Decompression Illness
This booklet has been designed by the staff of the Hyperbaric Service for patients receiving hyperbaric oxygen therapy (HBOT). It aims to provide expanded answers to the common questions that are asked by patients during their treatments.

The content of this booklet is by no means conclusive and the information given here can be elaborated on by the hyperbaric Nurse, Technician and Doctor.
# Table of Contents

- History of Hyperbaric Medicine at The Alfred...... 2
- What is Hyperbaric Oxygen Therapy? ............... 2
- What is Decompression Illness? .................. 2
  - What are the symptoms of DCI? ............... 3
  - What are the risk factors for DCI? .......... 5
  - What should I do if I have DCI? .......... 5
- How will HBOT help me? .................................... 5
- What happens during a hyperbaric treatment? .. 6
  - How long will my treatment take? ............. 7
- When can I dive again safely? .................. 8
- Safety in a hyperbaric environment ................. 8
- Conclusion ................................................................. 9
History of hyperbaric medicine at the Alfred

Hyperbaric medicine has been operating continuously at the Alfred since 1987.

The original chamber facilities were used to treat divers with the bends. As the number of patients being treated increased, facilities have been upgraded and our current chamber was put in place in 1999. Alfred’s Hyperbaric Service is the only public chamber in Victoria and provides the State Service 24hour 365day for emergencies alongside its regular inpatient and outpatient care.

What is hyperbaric oxygen therapy (HBOT)?

Hyperbaric Oxygen Therapy is the administration of 100% oxygen at a pressure greater that atmospheric pressure. As the air we breathe contains only 21% oxygen, breathing 100% oxygen at high pressure results in much more oxygen being dissolved in the body.

Hyperbaric oxygen has been used for many years to treat decompression illness ('the bends') in divers. We are now using this treatment for other conditions such as gas gangrene, bone infections and some non-healing wounds.

What is Decompression Illness (DCI)?

Decompression illness (DCI) is a term to encompass all bubble-related problems arising from decompression,
including both decompression sickness and arterial gas embolism.

- Decompression sickness (DCS) is a general term for all problems resulting from nitrogen leaving the body when ambient pressure is lowered. It can be divided into Type I (musculoskeletal and/or skin manifestations only) or the more serous Type II (neurologic, cardiac, and/or pulmonary manifestations).

- Arterial gas embolism (AGE) is the condition characterized by bubble(s) of air from a ruptured lung segment under pressure; the bubbles enter the pulmonary circulation and travel to the arterial circulation, where they may cause a stroke.

**What are the symptoms of DCI?**

There are a variety of symptoms associated with DCI. Most DCI cases fall into two main categories: Type 1 and Type 2.

**Type 1 (“pain only”)**
- Limb or joint pain or dysfunction
- Itch
- Skin Rash
- Localised swelling

**Type 2 (“serious”)**
- Central nervous system disorder
- Inner ear
- Lungs
- Cardiac
- Type 1 symptoms developing under pressure
- Other manifestations
DCS

• Signs
  ○ Skin rash
  ○ Paralysis, muscle weakness
  ○ Difficulty urinating
  ○ Confusion, personality change
  ○ Loss of memory, tremors
  ○ Staggering
  ○ Collapse or unconsciousness

• Symptoms
  ○ Fatigue
  ○ Skin itch
  ○ Pain in joints or muscles
  ○ Dizziness, vertigo, ringing in ears
  ○ Numbness, tingling and paralysis
  ○ Shortness of breath

AGE

• Signs
  ○ Bloody froth from mouth or nose
  ○ Paralysis or weakness
  ○ Convulsions
  ○ Unconsciousness or not breathing
  ○ Death

• Symptoms
  ○ Dizziness
  ○ Blurring of vision
  ○ Areas of decreased sensation
  ○ Chest pain
  ○ Disorientation
What are the risk factors for DCI?

- Age
- Fitness
- Obesity
- Illness
- Injury
- Stress
- Dehydration
- Time Depth profile
- Ascent rate
- Safety stops
- Exercise
- Temperature
- Sleep
- Alcohol

What should I do if I think I have DCI?

