



## Oxygenate yourselves! - The Hyperbaric Centre Magazine

N. 21 – May and June 2015



In 2010, the Hyperbaric Centre of Ravenna opened the blog [www.iperbaricoravennablog.it](http://www.iperbaricoravennablog.it) to share the stories of patients because we believe that the solution to a problem for one patient may be the solution for many others. This experience led to "Oxygenate yourselves!", the blog magazine of the Hyperbaric Centre, a new tool to read and save the most-read stories of the blog. This number contains the articles that were read the most in May and June 2015! Enjoy the reading!

### Gianni has hip osteonecrosis healed with 40 sessions of Hyperbaric Oxygen Therapy



Gianni is 45 years old, he lives in Ravenna and has never practiced sports at a competitive level. Despite this, last year, all of a sudden he felt a strong hip pain that made him worry very much: having never strained the joint, he just can not

figure out what caused it. His age is not a reason either: at 45 you can not think of a ailment!

Gianni goes straight to the doctor who speaks of worsening coxalgia, a strong hip pain that increases gradually. After a month of suffering, Gianni decides to investigate and undergoes some additional test to understand what the cause of his pain. MRI leaves no doubt: it is osteonecrosis.

It is now August and the practitioner who is following Gianni in this pathway suggests to immediately contact the Hyperbaric Centre of Ravenna to make an appointment: by acting promptly he may avoid surgery for hip reconstruction. He does not waste time: he picks up the phone and calls us, he wants to find out whether oxygen therapy can help reduce both the osteonecrosis and especially pain.

During the first visit, the doctors of the Hyperbaric Centre prescribes 40 sessions of hyperbaric oxygen therapy that Gianni has to do once a day, between October and December.

In cases of osteonecrosis, the hyperbaric therapy it is very useful, either because it gradually reduces pain until it disappears and because it is a non-invasive therapy that is used to activate a process of cell regeneration and thus avoiding surgery. The protocol that we follow the Hyperbaric Centre provides a first cycle of 40 sessions because the first 20 are used to reduce inflammation and are set to 2.5 ATA, while the subsequent 20 are set to 2.2 ATA to reconstruct the bone. At the end of these we consider whether the oxygen has given the desired results or if the person needs to start another cycle of therapy.

Gianni completes the cycle of oxygen before Christmas and, as required by the Protocol of the Hyperbaric Centre, after a month he goes to a physiatrist for the check-up, the pain completely disappeared and he has recovered the hip function. The resonance he undergoes the following month shows that the therapy had the maximum effectiveness: Gianni is completely healed!

Check-up visits by the physiatrist and MRI after one month from the end of the hyperbaric session are important because the beneficial effects of hyperbaric oxygen does not exhaust with the course of therapy, but it continues to act positively

on the organism also in the following months. This is why the results are remotely controlled by a bit 'of time and often the most benefits are felt right once concluded the sessions in hyperbaric chamber.

Gianni is now very well, he has completely recovered his daily activities and has not had any hip problems, the period of sadness linked to the deep pain of last summer are now only a memory.

A warm hug by the entire staff of Hyperbaric Centre.

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## Osteonecrosis of the femoral head: can oxygen help avoid the prosthesis?



Hi, I read your methods to treat necrosis of the femoral neck, I happened to fall on the hip and the femoral neck fracture of January 6, 2015. At the hospital they put me three screws cannulated to recover the break, but today, after a CT scan, they told me that the fracture is broken and consequently necrosis of the femoral neck was formed. As the only solution I was proposed a hip prosthesis, do you think it is possibile to avoid this? Thanks and look forward to an answer, if you can.

### ***Dr Andrea Galvani responds***



Good morning Mr Andrea, thank you for contacting us.

The head of the femur has a terminal vascularization and aseptic necrosis can occur in cases of major trauma, just as the fracture.

Situations like this require a mandatory examination and careful evaluation of medical documentation (examinations, consultations,

reports) to determine if the clinical point of view justifies an attempt with a cycle of Hyperbaric Oxygen (HBO).

