



# Hyperbaric Oxygen Therapy

**Patient Orientation Booklet**

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## WELCOME TO O<sub>2</sub> HEALTH

This booklet contains information about Hyperbaric Oxygen Therapy, our facility and your treatment process. Please ensure that you read through this booklet completely to familiarise yourself with the information contained within, including the protocols and safety procedures for the hyperbaric environment

### OUR STAFF

Mapua Health Centre staff are here to provide you with the highest level of care available. They are trained and experienced in the field of hyperbarics. Should you have any questions please do not hesitate to contact one of our staff members at your convenience.

### FACILITY OVERVIEW

We have a 4 person monolock chamber. It has been built to the highest standards and conforms to international regulations for technical standards and safety.

### WHAT IS HYPERBARIC OXYGEN THERAPY?

*Hyper* means greater than normal, *baric* means pressure. *Oxygen* is a colourless, odourless gas that is very important to the energy pathways of your cells and *therapy* is a treatment that is meant to cure or rehabilitate.

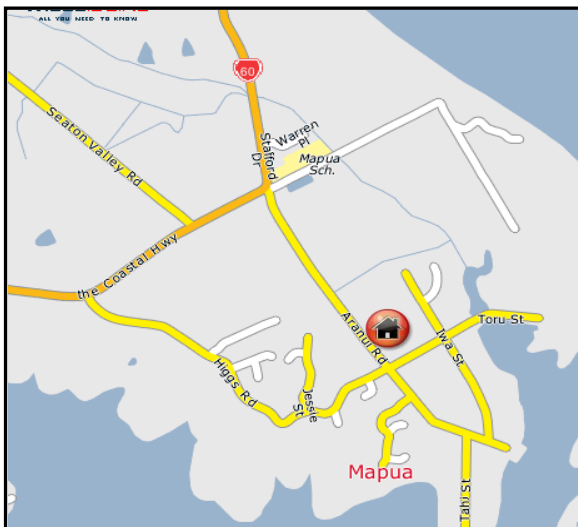
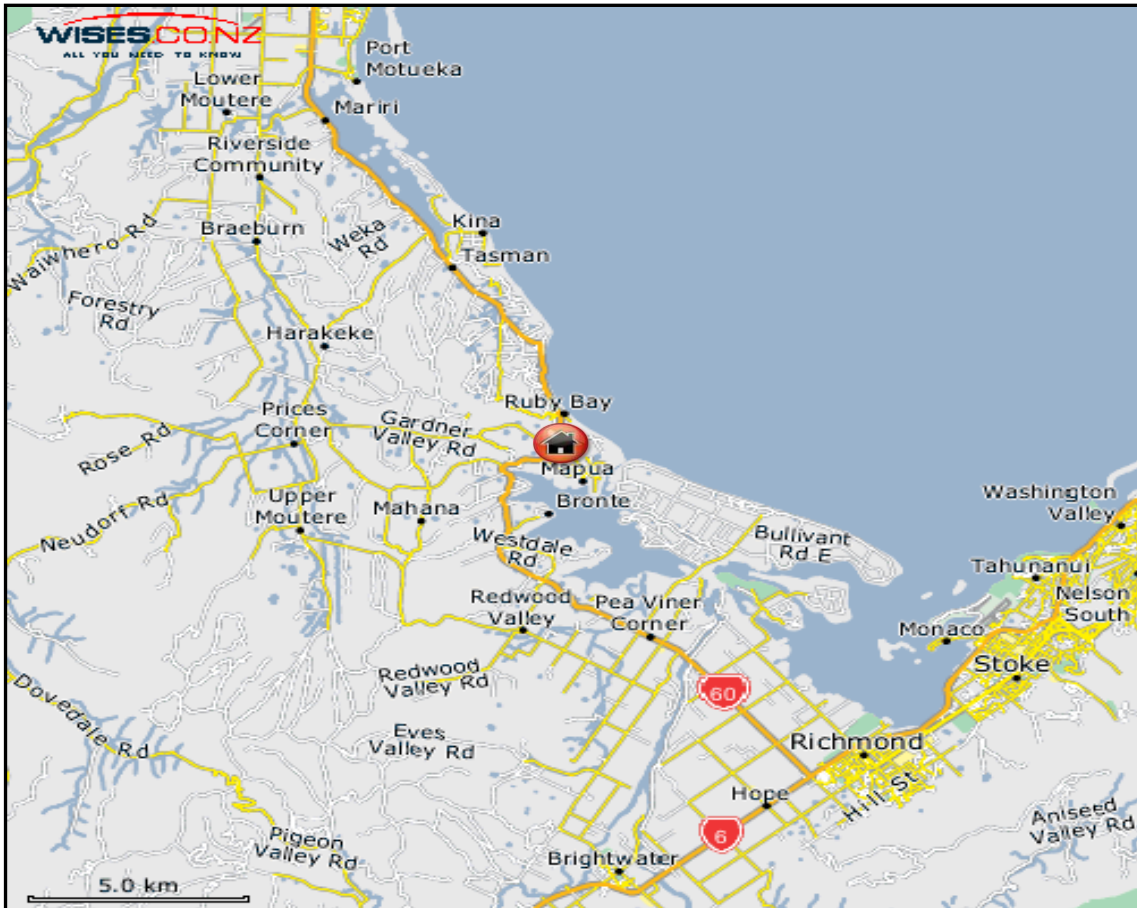
Hyperbaric Oxygen Therapy (HBOT) is a treatment in which the patient breathes 100% oxygen intermittently, while inside a treatment chamber that is specially pressurised to be greater than the normal outside pressure (i.e. 1 atmosphere absolute or ATA).

