Diabetic Foot Ulcer Treatment
Using
Hyperbaric Oxygen Therapy
Guide

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Diabetic Foot Ulcers & Hyperbaric Chamber Treatment

Fifteen percent of all diabetics will develop diabetic foot ulcers at some point. Currently, more than 17 million people in the US have diabetes, with another one million cases diagnosed per year. Of these patients, up to 70% have some degree of diabetic neuropathy or peripheral vascular disease, which can both lead to diabetic foot ulcers. If left untreated, or even with full conventional treatment, the ulcers may lead to serious consequences. These consequences include gangrene, infections and osteomyelitis. In addition, most diabetic amputation cases begin with foot ulcers. If a patient's body exhibits an inability to heal on its own within one month of symptoms, it is likely that continued problems will exist, eventually leading to amputation.

Diabetic foot ulcers can, for many patients, seem to appear out of nowhere. Diabetics tend to lose sensation in the feet; therefore, they are more easily injured and they may not even notice that the injury has occurred. This can leave these ulcers untreated for a period of time and leave them susceptible to serious infection. Once a patient presents with a diabetic foot ulcer, a physician will need to determine if the ulcer is ischemic (caused by narrowing of the arteries), neuropathic (actual injury to the nerve) or a combination of both. Traditional treatment involves bandaging, using an anti-bacterial topical product and an orthotic to keep the pressure off the ulcer. This traditional method does not have an impressive success rate when used alone, but when combined with hyperbaric chamber treatment, the statistics show a significant rise. For instance, diabetics suffering with foot ulcers who undergo traditional treatment avoid amputation 61% of the time. However, with added hyperbaric oxygen therapy, the number rises to 89%.

Hyperbaric oxygen therapy involves little participation from the patient. The patient simply lies inside the hyperbaric chamber and breathes normally. While in the chamber, the patient is exposed to 100% oxygen and 2 to 3 times the normal atmospheric pressure. This pressure is equivalent to a diver reaching 50 feet underwater. This method of therapy exposes the infected tissues to high concentrations of oxygen. The atmospheric pressure increases the level of dissolved gases in the patient's blood by 2 to 3 times its normal amount. In other words, the oxygen dissolved in the blood increases from 0.32% to 6.8%.

References:

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Doctor N, Pandya S, Supe A. Hyperbaric oxygen therapy in diabetic foot. *J Postgrad Med*. 1992;38:112–114

Hyperbaric Chamber/Diabetic Foot Ulcer FAQs

What is hyperbaric oxygen therapy?

Hyperbaric Oxygen Therapy is a treatment option for diabetic patients with a foot ulcer, where the patient inhales 100% oxygen in a pressurized chamber. This method helps the body increase the oxygen levels in the blood. It also exposes the affected tissues to more oxygen than would otherwise be present, thus allowing for enhanced healing.

How does hyperbaric oxygen therapy work?

Hyperbaric oxygen therapy increases the saturation of oxygen in the blood, due to the enhancement of atmospheric pressure. Increased oxygen can promote white blood cell activity, encourage tissue development and induce capillary growth. This method can be beneficial for a variety of conditions, but is proving exceptionally promising in the treatment of diabetic foot ulcers.

What health issues can benefit from hyperbaric chamber treatments?

While diabetic foot ulcers are the primary focus of this therapy, it is not the only condition that can benefit from hyperbaric chamber treatments. Hyperbaric chambers can be used to treat cyanide or carbon monoxide poisoning, decompression sickness, embolisms, compartment syndrome and thermal burns. These are only a short list of the possible uses for this technology.

Is this treatment painful and how much participation is required of the patient?

No! This treatment is not painful to the patient. A small degree of discomfort may be experienced from the increased pressure in the patients' ears and sinuses. This feeling is similar to that experienced during a takeoff or landing in an aircraft. The patient can relieve the pressure through yawning or other techniques. This method is actually relaxing. The patient can nap or watch an externally mounted TV and DVD player while safely receiving treatment. There may be brief moments of interruption during periodic "air breaks," but otherwise it is a very peaceful, healing experience. The patient is required to arrive for the appointment without perfumes, colognes or hair products. The temperature inside of the chamber will not vary from the temperature in the room so you may want to provide booties for the comfort of your patient.

How many treatments are necessary?