At the Hyperbaric Centre there is a first visit to assess with the physiatrist the degree of osteonecrosis: if the level is low, it is appropriate to undergo a series of oxygen therapy (30 sessions of 90 minutes each and on a daily basis). In addition to these sessions, the path of the Hyperbaric Centre dedicated to patients suffering from osteonecrosis also includes: consulting of physical medicine and rehabilitation, and drug therapy magnetoterapia support.

Usually for low degrees of osteonecrosis the Hyperbaric Oxygen therapy allows to obtain good results.

The prosthesis is instead the only possibility if the degree of osteonecrosis is very high, that is when they show signs of loss of structural integrity of the bone segment concerned.

I hope I was helpful and I wish you a great good luck for a fast recovery.

For any further request for information you may freely contact our office at (0039) 0544-500152.

Best wishes, Dr. Andrea Galvani

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## Giuliano, healed from ulcer vasculitis of malleolus in three months



Guliano is a gentleman from Rome, has now turned 80 and yet he is still very spry and active. A few months ago, however, he was literally stuck for

a malleolar vasculitic ulcer that caused him unbearable pain.

He arrived at the Hyperbaric Centre of Ravenna thanks to his daughter Katia who discovered our blog on the internet: she immediately called us to ask questions and decided to bring the father in Romagna, where she lives, to begin hyperbaric therapy in our structure. In Rome, Giuliano had already made numerous therapies but with no results and after 8 months of suffering he was starting to lose hope.

Once he set the appointment for the first visit to the Hyperbaric Centre he left the Capital and reached Ravenna with the fear of having to continue to suffer without a solution, so that when the daughter presented to us his situation, he could not hold back the tears. Situations like Giuliano's are very painful, not only for those suffering from the disease, but also for family members who want to stay close to the person they love, but often feel helpless and do not know how to be comforting.

The ulcer vasculitis is a very painful autoimmune disease: to cure it it is necessary to first reduce the pain, otherwise the immune system tends to attack even more himself and the disease progresses.

The pain of Giuliano during the first visit was so deep he could not extend the leg straight and when approached and touched he screamed for the pain. Katia told us that her father had never endured the dressing pressure on the wound that were made in Rome and each time ended up taking them off: a real torment.

During the first visit, the doctors and nurses of the Center noted immediately that the wound was infected: produced much pus and was very malodorous, so they made just a swab culture to understand which bacteria caused the infection and what was the most suitable antibiotic to eliminate it.

Giuliano's wound was then treated first with a compress with an anesthetic and analgesic therapy to reduce pain associated with antibiotics to clear the infection. Once the pain attenuated, Giuliano began to withstand the efforts of nurses and it was thus possible to treat the wound: on the malleolus was applied a bandage with an inert medication, a type of natural medication chosen because the immune system could warn positively and help to cleanse the wound.

At this point he continued with Negative Pressure Therapy for a week, useful to prepare the "wound bed". The NPT provides a continuous drainage of the wound and put it "under vacuum" allowing the

dressing to adhere to the best and speeding up the healing. Once the wound bed was prepared, Giuliano had infiltration of platelet gel (PRP) associated with bandages.

All the time he was with us at the Hyperbaric Centre Giuliano was subjected to treatments without ever removing his dressings: thanks to this the wound was able to heal quickly and Katia remained very pleasantly surprised.

Gradually cures allowed the wound to improve and we saw Giuliano gaining confidence in us and in the possibility of healing: it was a real pleasure to see him put his trust in us after so much initial fear, he felt involved and always collaborated so that we could work at best and allow him to get back in shape as soon as possible.

Giuliano made two medications a week for three months, after which it is healed completely and was able to finally enjoy some relax with his daughter who lives in Rimini and who hosted him during treatments. Katia was so happy with what we did for her father that she recently came at the Hyperbaric Centre together with her mother-in-law, for a small wound that completely healed in a month. The funny thing is that today Giuliano and Katia's mother -in-law are making follow-up visits together.

We still remember when Giuliano's wife, at the beginning of treatment, made us promise that we would have sent him back home only when he would have been recovered completely. We are really happy to have kept our promise!  
In the picture, Giuliano, his wife and our staff under the Christmas Tree.

