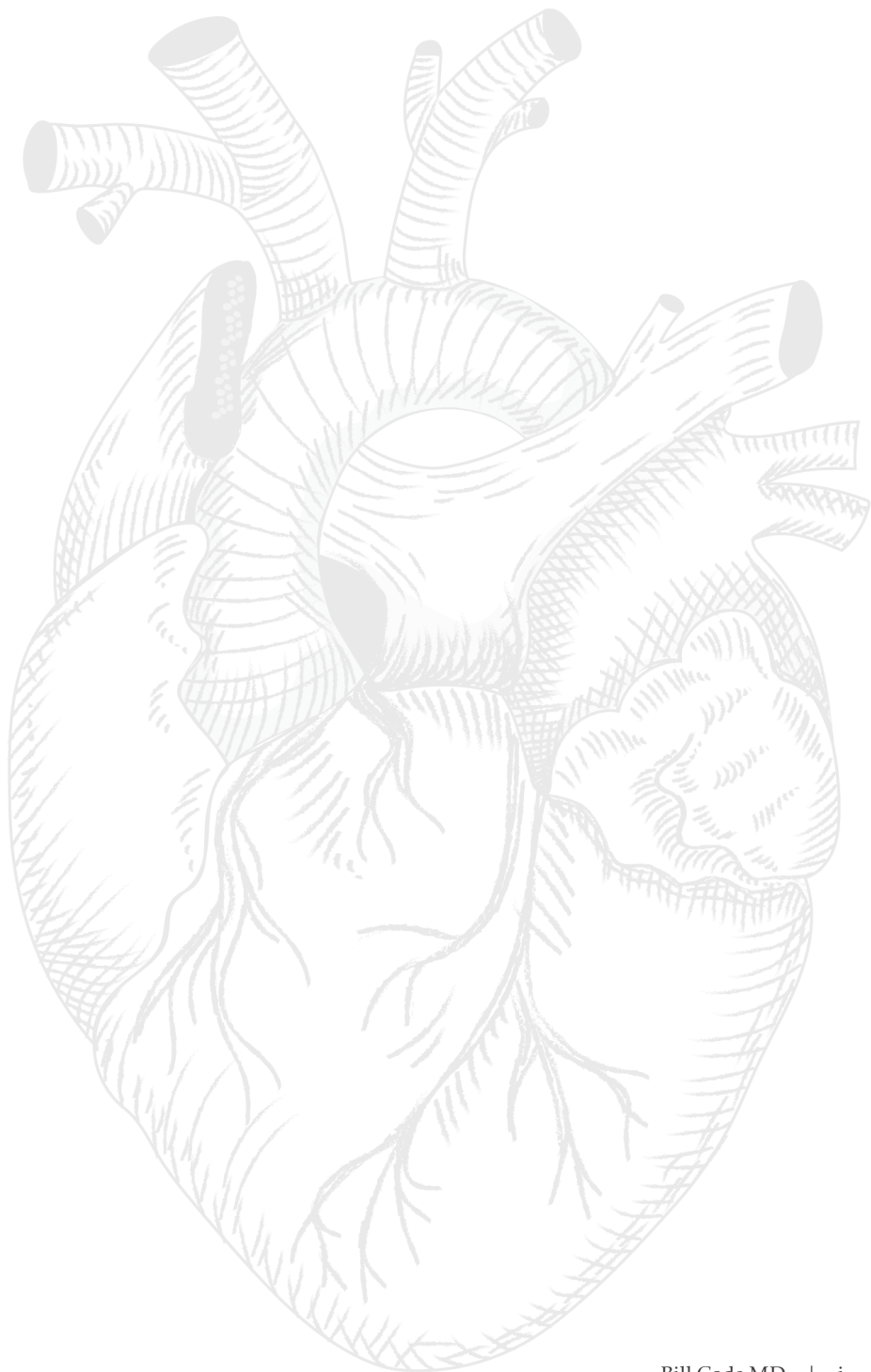




Solving the Heart Puzzle

An MD's Journey Through Oxygen, Omega-3s,
and the Science of Healing

— Bill Code MD —

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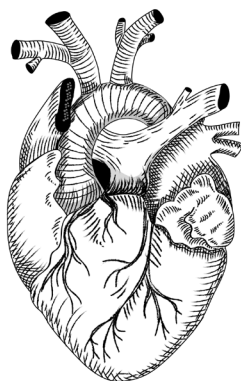
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CHAPTER 8

