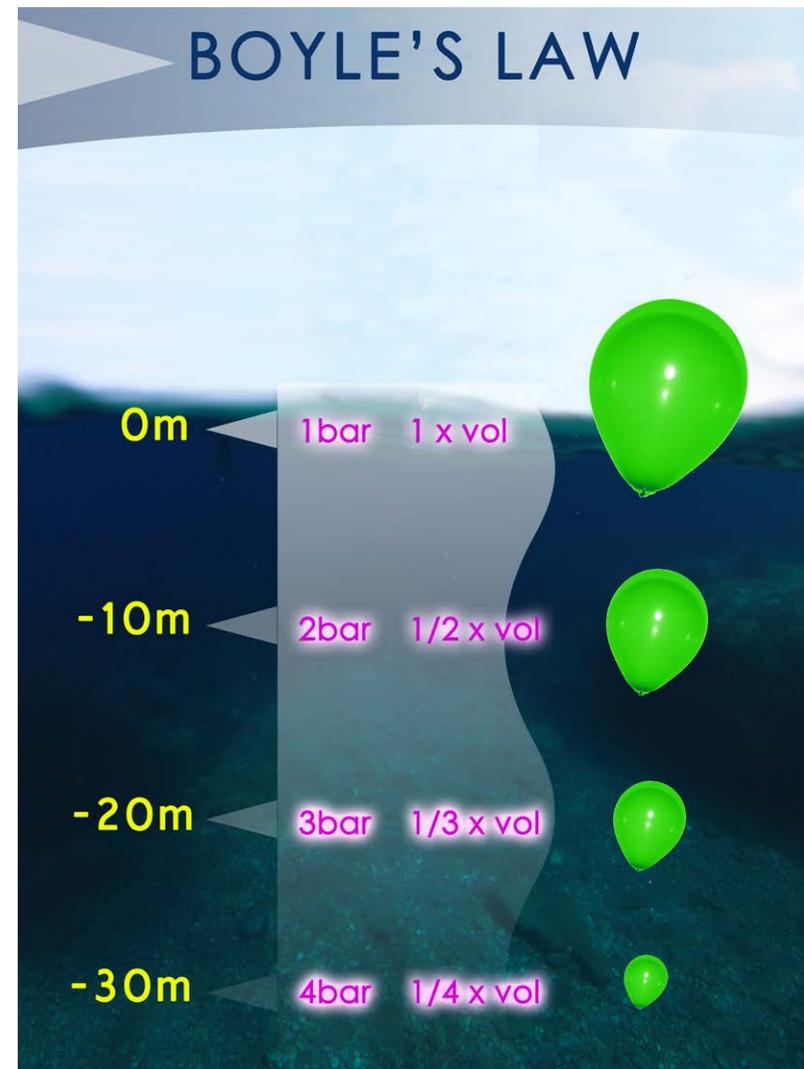
Pressure

Pressure builds by depth

1 bar per 10m

Boyle's Law:

"If the temperature remains constant, the volume of a gas is inversely proportional to the absolute pressure."