The amount of treatments will vary, according to the patient and the condition requiring treatment. For diabetic foot ulcers, the course of treatment can vary from approximately 20 to 40, 1 to 2 hour sessions, depending on the progress of the wound's healing.

Are there any side effects?

Hyperbaric chamber treatment is extremely safe and side effects are rare. One in 10,000 people may incur oxygen toxicity. Others may experience vision changes or a dry cough, which usually clear up after treatment is completed. If a patient suffers from claustrophobia, he/she may need to be educated on relaxation techniques, due to the enclosed space. Otherwise, hyperbaric chamber treatment is one of the safest medical treatments available today.

How successful is hyperbaric oxygen treatment in treating diabetic foot ulcers?

Without successful treatment, diabetic foot ulcers can eventually lead to amputation. 15% of diabetics will suffer foot ulcers at some point in their disease, and 80% of diabetes related amputations begin with these hard to heal ulcers. Traditional treatments are more successful when used in conjunction with hyperbaric chamber treatment. The increase in success is due to the fact that the tissues around the ulcer are exposed to increased oxygen and enhanced vascular healing. This technology does not replace the need for proper wound care and it should be utilized for patients who are not healing after one month of incurring the ulcer.

Will these treatments be covered by insurance?

Medicare and private insurance generally cover the cost for hyperbaric oxygen chamber treatment in cases of diabetic foot ulcers, decompression sickness, cyanide or carbon monoxide poisoning and embolisms. When used for non conventional conditions, or experimentally, it will need to be approved for payment *prior* to treatment. Medicare requires that a physician be present throughout the entire treatment process.

Are hyperbaric chambers expensive to buy and are they profitable?

Hyperbaric chambers require a reasonable investment; however, when you purchase from a reputable provider, the parts and maintenance are relatively inexpensive. This machine can be very profitable, even for a single physician charging average prices for each treatment. Most importantly, these treatments are priceless for the diabetic patients suffering from foot ulcers that won’t heal since it may well prevent amputation.

Hyperbaric Chamber Oxygen Therapy

Hyperbaric chamber treatment has been available for clinical use since the 1880's. However, today, it is being applied to more conditions than originally intended. The military has used hyperbaric oxygen therapy, since the 1930's, to treat decompression sickness. Since then, it has been used to treat everything from embolisms to diabetic foot ulcers.

The Many Uses of Hyperbaric Oxygen Therapy

The theory behind hyperbaric chamber therapy is to increase oxygen content in the blood and expose tissues to pure oxygen. In the case of embolisms, the increased pressure inside the chamber is used to force air (gas) bubbles to dissolve and be exhaled. Patients with carbon monoxide poisoning may avoid long term effects to memory when treated with hyperbaric oxygen therapy, in comparison to traditional treatment alone. This occurs because the chamber restores the level of oxygen and reduces the level of carbon monoxide in the affected person's blood at an accelerated rate.

Diabetic Foot Ulcers and Other Problem Wounds

When diabetics develop foot ulcers, it can be difficult in some cases to encourage the wound to heal. Even with the best wound care, antibiotic treatment and any other traditional approach, some patients' wounds will still cause an amputation. Hyperbaric chamber therapy, in conjunction with traditional treatment, significantly reduces the chance of amputation due to foot ulcers. The course of hyperbaric treatment varies for each patient based on the degree of infection in the wound. Some patients require multiple daily treatments or hospitalization, while others can visit once a day on an outpatient basis. Even after a therapy session ends, the patient's blood oxygen level will stay elevated for several hours promoting the growth of new capillaries, to aide in wound healing as well.

Side Effects of Hyperbaric Chamber Oxygen Therapy

Side effects of this therapy include oxygen toxicity, claustrophobia, and pressure changes. The changes in pressure can be mildly uncomfortable. There are techniques, which can be taught, to relieve that pressure. For patients who suffer from anxiety due to claustrophobia, it is recommended that they are instructed how to meditate and calm themselves. In more severe cases of anxiety, a doctor may prescribe a sedative. For Medicare patients, it is required that a doctor be present during the entire treatment; however, private insurances may have different guidelines.