Breathing oxygen at increased atmospheric pressure causes oxygen to be dissolved in your blood plasma and increases its availability to your body's tissues and cells.

HBOT is an "adjunctive treatment" for the majority of indications. This means that it is used in conjunction with other forms of treatment and is a part of your total medical treatment or care regime.



## OUR LOCATION



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## HOW DOES HBOT WORK?

Hyperbaric oxygen has a number of potential effects on the body including:

- ✓ **Angiogenesis** – stimulates growth of capillaries in hypoxic tissue to improve wound healing
- ✓ **Hyperoxygenation** - high levels of oxygen can help with the repair of cellular function
- ✓ **Osteogenesis** - HBOT can stimulate the production of new bone cells in compromised bones
- ✓ **Microbiological** - high levels of oxygen help eliminate anaerobic bacteria
- ✓ **Immune stimulation** –increased phagocytosis and natural killer cells
- ✓ **Decreased inflammation** – decrease in TNF alpha, cytokines and cyclo-oxygenase
- ✓ **Vasoconstriction** - oxygen causes the constriction of blood vessels which can reduce oedema
- ✓ **Bubble reduction** – the increased pressure decreases nitrogen bubbles in decompression illness
- ✓ **Tissue repair** – increase in stem cell production may help in tissue repair/regeneration

## WHAT CONDITIONS CAN BE TREATED WITH HBOT?

The mainstream and hospital-based uses for HBOT include the following:

- Air or gas embolism
- Carbon monoxide poisoning
- Acute traumatic ischemia
- Exceptional blood loss
- Cyanide poisoning
- Decompression illness ('bends')
- Clostridial myonecrosis
- Radiation proctitis
- Some non-healing wounds
- Gas gangrene
- Necrotizing infections
- Some cases of osteomyelitis
- Radiation-induced tissue damage
- Compromised grafts and skin flaps
- Burns
- Compartment syndrome

There are a growing number of extra conditions that may respond to increased oxygen levels. For many of these the level of scientific proof is limited or anecdotal. These include:

- Cerebral palsy
- Stroke
- Multiple sclerosis
- Head injuries and concussion
- Mycoplasma + Lyme's disease
- Before and after surgery
- Chronic fatigue
- ADD/ADHD
- Sports injuries
- Autism
- Idiopathic sudden deafness
- Migraine + cluster headaches
- Systemic fungal infection
- Parkinson's disease
- Trigeminal neuralgia
- Raynaud's phenomenon
- Vascular disease
- Crohn's disease (especially if fistula)
- Fibromyalgia
- Decreased immune function
- Venomous bites
- Retinal artery occlusion

## **FITNESS FOR HYPERBARIC OXYGEN THERAPY**

All patients are assessed for their fitness prior to entering the hyperbaric environment. This is to ensure you that it is safe for you to begin your course of treatment.