If have been diving recently and you believe you may have signs and symptoms of DCI, then please call us on (03) 9076 2269 and speak to one of our medical staff. We are a 24hour 365day a year service.

Please be aware that we may require you to present to the Alfred’s Emergency Department for further assessment/s that cannot be performed over the phone.

How will HBOT help me?

Hyperbaric oxygen helps the body in several ways. For divers suffering from DCI or ‘the bends’ it helps by:
• **Decrease gas bubble size & nitrogen elimination**
  Hyperbaric oxygen helps to reduce gas bubble size and diffusion of the embolised gas whilst re-oxygenating ischaemic tissue.

• **Hyperoxygenation**
  Hyperbaric oxygen increases the amount of oxygen able to be utilized by the body by super-saturating the tissue and well as haemoglobin.

• **Vasoconstriction and reducing oedema (swelling)**
  Hyperbaric oxygen has the unique property of constricting blood vessels thereby reducing oedema, whilst simultaneously increasing the oxygen supply to an area.

**What happens during a hyperbaric treatment?**

As the pressure in the chamber increases, you will develop a feeling of fullness in your ears. You will need to 'equalise' or 'clear your ears'. If are having difficulty equalizing your ears, please tell the nurse so that pressurisation can be stopped until your ears have cleared. You may not be able to equalise if you have a cold, flu or sinusitis.

You will notice that the chamber will become warmer during pressurisation. This is normal. There is a basic overhead fan in the chamber which the nurse can
increase. You will also notice that the chamber will become cooler during depressurisation. This is also normal. Blankets can be provided to help keep you comfortable.

You may find that the treatments will be time consuming, however, it is important that you continue the treatments on a regular basis. Interruptions will interfere with the healing process.

- Cerebral or Arterial gas embolism

How long will my treatment take?

Patients with moderate to severe symptoms of DCI are initially given an RN62 (based on Royal Navy dive tables). This treatment table has a duration of 4 hours 45 minutes (not including extensions) and is conducted at a depth of 180 kPa.
The number of further treatments a patient may require is based on clinical symptom resolution. Commonly most divers require two to five treatments to resolve all symptoms.

**When can I dive again safely?**

It is recommended that you do not dive for four weeks after being treated by the Hyperbaric Service for DCI. At which point a medical review will take place with one of our consultants to determine if your recovery is complete and if it is safe for you to continue diving.

**Safety in a hyperbaric environment**

As the Hyperbaric Chamber is a high oxygen concentration environment there is a slight risk of fire. As a safety precaution, we will ask you to wear 100% cotton scrubs which we provide. Shoes are not allowed inside the chamber. Please leave footwear outside the chamber so dirt and grease from the floor is not taken inside.

For safety reasons the following items are prohibited inside the chamber:

- Mobile phones
- Mp3 or CD players
- Watches
- Matches
- Cigarette lighters
- Hearing aids
- Prosthetics
- Insulin pumps
- Synthetic fibres
- Makeup/lipstick
- Hair spray/gel/other products
- Synthetic wigs/hairpieces
- Perfume/cologne

You may like to bring something to read during your treatment – but don't forget your glasses! The Hyperbaric Unit has a small library of books and magazines.

A nurse with Hyperbaric qualifications will always accompany you inside the chamber.

Outside the chamber there is another Hyperbaric qualified nurse, a Hyperbaric doctor and a Hyperbaric technician who are specially trained to operate the chamber. They observe the chamber interior constantly via a video and intercom.

**Conclusion**

The Hyperbaric Service is a 24 hour service, available seven days a week to treat emergency patients. Due to the irregular and unpredictable demand for hyperbaric treatment there will possibly be times when you may be kept waiting. This is unavoidable; we ask for your patience and understanding.
We have many other educational resources for you in the unit, so ask the nursing staff if you would like more information.

If you have any queries, please don't hesitate to ask.