



**Wellness at Work**  
forensic bodywork

## What is the cause of PCS or Post Concussion Syndrome? Our therapists believe we know and this is how we treat it.

Although it is a remarkably common condition, PCS has no universally agreed-upon definition. It is normally considered to be post to minor head injuries and is defined by the absence of objective Neurological findings. Symptoms can persist for months or years after injuries, and current data is unclear stating as low as 29 and up to 90 percent of head-trauma patients 'may' develop PCS.

The US Centre for Disease Control describes PCS as a collection of signs and symptoms that occur after a head injury in four distinct categories and PCS is typically diagnosed when three or more of these signs or symptoms are present for three weeks or more. For concussion patients examination is necessary to rule out internal brain bleeds and PCS must also be differentiated from PTSD / post traumatic stress disorder, depression and fibromyalgia. Unfortunately any of these conditions can be present simultaneously and any one of them can make the other symptoms worse.

Getting a concussion is bad enough by itself, the sickening shock to the head of something hitting you so hard that it rattles your brain, makes you feel nauseous weak and dizzy, it can darken your vision and focus to where you might momentarily blackout, vomit, or 'go unconscious'. The symptoms should fade fairly quickly but what happens if they don't? What happens if they continue for days, weeks, months even years? What you have now is PCS or Post concussion Syndrome. PCS refers an ongoing range of symptoms that can follow on from a mild (TBI) Traumatic brain injury or concussion and normally PCS is diagnosed when at least three symptoms are present following a head injury, they are: dizziness, fatigue, and headaches.

Symptoms can appear within days of the concussion sometimes however, it can take weeks or months for the symptoms to appear. Despite significant attention and research with specialists using the latest MRI's, Sonograms and Neurological techniques, it is not known what actually causes the onset of PCS, or why for some people it can linger on, for months, years, and even decades. One study showed that between up to 50 out of 100 people with a mild head injury had symptoms of PCS three months after the initial injury. Another found 40 out of 100 people still had symptoms one year afterwards. While most patients with post-concussion syndrome fully recover, it is difficult to predict when this might occur. PCS usually goes away within three months, but there have been cases that have lasted years or even decades

A large number of theories have been put forward as to why individuals are experiencing PCS symptoms. As we mentioned earlier no definitive answer stands out, and while this search goes on, PCS continues to alter personalities, destroy remarkable athletic careers and restrict the ability of millions to have a normal healthy life. Many PCS sufferers are unable to work, drive cars, play sport, and relate to anyone, including their own families.

Since 1997, Wellness at Work has been delivering treatments for chronic health conditions on a 'No change No charge' basis. That is; if you do not have positive outcomes after completing treatment, we will refund your fees in full, and, we have a very high success rate with over 98% of our patients experiencing positive outcomes. Our therapists also have a theory on what causes PCS and it stems from our "forensic bodywork" outcomes in successfully treating a wide variety of chronic and intractable Myofascial injuries, including PCS. Two years ago we began to successfully treat PCS by treating what we believe to be the cause, chronic Myofascial pain!

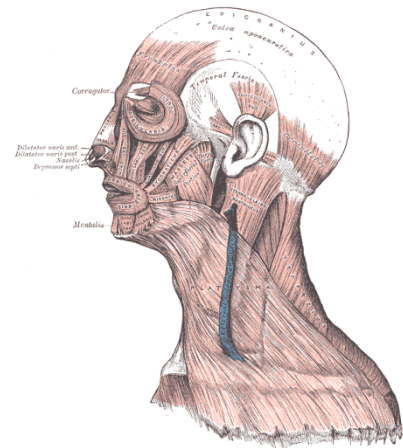


Results over the past two years have encouraged us to share what we have learned in the hope that this creates many more successful outcomes for this condition and expands into useful dialog on effective treatments for PCS. To do this we need to provide some background on this condition and to discuss 'the body's multi tool' for injury repair' Myofascia or as it's commonly known, Fascia.

