ALFRED HYPERBARIC SERVICE

Service and Care

Smoking and HBOT
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 ...... 1
What is Hyperbaric Oxygen Therapy? ............... 1
Why is smoking harmful to my health?.............. 2
How will smoking affect my HBOT? ............... 3
  How can I stop smoking? ......................... 3
  What if I can’t quit smoking? .................... 4
  Can the adverse effects of smoking be reversed? ..................................................... 4
How will HBOT help me? ............................... 5
What happens during a hyperbaric treatment? .. 7
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 24 hour 365 day 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 than 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.

**Why is smoking harmful to my health?**

Tobacco smoking is the single largest cause of preventable death in Australia. It causes more illness and death than any other drug. One in two lifetime smokers will die from their habit, half of these in middle age.

Tobacco smoke contains more than 4000 chemicals, including:

- Tar (a mixture of chemicals)
- Nicotine (an addictive substance)
- Carbon monoxide (found in car exhaust fumes)
- Ammonia (found in floor cleaner)
- Arsenic (found in rat poison).

At least 60 of the chemicals in tobacco smoke are known to cause cancer. It also causes heart disease, stroke and emphysema.

**How will smoking affect my HBOT?**

Cigarettes contain many chemicals, these include carbon monoxide. Carbon monoxide competes with oxygen to bind to your haemoglobin or red blood cells to form carboxyhaemoglobin. This leads to hypoxia, which means your body is not able to supply adequate oxygen to your cells.
amounts of oxygen to the tissues. Hypoxia can impair wound healing, and increase surgical wound complication and infection rates, particularly following plastic and reconstructive surgery, bone surgery, bowel surgery and microsurgery.

**How can I stop smoking?**

We can assist you if you wish to stop smoking. The next step is to plan the best way to do it. It might be useful to think about why and when you smoke, and then work out ways to tackle the urge to smoke.

Help is available for smokers who want to quit. This includes:

- Counselling
- Education and information
- Nicotine patches, gum, inhaler, lozenges and tablets

Most smokers try to quit several times before they manage to quit for good. To have a cigarette does not mean failure. A person can learn from a setback and succeed the next time.

**What if I can’t quit smoking?**

If quitting smoking is not an option for you at this time, please consider reducing the number of cigarettes you smoke or refrain from smoking for 2
hours before and 2 hours after your hyperbaric treatment so you can receive the maximum benefit.

**Can the adverse effects of smoking be reversed?**

Some adverse effects of smoking are considerably lessened following cessation of smoking. These benefits are particularly relevant in the perioperative period.

- Smoking increases the blood concentration of carboxyhaemoglobin. This has an average elimination half-life of four hours and therefore abstinence of only 12 hours will greatly reduce carboxyhaemoglobin concentrations, improve oxygen content and availability, and reverse negative inotropic and arrhythmic effects on the heart.

- Nicotine increases heart rate, myocardial contractility, blood pressure and peripheral vasoconstriction. These adverse effects generally improve following 12 - 24 hours of abstinence.

- In the respiratory system, smoking causes hypersecretion of mucus, impairment of tracheobronchial clearance and small airways narrowing, and smokers have an increased incidence of postoperative respiratory problems. If smoking is stopped, sputum production
initially increases for 1-2 weeks and then declines over the next month.

- Smoking may adversely affect immune mechanisms. Decreased levels of immunoglobulins and cells involved in the immune response in smokers apparently return to normal following a six month period of abstinence.

- Perioperative analgesic requirements are increased in smokers. This may be due to withdrawal of endogenous opioid stimulation, or increased enzyme induction which improves 6 - 8 weeks after cessation of smoking.

How will hyperbaric oxygen treatment help me?

There are several procedures that you must do before each treatment. Hyperbaric oxygen helps the body in several ways:

- **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.

- **Promotes tissue growth**
  Collagen is necessary to make scar tissue and stabilises skin while growing over wounds. High oxygen levels promote the growth of collagen. Tissue such as skin, muscles and other soft tissues grow faster in an oxygen rich area.

- **Stimulates white blood cell (WBC) action**
  Some white blood cells kill bacteria by using special enzymes and toxic substances incorporating oxygen. In areas of the body where oxygen levels are low, WBC lose the oxygen dependent killing systems. HBO restores this function, enhancing the killing of bacteria.

- **Promotes angiogenesis (blood vessel growth)**
  Hyperbaric oxygen stimulates the growth of new blood vessels into poorly perfused tissues. It also ‘supports’ at risk tissues until the new blood vessels grow.

- **Improves antibiotic action and toxic effect on micro-organisms**
  Certain antibiotics have enhanced action in an oxygen rich environment. Some bacteria are also restricted in their growth in oxygen rich tissues.
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 be taught how to 'equalise' or 'clear your ears'. This may involve swallowing, yawning, or performing a valsalva manoeuvre. You should expect a popping sensation in your ears. If the build up of pressure in your ears is becoming uncomfortable, 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. Please let us know if you get too hot, we can give you a wet face washer. 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 are time consuming, however, it is important that you continue the treatments on a regular basis. Interruptions will interfere with the healing process.
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 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.