

Oxygen Therapy

This helpful guide to Oxygen Therapy has been provided by the MS National Therapy Centres Website www.msntc.org.uk.

Anyone wishing to access oxygen treatment should be prepared to commit to an **initial intensive course of treatment**, usually 3 - 5 treatments per week, for 15-20 treatments. If this is not possible (either due to personal circumstances or centre capacity), the closer together the first 15-20 sessions can be attended, the greater the potential effectiveness of the treatment. We will always try to work with users to implement a workable schedule but, given the limited capacity of the centre, this may not always be possible (particularly now, with Covid, as we only have capacity for 3 in the chamber instead of 5 people).

What is Oxygen Therapy?

The oxygen in the air we breathe is constantly treating the day to day damage we sustain - repairing and renewing our cells. When tissues are damaged the capillaries they contain are also damaged. This reduces the flow of blood that transports oxygen, which may limit or even prevent recovery.

Being a gas, the concentration of oxygen in blood is actually determined by the air pressure surrounding us. To significantly increase the oxygen concentration in blood to improve healing, a higher dose is needed – 96-98% oxygen delivered by a mask and the use of a sealed room, known as a “barochamber” will allow the increase in pressure required.

How does it help people with MS?

The disease that results in the scarring – the sclerosis – in multiple sclerosis (MS) is associated with damage to blood vessels in the nervous system. This is not blockage but leakage which leads to inflammation and *hypoxia* - which simply means lack of oxygen. A high level of oxygen reduces the hypoxia, and the latest research has shown that it down regulates the genes that programme inflammation. (1) In other words oxygen induces remission. Healing is impossible without sufficient oxygen being present. (2)

Does everyone benefit?

The sclerosis, that is scarring, is healing just as a scar heals a cut in the skin. The objective of oxygen treatment is to help tissues heal and be able to function before the damage leads to scarring. Damage in MS patients occurs over time so the latest areas affected will be the most likely to recover. Trials have shown that patients may experience reduced levels of fatigue, improvements in balance and walking and also bladder function. (3,4)

Is it Safe?

Being in a pressure chamber is actually safer than being outside, e.g. it is not possible to be hit by a bus, nor will patients have either a heart attack or a stroke breathing a high level of

oxygen. With over 3 million sessions completed without a serious incident, MS Therapy Centres were deregulated by an Act of Parliament in 2008. Minor problems such as ear and sinus discomfort similar to that encountered in flying may occur, but, in contrast to aircraft, they can be dealt with by adjusting the pressure.

What happens during a session?

Oxygen treatment sessions at the Sussex MS Centre are simple, non-invasive and painless. Once they have become accustomed to the procedure most users find the sessions pleasurable and relaxing. Each session lasts around 90 minutes (you should allow for 2 hours at the centre, particularly for your first few sessions) and consists of three phases:

1. Pressurisation

Our centre has a barochamber which can accommodate a maximum of 5 people at a time. Once everyone is inside, the operator will close the door and begin pressurisation. This is where the air pressure increases slowly - users may experience slight ear discomfort similar to that experienced when flying in a commercial aircraft. The rate of pressurisation can be controlled to ensure all chamber users are comfortable.

2. Treatment

The treatment begins when the pressure reaches the prescribed level. This is between 1.5 atmospheres absolute (ATA) and 2.0 ATA. Users may then rest, read, listen to music or watch something on a tablet/phone/laptop. A general rule is that courtesy should be shown to other chamber users (headphones used, discussions kept to a minimum etc.).

3. Depressurisation

The operator advises users when the treatment is complete and reduces the pressure slowly, until it is the same as the ambient atmosphere. At this point, the barochamber door can be opened and the session ends.

References

1. Eltzschig HK, Carmeliet P. Hypoxia and inflammation. *N Engl J Med* 2011;**364**:656-65.
2. Semenza GL. Oxygen sensing homeostasis and disease. *N Engl J Med* 2011;**365**:537-47.
3. Fisher BH, Marks M, Reich T. Hyperbaric-oxygen treatment of multiple sclerosis. A randomised placebo controlled trial. *N Engl J Med* 1983;**308**:180-86.
4. Perrins DJD, James PB. Long-term hyperbaric oxygenation retards progression in multiple sclerosis patients. *IJNN*2005;**2**:45-48.

Why is Oxygen Therapy Effective?

Oxygen, Inflammation and Hypoxia Inducible Factor Protein

It has been known for many years that breathing more oxygen causes blood vessels to constrict reducing blood flow. Oxygen controls blood flow by involving another gas which has been thought for many years to be just a poison - nitric oxide. But there is even more

than this to the oxygen story and it is of direct relevance to the disease underlying 'MS'. Even those doctors who are convinced that the auto immune theory is correct, admit that the affected areas of the brain and spinal cord in MS are inflamed.

A review in a top scientific journal 'Nature' entitled 'Oxygen and inflammation' (Carl Nathan, Weill Medical College, Cornell University, USA) gives the detailed information. Inflammation causes the level of oxygen in the tissues to fall and this, in turn, activates a protein system – the Hypoxia Inducible Factor proteins (HIF). One of these proteins, HIF 1 alpha, not only controls the migration of white blood cells into the tissues to control infection, it is also responsible for the growth of new capillaries in wounds. This master protein regulates over 8,000 genes. So, giving a high level of oxygen even has genetic consequences and it is little wonder that one hour of oxygen in a chamber has effects that last.

All those of us who have used oxygen as a treatment for their MS for many years are shown to be correct and it is time for all neurologists, General Practitioners and all the MS Societies to listen to their expert patients and members.

Oxygen Therapy does not repair existing damage but tests have shown on MRI pictures how long-term regular sessions can help to slow down the progression of symptoms and so the earlier one starts following the confirmation of MS the better.

Christopher Fox-Walker has used Oxygen Therapy weekly for over 35 years at the Sussex MS Centre. (Information source Emeritus Professor Philip James, University of Dundee.)