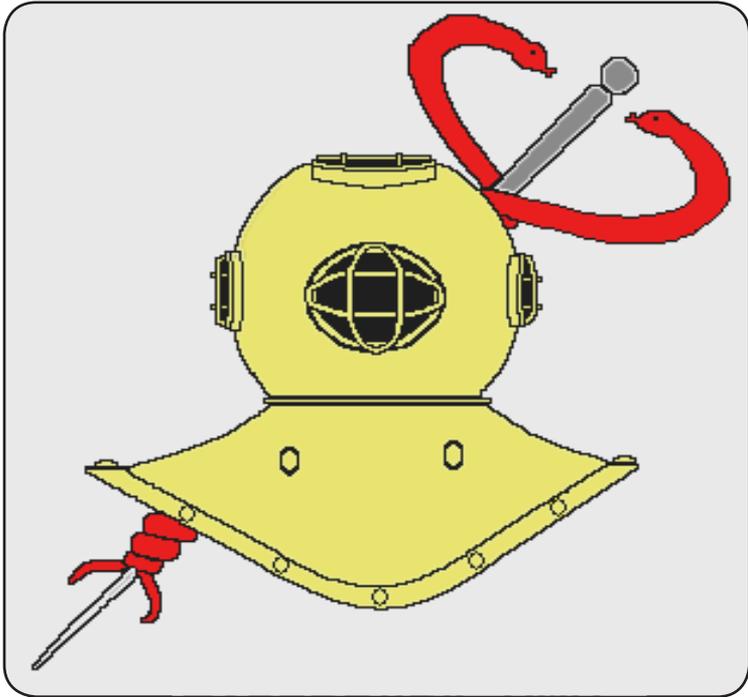


Hyperbaric Unit Patient Information



Vancouver General Hospital
Hyperbaric Unit

G700, 855 West 12th Avenue
Vancouver BC V5Z 1M9
Tel: 604-875-4111

Welcome to the Hyperbaric Unit

This booklet will hopefully answer many of your questions about the Hyperbaric Unit and the treatment that you will undergo. The Hyperbaric Unit at VGH is the only hospital based hyperbaric oxygen (HBO) treatment centre in BC. Our regular operating hours are Monday–Friday, 8:00 am to 4:00 pm. We are closed for stat holidays and VGH RAD days.

Please try to read through all the information in this booklet prior to your consultation or orientation. Much of the information that we will go over in the orientation is contained in this booklet. We will be happy to answer any questions you may have at your consultation or orientation. We are located on the ground floor of Centennial Pavilion at VGH, room G700 (please see directions on back).



Main treatment chamber with patient seating



What is a hyperbaric oxygen treatment?

“Hyper” means increased and “baric” means pressure. Therefore, hyperbaric treatment is treatment under increased air pressure. This unique treatment is achieved by compressing the air in a special pressure-proof, airtight, heavy caliber, cylindrical steel chamber. Our chamber is referred to as a “multi-place chamber”. This means that several patients are treated at one time. A trained staff member either a nurse, a respiratory therapist, or a physician always accompanies patients.

Hyperbaric oxygen treatment involves breathing 100% oxygen inside a hood while under increased pressure. Hyperbaric oxygen treatment is not a “stand alone” treatment, but rather an “adjunctive” one. This means that this treatment is meant to complement other treatment modalities, such as surgery, dressing changes, antibiotic therapy etc. What to expect during treatment will be covered later in this booklet.



LCD monitor in the chamber for watching TV or movies

What does hyperbaric oxygen help?

Hyperbaric chambers have been around for many, many years and were used without a clear understanding of their effects and benefits (or dangers). In the last few decades much research has been done on hyperbaric medicine and its role in various areas of medical treatment. From that research the following conditions (among others) have been shown to benefit from hyperbaric treatment:

- Diabetic non-healing ulcers – (30-40 treatments)
- Chronic osteomyelitis – (30-40 treatments)
- Soft tissue radiation damage – (30-60 treatments)
- Radiation damage affecting the bone – (30-40 treatments)
- Decompression sickness – (as needed)
- Carbon monoxide poisoning – (as needed)
- Necrotizing soft tissue infections – (as needed)
- Gas gangrene – (as needed)



