

# Multistep Oxygen Therapy (EWOT) - The Best Ant-Aging Gift You Can Give Your Body

Written by: Rober Rowan MD; Read more at [www.docRowen.com](http://www.docRowen.com).

Also read about Ozone in Sierra Leone and Vaccines at [FaceBook.com/DrRobertJRowen](https://www.facebook.com/DrRobertJRowen).

In the never-ending fight against the aging process, we have finally found a therapy that now gives us the edge. It can dramatically reduce the effects of the aging process from your body, it costs very little, and it can be done in the comfort of your own home.

The therapy is called EWOT (exercise with oxygen therapy) or multi-step therapy. You've read about it in the past, but that's just the beginning of what will be one of the biggest breakthroughs ever in anti-aging medicine in decades, and yet it's still virtually ignored by the medical establishment. Why? Probably because it doesn't cost much, so the doctors and drug companies aren't going to get rich using it. But I suspect most are simply in the dark about the incredible benefits you can receive using this therapy. I know I was for many years.

As an avid user of oxidation and oxygen therapies, I was fortunate to attend a lecture on oxygen multi-step therapy at the International Oxidative Medicine Association's convention years ago. However, it was presented in poor English without a clear understanding among the attendees of the mechanisms of action. Like most physicians, I need to know how something works to better apply it to patient care. Just hearing results without understanding is not satisfactory.

Now, with the aid of recent writings by Dr. Manfred von Ardenne, how this procedure produces its stunning effects becomes not only crystal clear, but also amazingly simple.

Before I explain the therapy, though, we need to understand how oxygen gets from your lungs to your tissues. This gets a little technical, but it will help you understand why multi-step therapy is so crucial to effectively fight the aging process.

Atmospheric air pressure at sea level is 760 mm of mercury. Since oxygen comprises approximately 20 percent of the atmosphere, the pressure component of oxygen, called partial pressure, is 20 percent of 760, or about 150 mm. The air coming into the lungs, therefore, contains a pressure of O<sub>2</sub> at 150 mm. However, in the lungs, the oxygen is diluted considerably with carbon dioxide leaving the body. Thus, in the air sacs of the lungs (alveoli), the pressure of oxygen is the 150 mm minus the partial pressure of CO<sub>2</sub> (which is 40) for a net O<sub>2</sub> pressure in the air sacs of about 100-110 mm. With me so far?

This 100-110 mm is the amount of pressure that drives the oxygen from the lungs into the blood. The blood takes the oxygen by way of the arteries to the extremities where it is fed to the capillaries. The capillaries release some of the oxygen to support each individual cell along their pathway. In an ideal situation, the pressure of oxygen in the arteries will almost match the pressure in the alveoli. When we're young, this is the case, with the arterial pressure running around 95 mm. However, as we age, the arterial pressure declines, with the average 70-year-old having an arterial pressure of only about 70 mm.

The reason this is significant is because when the blood carries the oxygen to the capillaries, the oxygen must dissolve in the waters of the body in order to reach the O<sub>2</sub>-thirsty cells beyond the capillary membrane. Unlike carbon dioxide, O<sub>2</sub> is much harder to dissolve in liquids and its solubility is heavily dependent on the pressure driving it. Oxygen is extracted in the capillaries and when the blood comes out the venous end of the capillary, the average pressure of oxygen in the veins is about 40 mm early in life and drops to about 35 mm by age 70. The difference in the pressure of oxygen

between the arterial and venous sides reflects how well the oxygen is delivered and consumed.

In your 30s, the amount of oxygen released to the cells is significantly higher than in your 70s. If you do the math, a 30-year-old will release 55 mm of pressure ( $95-40=55$ ), while a 70-year-old will release only 35 mm of pressure ( $70-35=35$ ). That's a huge drop (55 vs. 35) in the amount of pressure of oxygen your cells are receiving.

This is extremely important, as the most common complaint I've heard about multi-step therapy is from patients who have their blood tested by a conventional doctor who measures the amount of oxygen in the blood. When it comes back normal, people think they don't need the therapy. What the doctor is missing is how well the oxygen is transferred to the cells.

When the oxygen pressure falls as you age, the volume of oxygen may stay the same, but you may be oxygen deficient because there's not enough pressure to push the volume to a usable state. When your doctor tells you there's plenty of oxygen in your blood, he's correct. The blood is saturated with oxygen. Problem is, there's not enough oxygen in your cells! You see, the body's ability to transfer oxygen to the cells becomes damaged as we age.

This transfer of oxygen from the blood to the cells is perhaps the most significant underlying factor in whether you live a healthy life or not! The more damaged the transfer mechanism becomes, the more likely you will become ill. This is why you are more susceptible to illness as you age! (There is much more to this aspect of the therapy, but I've given you enough science for one day.)

The breakthrough with multi-step therapy is that it actually raises the arterial pressure back to youthful levels. And what's just as important is the effect is long lasting!

Furthermore, the technique lowers the oxygen in your veins at the same time, which indicates a dramatic increase in the release and consumption of oxygen as a result of treatment. The larger the difference between the pressure of oxygen in the arteries and veins simply indicates greater oxygen release and consumption by the cells.

Multi-step therapy is surprisingly simple. All it involves is breathing high levels of oxygen while exercising. The higher oxygen level in the lungs creates a greater head of pressure to drive oxygen into the pulmonary capillaries. The exercise moves the circulation much faster, ensuring a greater oxygen carriage. Initially, the oxygen pressure in the veins rises, as more oxygen is getting through to the venous side, but it is this oxygen that allows the capillaries to repair the transfer mechanism. Once the mechanism is fixed, more oxygen can diffuse through the capillary wall to oxygen-thirsty tissues.

Typically, the multi-step therapy consists of an 18-day, 36-hour program. First, a drug-nutrient combination is orally administered 30 minutes before the exercise starts. The combination consists of 30 mg of thiamin (vitamin B1), 75 mg of Dipyridamol (the prescription drug Persantine), and 100 mg of magnesium orotate. These agents help the uptake and utilization of oxygen.

Thirty minutes after taking the combination, you begin exercising while breathing oxygen using a mask and storage balloon at a flow rate of four to six liters per minute. This lasts two hours each day for 18 days, giving you a total of 36 hours of therapy time. Every 20 minutes during the two-hour treatment period, the individual pushes the exercise to a comfortable maximum, which enhances cardiac output and oxygen delivery to the needy areas. This procedure is probably best supervised by a doctor, though this is not entirely necessary.

A simpler modification, called the quick technique, uses the same procedure (including the drug-nutrient combination), but instead of two hours, you do moderate aerobic exercise for only 15 minutes while breathing pure oxygen at 10 liters per minute.

Some combination of the two techniques might be the most effective method.

The effects of this treatment are far reaching for virtually every conceivable human condition. Not that this is a cure for anything, but by improving delivery of the most important substance for tissue life and repair, the body will have a much better opportunity to correct any problem. Emphysema, for example,

can definitely be assisted, but ongoing sessions are necessary since the transfer mechanism is severely compromised by loss of tissue due to the emphysema. All circulatory disturbances can benefit, including high blood pressure. The development of cancer also may be inhibited. Otto Warburg won the Nobel Prize years ago for demonstrating that cancer functions in an oxygen-poor environment.