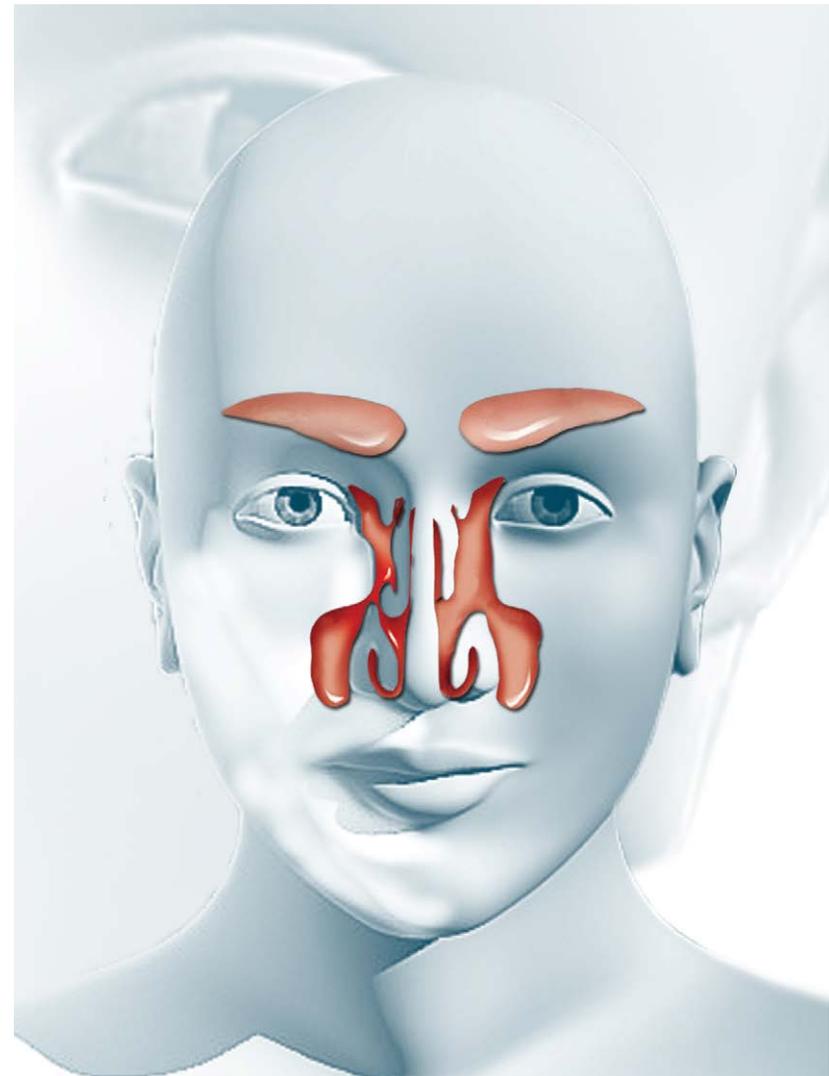
Air Spaces

Need to equalize:

- Ears
- Sinuses
- Mask

No need to equalize

- Lungs

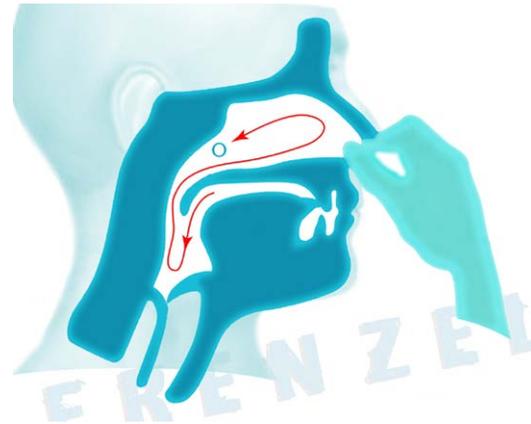


Equalisation Technique

Valsalva Manoeuvre



Frenzel Technique



Facilitate Equalisation

Good technique

Equalise frequently enough

Slow down your descent if necessary

Dive healthy

Stretching before diving (neck, jaw, full body)

Outer ear filled with water (if wearing a hood)

Avoid decongestant medication

Avoid air condition

Equalisation: Summary

Pressure: Boyle's Law

The Body's Air Spaces

Equalisation Technique

Facilitate Equalisation



FREEDIVE TECHNIQUE

Freedive Technique

Technique is key to safe freediving

- Preparation
- Duck Dive
- Descent & Equalisation
- Turn
- Ascent
- Surface and Recovery

Preparation

Relaxation Phase

One Full Breath

Take snorkel out

Pre-equalise

... Duck Dive!