## **TREATMENT**

The number of hyperbaric oxygen sessions you will require will depend on the condition being treated. You will generally require between 10 and 40 treatments and will usually have these treatments once a day from Monday to Friday. Certain conditions may require treatment frequencies greater than once a day and for a varied number of total treatments.

You will be treated inside a hyperbaric chamber where you will breathe pure 100% oxygen in intervals from a specialised hood or mask while at an atmospheric pressure between 1.5 and 2.4 ATA. Your total treatment time will be between 60 and 120 minutes (the time, pressure and breathing intervals may vary depending on the condition being treated).



You may be asked to fill out various assessment forms. These questionnaires are an important and useful tool that will assist us in monitoring your treatment progress.

You will be informed as to the times of your treatments. Please ensure that you arrive at least 20 minutes prior to your scheduled treatment time to facilitate changing and entry into the hyperbaric chamber.

## **WHAT IS THE TREATMENT CHAMBER LIKE?**

The type of hyperbaric chamber that we use is designed to fully meet the international safety regulations on HBOT. It is built to very high standards for both reliability and comfort. You can either sit or lie on a comfortable mattress with pillows for support if needed during the treatment. The chamber is pressurised with normal air and you wear a comfortable mask or hood which supplies oxygen. You have constant access to the technician during each treatment via intercom.

Whenever the chamber is pressurised, depressurised or air is circulated (this is called a vent or flush) in the chamber you will hear the sound of air moving through the pipes and valves. This is part of the normal operation of the chamber. The technician will be in constant communication throughout your treatment.

## **EFFECTS OF PRESSURE**

As the pressure in the hyperbaric chamber increases the volume of air in any air spaces in your body is affected. The major air spaces in your body include your lungs, middle/inner ear, gastrointestinal tract, and your sinuses. Your body is capable of equalising most of these air spaces all by itself; however there are certain air spaces which may need some assistance. Your lungs may be equalised simply by breathing normally.

**One important rule to remember: NEVER hold your breath whilst inside the hyperbaric chamber.**

You will also notice the pressure change in your ears. It will be necessary to equalise the pressure you feel on your eardrums during pressurisation of the chamber. You will feel fullness in your ears



during compression. This feeling may be similar to the feeling sometimes experienced in elevators or flying in an airplane. This pressure can be relieved by a simple equalisation procedure. You will be shown how to equalise your ears prior to entering the chamber for your first treatment.

During ascent or depressurisation of the chamber you should generally not have to equalise your ears. You may hear a slight popping sound. This is normal please continue to breath normally.

There should never be any pain in your ears. Should you feel any pain or discomfort in your ears or anywhere else that is not normal for you, please inform the attendant/operator **immediately**. The quickest way to do so is to tell them to stop. The pressurisation or depressurisation will be immediately stopped to ensure that you can equalise properly before proceeding.

As the pressure increases inside the hyperbaric chamber the air inside the chamber increases in density. As a result of this you may notice that your voice sounds slightly different. This is temporary and will only occur whilst at pressure.

Changing pressure affects temperature. As pressure increases the temperature increases through heat of compression. As pressure decreases temperature will decrease as well. During and directly after descent or pressurisation you will notice that the temperature increases. During ascent or depressurisation you may notice that the temperature gets cooler. There also may be a fog or mist in the air. This is normal and is caused by the humidity in the chamber air.

## **RISKS DURING TREATMENT**

All medical treatments and medication have potential side effects or risks associated with them. There are some risks associated with hyperbaric oxygen therapy; however most of them are rare and great care is taken to prevent their possibility.