Outside of our main treatment chamber with an operator

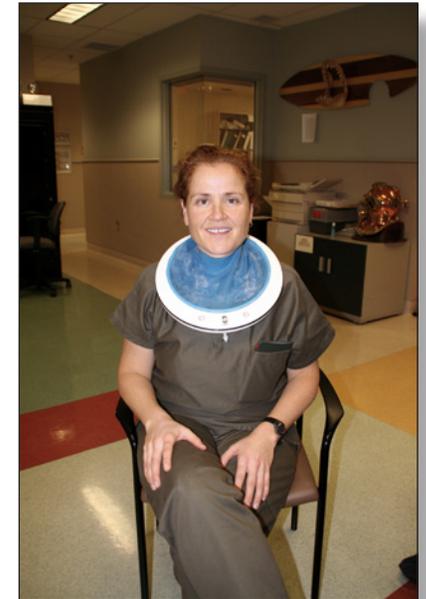
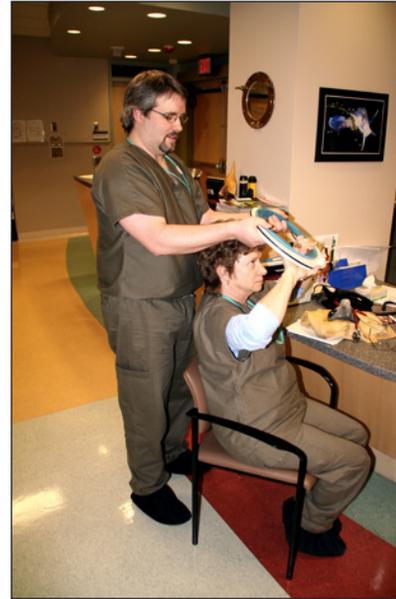
What does Hyperbaric oxygen treatment do?

There are several effects of hyperbaric oxygen. The first is one that most people are a little bit familiar with – the pressure effect. Scuba divers may sometimes get into trouble because gas bubbles form in their blood. If these bubbles block blood flow, divers can get pain or even symptoms that resemble a stroke. The purpose of HBO in that setting is to “squeeze” the gas bubble down to a small size and let the blood flow normally again. When the bubble is small, the body can dispose of it more easily.

The second effect of HBO is less well known, but far more frequently used. This involves the use of compressed oxygen as a drug. HBO has a variety of effects that include growth of new blood vessels, enhancing the effects of certain antibiotics, and fighting some types of infections. This seems to occur because HBO greatly increases the concentration of oxygen in the body tissues.

This may result in improved wound healing, less need for surgery, and better outcomes from infections.

A third effect involves treatment for exposure to a poisonous gas called carbon monoxide (CO). Here, the high concentration of oxygen helps to push the CO out of the red blood cells. It not only works faster than a regular oxygen mask, but there is some evidence that it may prevent permanent brain damage, which may result from CO poisoning.



Application of the oxygen hood system. From Left to right: placing the latex collar, with the collar on, placing the clear hood on.



What is not permitted in the chamber with me?

At the VGH Hyperbaric Unit we take the safety of our patients and staff very seriously. Due to the nature of the hyperbaric environment the risk of fire is increased because items may ignite more easily than they would outside of the chamber. If a fire developed in the chamber it would most likely be a catastrophic event. Therefore, the following items are **not allowed** in the chamber:

- ☒ Hair products of any kind, along with any kind of cosmetics or skin creams
- ☒ Deodorants, perfumes, after-shave or cologne
- ☒ Garments that are not 100% cotton, or those that have embroidery or appliqués
- ☒ Newsprint material like newspaper or crossword puzzle books
- ☒ Sources of ignition like matches, lighters, some toys, hand warmers, chemical-heating pads etc.
- ☒ Street clothes or shoes, as they may be contaminated with oil products
- ☒ Jewelry around the head and neck area (to protect the hoods), as well as watches and rings
- ☒ Personal entertainment items like MP3 players, etc., including other battery operated devices
- ☒ We ask you to remove your dentures
- ☒ If you have hearing aids please remove them before entering the chamber

At your orientation you may be asked to read and sign a safety agreement stating that you understand what is not permitted in the chamber and agree to follow these guidelines.



This section is not included to scare you, but rather to impress on you the importance of our safety guidelines. It is reassuring to note that there has never been a fire inside a chamber when current safety standards have been followed.

What can I take into the chamber and what can I do?

Now that we've gone over the disallowed items, here are some **allowed** items.

- ☑ We allow each patient to bring in **1** book, novel, magazine, etc.
- ☑ You also may take knitting or crochet with you as long as you use 100% cotton yarn and no plastic needles. We ask that you keep your projects to the size of a washcloth.
- ☑ You may take your own water bottle, filled with non-caffeinated, non-alcoholic, & non-carbonated beverages. You **must** remember to loosen the cap to prevent the bottle from crushing or bursting.
- ☑ You may take photocopies of puzzles from a puzzle book. (Paper from a puzzle book is much like newspaper)
- ☑ You may take in a pad of paper and pen, (ballpoint or felt tip), or pencil for drawing or journaling.