There are also reports of excellent results in eye problems, including cataracts (this is understandable, since the lens of the eye is known to be oxygen-deficient already). Other illnesses that benefit from multi-step therapy include: senility, arthroses (joint disturbances), liver and internal organ disturbances, infections, radiation exposure, late effects of strokes, poisonings and burns, and stress.

Oxygen multi-step therapy is definitely something you can do in the privacy of your home and very inexpensively. And it may be the most dramatic single thing you can do to prevent disease and restore health. Now you have the tools to turn back the aging clock in your circulation to youthful parameters in just a few weeks.

To get medical-grade oxygen, you'll need a prescription, so I suggest you find a doctor who is a member of the International Oxidative Medicine Association (IOMA). These doctors are aware of this therapy and know the value of increasing your body's use of oxygen as you age. They can give you a prescription for the oxygen tanks.

If you're interested in doing the 18-day program, you can use an oxygen concentrator, which is available from most medical supply houses. Check with them to see if your state requires a prescription. Oxygen concentrators are more expensive up front (well over \$1,000) than oxygen tanks, but you'll save money over the long haul because you don't have to refill the tanks. Shop around (and don't forget to check the Internet) to find the best deal. The concentrators will not work for the quick program, as they don't provide enough pressure. You need a minimum of 10 liters per minute with 100% oxygen for the therapy to be of any use, and the concentrators usually max out at five liters per minute and are typically a little less than 100% oxygen.

Many people have asked me if they can use the commercial-grade oxygen found at their local compressed-gas supply house because it's cheaper and they can get it without a prescription. While I've known people to use this successfully without any problems, they purchase their oxygen from supply houses that use the same source (meaning the supply house uses the same compressor and filter) for the commercial and medical-grade oxygen. I've been assured by the suppliers in my area that the oxygen is taken from the same source, but not all supply houses do so. When the commercial oxygen is taken from the same source as the medical-grade, there is no difference between the two. While this is a very safe option, as a doctor, I'm prohibited by law from prescribing it. Federal law also prohibits me from using commercial-grade oxygen for any medical purpose. And whoever you get your oxygen from, make sure you get and read all the safety precautions associated with handling oxygen.

The thiamin and magnesium orotate can be acquired from health food stores. The dipyramidole (Persantine) would have to be obtained through prescription, but appears not to be an absolute essential (ask your IOMA doctor about it). Acquisition of an exercise machine (a treadmill or exercise bike will work just fine) takes a little effort and money, but you probably should have one of these anyway.

The quick technique is so easy and time efficient and may suffice for those in relatively good shape who want to practice prevention. For those with more significant problems, the 18-day, 36-hour method may be best. For those even more impaired, it would be most advisable to consult with a physician familiar with oxygen therapies. A graded exercise program perhaps beginning with nothing more than lifting a few pounds can be easily devised together with oxygen to begin the transforming process.

As Paul Harvey would say, "and now you know the rrrrrrest of the story." Oxygen multi-step therapy is a monumental breakthrough that can benefit nearly everyone and is easily administered in your own home.

# Prof. Dr. h.c. mult. Manfred von Ardenne

## Introduction

The life's work of Manfred von Ardenne reflects the personality of a highly gifted, visionary and tenacious researcher and inventor. Born in the German Empire in 1907, he grew up during the Weimar Republic, was a scientist under three dictatorships, lived through a century of complete economic and political revolution, and yet was able to establish himself as a successful businessman again and again.

By the end, he held about 600 patents in radio and television technology, electron microscopy, nuclear plasma and medical technologies and was the author of countless books and publications - without holding a degree or even a school leaving certificate! His clear sightedness and hard work was to thank for his progress from school dropout to famous scientist.

Manfred von Ardenne's spirit lives on today. On the following pages you can find out more about the life and work of this great inventor.

- Manfred von Ardenne in 1908

## 1907: Birth and Family Background

Manfred von Ardenne was born in Hamburg on 20 January 1907, the first child of a family of Prussian officers. His father, **Egmont Baron von Ardenne**, was appointed to the Ministry of War in Berlin in 1913, and the family moved into a rented apartment in Berlin Hasenheide. His mother **Adela, née Mutzenbecher**, devoted all her attention to the family and the children. Manfred von Ardenne had three siblings: **Magdalena** (1909-1985), **Ekkehard** (1914-1940), **Gothilo** (1917-1939) and **Renata** (1924-1999).



The younger brothers also followed a military career and died in the Second World War. Both served in the legendary Potsdamer Infanterie-Regiment 9, which was later the regiment of some of the conspirators in the plot to assassinate Hitler on 20 July 1944. At a meeting between Manfred von Ardenne and Richard von Weizsäcker, the latter emphasized his respect for his former superior, Ekkehard von Ardenne, who did not hide his distance from the "brown regime of violence" even when addressing the troops, and who was also friends with his brother Heinrich von Weizsäcker.

The life story of his grandmother, Elisabeth Baronin von Ardenne, née von Plotho, was used by **Theodor Fontane** as the basis of his novel **Effi Briest**.

- The first private laboratory in his parents' apartment

## 1907-1928: Childhood and Youth

Manfred von Ardenne was a practical, technically gifted child. Instead of following school, he conducted his own experiments, built models and circuits, tinkered and took measurements. His lack of interest in class had an effect on his achievements and he left Berlin Tempelhof secondary school after failing an exam. In his final report, his teacher wrote, "His knowledge and skill in a



few areas of physics and chemistry are beyond the expectations of his class or of the school." Von Ardenne subsequently changed to the Friedrich-Realgymnasium, which he left in 1923 with "Primareife". His parents recognized and supported their son's potential and gave him the best room in the apartment in Hasenheide. This became Ardenne's first **private laboratory for radio technology**.

In 1923, at only 16, the young researcher registered his first patent for a "method for sound selection, especially for the use of wireless telegraphy". From 1924, Manfred von Ardenne earned his living by selling his first books and technological developments and discoveries, and voluntarily paid the rent for his thirty square meter laboratory to his parents.

## Study and Research

The two **radio pioneers Georg Graf von Arco** and **Geheimrat Walther Nernst** put pressure on Manfred von Ardenne to take a degree. Thanks to their help he enrolled at the University in Berlin in 1925 without a school leaving certificate, and attended lectures on physics, chemistry and mathematics. After four semesters of basic studies he was seized with impatience and went back to his private research.

In 1926, the 19 year old became well-known through his idea of the **multi-system electron tube**. This was the technological basis for what was later to become the mass-produced **Loewe-Opta** radio set. It was also one of the first integrated circuits in the history of electronics.