Duck Dive

Most effective start of a freedive

Pre-equalise

3-Step Duck Dive

1. Stretch out on surface
2. Bend from hips
3. Pull arms back



Descent

Minimum effort

Equalise when needed

Stay relaxed



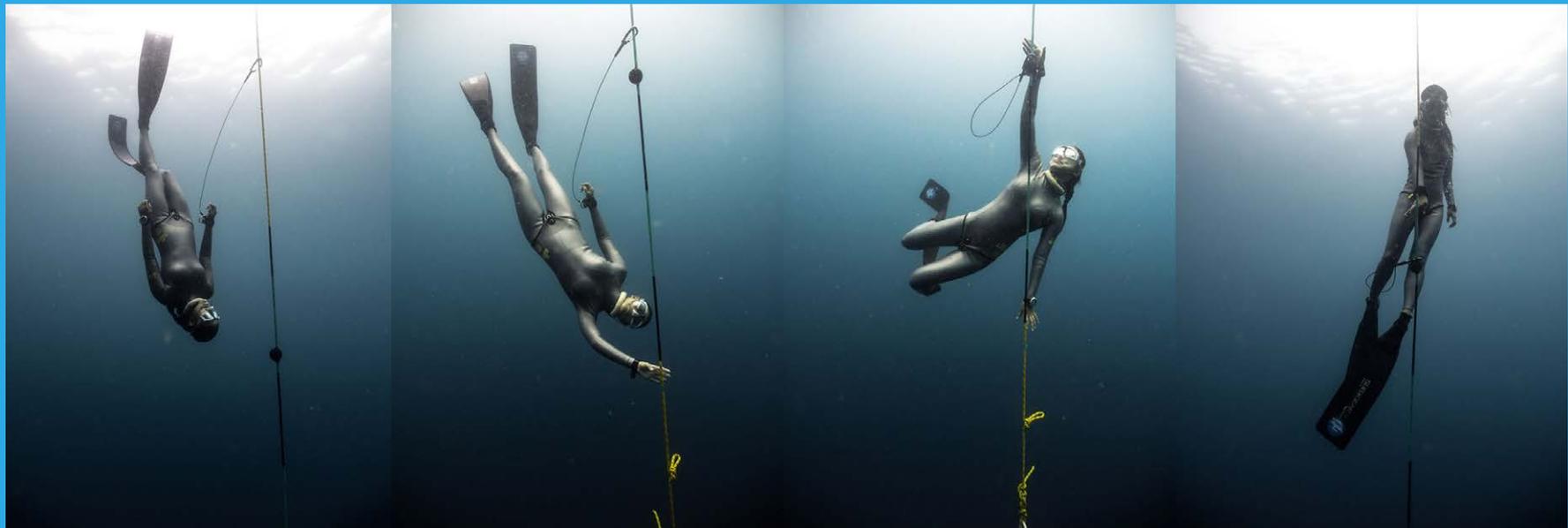
Turn

1. Extend one arm (glide)

2. Grab the line to stop

3. Forward tumble turn

4. Pull line to start ascent



Ascent

Looks like descent
(minus equalisation)

Focus: Finning technique
& streamlining

Use of buoyancy



Surfacing & Recovery

1. Keep your air in
2. Grab the buoy
3. Recovery Breathing
4. Buddy communication

Freedive Technique: Summary

Preparation

Duck Dive

Descent & Equalisation

Turn

Ascent

Surface and Recovery



SAFETY IN FREEDIVING

Safety in Freediving

The Buddy System

Loss of Motor Control (LMC)

Blackout (BO)

Signs of Trouble

Symptoms of Blackout

Rescue Procedures

Risk Reduction

Freediving and Scuba

Buddy System

First level of safety: You!

Second level of safety: The buddy team

Take buddying as seriously as diving

Buddy communication

- Session briefing
- Keep communicating
- Refuse if uncomfortable

Forms of buddying



Static Buddying

Safety check

- Verbal
- Non-verbal

Buddy team plan

Maximum reliability

Dynamic Buddying

Follow on surface

Head-to-head

Use snorkel

No weights

**Upon surfacing:
Be there, but not touch.**

Deep Buddying

Meet at depth: minimum -10m

Keep the rope between the diver and yourself

Synchronize ascent

Surface together

Watch the diver for >30s

Loss of Motor Control (LMC)

Hypoxic fit after surfacing

Jerky movements of eyes, limbs or head

Strong warning signal

Stop diving for the day

Find out why it happened

Support a Victim of LMC

Gently hold the freediver so his/her airways are out of the water

Reassure and coach through recovery breathing

Remove facial equipment if needed

Remind to stop diving

Check for injuries (mainly in pool)

Blackout (BO)

Loss of consciousness

Hypoxia

• SatO₂ < 50%

Brain damage: Question of doses!

Stop diving for the rest of the day

Find out why it happened. Change your diving!

Signs of Trouble

You can see:

- Change of finning style
- Unfocused eyes
- Grabbing the rope
- Speeding up
- Escaping air
- Inability to keep head above water
- Anything abnormal

If you think you should act – act!

Symptoms of BO

You can feel:

- Ear ringing
- Feeling of warmth
- The dive starts to feel easier
- Tunnel vision
- Fuzzy thoughts
- Tingling sensation

Surface immediately or indicate to your buddy!