Concussion and the Role of Extra Oxygen

This is the beginning of the second part of the book in that I am primarily focusing on extra oxygenation after beginning this book with Omega-3 information including chapter 7, on Concussion and “The Omega-3 Protocol”.

Introduction

In the companion section of chapter 7, I described how omega-3 fatty acids — taken regularly as prevention and in higher doses after an acute brain injury — can dramatically reduce the damage caused by concussion and traumatic brain injury (TBI). Now I want to turn to the second major tool in our arsenal: more **oxygen**.

The brain is the most oxygen-hungry organ in the body. Although it makes up only about two percent of our body weight, it consumes roughly twenty percent of the oxygen we breathe. When a concussion or TBI occurs, the brain’s ability to use oxygen is disrupted almost immediately — even when blood flow appears normal on routine scans. This metabolic disruption is one of the key reasons why people can feel so profoundly unwell for weeks or months after what seemed like a relatively minor head injury.

The good news is that giving the injured brain extra oxygen — whether through a simple mask at home or through the more powerful technique of hyperbaric oxygenation (HBO) — is one of the most logical and evidence-supported ways to help the brain heal.

What Happens to Oxygen After a Head Injury

A concussion or TBI causes two waves of damage. The first is the immediate, physical injury itself — the brain being shaken or struck. The second, and often more harmful, wave is what happens in the hours and days that follow. Scientists call this the “secondary injury cascade”.

During this secondary phase, several damaging processes unfold simultaneously:

- Brain swelling increases pressure inside the skull, squeezing blood vessels and reducing oxygen delivery.
- Mitochondrial failure occurs — these are the many tiny energy factories inside each brain cell, and they are very sensitive to concussive forces. When mitochondria fail, cells cannot produce ATP (the body’s energy currency), even if oxygen is present.
- Inflammation erupts throughout the injured tissue, producing toxic chemicals (inflammatory cytokines) that injure neurons even further.
- Oxidative stress damages cell membranes, which are rich in the very omega-3 fatty acids we discussed earlier — another reason Omega-3s and oxygen work as a team.

Extra oxygen delivered to the brain interrupts all of these processes. It reduces swelling, helps mitochondria restart, calms inflammation, and neutralizes the harmful free radicals produced during oxidative stress. In short, it gives the brain what it desperately needs during its most vulnerable hours and days.

Two Forms of Extra Oxygenation for the Injured Brain

There are two practical ways to deliver extra oxygen to the brain after a concussion or TBI. They are different in power and accessibility, but both have a role depending on the severity of the injury and the resources available to the patient.

1. Home Oxygen (Normobaric Oxygenation)

This is the simpler and most accessible option. A portable oxygen concentrator delivers near-pure oxygen (90–95%) through a non-rebreather mask at 5 to 10 litres per minute, at normal room pressure (one atmosphere). This is the same type of home oxygen I describe in later chapters for headaches and stroke recovery.

For concussion, I recommend using home oxygen for 30 to 60 minutes as early as possible after the injury and even up to 4 hours. Then once or twice daily for 30-60 minutes during the first week of recovery. Even at normal atmospheric pressure, breathing concentrated oxygen significantly raises the amount of dissolved oxygen in the blood and brain tissue, helping to support damaged neurons while the body works to repair itself.