This is not a complete list, so please ask staff about items you're not sure of. Staff reserves the right to prohibit any items or patients from entering the chamber, if there is a safety issue.

While you are in the chamber we request that, if possible, you remain seated for the entire treatment. This is for safety as the chamber is somewhat of a tight space with staff and patients in it. We also request that patients leave a path down the center of the chamber so that staff may move unobstructed from one end of the chamber to the other. This will also prevent feet from being stepped on by accident. We encourage you to relax as much as possible during the treatment and enjoy a book, a movie, TV, or listen to your favorite music.



We have a selection of movies that you may choose from, or you may bring along a group appropriate movie from home to watch. Our system takes VHS tapes and DVDs. Unfortunately we do not have a music library so please bring your own music that is group appropriate.

What happens during my treatment?

The Hyperbaric Unit has multiple treatment times, in the morning and in the afternoon. These occur on weekdays except for holidays and hospital Reduced Activity Days. Patients are offered a choice of AM or PM treatments, although you may find that one is available sooner than the other.

Patients need to be aware that we also treat emergencies, which may result in the occasional cancelation of treatments.

An example of the times for daily treatments is as follows:

Activity	AM Treatment	PM Treatment
Arrive at unit	08:15–08:30	12:15–12:30
Pre-dive assessment	08:30–09:00	12:30–13:00 (1:00 pm)
Treatment time in chamber	09:00–11:15	13:00 (1:00 pm)–15:15 (3:15 pm)
Leave chamber, change clothes	11:15–11:30	15:15 (3:15 pm)–15:30 (3:30 pm)
If you have diabetes we need to test your blood sugar before you leave		
Once you have changed you are free to leave		

Arrival at the hyperbaric unit

When you arrive at the unit we ask that you come in and change into the clothing (“scrubs”) we have provided for you. If you get cold easily we recommend that you wear a 100% cotton crew neck t-shirt that is completely plain, with no embroidery or appliqués. No shirts with buttons please. You also may wear 96%-100% cotton socks with Lycra - no nylon or polyester - under your slippers. 100% cotton underwear and bras, like sports bra with no nylon, are permitted in the chamber. The elastic waist band is ok.

Please review what personal toiletries are not allowed in the chamber. The rule of thumb is to be as clean as you are when you walk out of the shower. You will be assigned a locker for your street clothes and hyperbaric scrubs when not wearing them. Please keep the same scrubs for the entire week unless they are soiled as we have a limited supply. You may put a lock on your locker but must take it home with you each day. Once you are changed please go back out to the waiting area until we bring you in for your pre-dive assessment. This allows privacy for other patients during our pre-dive check.

Pre-dive assessment

Once we are ready to begin assessing patients we will bring you in one at a time. During this time we will ask how you are doing, and check your blood pressure, pulse, blood sugar (if you are diabetic), and may examine your ears with an otoscope. If you have a wound we may change the dressing. We encourage you to do your own dressings as much as possible. If appropriate, we will take pictures once a week to monitor progress.



At this time the staff will also ensure that the items you are wearing or wish to take into the chamber are permitted. This is a great time for you to ask any questions you may have or mention concerns.

At the end of the assessment we'll put on your latex collar (part of the oxygen hood). Each patient is given the same hood assembly for the course of their treatment. The latex collar is trimmed to size and will be snug fitting to prevent oxygen leaks. If the collar is uncomfortable the staff will assess the fit and trim it as necessary for a more comfortable fit. After the assessment is complete you will be assisted into the chamber. Once all the patients are assessed and seated in the chamber, and the diving staff member is ready, your treatment will begin. Please alert staff of any latex allergy or sensitivity right away.

Treatment time in the chamber - Pressurization

An RN, RT, or physician will accompany you and four to five other patients during your treatment. The staff is there to assist you and address any complications that may arise. Please note that the chamber is equipped with emergency breathing masks (stored in bags beside each chair) that are to be used if the chamber air becomes contaminated. Please ensure you note their location when you enter the chamber. The staff member will direct you as needed if the emergency breathing masks are necessary.

You are now ready to dive!

Using air from compressors or tanks the chamber will be pressurized, usually over a period of ten minutes. You will feel a sensation in your ears similar to that of traveling over mountains or coming down for a landing in a plane. You must be able to clear your ears as the chamber pressurizes. Your ears will begin to feel full or plugged; this is a signal to you that you need to clear your ears.