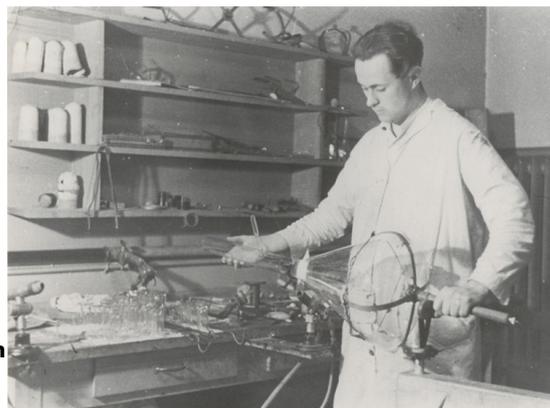
- A loyal member of staff for decades: Emil Lorenz, glassblower and laboratory assistant.

## 1928-1945: The Berlin Years

At the age of 21, the man of many talents founded the **VON ARDENNE-Laboratorium für Elektronenphysik** at Jungfernstieg 19 in Berlin-Lichterfelde, which he led until 1945. Until its forced closure, this laboratory was the birthplace for pioneering contributions in **television technology, image conversion, electron microscopy, scanning microscopy, isotope separation** and **electron and ion beam technology**.

Von Ardenne succeeded in presenting the **first completely electronic television transmission** in the world, as he suddenly realized that all the essential components were available in his laboratory in Lichterfelde. His close collaborator Emil Lorenz was present. Manfred von Ardenne on the events of that day:

"In feverish haste we took two electron beam tubes out of the stores, assembled two installations to produce the deflection tensions out of components from the low frequency lab, prepared one of the broadband amplifiers and borrowed a lens with high light intensity and a low inertia photocell from the optical lab. On the same evening, 14 December 1930, Emil Lorenz and I had a decisive experience. I held a pair of scissors in front of the screen of my bright spot scanner and saw exactly how its contours appeared on the fluorescent screen of the receiver tubes at the other end of the room. We repeated the experiment with a slide and had even greater success."



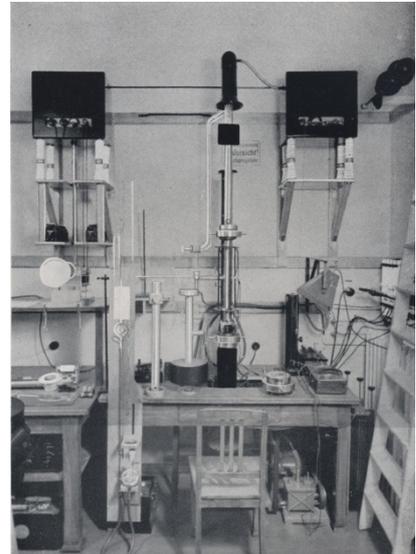
The following year, Manfred von Ardenne presented his ground breaking discovery at the "Internationale Funkausstellung (IFA)" trade show in Berlin, which made the front page of the New York Times.

- The first scanning electron microscope

## Survival and Scanning Electron Microscope

The von Ardenne family had no sympathy with National Socialism. When Hermann Göring invited Manfred's father to take up a leading position in the NSPAD, he refused categorically. Egmont Baron von Ardenne had got to know the later Reichspostminister and physicist Wilhelm Ohnesorge during the First World War. Later, Manfred von Ardenne made use of this contact as a source of money for his research work and for securing the existence of his laboratory, but without any kind of political background. He also turned down an invitation from his benefactor to join the Party.

In 1937, von Ardenne developed the **first high-resolution scanning electron microscope**, without which biological research would be unimaginable right up to the present. It was followed two years later by the universal electron microscope with the highest resolution in the world.



## Marriage to Bettina Bergengruen

In 1938, Manfred von Ardenne married **Bettina Bergengruen**, born in 1916, granddaughter of the writer Wilhelm Meyer-Förster and also niece of the author Werner Bergengruen. It was his second marriage, and it produced four children: **Beatrice, Thomas, Alexander** and **Hubertus**.



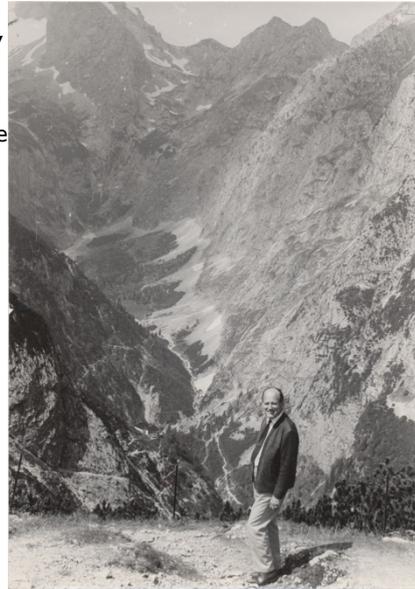
- **1945-1955: The Research Institute near Sukhumi**

The Soviets reached Berlin before the Americans in May 1945, and placed the famous von Ardenne Laboratory under the "protection" of Russian military headquarters. A few days later, an offer was made to Manfred von Ardenne to set up and lead a technological-physical research institute which would work for the Soviet Union on electron physics, nuclear-physical measurement, magnetic isotope separation and mass spectrometry. Von Ardenne agreed, and the Berlin laboratory was transferred to **Sinop (Soviet Union)** near Sukhumi in the same year. At that time, he had no idea that ten years would go by before he and his family would tread German soil again.

- Manfred von Ardenne on the way to inner Svaneti

## Internment and the Development of the Isotope Separation Process

After the dropping of the atom bombs on **Hiroshima** and **Nagasaki**, von Ardenne and other leading German scientists, including Nobel Prize winner Gustav Hertz, the physicist Max Steenbeck and the nuclear chemist Nikolaus Riehl, became caught up in the network of Soviet nuclear armaments. Whereas the Soviet specialists perceived Manfred von Ardenne as a specialist in electron optics and the construction of electron microscopes first and foremost, political events determined research work from then on, and he was brought in to collaborate on the Soviet atomic program. The Soviet side was obsessed with closing the gap and being able to compete with the USA. The head of the Soviet secret service Beria tried to entrust the project to von Ardenne during a meeting. Von Ardenne himself on the aforesaid meeting: "I had about ten seconds to think it over. My answer was as follows: I regard the proposal just made as a great honor for me, as it is an expression of an unusually great trust in my abilities altogether. But the solution to the problem we have here has two different areas: 1. the development of the atom bomb itself and, 2. the development of the isotope separation process for obtaining nuclear explosives such as Uran-235 to industrial standards. Isotope separation is the real and very difficult bottleneck for development. Therefore I propose that isotope separation alone should be the main task of our institute and the German specialists, and that the leading nuclear scientists of the Soviet Union that are sitting in front of me should bring about the development of the atom bomb as a great deed for their own motherland."



Beria accepted this recommendation. Years later, when Manfred von Ardenne was introduced to the Soviet Prime Minister Khrushchev at a state reception, the latter reacted spontaneously, "Ah, you're the Ardenne who got his head out of the noose so cleverly!"