### **i. Barotrauma**

During pressure change you may experience discomfort in your ears, sinuses or teeth (if you have fillings or cavities). The pain in your ears may be relieved by several methods of equalisation.

Whenever a change of pressure occurs, there is the possibility of a small tear in the lung tissue and escape of air into surrounding structures outside of the lungs (pneumothorax). This can occur if the normal passage for air out of the lungs is blocked during depressurisation. Slow depressurisations are used in all hyperbaric treatments to minimize this risk. Breathing normally will also aid in the minimization of pulmonary barotrauma. **NEVER hold your breath.**

### **ii. Oxygen toxicity**

Breathing oxygen at increased pressure can result in central nervous system oxygen toxicity or pulmonary oxygen toxicity. In order to minimise this risk you will breathe oxygen intermittently alternating between oxygen and air breaks. Should you feel any unusual symptoms such as facial twitching, nausea, ringing of the ears, visual disturbances, or irritability of these signs please notify the attendant **immediately**? This is quickly and simply corrected by removing the hood or mask for a few minutes.

### **iii. History of seizures**

HBO therapy may lower the seizure threshold and it may be appropriate to increase medication for patients treated for epilepsy.

### **iv. Pregnancy**

Theoretical concerns that either retrolental fibroplasia or closure of the ductus arteriosus could occur in the foetus whose mother undergoes HBO appear to be groundless from considerable overseas experience. However, we continue to exercise caution in the



treatment of pregnant women, and HBOT will be done only on a case-by-case basis.

**v. Fire risks**

With the use of oxygen in any form there is always an increased risk of fire. We adhere to strict safety regulations to minimise and prevent hyperbaric related fires.

**Please observe all safety regulations and restricted materials list.**

**vi. Risk of near sightedness (myopia)**

Patients that undergo over 20 hyperbaric treatments may occasionally experience diminution in the ability to see things that are far away. This is usually a temporary condition and is very rare.

**vii. Maturing or ripening cataracts**

Individuals with cataracts may possibly experience accelerated ripening or worsening of the cataracts.

**viii. Temporary improvement in far sightedness (Presbyopia)**

Patients that undergo over 20 hyperbaric treatments may experience an improvement in the ability to see things close by or to read without reading glasses. Vision should return to pre-treatment level approximately six weeks after the cessation of therapy.

**ix. Numb fingers**

You may notice a slight feeling of numbness in your fingers. This is a temporary condition which should subside within six to eight weeks after the cessation of your last treatment.

**x. Serous otitis**

Fluid in the ears sometimes accumulates as a result of breathing high concentrations of oxygen. This may cause a muffled feeling in your ear. This disappears after hyperbaric treatment ceases and may often be eased with decongestants.

**xi. Fatigue**

Some people may feel some fatigue following hyperbaric treatment, which will resolve over time.

**xii. Optic neuritis**

There have been very occasional reports of patients with optic neuritis having deterioration in vision and HBOT should be used with caution in this condition.

**xiii. Medication**

Certain medication may interfere with HBOT, including asthma inhalers, Cisplatinum, Disulphiram and Doxorubicin. **Please let the staff know about any medication taken.**

**xiv. Decompression illness**

Anytime you enter a pressurised environment there is a possibility of decompression illness (DCI). Pressure causes nitrogen to go into solution in your blood and becomes absorbed in the tissues. When it comes out of solution it can cause DCI if it comes out of solution too fast. You will be breathing oxygen for the majority of your treatment so your nitrogen intake is extremely limited. Your treatment is designed to allow you to safely undergo treatment while minimising the risk of DCI.

**xv. Gas embolism**

A gas embolism occurs by the expansion of respiratory gasses during a reduction in atmospheric pressure (ascent) which enters blood vessels. This risk is minimised by thorough pre-dive assessments, controlled ascent rates, and **never holding your breath.**





## TECHNIQUES FOR EQUALIZING EARS AND SINUSES

Your middle ears are dead air spaces connected to the outer world only by the eustachian tubes which run into the back of your throat. Increased pressure on the outside of your eardrum causes an increase in pressure in the middle ear which can cause pain and possible middle/inner ear damage. Swallowing often equalises this pressure. You may equalise your ears many times a day without realising it. When you swallow, your soft palate muscle pulls your Eustachian tubes open and allows air to move from your throat to your middle ears. This equalises the pressure in your middle ear and you may hear a faint 'click' or pop similar to being in an aeroplane.