Rescue

SAFE-Rule

Surface

Airways

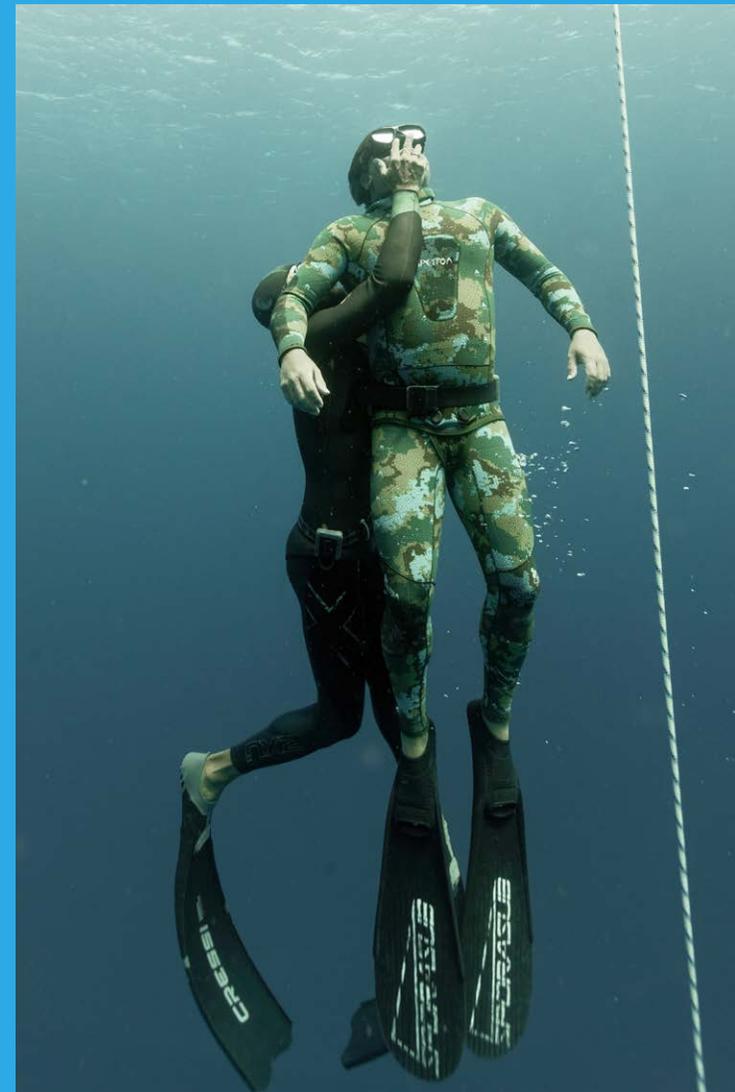
Facial **E**quipment

Blow - Tap – Talk

- Until regaining consciousness
- Max. 10-15 seconds

Rescue breaths

- Up to 5 rescue breaths
- Open airways: Tilt-back the head



Rescue

If the victim does not resume breathing:

- Call for help
- Start CPR (Cardiopulmonary Resuscitation)
- Evacuate to nearest medical facility

AIDA advises you to consider attending a first aid course!

Risk Reduction

Always freedive with a trained buddy

- Regular rescue training!

Correct weighting

Snorkel out!

Bring a buoy or float!

Wear a lanyard in <10m visibility

Always Recovery Breathing

Risk Reduction

Relaxation

Good technique

Conservative freediving

Hydration

Slow progression approach

Avoid smoking

Low blood sugar vs. Eating

Stay warm

Freediving & Scuba

With scuba computer:

- Wait for No Fly Sign!

Rule of thumb:

- After one scuba dive: Wait 12h
- After several scuba dives: Wait 24h

Do not accept air from Scuba divers!

Scuba after Freediving:

- Wait 12h!

Safety in Freediving: Summary

The Buddy System

Loss of Motor Control (LMC)

Blackout (BO)

Signs of Trouble

Symptoms of Blackout

Rescue Procedures

Risk Reduction

Freediving and Scuba



FREEDIVE EQUIPMENT



Freedive Equipment

Masks

Fins & Monofins

Snorkels

Weight belts & Weights

Wetsuits

Lanyards

Buoys & Floats

Mask

Enclose nose

Assure good fit

Low volume

Clear lenses

Flexible skirt



Freedive Fins

Full foot pocket

Length = Power (with good technique)

Plastic / fibre glass / carbon

Blades in var. stiffness



Monofin

More powerful

Different technique

Competition tool



Snorkel

Safety tool

Moderately rigid

Without purge valve

Remove before diving

Attached to mask?