Fascia is a gel, as a gel it can vary from being liquid and runny like jelly on the stove, to being extremely hard in the same way that jelly forgotten in the back of the refrigerator for a few weeks now requires a knife to cut it out of the bowl. This gelatinous property is useful to the body as Fascia is woven into a web like structure then used to contain all of our muscles. Fascia is what stops your muscles from bursting and ligaments and tendons from tearing off you bones. It also protects nerves, blood vessels, bones and organs from damage and it's pretty much everywhere. Because it's so strong (fascia it can withstand up to  $141\text{kgm}^2$  or 2000 psi of pressure) it's the adhesive used to glue scars together. Yet with just a small change in your body chemistry fascia can be so liquid that it's used to allow our muscles to glide past each other. It's very useful stuff to know a bit about!

The most abundant connective tissue in the body, fascia is also regarded by many to be 'the most pain-sensitive tissue in the body'. Made up of Proteoglycans PGs and Glycosaminoglycans GAGs fascia can change its state when you are injured to tighten and contract. If this happens Fascia can form within its structure microscopic traumas and scar tissue so thin it can be difficult to image even with the latest CT and MRI scanners. If there's ongoing pain at the site of the injury, the fascia there can feel like a hard painful lump, often too painful to touch and so painful that the slightest movement can be agony, and when it's like this it puts painful pressure on your nerves, organs, muscles and bones, including your skull.

Now the surface of the skull is covered by quite a bit of muscle, however the entire surface is also covered with a thin membrane called the 'epicranial aponeurosis' a fibrous 'fascial' tissue that envelopes the top of your skull. Basically it forms a shock absorbing helmet very like woven carbon fibre. One reason head wounds bleed so profusely is because these tough fibres prevent your blood vessels from contracting so they can't close up to slow down the flow of blood like normal soft tissues.



Embedded throughout these myofascial structures are extremely fine sensory neurons or nerves and the central nervous system receives its 'greatest amount of sensory information' from this huge array of sensors. Yet we know very little about them. What we do know is that these microscopic mechano-receptors are found almost everywhere in the body, and the highest density is in the thin tough sheath that surrounds every single one of your bones. This connective tissue is called the 'periosteum' this material also covers your skull where it's called the 'pericranium'.

This thin sheath of fascia has a high level of neural / nerve innervations within it and this nerve level can and does change after an injury. Once injured your immune system embeds more nerve at the injury site to remind your not to injure it again. In a similar way to when you see someone strapping a sports injury. It's to remind the brain "this is injured here!"

Recent insights into the physiology of pain have shown that several types of fascial receptors function not only as pain receptors but also as 'mechanoreceptors' that is they sense movement but also react to the presence of pain. When they react it is often with strong and chronic firing of these pain receptors. This explains how that throbbing aching pain can exist even without any pressure or irritation to the surrounding nerves.



It's important to note that Myofascial pain, affects up to 85% of the general population and fascial pain is statistically 'the highest reason for MD visits in musculoskeletal pain events' and, fascial "trigger points" play a central role in the pathology of all common myofascial pain syndromes. These trigger points are defined as hyper-irritable spots that can usually be found within a taut band of skeletal muscle or in the muscle fascia itself. They are painful on compression and can give rise to characteristic referred pain, motor dysfunction, and autonomic phenomena such as muscle spasms.

At injury sites all over the body significant abnormal spontaneous electrical activity has been observed. Several biochemical and inflammatory mediators appear to be involved in subsequent nerve remodelling, remodeling that's been shown to be present in the peripheral and the central nerve system. Understanding the causes of trigger points and myofascial pain still requires further significant research. We believe a treatment knowledge gap exists in this field and creates an evidence-to-practice care gap, "it's not what you don't know in treating in these injuries it's what you don't know what you don't know". In performing our treatments, we focus on releasing these microscopic myofascial adhesions and tissue injuries on the surface of the skull by working directly on the fascial helmet covering the skull.

Part of the challenge in understanding all the complex pathogenic pathways that lead to myofascial pain may be that it's a complex stress response, one that extends beyond the localised injured area. Because your brain and your hormones get involved, the problem can become a whole body problem. Risk factors can elevate your chances of PCS such as a pre-existing medical or psychological condition, being female, or a bit older, all increase the chances that an impact may trigger PCS.