In order for equalisation to be effective you should be free of nasal or sinus infections or allergic reactions. Should you be suffering from a cold or allergies please see the attending physician prior to your treatment.

### **Valsalva**

Pinch your nose and blow gently through your nostrils. You should do this gently until you feel your eardrums move. This method will increase the pressure in your throat allowing equalising air into your middle ear.

### **Swallowing**

Swallowing with the mouth and nose closed and/or drinking water during the descent/pressurisation may assist your equalisation.

### **Tips to help you equalise:**

- Practice until you are able to easily feel your ears "pop" on the surface.
- Don't wait until you feel discomfort or pain before equalising.
- If difficulty occurs in equalising, ask the attendant to stop.
- Avoid milk, tobacco, and alcohol prior to a hyperbaric treatment. These items increase your mucus production and may irritate your mucus membranes.
- **Do not** blow forcefully while doing a Valsalva manoeuvre. You could rupture your eardrum. Slow, frequent and gentle Valsalva manoeuvres can be very effective.



## HYPERBARIC CHAMBER SAFETY

The increased pressure and oxygen in a hyperbaric environment increases the risk of potential fires. As a result of this there are certain items that may not be brought into the chamber as they may increase the risk of fire.

### Prohibited Material

The following material is **not allowed** in the hyperbaric chamber:

- |                 |                   |                          |
|-----------------|-------------------|--------------------------|
| × Lighters      | × Cameras         | × Flammable liquids      |
| × Matches       | × Knitting        | × Electronics, IPOD, MP3 |
| × Cigarettes    | × Alcohol         | × Glass objects          |
| × Newspapers    | × Tobacco         | × Nitrolingual spray     |
| × Newsprint     | × Hand warmers    | × Patches                |
| × Mobile Phones | × Hearing aids    | × Synthetic Wigs         |
| × Pagers        | × Stuffed animals | × Lithium ion batteries  |

For safety reasons please do not wear any of the following in the hyperbaric chamber:

- |                   |                  |             |
|-------------------|------------------|-------------|
| × Lipstick        | × Synthetics     | × Jewellery |
| × Ointments       | × Shoes          | × Cologne   |
| × Oils            | × Contact Lenses | × Makeup    |
| × Hair Gel        | × Nylons         | × Perfume   |
| × Hairspray       | × Liniments      | × Creams    |
| × Petroleum Jelly | × Watches        |             |

Please ask the attendant or operator if you are not sure whether an item you wish to take into the chamber is permitted.

### Hyperbaric Clothing

You will not be able to enter the hyperbaric chamber in your own clothes. We provide you with a set of 100% cotton scrubs (clothes) and disposable foot coverings to wear in the hyperbaric chamber for safety reasons.

### Undergarments

**Please bring/wear 100% cotton undergarments** under your hyperbaric scrubs. Do not wear lycra or spandex brassieres or undergarments.

## HYPERBARIC EMERGENCIES

In the event of an emergency please remain calm. The hyperbaric chamber and staff are equipped with the tools and training to deal with any emergencies that may arise. Should an emergency arise please remain calm and follow the directions given to you by the attendant. They will instruct you and assist you as needed.



## **RESTRICTIONS AFTER HBO TREATMENT**

After a hyperbaric oxygen therapy treatment there are some restrictions which you must abide by:

### *Changing Altitude:*

In addition to restrictions on flying you should not drive or otherwise travel to higher altitudes for a period of 24 hours.

Any patients treated for Decompression illness/sickness and or Arterial Gas Embolism may not fly or travel to elevated altitudes for 72 hours after their hyperbaric treatment.

### *Driving after Hyperbaric Treatment:*

Throughout the course of your hyperbaric treatments you may experience changes in your visual acuity and fatigue. We recommend that if you experience vision changes or increased levels of fatigue do not operate vehicles or other heavy machinery while the symptoms persist.