The Benefits of Hyperbaric Chamber Therapy in the Treatment of Diabetic Foot Ulcers

There are more than 17 million diabetics in the United States with an additional one million diagnosed annually. Fifteen percent of diabetics develop foot ulcers, which can lead to serious infections and possible amputation. Offering top notch wound care will help some but for others they will need hyperbaric oxygen treatment. Approximately 61% of diabetic patients will heal from their foot ulcer with traditional treatment, but when you add hyperbaric chamber therapy those numbers rise to 89%.

Every hospital in the country should have a hyperbaric chamber on premises. This vital technology carries enough benefits and profit potential to make it an easy decision. Most private insurance companies are more than willing to cover the cost for treatment of diabetic foot ulcers because the long term savings versus amputation and follow up care is huge. Medicare also covers the cost for oxygen therapy if standard wound care is not healing the wound.

When you purchase a hyperbaric chamber, you offer your patients an innovative treatment that is safe, convenient, simple and cost effective. Very little participation is required of the patient while undergoing oxygen therapy. They can watch a portable DVD, listen to an MP3 player or just nap and relax throughout the entire process. The treatment is safe and the side effects are few.

If you are considering a hyperbaric chamber for your facility, it is important that you purchase from an experienced, qualified dealer, such as Sechrist. We offer multiple models and are the largest hyperbaric chamber manufacturer in the country. Once you have made your purchase, you are not left on your own. Sechrist offers fantastic technical support to ensure you have an easy installation and we have the best maintenance services in the industry. For the highest quality hyperbaric chambers on the market, contact Sechrist and offer your patients this vital treatment in your facility.

Possible Side Effects

The most serious and rare side effect that can occur is oxygen toxicity, which may lead to seizures. In this event, treatment should be ceased immediately, which should stop the seizures right away. Patients with claustrophobia should be encouraged to calm themselves by mediating or whatever works for them. In more severe claustrophobic cases, a doctor may prescribe a sedative. The most common side effect of hyperbaric chamber therapy is pressure (or “popping”) in the ears. This sensation is similar to that felt when taking off or landing in an aircraft. It is uncomfortable, but not painful. The patient should be told that yawning will alleviate the pressure.

Improved Wound Care Programs

Sechrist Industries is committed to improving wound care programs in every hospital in the country. It is our goal to ensure that every hospital is equipped to provide hyperbaric chamber oxygen therapy for patients with wounds that won't heal on their own. Traditional wound care is successful in only about 60% of diabetic foot ulcer cases. Hyperbaric oxygen therapy in addition to the traditional care significantly increases the rate of success to 89%. These combined methods offer your patients an ability to avoid costly infections and life altering consequences, such as amputation.

When a patient presents with a diabetic foot ulcer, the best wound care available is vital. This includes bandaging, antibiotics and, in some cases, orthotics to avoid pressure on the wound. After one month of traditional treatment, if the patient is not healing, hyperbaric oxygen therapy is the next best step. This safe, proven treatment is cost effective and is covered by most private insurance companies and Medicare. In addition to diabetic foot ulcers, there are multiple other conditions that can benefit from this therapy.

The Use of Hyperbaric Oxygen Therapy is Growing

This important technology is expanding quickly and is now an accepted treatment for more than twelve medical conditions. These conditions include:

- Diabetic foot ulcers or other problem wounds
- Gas or air embolisms
- Burns
- Decompression sickness
- Carbon monoxide or cyanide poisoning
- Compartment syndrome

These are only a few of the important applications which make hyperbaric chambers a necessity in every medical facility. Sechrist Industries is the largest hyperbaric chamber manufacturer in the country and we are ready to assist you with your purchase. We will help you every step of the way and we will be there in the future for any technical or maintenance needs. When you purchase such an important piece of equipment, it is imperative to know that the supplier is going to be by your side for years to come. Our proven track record shows our dedication to our customers. Sechrist has been in business since 1973 and is committed to our customers.

If you are considering purchasing a hyperbaric chamber for your medical facility, please feel free to contact us with any questions or concerns. Sechrist Industries is your partner in providing the best care for all your patients.