Clearing your ears, or “equalizing”, may be done several ways. Simply moving your jaw may work. Yawning, sipping water, chewing gum or sucking on a candy is also used. Sometimes you may need to be a bit more aggressive and do what is called a modified valsalva. This involves taking a breath, closing your mouth, plugging your nose, and gently blowing your nose. An alternative method is to close your mouth and plug your nose and try to swallow.

If your ears do not “pop” or “click” and they are becoming increasingly uncomfortable you must inform the staff member immediately. They will stop the pressurization and help you clear your ears. If you do not tell us about your ears they will become very painful and your eardrums may rupture.

This process of “clearing” your ears must be done multiple times for the full 10 minutes. If you are unable to clear your ears with staff assistance – and approximately 10% of patients cannot - you will need to leave the chamber and will be referred to an ENT doctor for ear tubes. This is a minor procedure, and most people are back in the chamber the next day.

The pressure can also affect your sinuses. If your head feels like it is being squeezed then you must tell a staff member, as it is likely you are experiencing what is called a sinus squeeze. You may need to leave the chamber and be assessed by the physician.

An increase in air temperature during pressurization is normal; it will decrease once pressurization has stopped.

Hyperbaric Oxygen Treatment

We are now at the treatment pressure or depth. At this time the staff member will set everyone up for their oxygen treatment. The air going to your latex collar will be turned on, and then the clear hood part of the assembly will be attached. Once the hood is in place the gas going to the hood will be switched to oxygen. It is normal to feel some pressure inside the hood. It is also normal for the hood to move up and down with your breathing. The hood has a clear panel through which you can read or watch a movie. Eyeglasses are permitted in the hood. The staff member will, if needed, assist you with earphones so that you can hear the TV, movie soundtrack or music. Usually you will have the hood on for three 30-minute periods with a 5-minute break in between. All you need to do is sit back, relax, and breathe.

The staff member is like a scuba diver without the water and thus must follow appropriate precautions to prevent decompression illness, or “the bends”. Therefore, once your oxygen treatment is complete the chamber cannot go straight to the surface but must make decompression stops. At each stop you will notice the staff member using a mask to breath oxygen. Once the decompression stops are completed the chamber will be fully depressurized and the door will be opened.

Possible Side Effects of Breathing Hyperbaric Oxygen

Hyperbaric oxygen treatment is a medical treatment and is not without potential risks and side effects. The following are some things to be aware of.

- Anxiety is something that most patients experience when faced with new situations or environments. Usually that anxiety subsides once the first treatment is completed. However, some patients (1 in 50) experience anxiety to the point where it affects their ability to have hyperbaric treatments. With reassurance and, if necessary, the use of a mild sedative, most patients can complete their treatment course.
- Some people will develop temporary myopia (near-sightedness), especially if they are over 40 years of age. This usually occurs after 20 or more treatments. On the flip side, some patients may notice a temporary improvement in near vision and the ability to read without glasses. These changes are usually temporary and shouldn't last longer than a few weeks or months after the treatment course has stopped. Rarely, the myopia may last more than a year or be permanent. We therefore recommend that patients do not purchase new glasses until at least 8 weeks after completing hyperbaric therapy.
In some cases, hyperbaric oxygen may cause pre-existing cataracts to progress more quickly than normal.
- As a result of pressure changes fluid may accumulate behind your eardrum. This usually resolves after hyperbaric treatments cease. Sometimes decongestants may ease this side effect.

- In addition to ear and sinus squeezes, your teeth may also have difficulty adjusting to pressure changes. If you experience pain in your teeth/tooth with changes in pressure please inform the staff member. You may require some dental work to fix fillings or cracks in your teeth.
- Some patients complain of finger numbness after treatment. This is a temporary condition.
- You may have heard about people feeling energized from hyperbaric treatment. Unfortunately, that is not a side effect we see very often. Probably the most frequent side effect of HBO is fatigue. Most people report an increased need for sleep, especially early in their treatment course.
- Rarely, breathing the dry 100% oxygen may irritate the lungs, causing some shortness of breath and/or chest pain. This is called “pulmonary oxygen toxicity” and usually occurs at pressures and treatment durations greater than those routinely used in our chamber. This resolves fairly quickly after completing the dive.
- Excessive oxygen can also cause “central nervous system oxygen toxicity”. This occurs when the increased oxygen levels reached in the chamber irritate the brain. It usually only happens at pressures and treatment durations much greater than those we commonly use. This condition may result in unusual sensations such as a sense of closeness, severe fatigue, or tunnel vision. It may progress to convulsions or seizures in approximately 1/10,000 treatments. If this does occur the patient is taken off oxygen, kept safe during the seizure, and observed. Usually treatment resumes 15 minutes after the episode has resolved. There is no permanent brain damage or increased tendency to have convulsions.