In the end, industrial isotope separation became the main task of the research institute for Manfred von Ardenne and his colleagues. The processes developed by them for the production of uranium-235 for bombs turned out to be too complicated, and the gas centrifuge developed by Steenbeck eventually contributed to the building of the first Soviet atomic bomb. Later von Ardenne saw his contribution to the acceleration of the nuclear arms race as "the most important deed that fortune and post war events had led me to."

- **1955-1990 A New Home in Dresden**

After ten years of internment in the Soviet Union, Manfred von Ardenne decided on a life in the socialist part of Germany. Looking back in his biography of 1997, he explained that this choice prevented him having to give up the equipment which came from the laboratory at Lichterfelde. This had the highest priority with regard to his future research work. But the memories of the rule of terror of the National Socialist regime and the resulting hope of actively influencing the young socialist state played a significant part in the making of the decision.

The new beginning in the German Democratic Republic was made easier by a series of concessions and privileges on the part of leading politicians, who promised themselves an international image triumph thanks to the decision of the scientist. The researcher chose **Dresden** as a new home for himself and his family as well as a new location for his institute. He had already begun planning during internment in 1951 and he asked his brother in law Otto Hartmann, who lived in West Berlin, to find a suitable property. He in his turn engaged Johannes Richter, an engineer from Zwickau, who found two attractive properties at "**Weißer Hirsch**", a suburb of Dresden. The answer from the Soviet Union was positive and clear; and although von Ardenne only got to see photographs of the house, he pressed for an immediate purchase. A short time later he set up his research institute at "Weißer Hirsch", and also lived there with his family.

- 25th anniversary of the Research Institute in Weißer Hirsch

## Manfred von Ardenne Institute

Manfred von Ardenne led the institute that bore his name from 1955 to 1990, at times employing about 500 staff. It acquired an international reputation as the birthplace of important innovations.

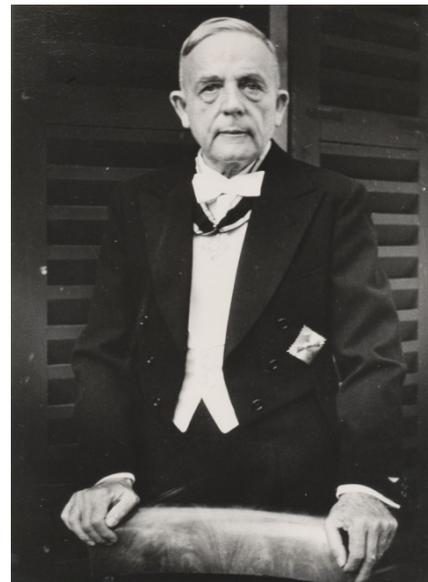
At the beginning, the focus of the work was in **electron, ion, nuclear physics** and **over microscopy**, and later in **medical electronics** and **basic research in biomedicine**. The institute pursued research in close connection with industry. Industrial facilities using melting, cutting and coating were developed from different materials, all based on **electron and ion sources**.



- The biochemist Otto Warburg received the Nobel Prize for Medicine in 1931.

## Research in Medicine

In the 1960s, von Ardenne met the Nobel Prize winner **Otto Warburg** several times. Inspired by Warburg's research into aerobic changes in fermenting agents in cancer cells, he turned to a completely new area of interest: medicine, and especially cancer therapy. After a period of research over several years, the polymath scientist and his staff developed the **systemic Cancer Multi-step Therapy** (SKMT), in which cancer cells and metastases were combated in a defined combination of steps, using chemotherapy where necessary. The basis of this therapy is an extreme hypothermia of the whole body combined with targeted over-acidification of the tumor and an oxygen feed. Manfred von Ardenne worked on cancer research up to the end of his life.



- Elements of the Oxygen Multi-step Therapy

## Oxygen Multi-step Therapy

In the 1970s, regular clashes with the authoritarian state and the uncertain outcome for the institute which resulted took their toll: Manfred von Ardenne suddenly became severely bedridden without however losing his mental capacities. The doctors treating him could not discover any organic cause and estimated he would live for two more years. Von Ardenne accepted that his illness was a "general lack of energy" and hit up on the idea of inhaling from



an oxygen gas cylinder several times a day. Thanks to his research in cellular energy status while working on systemic cancer multi-step therapy, he knew the importance of oxygen as an agent against debilities and was proved right. With a few days he regained his old quality of life, and from this experience developed **Oxygen Multi-step Therapy**, which is today an internationally well known and widely used natural medical treatment.

The scientist was able to protect his institute - which as a private enterprise was unique among the socialist states - from nationalization and survived as a businessman under socialism up to German reunification.

- The family - still small at that time - on an automobile trip in 1946

## Private Life

Much has been written about Manfred von Ardenne, and he is often referred to as the **"Pioneer of radio and television technology"**, **"The Red Baron"** and **"The Sage of Weißer Hirsch"**. The most important thing in the life of this great man was his work – otherwise he would scarcely have been able to achieve such extraordinary scientific and technical accomplishments. What else apart from science was important to this genius, and what was he like as a boss?



Von Ardenne was also a family man and a father several times over. His second marriage to Bettina Bergengruen produced four children: Beatrice, Thomas, Alexander and Hubertus. The marriage was very close and lasted right up to the end of his life. In a television interview at the age of 65 Manfred von Ardenne spoke about love: "Love, God's most successful device for mankind, or to put it another way, the greatest discovery of the endless wisdom of nature, has always throughout my life given me the strength to achieve more than the world expected." He needed the support of his family for his work, which enabled him to complete great undertakings. The children appreciated the liberal atmosphere at home which encouraged debate: "Independent criticism was not only tolerated – it was encouraged," said one of his sons. They learned how to take responsibility early, and still continue the life's work of their father today

- Manfred von Ardenne and his wife Bettina

Dr. Peter Lenk, Managing Director of VON ARDENNE from 1991 to 2006, on Manfred von Ardenne as a boss: "Reliability, hard work, punctuality were qualities that a member of staff had to have. We learned very quickly that it was great fun to work in his establishment, as we had considerable freedom. And at some stage you gave up looking at the clock and went home when the work was finished."



For relaxation, the inventor liked to listen to classical music – Mozart above all: "I have the highest admiration for Mozart's genius. It is incredible that a human being who only lived to be a little over 30 contributed so much to a specific field and that his influence on it has lasted for centuries." With regret he maintained that truly great composers had existed only up to the beginning of the 20<sup>th</sup> century, and that much in classical music had been exhausted

Without a doubt, Manfred von Ardenne was more than a charismatic scientist and thinker. A look at his life reveals many facets of his personality which can only be judged in this context with difficulty.

- **Manfred von Ardenne as Visionary**

In his 1962 essay "**Visions of Technology in the Year 2000**", which appeared in the periodical "Technische Gemeinschaft", Manfred von Ardenne demonstrated that he was a scientist and thinker of vision. In his opinion, all that one needed for such prophecies was to "estimate each research result with a little imagination which is anyway part of the first stage of development", and that the scientist should carry within himself "the attributes of great importance for the future". And most of his prophecies have indeed come true and have been part of our daily life for some time. A selection follows:

- **The Vision of the Microchip and the Internet**

As for the miniaturization of electronic components, the semiconductor and molecular electronics, he foresaw the **microchip** and the wild developments that are connected with it, which even "specialists find it difficult to keep up with."