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## How to treat my father's salivary fistula?



Dear all, after an operation of unblocking carotid artery, my father has a fistula that does not close

that now is medicated with iodoform gauze and silver gauze. What do you think? Can you give me some advice on what to use to promote granulation?

**Klarida Hoxha responds**



Dear Antonio, I am very sorry for your father, the surgery he had to undergo certainly is not easy to deal with.

The fistula you are talking about is a dehiscence of the surgical wound, one of the complications that occur more often after this type of surgery. It is easy that the fistula is formed if there are factors of impairment as: anemia, malnutrition (including obesity), use by the patient of certain steroidal drugs and diabetes. Often, this problem occurs in male patients and in old age.

In your request you did not indicate enough elements that allow us to frame the situation in a comprehensive way and to suggest the most appropriate treatment in your father's case, but in any case I describe an example of what we do at the Hyperbaric Centre with patients with similar problems.

First, it is important to understand what is the cause that led to the dehiscence of the wound, which will most likely be an infection. To do this the patient may need a histological examination to define what is the germ responsible for the infection and thus to establish the correct antibiotic therapy to eliminate it.

The area where the fistula is located does not allow the use of devices such as the negative pressure therapy (NPT) that in these cases could help to foster the acceleration of filling the fistula with granulation tissue.

Instead it might be useful the hyperbaric oxygen therapy (HBO): a therapy based on breathing pure oxygen under pressure, in a particular pressurized environment (hyperbaric chamber). The pressure allows the diffusion of oxygen in the blood in a ten times greater concentration than normal speed. The increase of oxygen in body fluids stimulates the synthesis of a gas, nitrogen monoxide (NO), which has a strong anti-inflammatory action, favoring the formation of new blood vessels (also through the recruitment of stem cells) and accelerates wound repair.

In addition, our patients have daily dressings made with different types of advanced dressings such as hydrogels in case the lesion has materials as fibrin

or slough, polyurethane foams which favor the emission of exudate and other materials chosen depending on the phase of the wound.

If results are not obtained in a short time we have the possibility to practice other types of upper level therapies such as the application of platelet rich plasma (PRP) issuing a series of growth factors that can accelerate healing processes.

Obviously what I have described is a case of treatment that must be evaluated with a visit in which we decide together the best path for your father after a careful evaluation of the clinical picture.

If you are interested or want a consultation can book a first visit at the Hyperbaric Centre by calling the Secretariat at (0039) 0544-500152.

Good luck. Best wishes, Klarida Hoxha

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## Tingling and isolated itching after diving



Hello Doctor, I am writing to deepen some symptoms that I had after a few dives in a week dedicated to diving during which it was doing three dives a day.

After the first day, after the third dive, I began to feel a moderate tingling in the left leg only in the area of the calf, shin and foot. The problem persisted and since the dives I did were within 30 meters, with no decompression and no go-up-speed over 20m/min, I took a Cardioaspirin and I postponed the issue to the following day.

At the beginning of the second day the tingling was slightly decreased so I did two more dives; I did not do the third though because the problem persisted and became annoying; so I took a second Cardioaspirin and, in order to rest I reached the total desaturation as indicated by the dive computer. I rested also because in those two days

and I was in bad psychological and physical conditions due to heavy work and travel. After the third day the tingling did not occur again, I was able to rest for good, but I experienced some isolated itching skin that lasted several days, located in various parts of the body, mostly on the legs, which were sometimes accompanied by local pulsations and sense of superficial arteries or veins obstruction: as if something was moving in them.

Things gradually improved and when I boarded the plane, after 16 dives and surface interval of 27 hours, I began to feel minor tingling that I fought with a Cardioaspirin.

Note that I have been diving for almost 20 years and I have never had such problems, even though I never studied the matter of the patent foramen ovale; the only unusual thing is that from not smoking or so (1 cigarette per week), in this holiday I smoked 4 cigarettes a day.

Thank you for the time you dedicated to me and I hope you can help also by indicating medical examinations.

**Dr Luigi Santarella responds**



Caro Remo, thanks for the attention and esteem.

The symptomatic episode you tell us is due, until proven otherwise, to decompression sickness (DCS).