Weight belt

Flexible

Worn on hips

Small weights

Seals suit

Quick release

Worn on hips

Small weights

Seals suit



Wetsuit

Protection from cold and sun

Varying thickness

Tailor made / close fit

Full body

No zipper

Mobility

Fragile



Lanyard

Attaching to the dive line

To keep the bearings

**For rescue purposes with a
counterweight system**

Quick release



Freedive Buoy

Flat for resting

Dive line firmly attached

Tethering line

Carabineers

Handles to hold on to

Light bottom weight

Tennis ball to stop lanyard

Bottom plate



Gear maintenance

Rinse in fresh water

Dry in the shade – protect from direct sun

Store in dry place

Freedive Equipment: Summary

Masks

Fins & Monofins

Snorkels

Weightbelts & Weights

Wetsuits

Lanyards

Buoys & Floats

FREEDIVE DISCIPLINES



Introduction

Recreational and Competitive Freediving

In AIDA: 8 disciplines

In AIDA2 Course: 4 disciplines

Static Apnea (STA)

Breath hold face down in water

Pool or confined water

Mind game

Contractions

Most accessible form of training

In the dry: Solo training possible

In water: Always with a buddy!

World Records

Video: Static Apnea



Dynamic Apnea (DYN, DNF)

**Horizontal distance covered
on one breath**

Pool or confined water

**Dynamic with Fins
or Monofin: DYN**

World Records



Dynamic Apnea

**Horizontal distance
covered on one breath**

Dynamic no Fins: DNF

Lifeguard is NOT a buddy!

World Records

Video: [Dynamic Apnea](#)



Free Immersion

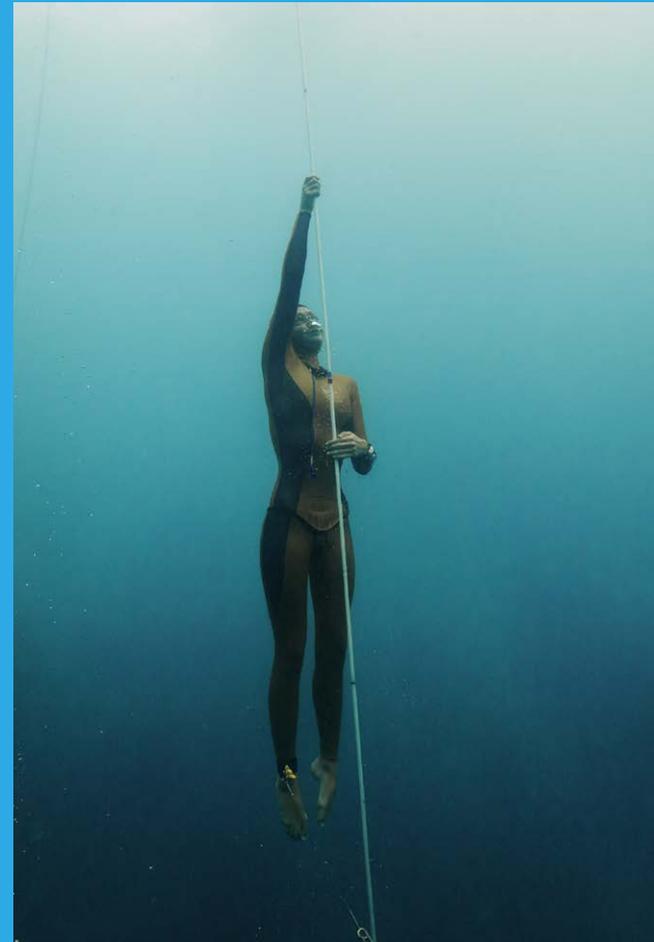
Pulling yourself down and back up a line: FIM