Again some of the symptoms of headaches, dizziness and sleep disorders are often experienced by people diagnosed with depression, anxiety and PTSD / post traumatic stress disorder, so some health experts suggest that PCS symptoms are related to "psychological factors" or "it's all in your head!"

Others propose that structural damage to the brain itself or a disruption of the brains neurotransmitter systems by the impact could be the cause. Or, it may be that all these symptoms flow from a combination of these traumas, and that the physiological effects of brain trauma and the emotional reactions following on from these events play a role in the development of PCS symptoms.

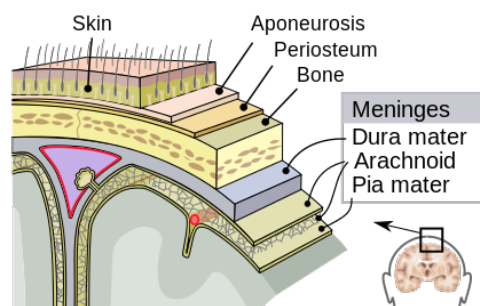
The actual symptoms of PCS are: Headaches, dizziness, vertigo, fatigue, memory problems, trouble concentrating, sleeping problems, insomnia, restlessness, irritability, apathy, depression, anxiety, And personality changes, plus a sensitivity to noise and light.

Because the symptoms can vary an (MRI) magnetic resonance imaging or (CT) computed tomography to make sure there are no significant brain abnormalities is advisable and although rest is often recommended after a concussion, it can perpetuate the psychological symptoms of PCS so gently getting moving as soon as possible is a good idea.

Many individuals suffer a minor trauma to the brain then later develop PCS, while others can suffer much larger trauma and do not. The syndrome and its diagnosis have been the subject of intense debate in the health sector for decades, with each specialist group weighing in and sure they have the answer only, to find the treatment they have developed is effective for only a few symptoms leaving people stuck in chronic states.

At Wellness at Work we think that it's something else entirely and recent treatment outcomes have guided us in a different direction of treatment. We treat the concussion impact sites as myofascial injuries, because 'we believe' the cause of PCS to be a dysfunction in the Myofascia causing a neural overload, and we have achieved excellent outcomes with these methods in our clinical interventions for PCS.

It's important to understand that the highly sensitive myofascial tissue on the outside of the skull was impacted in this injury process and we have repeatedly demonstrated that most of the symptoms such as headaches dizziness and disorientation experienced post concussion can be treated by treating the injuries you find of the surface of the skull, both in the muscles, and in the thin layer of myofascia that encases your entire head.



We believe that this residual damage to the derma and your fascial helmet contributes to and maintains many of the 'side effects' of concussion known as PCS.

Myofascia (or Fascia) is the tough outer skin of your muscles (the muscle sheath) it's also the glue that glues muscles tendons and ligament into bone and it's also the slimy stuff that lets muscles slide past each other when you're using them. If you've ever wondered what stops weightlifters muscles from bursting when they lift those hundreds of kilo's or why your muscles form the shapes they do? It's Fascia and it surrounds all your organs to acts like a shock absorbing gel to protect them.

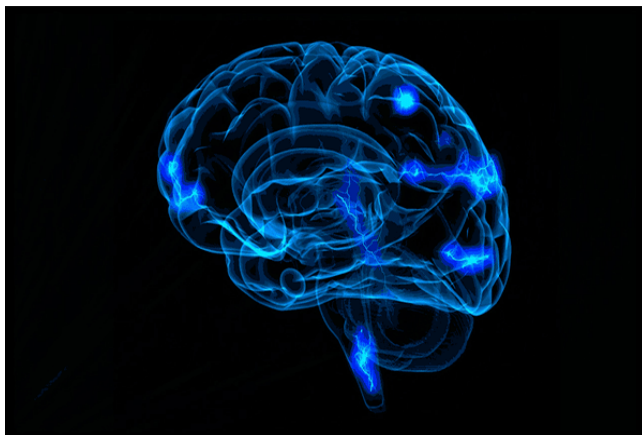
As we previously mentioned fascia is made up of Proteoglycans or (PG's) and long carbohydrate chains known as Glycosaminoglycans or (GAG's). One type of proteoglycan (CSPG) is involved in cell adhesion and receptor binding along with collagen and fibronectin. These PG's are known to inhibit or restrict axon or nerve regeneration in spinal cord injuries. It is now understood they play a crucial role in why the spinal cord is unable regenerate easily after injury. Essentially Proteoglycans act as watertight doors like those found on a ship, sealing off areas in the body and cells of all types are sealed off in this way to protect them from further damage. Unfortunately these doors need to be reopened for nerves to heal and re-grow.