Even more astonishing was his vision of the **internet**:

"Within a few decades, electronic data processing and storage (including that in miniature design) will increase the capacity of the human brain to an extent that can scarcely be conceived today. With every passing day, the increasing power and rapid specialization in the sciences demands the use of carefully arranged methods for storing scientific material, which today still strains the brain unnecessarily", he concluded in his essay.

- **The Vision of Genetics as Blessing and Curse**

After the decoding of human **DNA**, Manfred von Ardenne foresaw genetics as both a blessing and a curse for humanity: "Now that the synthesis of nucleic acids has been achieved recently, we may hope that the synthesis of important proteins can be achieved within the near future. Given the current status of this work, we can predict the solution to the riddle of the heredity of protein structure. And with that humanity will be granted the great but also terrifying possibility of **creating living entities** at will."



- **The Vision of Wallpaper made of Light**

Concerning **telecommunications** he made a prophecy that has turned out to be exactly true to an astonishing extent: "At the end of the development, for example, every telephone subscriber will be able to dial every other subscriber in the world using a dialing system without any delay." And in semiconductor and display technology, as far back as 1962 he announced the so-called **OLEDs** (organic light emitting diodes): "In



lighting technology diffuse ambient light using electroluminescent panel lights will find many friends. It will replace the light bulb or the fluorescent tube with luminescent panels, which can be fitted on the wall of the room partially or wholly." The current development projects at VON ARDENNE are precisely on this technology.

What was unbelievably remarkable about von Ardenne's thoughts at the time was the sweeping way he cut through the most different scientific disciplines and how exact his prognoses were.

## Legacy

Manfred von Ardenne died on 26 May 1997 at the age of 90. The funeral took place in the chapel of Bad-Weißer-Hirsch cemetery. The theologian Klaus Peter Hertzsch gave the address before about 500 people who had come to pay their last respects. To the members of his family he left behind the results of a life rich in invention together with a famous name.

In Dresden, there is a "Manfred-von-Ardenne-Ring" and in Hamburg a "Manfred-von-Ardenne-Platz" in memory of the technological pioneer. A secondary school in Berlin bears his name and there is a "Manfred-von-Ardenne-Gewerbezentrum" in the "Innovationspark Wuhlheide" in Berlin. The "URANIA-Vortragzentrum" in Dresden holds an annual event on the day of the death of Dresden's honorary citizen, and since 2002 the European Society of Thin Films has awarded the "Manfred-von-Ardenne Prize for Applied Physics".

The entrepreneurial spirit of the polymath is represented by VON ARDENNE Anlagentechnik GmbH, whose shareholders are Manfred von Ardenne's descendants. The internationally successful company is today led by Robin Schild (CEO), Thomas Krischke (CFO) and Hans-Christian Hecht (CTO).

The life's work of Manfred von Ardenne in medicine is being carried on in the VON ARDENNE Institut für Angewandte Medizinische Forschung, which is led by Dr. Alexander von Ardenne.



## • Scientific Discoveries and Inventions

### **The most important inventions and discoveries made by Manfred von Ardenne and his team:**

#### **1923**

First patent filed on "Method for sound selection" at the age of 16

#### **1925**

Broadband amplifier using HF dual tube systems with a bandwidth of  $10^6$  Hz as the foundation of the later development of the fully electronic television

#### **1926**

Development of a resistance radio receiver with three-stage tube (together with LOEWE radio), thus making an affordable radio for a wide range of social classes possible.

#### **1928**

Founding of the VON ARDENNE Laboratory for Electron Physics in Berlin-Lichterfelde  
Inertia-free brightness control of the light-spot of Braun tubes by the introduction of a negative pre-stressed control electrode for the electron beam, called the "Wehnelt Electrode" in honor of his teacher

**1930**

On 14.12.1930 the first fully electronic television broadcast in the world was produced in the Lichterfelde laboratory using Flying Spot Scanners (FSS), which are still in use today.

**1931**

The first public film transmission at the Berlin Radio Exhibition using the Flying Spot Scanner (180-lines-technology), regarded by specialists as the birth of completely electronic television using electron beams

**1933**

Precision electron beam oscillograph for electronic measurement

**1934**

The electron-optical image converter (X-ray and infrared image converters)

**1937**

The scanning electron microscope (SEM), which was perfected in the 1960s, is still the most important analysis instrument in biomedical and microbiological research

**1938**

First usage of the electron beam as a laser tool for production of microstructures

**1939**

High-resolution magnetic universal electron microscope for bright, dark field and stereo scope; the X-ray projection microscope and electron beam micro-oscillograph

**1941**

Development of the 200 kV universal electron microscope, the first emission electron microscope for object temperatures of up to 2,500°C, electron optic shadow image method

**1942**

1 MeV van de Graaff neutron generator

First fine beam electron diffraction in the electron microscope

**1943**

Construction of the Cyclotron with 60 t magnet for nuclear-physical research

**1944**

Increase of the resolution of the universal electron microscope to 12 AE (the highest resolution in the world until 1954)

**1945-1955**

Magnetic mass separator for industrial isotope enhancement

Duoplasmatron ion source for high ion flow concentration on the basis of strong inhomogeneous magnetic fields – the Duoplasmatron is still used in particle acceleration and as a correction drive mechanism in space technology today.

Precision oscillograph with 2 µm scanning spot

Precision mass spectrograph with double focusing and ion image converter

**1955**

Establishment of the Manfred von Ardenne Research Institute in Dresden:

From the very beginning, physical-technological development projects with a high practical relevance occupied center stage. New fields of application were continually developed for the electron beam, the importance of which as an energy intensive and highly flexible laser tool for a host of industrial processes Manfred von Ardenne recognized early on:

- Vacuum melting and refinement of reactive and refractory metals
- Cutting and welding
- Thermal and non-thermal microstructuring
- Textured surface coating
- High-rate evaporation of metals and dielectrics
- Radio polymerization of synthetic materials
- Radio sterilization of crop seeds or disposable medical products

**1957**

Ingestible intestinal transmitter for measuring pressure and pH values in the gastrointestinal tract

**1958**

Electron attachment ion source for organic molecules of lower binding energy

**1959**

The 45 KW electron beam multi-chamber furnace (EMO) for vacuum melting and refinement of reactive and refractory metals

**1961**

Safety belt for extending the inner braking distances in automobiles

**1962**

Operating room with electronic patient surveillance for surgery at the Medizinische Akademie Dresden;  
Formulation of the first concept of cancer multi-step therapy (KMT);  
Development and small-scale production of heart and lung machines for the heart centers in The German Democratic Republic;  
Development and small-scale production of ultrasonic diagnostic units

**1964**

Installations for industrial micro processing of microelectronic circuits using electron beams