However, it is possible that during a seizure you could fall out of your chair and be injured. In order to decrease the chance of both types of oxygen toxicity we give patients air breaks at regular intervals.

- A rapid depressurization could result in damage to the lungs, allowing air to enter into the arteries or the chest cavity. This is most likely to occur if you stop breathing in and out normally during decompression. To help decrease this risk we use only slow decompression rates and ask that you continue to breath normally. It is very important that breath holding be avoided at all times during a dive.
- As mentioned earlier in the booklet, fire is a life-threatening risk in the hyperbaric environment. It is therefore important to follow all safety directions given to you by the staff. If you do not adhere to our safety measures you will not receive hyperbaric oxygen treatment.

How can I make my treatment better?



No cigarettes, minimal alcohol. At the discretion of the hyperbaric physician, any patients who continue to smoke during their treatment course may not be permitted to undergo hyperbaric oxygen therapy. The effects of smoking essentially negate the beneficial effects of hyperbaric oxygen. If you are unable to stop smoking, you must consult your family physician for treatment before being considered for hyperbaric therapy.

Alcohol in excess will impair the immune system and slow healing. Open sores in the mouth and throat will have new, fragile tissues in them that may be damaged or destroyed with the consumption of alcohol. Generally an occasional glass of wine or beer is acceptable and will not interfere with your therapy.

This treatment is only beneficial with a strong commitment from you to be here Monday–Friday for your full treatment course. Occasional absences for Doctor appointments are understandable but repeated absences on a regular basis is not beneficial for you. If this occurs you may be asked to relinquish your spot in the program until you are able to make the necessary commitment.



Patient with hood and earphone assembly

The VGH & UBC Hospital Foundation

The VGH & UBC Hospital Foundation is a registered charity with the primary purpose of providing additional resources and support over and above what the Ministry of Health provides. The Foundation's overall goal is to raise funds for VGH & UBC Hospital to aid in research for the future while ensuring equipment is available to meet the needs of British Columbians today.

Contact us: 604-875-4676

Website: <http://vghfoundation.ca>

E-mail: info@vghfoundation.ca



Our goals at the Hyperbaric Unit are to be actively involved in research and to provide timely therapy to patients who could benefit from hyperbaric treatment. Both goals require funding, quite often exceeding the funding we receive from the Ministry of Health. Donations to the VGH & UBC Hospital Foundation - designated for the Hyperbaric Unit - would help us accomplish these goals.

The money you donate to the Hyperbaric Unit Foundation Fund will be used in a variety of different ways to improve this program. This may include:

- 1) Research into conditions we already treat, as well as conditions that require further investigation.
- 2) Staff education.
- 3) Completion and staffing of the second treatment chamber. This would decrease the wait times for patients and improve patient outcomes.

To make a tax deductible donation to the Hyperbaric Unit please contact the VGH & UBC Hospital Foundation office by phone, Internet or email. You may also use the last page of the Foundation brochure provided with your information booklet to make your donation. The Hyperbaric Unit thanks you for helping us to serve you better.

VGH Hyperbaric Unit Contact Numbers

Phone Number: 604-875-4033*

*If you are phoning after hours please leave a message and we will return your call as soon as possible.

Fax: 604-875-5294

Directions to the Hyperbaric Unit

The VGH Hyperbaric Unit (HBU) is located in Room G700 on the ground floor of Centennial Pavilion at 855 West 12th Avenue in Vancouver.

If entering Centennial Pavilion:

Take the elevator down to the ground floor. When exiting the elevator find the yellow line on the floor and follow it to the left (east). After several turns you will arrive at the front door of the Hyperbaric Unit. Push the silver button to the left of the door while standing well to the side and have a seat in our waiting area.

If entering Jim Pattison Pavilion:

Enter through the main doors onto Level 1. Continue straight past Café Ami and the information kiosk, past the outpatient lab on your left, and keep going to the elevators. Take the elevator down to the ground floor (G) and follow the yellow line on the floor to the right (or east) until you are at the front door of the Hyperbaric Unit. Push the silver button to the left of the door while standing well to the side and have a seat in our waiting area.

Booklet compiled by P. Doherty CHRN & Dr. Bruce Campand 2007

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email pchem@vch.ca and quote Catalogue No. **JB.300.H999**

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