Warm-up

Streamlining

Equalisation training

World Records



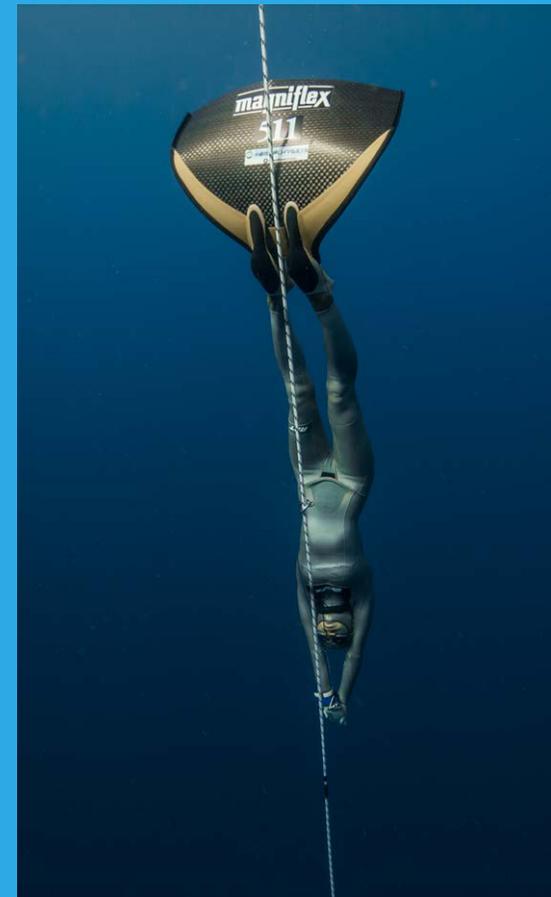
Constant Weight

Swim down and back up using the same amount of weight

Grab the rope only to turn

Constant Weight with Fins or monofin: CWT

World Records



Constant Weight

Constant Weight No Fins: CNF

World Records



Variable Weight (VWT)

Descend with weight or sled

Ascend without weights

Ascend swimming and/or pulling

Not a competition discipline

World Records



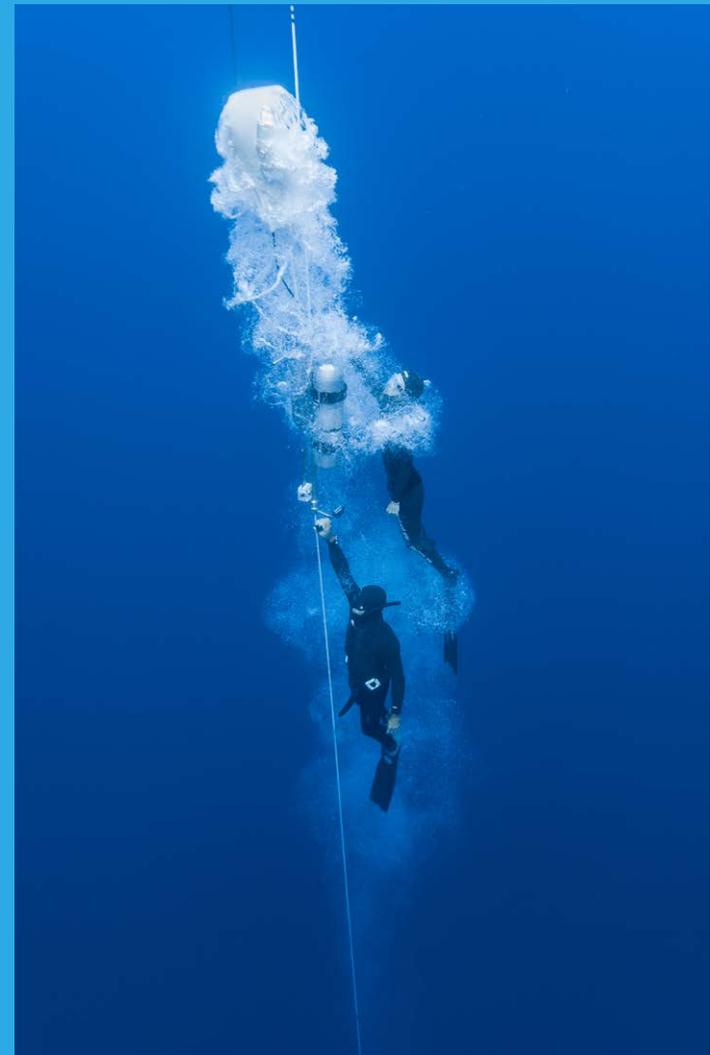
No Limits (NLT)

Descend with weights or sled

Ascend using lifting device

Not a competition discipline

World Records



Disciplines: Summary

Static Apnea	STA
Dynamic Apnea	DYN / DNF
Free Immersion	FIM
Constant Weight	CWT / CNF
Variable Weight	VWT
No Limits	NLT

Freedive Code of Conduct

Mind your surroundings

Mind your long fins

Mind marine life

Do not remove anything from the sea

Do not leave anything in the sea

Mind the dive site

Be a role model



Thank you for your attention

Written & Produced by Oli Christen

Illustrations by Francine Kreiss with Felice Mastroleo

Photos by Jussi Rovanpera, Daan Verhoeven & Kimmo Lahtinen

Supervision for AIDA International by Jean-Pol Francois

Copyright AIDA International 2015 v1.00 10/2015