## **SELF-CARE ACTIVITIES**

### **Medications**

Please discuss your medications with the hyperbaric physician. Some medications are contraindicated during hyperbaric oxygen therapy. If medication is due during treatment, please advise the attendant and bring them with you so that you can take them at the correct time. Should you change your medication regime during the course of your hyperbaric treatment please notify the hyperbaric staff.

### **Smoking**

Nicotine may counteract the attempts to deliver oxygen through hyperbaric oxygen therapy. As a result regular doses of nicotine due to smoking a cigarette result in reduced blood supply to fingers and toes. Nicotine also irritates mucus membranes and may make it difficult to equalize your ears and sinuses resulting in damage to your middle or inner ear.

### **Alcohol and Recreational Drug Use**

Alcohol and recreational drug use may be incompatible with patients undergoing hyperbaric oxygen therapy.

### **Caffeine**

Caffeinated drinks such as coffee, tea, and some carbonated drinks have effects similar to smoking. It decreases the amount of oxygen that can be transported by the blood.

### **Wound Care**

Patients having HBOT for wound care will be scheduled to have appropriate assessment and treatment from our wound care nurse.

## **FEES**

Fees for hyperbaric oxygen treatments, wound care and assessments are available on request. Please phone us on **03 5402211** or email: [hyperbaricnurse@mapuahealth.com](mailto:hyperbaricnurse@mapuahealth.com) for all the information.



## **PATIENT RIGHTS AND RESPONSIBILITIES**

All people have statutory rights under the Health and Disability Act (1994) and the Code of Health and Disability Consumer Rights (1996) ("The Code")

A summary of patient rights and responsibilities under The Code follows:

### **Patient's rights:**

- To be treated with respect
- To freedom from discrimination, coercion, harassment and exploitation
- To dignity and independence
- To services of an appropriate standard
- To effective communication
- To be fully informed
- To make an informed choice and to give informed consent for treatment
- To support (except where safety may be compromised or another consumer's rights may be unreasonably infringed)
- Rights in respect of teaching or research
- To complain

### **Patient responsibilities:**

- Advise of any significant medical history, diagnosis, or risk factor of which they are aware
- Do all they can to maintain their own health and the health of those dependant on them
- Advise of all concurrent treatment that they may be receiving from other healthcare providers
- Advise the doctor or nurse if they do not understand advice or instructions, want more information, or want time to consider their decision
- Act on advice given, or, if they do not wish to do so, to inform the health doctor or nurse of their decision
- Seek advice elsewhere if not satisfied with the care offered
- Advise if they believe the health care they, or someone dependent on them, received is not adequate or appropriate
- Respect the rights of other patients and their support persons
- Cooperate with the non-smoking policy and safety policy

## **CONFIDENTIALITY**

Mapua Health Centre recognizes the importance of the proper use, storage, accuracy, and disclosure of our patient's health information in accordance with the Privacy Act 1993 ("the Act") and the Health Information Privacy Code 1994 ("the Code")

We will take all practicable steps to:

- Protect patient's personal and health information including details of their medical history and disabilities
- Protect information about health services provided to the patients
- Maintain patient and staff privacy
- Comply with legislation

Mapua Health Centre recognises the responsibility of all health care providers to take into account the needs, values and beliefs of Maori and ethnic minorities in accordance with the Code of Health and Disability Services Consumers' Rights'.



**PATIENT AGREEMENT**

I understand that Mapua Health Centre will rely on information supplied to it about my health. I confirm that I have answered the patient questionnaire accurately and that the information supplied by me to Mapua Health Centre is true and correct. I confirm that I have supplied Mapua Health Centre with all information about my health that may be relevant to my treatment.

I realise that it is very important to arrive a minimum of 20 minutes prior to my scheduled hyperbaric oxygen therapy.

I understand that smoking reduces the effectiveness of hyperbaric oxygen therapy and that it is advisable to stop smoking during the course of my treatment.