**1965**

Installations for evaporation coating of thin films in a high vacuum for industrial applications  
Two chamber tank for extreme whole body hyperthermia

**1968**

Discovery, purification and implementation of lysosomal chain reaction of cancer cell deterioration, foreseen in 1965;  
Discovery of the sensitization of tumor cells against hyperthermia by targeted overacidification

**1970**

Systemic Cancer Multi-step Therapy (sKMT)  
Discovery of the blood-nerve-barrier and a primary process of pain release  
Mechanism of anesthetic death and death during hyperglycemic coma

**1972**

Oxygen Multi-Step Therapy (SMT) and beginning of work on the extraordinary pharmacokinetics of the cardiac agent g-Strophanthin

**1976**

SELECTROTHERM method for two step deka wave raster hyperthermia for a homogenized energy supply for treatment of cancer

**1987**

IRATHERM<sup>®</sup> method with water filtered infrared-A radiation for whole body hyperthermia in treatment of cancer

**1990**

Foundation of the VON ARDENNE Clinic for Systemic Cancer Multi-step Therapy (sKMT) for the evaluation of sKMT and treatment of patients with cancer at an advanced stage

**1994**

IRATHERM<sup>®</sup> 1000 for non-oncological treatment of patients for mild and moderate whole body hyperthermia



## What does Oxygen Multistep Therapy Involve?

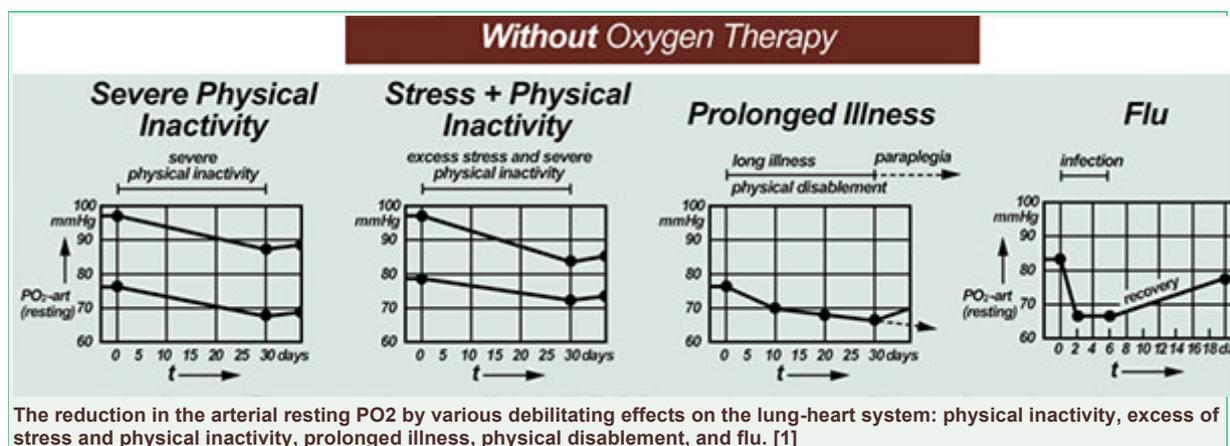
Oxygen Multistep Therapy involves breathing higher levels of oxygen (90%) while exercising on a stationary "spin" bike. This treatment is combined with supplements that increase blood flow and cellular metabolism and to maximize oxygenation uptake. And unlike many similar oxygen therapies, our system is designed to give you a high-volume flow of oxygen through a sealed mask. This prevents you from breathing ambient air from the room during your treatment, and ensures maximum benefit.

*A single session of Oxygen Multistep Therapy lasts about 20-25 minutes depending on your fitness levels and goals.*

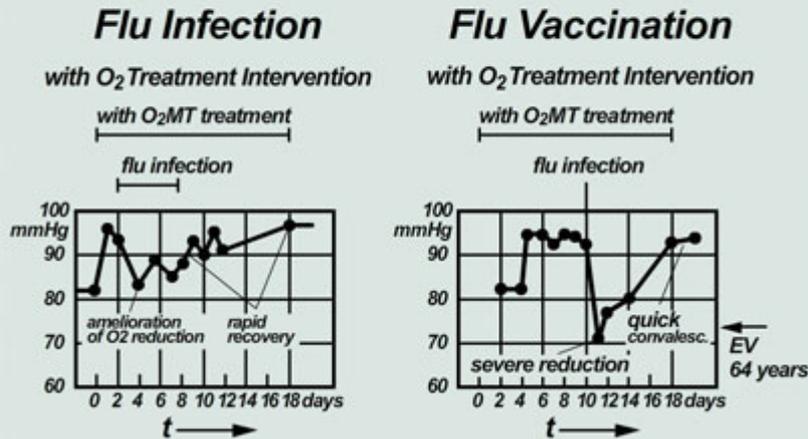
## Why the need for Oxygen Multistep Therapy?

Many everyday stressors can decrease your blood's "plasma oxygen levels" and can cause poor circulation in various parts of the body. The oxygen in your blood resides in two places... attached to your red blood cells, and dissolved into the fluid portion of your blood (the plasma). Dr. von Ardenne's research institute did extensive studies on plasma oxygenation, and how it reacts to different stressors. Here are some charts below showing the effects of specific stressors, and their effects on plasma oxygenation.

*Everyday Stressors that reduce Plasma O<sub>2</sub> (and O<sub>2</sub> uptake):*