Think of it this way: after a brain injury, the brain is like a city that has just had its power grid damaged. The roads are still there, but many of the substations are not working properly. Home oxygen is like sending in emergency generators — it provides power to the parts of the city that still have intact wiring, keeping them alive until the main grid can be repaired.

2. Hyperbaric Oxygenation (HBO)

Hyperbaric oxygenation is the more powerful option. The patient enters a sealed chamber and breathes 100% pure oxygen at a pressure higher than normal atmospheric pressure — typically 1.5 times normal (1.5 ATA). This combination of increased pressure and increased oxygen dramatically boosts the amount of dissolved oxygen in the bloodstream — up to 10-12 times above normal. At these levels, oxygen can penetrate deeply into tissues that have reduced blood flow, reaching injured areas of the brain that home oxygen cannot easily reach.

HBO is not new. It has been used for decades to treat decompression sickness in divers, carbon monoxide poisoning, and non-healing wounds. What is newer — and very exciting — is the growing evidence that it can help the injured brain, even months or years after the original injury occurred.

Multiple clinical studies now show that a standard course of 40 HBO sessions (one per day, five days per week, over eight weeks), each lasting 60 minutes at 1.5 ATA, produces significant improvements in post-concussion symptoms, memory, cognitive speed, depression, anxiety, sleep quality, and quality of life — even in people who are still suffering years after their initial injury.

How Many Sessions and When?

Timing matters enormously with extra oxygenation. As I learned with Omega-3s, the earlier treatment begins, the better the outcome. This is because the secondary injury cascade unfolds over hours and days. Interrupting it early limits the total damage done.

For **acute concussion** (within the first few days): Dr. Paul Harch, a pioneer in this field, has reported that if HBO is initiated within the first few days of a concussion, as few as one or two sessions may be enough to resolve symptoms and prevent the development of post-concussion syndrome. This is a remarkable finding — it suggests that early HBO could function almost like emergency first aid for the brain.

For **persistent post-concussion syndrome** (symptoms lasting more than three months): The standard protocol in clinical studies is 40 sessions, delivered five days per week. Research from the Sagol Center in Israel — one of the leading HBO research institutions in the world — suggests that at least 40 to 60 sessions are needed to initiate and consolidate neurovascular repair, angiogenesis, and neurogenesis. In their 2025 study, adults who had suffered concussions as children showed meaningful cognitive improvements even decades after the original injury, following a course of HBO.

For **severe TBI** (in hospital): Normobaric extra oxygenation — giving high concentrations of oxygen through a ventilator or tight-fitting mask in the first 6 hours after a severe injury — has been shown to improve long-term outcomes on standard neurological recovery scales at six months compared to patients who received standard care alone.

If you do not have access to a hyperbaric chamber, home oxygenation remains a valuable alternative in the interim. It is not as powerful, but it is far better than nothing, and it is immediately available.

A Practical Protocol

Based on the available evidence and my own clinical experience, here is a practical approach to using oxygen therapy for concussion and TBI:

- Immediately after injury (first 24–48 hours): If extra home oxygen (ie a concentrator) is available, use a non-rebreather mask at 8–10 L/min for 45–60 minutes. Repeat two to three times per day if tolerated. If a hyperbaric chamber is accessible, seek HBO within the first 72 hours if possible — even one or two sessions may significantly reduce the severity of post-concussion symptoms.
- First week of recovery: Continue home oxygenation once to twice daily. Combine with the Omega Protocol (high-dose Omega-3s as described in the companion section Chapter 7). Ensure good hydration and gentle rest — but do not encourage prolonged complete inactivity, as gentle activity has been shown to support recovery.