Many factors may have favored the development of this disease, you tell us that in those days you were going through a period of severe fatigue and stress both physical and psychological. Many scientific evidences show that the state of physical and psychological stress, inappropriate diets and unhealthy lifestyles influence, through an increase in pro-inflammatory cytokines, making the body more susceptible to DCS.

We must also add that the high number of daily dives (three), given your physical or mental condition was not optimal and may have further encouraged the DCS.

Last, but very important, undesired decompression sickness (so defined to indicate that the dive profile was fully adhered to) can be caused for the presence of a Patent Foramen Ovale (PFO). This alteration of the atrial septum can allow the passage of air bubbles from the right heart to the left, avoiding the lung filter causing systemic embolic phenomena.

About 30% of the entire population, even the underwater, has a Patent Foramen Ovale (PFO): many people and so many divers are bearers of PFO but, fortunately, few develop decompression sickness.

The Hyperbaric Centre of Ravenna has developed a process of customized diagnosis, which allows the diver to clarify how this problem can be significant or not and how to dive safely.

Taking into account the different scientific evidence and the opinions of the leading experts in the industry, we have developed a diagnostic that provides:

-transcranial Doppler with sonographic contrast (up to twenty bubbles shows a minor problem).

-arterial blood gas analysis while breathing in pure oxygen mask with a high flow. A partial pressure of oxygen in arterial blood greater than 400 millimeters of mercury is in the norm, a lower pressure confirms the presence of a shunt in the circulatory system and enables an indication of how great it is

- Transcutaneous oximetry to validate the data of the blood gas analysis.

The final decision is mathematically certain:

- Less than twenty bubbles and blood oxygen pressure greater than 400 mmHg: the patient can continue diving

- More than twenty bubbles and pressure of oxygen in the blood below 400 mmHg: depending on the severity of the problem you decide whether to allow diving with prudential rules or whether to proceed to the closure of the shunt.

In case of closure of PFO, it is usually suggested a program of controlled diving in order to begin rehabilitation after the first check with transthoracic ultrasound, performed after a month after surgery. After six months from the closure there is the final visit for the go-ahead to diving without restriction (within the limits set by the patent).

My first advice is to try to maintain a lifestyle as healthy as possible with a diet rich in fruits and vegetables, very useful to reduce the acidity of our body and then fix one of the many factors favoring the development of bubbles.

Smoke-wise, literature is somewhat lacking, but it is nevertheless evidenced that, independently on other risk factors, it can cause

the manifestation of a more severe symptomatology in divers suffering from decompression sickness compared to that of non-smokers.

To exclude the presence of a patent foramen ovale, as desired, you can take contact the Hyperbaric Centre of Ravenna ((0039) 0544-500152, [segreteria@iperbaricoravenna.it](mailto:segreteria@iperbaricoravenna.it)) with a visit of the neurologist (dr. Paolo Limoni) for doppler and a visit of the diving specialist for the final evaluations. It runs every Tuesday and the commitment is of half a day.

A warm greeting, Dr Luigi Santarella

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## I closed the PFO six years ago. Do I need further checks to dive?



Good evening, I wanted to ask you some questions about the closure of the PFO, I apologize if I write some "blunder". I closed the PFO in the summer of 2009 in Florence and the doctor told me that I could go back to dive after a year. Since then I have not done any check (I was told that there was no need), but now with my desire to go underwater I wonder if it would be appropriate to make any specific check and if so, what are the ones offered by the Centre and the ones I should do outside. Looking forward to your response, I thank you I extend my greetings. Massimo

### ***Dr Luigi Santarella responds***

Hello Massimo, in case of closure of the PFO, it is suggested a controlled diving program in order to start rehabilitation after the first check with

transthoracic Doppler, executed a month after surgery. After six months there is the final visit for the go-ahead to dive without restriction (within the limits set by the patent). I therefore believe that the diagnostic-interventional process you had can be considered comprehensive and appropriate, so no additional controls are necessary in the absence of any symptoms correlated to decompression sickness. I suggest you do the normal annual visits for the non-competitive eligibility to diving and dive safely. We remain at your disposal for further information

Sincerely, Dr Luigi Santarella

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## Trimalleolar ankle fracture



On March 12, 2015 I fell while walking and I had a trimalleolar ankle fracture in my left foot, after which I was immobilized for two months.