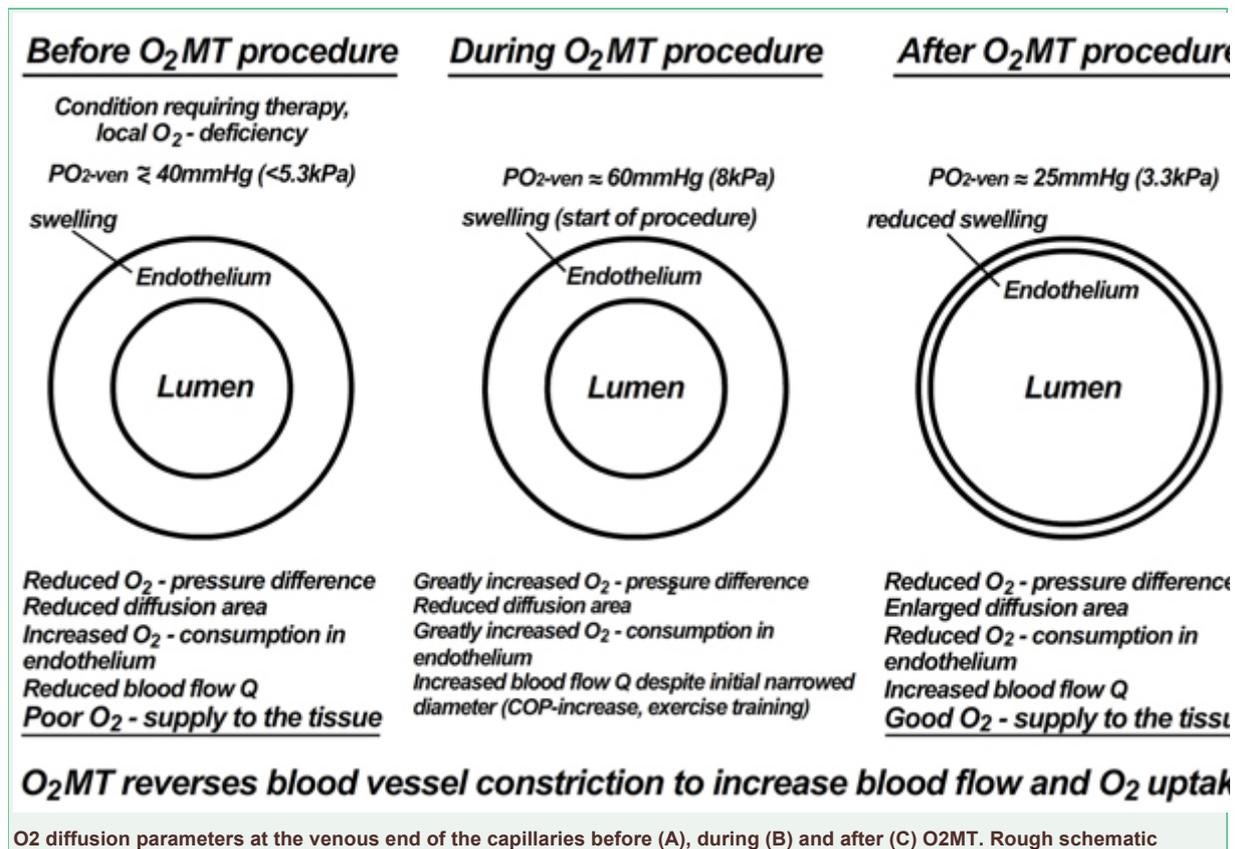


## With Oxygen Therapy



Dr. von Ardenne found that lowered plasma oxygen levels caused capillaries (small blood vessels) to narrow. This restriction of blood flow contributes to a wide variety of diseases and accelerates aging in general.

*Increased Oxygen uptake and Blood Circulation after O<sub>2</sub> Therapy:*



*Whether you are fighting cancer, chronic illness, or just want to perform at your best, optimizing your plasma oxygen levels and restoring proper blood circulation is a fundamental step.*



## Who can benefit from Oxygen Multistep Therapy?

### ***1. Athletes:***

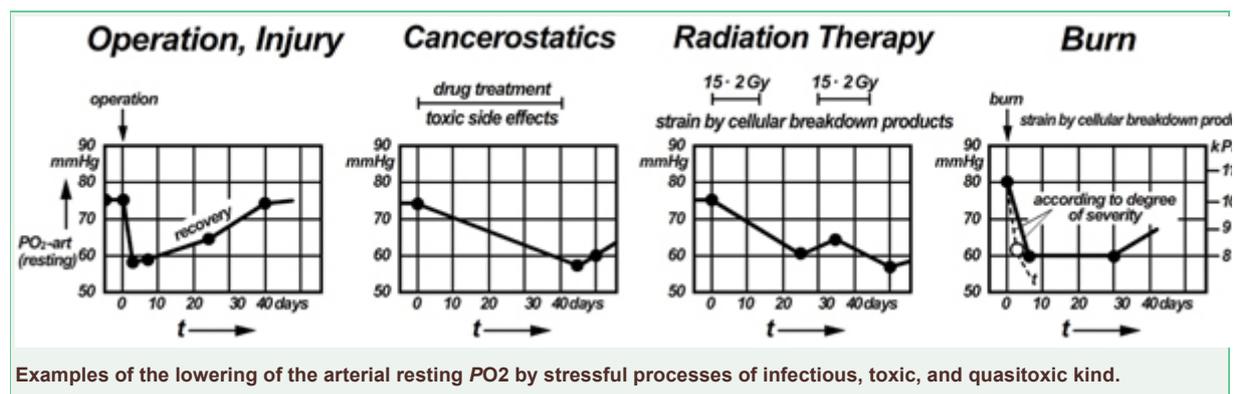
People who want to increase their athletic performance, will undergo O2MT in a different way. Rather than breathing only oxygen rich air, we cycle between low oxygen and high oxygen air throughout your 15 minutes session on our exercise bike. This "altitude contrast" training combines the best of both worlds: the physiological stimulation of high altitude training, with the metabolic benefits of Oxygen Multistep Therapy. The program itself can be conducted in a few different ways depending on your goals. So whether you are looking to accelerate your endurance gains and VO2 max, or want to reduce the soreness of "season fatigue," we can create a plan to suit your needs.

## 2. Cancer Patients:

The relationship of poor oxygenation to cancer growth has been studied for decades. Yet, with today's resurgence of metabolic research in relation to cancer, the oxygen-cancer connection is making its way back into the news [3,4,5]. Modern studies are again showing that poor oxygenation in tumor tissues decreases patients' chances of survival with conventional therapies [6-11]. It can also increase the chances of tumor recurrence [12,13] and metastasis [14].

Researchers have also shown oxygen therapy to increase the effects of both radiation therapy [15], and other natural anti-cancer approaches [16,17]. It has also shown to prevent and treat long term damage caused by radiation therapy [18]. Oxygen Multistep Therapy is also important to maintain your plasma oxygen levels after surgery, chemotherapy, and radiation therapy as these therapies can all decrease your plasma oxygen levels [19] (see charts below). With powerful tools like O<sub>2</sub> Multistep Therapy, we can design a complementary cancer care protocol to support you every step of the way.

### Cancer Related Stressors:



**Note to cancer patients:** While anti-angiogenic (blood vessel blocking) therapies (natural or pharmaceutical) can be very beneficial, "restoring proper blood flow" with O<sub>2</sub>MT does *not* mean that it will increase blood vessel growth and promote tumor growth. Quite the opposite is true. Healthy angiogenesis (blood vessel growth) itself is fundamental to life. But angiogenesis in cancer growth is deranged [20] and can be thought of as "pathological angiogenesis" (disease state induced blood vessel growth). Researchers have shown that low oxygen (hypoxia) can stimulate this deranged tumor blood vessel growth through proteins called "hypoxia-inducible factor" (HIF) [21,22,23]. Rather than just blocking this (diseased) blood vessel promoting mechanism, Oxygen Multistep Therapy works to remove one of the underlying factors (local oxygen deficiency) that stimulates this deranged blood vessel growth. In fact, though it was contrary to their previous beliefs in blocking tumor blood vessel growth, researchers at Oxford University found benefits with a similar approach of promoting oxygenation and blood flow to tumors before conventional therapies [24]. Researchers at University of Rochester found the same effect [25]. Yet, this is something that Dr. von Ardenne and other (especially German) researchers had studied for decades. Overall, oxygen therapy approached in a specific way, combined with a wide range of complementary anti-cancer approaches, can be a very powerful complement to conventional cancer treatments.