PGs are molecules that bind with GAGs and both are found in the extracellular matrix (ECM) and are used in many important biological processes. Plus PGs are involved in the regulation of brain development, normal brain function and also possibly implicated in neurodegenerative diseases such as Alzheimer's disease.

When the PGs and GAGs in fascia combine with hydrogen and collagen, they form scar tissue. This scar tissue now has a 'tensile strength roughly 10 times that of steel' and because fascia can withstand up to 140 kg/cm<sup>2</sup> of pressure or 2000psi this ne3w structure is used to repair hold in place almost all of your injuries and it acts as the adhesive in all your scars, both externally and internally.

Of course the best preventing PCS is avoiding a head injury in the first place. Doing things like wearing your seatbelt while in a car, ensuring that children are in the proper car seats, wearing a helmet when participating in activities like riding a bike / motorcycle or playing sports, even paying attention to things around the home like head high open cupboard doors are all good ideas.

Presently no singularly effective treatment exists for all the symptoms of PCS. Your doctor may treat symptoms specific to you with medications, for anxiety and depression or may be refer you to a psychiatrist for psychotherapy treatment. Cognitive therapy might also be suggested if memory issues are present the drug, Amitriptyline may be prescribed to combat irritability, dizziness, and depressive symptoms plus antidepressants and/or anti-anxiety medications can be prescribed to treat depression, anxiety, and headaches. Clearly most PCS treatments focus on the impact of the skull on the brain. We focus on the original injuries themselves.



When we think of ourselves moving around we tend to think of our muscles doing that job. However we fire these muscles into action with minute electrical shocks and these small electric charges cause weak Electro- Magnetic Fields or EMF's to form within our bodies. A magnetic field is an invisible force field created by a magnet or the flow of electricity. The intensity of a magnetic field is usually measured in Tesla, but it can also be measured in Gauss. The intensity of the magnetic field decreases with distance from the field source so the closer you get to the magnet the stronger it feels to your body.

Many in natural health believe to most effectively use a magnet for any form of therapy, you need to get it on, or very close the injury site, and millions of people worldwide already use these therapies.



The brain is 'the source' of many of these small neural electric charges that move you around, so one of the part of the body that has quite high levels of magnetic fields is the brain. And, **because you guide you body electrically, and electrical currents form magnetic fields**, the study of the body's magnetic fields can, and is, delivering new forms of injury diagnosis and treatments.

Magnetic fields like this can be measured using a machine called a Magneto-Encephalo-Gram, or MEG. Currently MEGs are producing valuable new information about the normal human brain and brain abnormalities and recently the study of Biomagnetism is a promising new window into the human body, and into the brain.

Magnets and magnetic stimulation have been shown to be effective tools for diagnosing 'active' stump neuroma following amputation surgery. An active stump neuroma is a collection of nerves that have been severed or damaged in an amputation or severe injury. In a 4-month, double-blind, placebo-controlled study of peripheral neuropathies, (nerves that carry messages to and from the brain and spinal cord from and to the rest of the body are damaged or diseased) it was found that a significant reduction in symptoms were achieved when compared to a placebo.

The reductions in the symptoms of burning, numbness, and tingling were especially marked in those cases of neuropathy associated with diabetes. Additionally a 4 month large randomized, placebo-controlled study of treatment with magnetic products produced benefits beyond that of the placebo effect, reducing such symptoms as burning pain, numbness, tingling, and exercise-induced pain.