Preparing Your Diabetic Patient for Hyperbaric Oxygen Therapy

Once you have purchased a hyperbaric chamber and have it set up, you must first know how to prepare your patients before treatment. It is important that your patient understands prior to the first treatment what is expected of him/her and what he/she can expect. You can do this by preparing a "pre-treatment packet" to be sent home with the patient, prior to the first treatment. This is important for several reasons, but most importantly for the safety of the patient. The packet should include information on treatment guidelines, including the importance of not wearing any beauty products. This includes:

- Perfume/cologne
- Hair spray and hair gel
- Wigs/toupees
- Finger and toenail polish
- Jewelry and watches
- Hearing aids
- Glasses
- Contact lenses

Patients with diabetic foot ulcers should not wear a sock on the ulcerated foot, as exposure to the extra oxygen is beneficial for the wound. In addition, you can instruct your patient to bring a book or watch an externally mounted LCD TV or external MP3 music player. Sechrist offers a convient sliding LCD monitor that mounts outside the chamber and slides back and forth for the patient comfort.

Patients should be advised of the pressure changes they will likely feel in their ears. This usually only occurs within the first 5 minutes. They can be instructed to yawn, move their lower jaw or pinch their nose and blow out their mouth. Occasionally, this sensation can be felt between treatments, but can be relieved the same way. If a patient is anxious, due to the confined chamber, they can be shown relaxation techniques or, if the doctor feels the necessity, he/she can be sedated.

We at Sechrist are delighted that you have made the choice to buy from the largest hyperbaric chamber manufacturer in the country. Not only are we here to sell the product to you, but we are here to guarantee your success and satisfaction. Please take some time to browse our website. You will be able to find all the pertinent information that will help you get started as a hyperbaric oxygen therapy provider.

Enhance Your Facility's Wound Care Program with a Sechrist Hyperbaric Chamber

Twenty five percent of diabetic admissions to American hospitals are a result of foot complications. Diabetic foot ulcers are the number one cause of amputation of a lower extremity, leaving patients changed for the rest of their lives. Even with the best possible wound care, including bandaging, antibiotics and orthotics, diabetic foot ulcers can be extremely hard to heal. Fortunately, hyperbaric oxygen therapy increases the odds that patients will leave the hospital on their own two feet.

Hyperbaric chambers are a profitable treatment that should be provided in every medical facility. These units can be purchased at a reasonable price, which will be quickly paid for by the profits from treatments. In addition, your facility's wound care program will be drastically improved. The treatment is covered by Medicare when the wound is severe or traditional wound care has failed after one month. Private insurance coverage varies; however, hyperbaric chamber treatment is becoming increasingly accepted for a variety of conditions, and almost always for hard to heal wounds. The prospect of additional costs for amputations, and the lifelong costs associated with it, is leaving private insurers no choice but to cover hyperbaric oxygen therapy.

Choosing a Manufacturer

Choosing the right company to purchase your hyperbaric chambers from is crucial. You need quality, value and follow up. When you choose Sechrist, you can rest assured that you are receiving a quality unit, a fair price and continuous service. We offer maintenance service, replacement parts and warranties. Sechrist is the largest hyperbaric chamber manufacturer in the country. You will find our chambers located in three times more hospitals when compared to any other brand.

Sechrist Hyperbaric Chambers

Sechrist offers a range of models to fit any facility's hyperbaric chamber needs. Our number one priority is to ensure the safety of each and every patient. When you purchase a hyperbaric chamber from Sechrist, you can feel secure that you have a loyal partner by your side. We offer stellar customer service and convenient technical support. Your wound care program will be greatly enhanced with a purchase from Sechrist.

Why Does Your Facility Need a Sechrist Hyperbaric Chamber?

Currently in the United States, 750 medical facilities have a hyperbaric chamber in use. This number is expected to soar as more wound care facilities make this important purchase and additional studies produce positive results in its treatment of other conditions. The Sechrist hyperbaric chamber is cost effective and safe; and the results arising from the study of diabetic foot ulcers are impressive.

More than one million people are diagnosed with diabetes each year, in addition to the 7% of the population who have been already been diagnosed. Approximately 15% of these patients will eventually face serious diabetic foot ulcers, which require more than what traditional wound care can offer. Traditional wound care has come a long way over the years, but the bottom line is that there is an even more effective and better way. Hyperbaric oxygen therapy is not meant to replace quality wound care for diabetic foot ulcers; however, when they are used together, it can increase the likelihood that your patient will not face amputation.