## ***What is "Accelerated Multistep Therapy"?***

At the Center For Acupuncture and Integrative Medicine, we also combine Multistep Oxygen Therapy with Whole Body Periodic Acceleration (WPA) Therapy, something that we call "Accelerated Multistep Therapy." WPA Therapy involves a device called the "Exer-Rest" bed, which rocks the patient gently back and forth to increase blood flow. You can think of it as a form of "passive exercise" that we combine with Multistep Oxygen Therapy. This combination was designed especially for those who are undergoing conventional therapies for cancers in certain areas of the body.

## ***Why "Accelerated Multistep Therapy"?***

While exercise increases blood flow to the muscles, lungs, and heart, it can actually decrease blood flow to internal organs like the kidneys, stomach, small intestine, and spleen. Because cancers can often be present in these areas, we have some patients undergo Oxygen Multistep Therapy using Whole Body Periodic Acceleration Therapy, instead of exercising on a bike. WPA has shown to increase blood flow to the brain (+180%), liver (+86%), stomach, small intestine, and kidneys (+53-72%). So depending upon the location of your tumor, we can determine which form of Oxygen Multistep Therapy will best fit your case.

## ***3. Computer Professionals/ Knowledge Workers:***

During his research in the 1960's, Dr. von Ardenne found something that is more relevant now than **ever** before. Though physical inactivity was found to decrease patients' blood plasma oxygen levels, physical inactivity combined with stress caused even greater drops. Why is this so relevant today? Because many of us are "knowledge workers" who spend long stressful hours working on the computer. Our brains work extra hard, our bodies tend to be motionless for many hours, and our breathing tends to be shallow and erratic. This can be highly disturbing to our plasma oxygen levels and blood circulation. People who exercise intensely right before working on a computer can be at even greater risk, because of the "metabolic debt" incurred through intense physical exertion.

*If you are a "knowledge worker" who suffers from any of these symptoms below, O2 Multistep Therapy should definitely be considered.*

Poor blood circulation

Chronically cold limbs or body parts

Frequent colds and flus

Muscle tightness and spasms

Tension Headaches

Any condition that is clearly made worse by working long hours on the computer

Any condition that is clearly made worse by getting a massage (including lightheadedness, dizziness, heart palpitations, digestive disturbance)

#### ***4. People Fighting Chronic Illnesses (especially stress or age induced):***

Oxygen Multistep can benefit a wide variety of chronic illnesses because oxygen is at the center of cellular energy creation. Here is a list of cases that can benefit from O2 Multistep Therapy [26]:

Degenerative eye disorders

Angina-pectoris (heart related chest pain)

Asthma and shortness of breath

Liver toxicity

Circulation disorders

Migraine headaches

Wound healing

Post Illness rehabilitation (heart attack, surgery, infection, intoxication)

Reduction of side effects of conventional cancer therapies (surgery, radiation, chemotherapy)

Rehabilitation after illness induced immobility (paralysis, arthritis, rheumatism, catastrophic injury)

#### ***5. Health Conscious People/ Everyday People:***

Because proper oxygenation is fundamental for cellular energy creation, there are only a few that won't benefit from this therapy in some way. But in general, here are some of the reasons to utilize O2 Multistep Therapy for disease prevention [27]:

Reduced susceptibility to disease in general

Improved skin oxygenation and health

Anti-aging effects (decreasing "biological age" by an average 10 years)

Reducing the impact of job stress

Conditioning before and or after events involving intense physical or psychological stress (surgery, public speaking, competitive sporting event)

Normalization of oxygen transport capacity in cigarette smokers (especially those who smoke more than 4 per day)

Cancer and cancer prevention

Immune system maintenance

Blood circulation stability

Intensification of "holiday effect" on overall health

## Oxygen Multistep Therapy vs Hyperbaric Oxygen Therapy

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**There are three main differences between these two types of Oxygen Therapy:**

**While Hyperbaric Oxygen Therapy and Oxygen Multistep Therapy** provide similar benefits, Hyperbaric Oxygen Therapy uses pressure to **push** oxygen into your body. O2 Multistep Therapy on the other hand, uses physical exertion (and supplementation) to **pulloxygen** into your body with its own natural mechanisms.

Both therapies are very beneficial, but Hyperbaric Oxygen is best reserved for those who are severely disabled and/or cannot endure physical exertion.

High quality Hyperbaric Oxygen treatments are more time consuming, and **much** more costly for both the patient and provider.

O2 Multistep Therapy is just as effective, more practical, quicker, and **much** more cost effective.

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[1] von Ardenne, M. Oxygen Multistep Therapy: Physiological and Technical Foundations. Stuttgart, Germany; 1990. pgs. 44-45

[2] von Ardenne, M. Oxygen Multistep Therapy: Physiological and Technical Foundations. Stuttgart, Germany; 1990. pgs. 62

[3] <http://www.sciencedaily.com/releases/2012/05/120503194219.htm>

[4] <http://www.nutritionandmetabolism.com/content/7/1/7>

[5] <http://link.springer.com/article/10.1007%2Fs10863-007-9094-x>

[6] <http://www.ncbi.nlm.nih.gov/pubmed/8438086>

[7] <http://www.ncbi.nlm.nih.gov/pubmed/9783886>

[8] <http://www.ncbi.nlm.nih.gov/pubmed/10717157>

[9] <http://www.ncbi.nlm.nih.gov/pubmed/11395851>

[10] <http://www.ncbi.nlm.nih.gov/pubmed/11395850>

[11] <http://www.ncbi.nlm.nih.gov/pubmed/12067980>

[12] [http://www.uhn.ca/corporate/ForMedia/PressReleases/Pages/oxygen\\_in\\_tumours.aspx](http://www.uhn.ca/corporate/ForMedia/PressReleases/Pages/oxygen_in_tumours.aspx)

[13] <http://www.sciencedaily.com/releases/2009/05/090527151136.htm>

[14] <http://cancerres.aacrjournals.org/content/56/5/941.full.pdf+html>

[15] <http://www.utsouthwestern.edu/newsroom/news-releases/year-2013/july/oxytumor-mason.html>

[16] <http://www.ncbi.nlm.nih.gov/pubmed/23755243>

[17] <http://www.washington.edu/news/2011/04/04/high-dose-of-oxygen-enhances-natural-cancer-treatment/>

[18] <http://www.uclahealth.org/body.cfm?id=502&action=detail&ref=675>

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- [20] <http://gan.sagepub.com/content/2/12/1117.full>
- [21] <http://www.nutritionandmetabolism.com/content/7/1/7>
- [22] <http://www.ncbi.nlm.nih.gov/pubmed/18300418>
- [23] <http://www.ncbi.nlm.nih.gov/pubmed/15245814>
- [24] <http://www.dailymail.co.uk/health/article-1203600/Injecting-oxygen-cancerous-tumours-improves-chances-recovery.html>
- [25] <http://www.urmc.rochester.edu/news/story/index.cfm?id=375>
- [26] <http://med.ardenne.de/?therapien=oxygen-multistep-therapy&lang=en>
- [27] <http://med.ardenne.de/?therapien=oxygen-multistep-therapy&lang=en>