Using our Mustang Magnetic Massager® you are essentially able to do the same thing yourself, at home. We believe that by following our simple video program you will be able to locate and then treat cranial neuroma yourself. It's worth noting that extensive investigation has found no evidence of harm when magnets are used on the body and massage as well is also inherently safe.

Magnetic fields exist all around us. MRI machines expose the body to gigantic magnetic fields of around 15,000 gauss of magnetism 'albeit for a short period of time' and millions of people use static magnets daily or sleep on them every night so are subjected to low levels of magnetism for long periods of time. So far, it is has not been shown whether this type of long duration exposure has any deleterious effects however one study in which participants slept on a magnetic mattress pad every night for 4 months, found "no side effects".

There are a number of theories on the best size and type of magnets to use for therapy, and where to apply them based on the condition being treated. Unipolar magnets have greater depth of magnetic field penetration so some researchers consider these more effective in treating deeper tissues. Conversely, it is considered that alternating-pole magnet devices may be more effective at stimulating surface tissues. Thus it might be appropriate to use a unipolar high-gauss magnet for pain that originates deep in the tissue and an alternating-pole magnet for an injury closer to the surface. However, there is no meaningful scientific evidence to support these distinctions.

Each ball of a Mustang Magnetic Massager is 1400 Gauss delivering a total magnetic field of 9800 Gauss with alternating polarities, and as we mentioned earlier, alternating polarity magnets are considered by many researchers in the field to be "the most effective for surface tissue injuries".

A Mustang Magnetic Massager will not only help you to locate old or new injuries and trigger points, it will help you to rapidly release and safely treat them as well. By altering the biochemical states in these tissues the treatment restores proper long-term control of blood flow and the delivery of oxygen and nutrition to skull and the fascia. This enables these tissues to completely relax so nerves that are in neuroma states can remodel, releasing existing adhesions and trigger points and decreasing pain.

Other recommendations for treatment are: Don't rush back into things - it is generally advised that anyone who has had a head injury should take things slowly. If possible, try to return to your usual activities gradually after a head injury. Sleep hygiene - if you are having problems sleeping and are feeling very tired, try to stick to a regular schedule. There are medications to help with symptoms and your doctor may: Pain-killers for your headaches, nausea medication to help with nausea, or an antidepressant, if you have symptoms of depression. It's important to keep your stress levels down and avoid alcohol and recreational drugs.

If your symptoms are prolonged or particularly troublesome, your doctor may suggest referral to a specialist used to dealing with problems related to head injury. This may be a neurologist, who specialises in problems of the nervous system, or a neuropsychiatrist or neuropsychologist, who specialises in problems relating to the brain and mental health, or a rehabilitation medicine specialist. There are various other healthcare professionals who may be able to help in your rehabilitation including occupational therapists and physiotherapists and of course massage therapists. Any one of them may help you to develop strategies to cope with memory, concentration and other problems. Cognitive behavioral therapy and relaxation techniques may also be helpful for some people.

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## PCS symptoms and treatment test.

Instructions: Enter 0-3 for each symptom that best describes your level of discomfort

**None (0) – Mild (1) – Moderate (2) – Severe (3)**

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### 1 – 3 Symptoms

1. Headache

0  1  2  3

2. Feeling of dizziness

0  1  2  3

3. Nausea and/or vomiting

0  1  2  3

### Section 2 – 13 Symptoms

1. Noise sensitivity (easily upset by loud noise)

0  1  2  3

2. Sleep Disturbance

0  1  2  3

3. Fatigue, tiring more easily

0  1  2  3

4. Irritability, easily angered

0  1  2  3



5. Feeling depressed

0  1  2  3

6. Feeling frustrated or impatient

0  1  2  3

7. Forgetfulness, poor memory

0  1  2  3

8. Poor concentration

0  1  2  3

9. Taking longer to think

0  1  2  3

10. Blurred vision

0  1  2  3

11. Light sensitivity (easily upset by bright light)

0  1  2  3

12. Double vision

0  1  2  3

13. Restlessness

0  1  2  3