Not only is hyperbaric oxygen therapy showing tremendous results for diabetic foot ulcers, there are many other conditions that may be helped using this technology. They include:

- Cerebral edema
- Cirrhosis
- Chronic and acute bone infection
- Compartment syndrome
- Decompression sickness
- Deep vein thrombosis
- Difficult to heal fractures
- Fetal alcohol syndrome
- Fibromyalgia
- Flesh eating bacteria
- Frostbite
- Gangrene
- Gas or air embolism
- Lyme disease
- Near drowning
- Optic neuritis
- Pancreatitis
- Plastic surgery recovery
- Radiation myelitis
- Severe migraines
- Smoke inhalation
- Soft tissue swelling
- Stroke
- Sympathetic Reflex Dystrophy
- Thermal burns

- Prolonged coma
- Vertigo

In addition, there has been promising improvement displayed in chronic diseases such as:

- ALS
- Autism
- Cerebral Palsy
- Crohn's disease
- Meniere's syndrome
- Multiple sclerosis
- Parkinson's disease

The implications for future study and treatment are astonishing. Even if your plans of purchasing a Sechrist hyperbaric chamber are strictly for the care of diabetic foot ulcers, it is good to know that you can expand your treatment options for many other conditions if you choose.

Currently, Medicare will only authorize payment for hyperbaric chamber therapy for diabetic foot ulcers that won't heal after one month of standard wound care, and for fractures that won't heal. This is expected to change due to the promising results for patients and the long term savings of hyperbaric oxygen therapy for insurance companies.

Diabetic Foot Ulcers & Side Effects of Hyperbaric Oxygen Therapy

You have made a wise choice to provide your diabetic patients with hyperbaric oxygen therapy in your facility. As with any treatment, there are a few minor side effects for which you should be prepared. Hyperbaric chamber treatments are impressively safe and serious side effects are very rare. Even the rare, more serious side effects can be monitored and dealt with quickly and easily. Sechrist wants to help you not only prepare your facility for your purchase of a quality Sechrist hyperbaric chamber , but also provide you with some pro-active solutions to guide you.

The Most Common Side Effect

By far, the most common side effect that your patients will experience in the hyperbaric chamber, is pressure in the ears. This feeling is equivalent to that experienced when taking off or landing in an aircraft. To ensure the treatment is relaxing, prior to entering the chamber you can educate your patients on how to relieve this pressure. Some of the techniques recommended for patients are:

- Pinching the nose and blowing out of the mouth
- Yawning
- Adjusting or rolling the lower jaw
- Blowing the nose

This pressure effect will typically only be felt for the first 5 minutes as the pressure increases in the chamber. The more effective your patient is at applying the above techniques, the less likely pressure will be an issue.

The second most common side effect is claustrophobia. This can be dealt with in a variety of ways, and it is vital that this condition be taken seriously. It may require some patience on your part, as you may have to slowly introduce the patient to the chamber. In this case, some ideas to consider include:

- Place the patient in the chamber for a few moments, to get acclimated to the environment. Each time they enter the chamber, increase the time spent until they are comfortable.

- Aid your patient with a relaxation method, by having them focus on their injury and healing. For example, when you have a patient with a diabetic foot ulcer, he/she can use his/her mind to envision healing in that area. This serves two purposes - calming them and potentially aiding in healing.

- Provide relaxing music, reading material or another kind of distraction (such as an extenally mounted LCD TV) to keep their focus on something other than the enclosed environment.

- For severe cases of claustrophobia, you can utilize sedation. Sedation can be done safely

and does not inhibit the hyperbaric chamber results.

A rare side effect is oxygen toxicity caused by taking in oxygen at elevated pressure and can infrequently result in seizures. Almost always, this side effect will go away once the treatment stops. Oxygen toxicity as a result of hyperbaric oxygen therapy is an extremely rare side effect. Another rare side effect is change in vision. Vision changes occur in the occasional patient, but also will clear up after treatment is completed.

Once you have completed your purchase of a Sechrist hyperbaric chamber, consider preparing an informational packet with some of the above ideas to prepare your patients for hyperbaric oxygen therapy.

Sechrist is committed to being a long term partner for all hyperbaric oxygen therapy providers. We will continually update our website, with the newest research, products and ideas to help our customers keep up with all the latest information and technology. This is in addition to receiving the best technical support, warranties, parts, and maintenance in the industry.