I will refrain from drinking caffeinated beverages two hours pre and post my daily hyperbaric oxygen therapy.

I will refrain from consumption of alcohol and/or recreational drug(s) four hours pre and post hyperbaric treatment. I will not attend a hyperbaric treatment under the influence of alcohol or recreational drugs.

If I have any questions I will ask one of the staff members.

If I feel any pain in my ears, sinuses, or chest during the treatment I will immediately inform the attendant/operator. I will also inform the attendant nurse, or attending physician about any changes in my signs and symptoms.

I will comply with all safety and health requirements, in addition to following the instructions of the attendants, operators, and physicians pre, during and post treatment.

I have been oriented to the treatment process at Mapua Health Centre. This orientation has covered but was not limited to a hyperbaric overview, equalization techniques, safety, post treatment restrictions, and patient rights. I understand that I may request additional information at any time should I require it.

Name of patient: .....

Signature of Patient:.....

Date: .....

**OR**

*I confirm that I am the authorised representative legally entitled to sign this Patient Agreement on*

*behalf of \_\_\_\_\_ . I confirm my agreement to the terms of this Patient*

*Agreement on behalf of \_\_\_\_\_ and I agree to take all reasonable*

*steps to ensure that \_\_\_\_\_ complies with the requirements contained in the Patient Orientation Handbook and in this Agreement.*

*Authorised Representative Name: .....*

*Signature of Authorised Representative: ..... Date:.....*



**CONSENT FOR HYPERBARIC OXYGEN THERAPY**

I, ..... do hereby authorise Mapua Health Centre and its trained staff to treat me with hyperbaric oxygen and to render such other supportive or additional care that their professional judgment may dictate during the course of the above treatment.

The protocols and procedures for Hyperbaric Oxygen Therapy (HBOT) and the adjunctive treatments have been explained to me by the Mapua Health Centre staff.

I have been provided with an orientation to HBOT which has included (but was not limited to) indications, contraindications, risks and side effects, benefits, safety, equalization techniques, patient rights, flying after treatment, use of tobacco and HBOT and a chamber and facility overview.

I have been made aware of the possible risks and side effects of HBOT including but not limited to:

Barotrauma in the ears sinuses or teeth, Pulmonary Barotrauma, Oxygen Toxicity, Fire risks, Risk of near-sightedness, Maturing or ripening cataracts, Temporary improvement in far-sightedness, Numb Fingers, Serious Otitis, Fatigue, Decompression Illness, Gas Embolism.

I have been given an opportunity to obtain further information and to ask questions about HBOT, and I understand that I can ask questions or stop treatment at any time.

I consent to Mapua Health Centre collecting and keeping information about my health for the purpose of making sure that I receive appropriate care and treatment, and for associated administrative tasks. I understand that my health information will be securely stored by Mapua Health Centre and that I am entitled to request access to and correction of my health information. I agree to provide all information about me to Mapua Health Centre voluntarily. I authorise Mapua Health Centre to use information from questionnaires that I have agreed to complete and to take medical photographs for the purpose of research, teaching, publication, education and medical files. I understand that I will not be identified by name and that my anonymity will be preserved in any presentation or publication.

I am aware that the practice of medicine and surgery is not an exact science and that I have been made no guarantees as to the results of hyperbaric oxygen therapy.

My signature below constitutes my acknowledgement (1) that I have read and agreed to the foregoing, (2) that HBOT has been satisfactorily explained to me and that I have all the information I desire, and (3) that I hereby give my authorisation and consent to the use of HBOT on myself.

Name of patient: ..... Signature of Patient: .....

And/or Authorised Representative: .....

*I confirm that I am the authorised representative legally entitled to sign this Consent for Hyperbaric Oxygen Treatment on behalf of \_\_\_\_\_. I have read and understood the Patient Orientation Handbook and this Consent and I confirm the matters contained in this Consent and I consent to the treatment of \_\_\_\_\_ by Mapua Health Centre.*

Representative Name: .....

Witness signature: ..... Date: .....

Witness Name:..... Time: .....



**NOTES**

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