- Persistent symptoms (three months or more): Seek a formal evaluation at a hyperbaric oxygenation centre. A course of 40 sessions at 1.5 ATA is the best-evidenced protocol. Do not be discouraged if access is delayed — HBO has shown meaningful benefits even years after the original injury.
- Combination therapy: Oxygenation and Omega-3s are a powerful team. Both reduce inflammation. Both support mitochondrial function. Both have independent evidence behind them for TBI. Using them together makes biological and clinical sense.
- Photobiomodulation (infrared helmet) : As I have mentioned in other chapters on Headache, Stroke or Chapter 19: photobiomodulation (PBM) using a near-infrared light helmet is a useful adjunct when oxygen is not enough or effective synergy if both are used together. PBM works by a different mechanism — stimulating mitochondrial cytochrome c oxidase directly with light energy — but shares the same goal: restoring cellular energy production in the injured brain.

Is Extra Oxygenation Safe?

For the vast majority of people, yes. Home oxygenation at the concentrations and durations I have described is very safe. With Hyperbaric Oxygenation (HBO) side effects are uncommon and typically limited to mild ear discomfort or sinus pressure — the most common being mild barotrauma (pressure discomfort in the ears, similar to what you feel in an airplane), which resolves quickly.

HBO should be used cautiously in people with certain lung conditions (particularly untreated pneumothorax — a collapsed lung). In addition, caution is warranted in people with severe chronic obstructive pulmonary disease (COPD). It is reasonable to apply 2 liters per minute with nasal cannula or prongs. If in doubt, consult your healthcare provider before starting any more oxygenation than this. A pulse oximeter and a personal attendant are likely all that is required.

Oxygen toxicity — meaning harm caused by too much oxygen — can occur at very high pressures (above 3–4 ATA), but is not a practical concern at the 1.5 ATA levels used in concussion/TBI protocols, or with home oxygen concentrators at standard flow rates and a non-rebreather mask for up to 6 hours.

Putting It All Together

For too long, the standard advice for concussion has been “rest in a dark room and wait.” We now know that this passive approach misses a crucial opportunity. The hours and days after a brain injury are a biological window during which active, targeted intervention can make a profound difference to the final outcome.

Oxygenation—whether from a home concentrator or a hyperbaric chamber—is the single most direct way to address the core problem: a brain that is starved of the energy it needs to survive and repair itself. Combined with high-dose Omega-3s, which protect cell membranes and reduce inflammation from a complementary angle, we now have a two-pronged biological response to concussion that is both logical and increasingly supported by evidence.

None of these measures require a hospital. Many can be started at home within minutes of an injury. They are safe, accessible, and both are essentially free of serious side effects.

The message I want every reader to take away from this chapter is simple: if you or someone you love suffers a head injury, do not wait passively. Start Omega-3s early and at high dose. Get access to oxygen — either at home or hyperbaric — as soon as you possibly can. These are not exotic or experimental treatments. They are biological first aid for the brain, grounded in a growing body of solid science.

Your To Do List:

Suggested steps to protect brain health after concussion/TBI:

1. Take a Fish Oil/Olive Oil Blend, 0.15 mls/kg (0.07 mls/lb) daily
2. Exercise 5-6 days per week (Vibration unit, Exercise While Oxygen Training (EWOT), walk)
3. Daily oxygen with non-rebreather mask at 5 or 10 liters/min; 30 minutes twice a day

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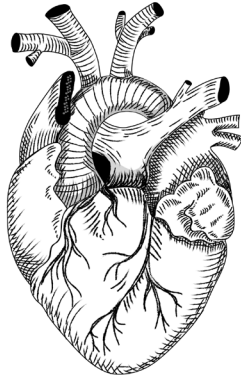
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Figure 5: Extra Oxygen for Concussion.

Shungite chair is optional, not required. It is exciting we now have two methods to assist folks with Concussion. The Omega-3 Protocol (earlier chapter) and now extra oxygen with an NRB mask for an hour as soon as possible and then 30 minutes twice a day as needed for symptoms.



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Just as it takes a village to raise a child, I have needed a village to write this book. I am grateful to everyone who have contributed to this end result. Inevitably, I will miss someone, and I sincerely apologize for that.

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Any errors you note in this book are my responsibility. Please forgive me and let me know for the next printing.