My foot is always swollen and it is "dancer" position instead of "hammer". I wonder if there is a chance to do physiotherapy at the Hyperbaric Centre of Ravenna to recover the joint as soon as possibile, perhaps with hospitalization, since I am from Resana (TV).

If you could please give me an answer also about the necessary cost and time. Thank you and best wishes, Carla

### ***Paola Mengozzi, physiotherapist, responds***



Dear Carla, thank you for writing to the Hyperbaric Center for your ankle problem.

First of all I suggest a visit with the physiatrist Dr. Fontana who works with our Centre: he will assess your problem,

indicate if you need more specialist visits and set the best rehabilitation program for your case. Dr. Fontana will also tell you if you need, in addition to physiotherapy, some Hyperbaric Oxygen therapy (HBO) to speed the healing.

If you decide to book a visit, remember to bring the latest medical examinations related to the accident.

The Hyperbaric Centre does not hospitalize but if you decide to start physiotherapy here I can suggest structures affiliated with the Centre (hotels, bed & breakfasts, apartments) that are listed here: <http://www.iperbaricoravenna.it/it/hotel-convenzionati/>.

On the website of the Hyperbaric Centre of Ravenna, (<http://www.iperbaricoravenna.it/it/trattamento-di-fisioterapia-riabilitazione-post-traumatica-e-neurologica/>), you will find all information on the costs of physiotherapy.

If you want to ask for more information or decide to book a visit with Dr. Fontana and start physiotherapy, you can call the Secretariat of the Hyperbaric Centre at (0039) 0544-500152.

I hope I was helpful and I rest at your disposal for all possible questions.

Best wishes, Paola Mengozzi

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## Sudden hearing loss and injury to the auditory nerve



Good evening Doctor,

on Sunday, May 24, during the night, my father heard a loud hiss in his left ear and since then he suddenly lost hearing. Visited by an audiologist the day after, he had performed the hearing test and a lesion of the auditory nerve was envisaged. He

immediately started a drug therapy. It is now four days he has no improvements, on the contrary unilateral deafness and the presence of tinnitus and dizziness persist. We also scheduled an MRI to investigate the cause of the hearing loss, but it is still unclear when it will be performed. I wanted to ask if you think that a hyperbaric treatment can be effective (at least potentially) and what is the timing in which we can possibly hope to get results. Waiting for your reply, I send cordial greeting.

### *Dr Andrea Galvani responds*



Good morning Aurora, thanks for writing.

First, it is necessary that he undergoes the MRI to "study" the situation better.

The potential indication to a cycle of Hyperbaric Oxygen therapy is evaluated after consulting a ENT and requires a careful examination and analysis of the type of hearing loss on the basis of the audiometric examination report.

Keep in mind that the hyperbaric oxygen therapy offers the most encouraging results when it is started within the first 30 days of diagnosis. The timing to enter the cycle Oxygen therapy for patients with hearing loss is quite fast, and possible improvements can be seen at the first control, which is done at the end of the sessions in the hyperbaric chamber.

The process proposed by the Hyperbaric Centre of Ravenna for "sudden hearing loss with tinnitus" includes 15 initial sessions at 2.5 bar pressure: a session per day lasting slightly more than the classic OTI adopted by our Centre (for ear disease we in fact adopt a specific cycle called "alternated hyperbarism").

If necessary, this cycle of sessions can also be combined with a pharmacological therapy and possibly a cycle of neurostimulation with FREMS (Frequency Rhythmic Electrical Modulation System). If there is an improvement of hearing it is also possible that the physician assesses to extend the therapy and prescribes additional 10 sessions of HBO, upon a further check-up by ENT.

I hope I have answered your questions, for any information or to book a visit you can contact our office at (0039) 0544-500152.

I wish a great good luck to your father, and I wish you to solve this problem as soon as possible.

A warm greeting, Dr Andrea Galvani

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