UNDERSTANDING PAIN AND PERSISTENT PAIN

There is compelling research that suggests that having a good understanding of pain based on the available science can aid recovery from injuries and persistent (chronic) pain situations.

So how does this work?

First let's consider the difference between pain itself vs the electrical signals (nociception) that injuries create:

The nervous (or neurological) system has fibres all over the body and skin that sense things. But what is it that they sense? Actually they do not sense or transmit 'pain' directly. They only sense changes in either pressure or temperature ie: from injury, injury-related chemicals and swelling, and changes in body 'wear' (also called degeneration).

These sensory fibres are called *nociceptors*.
(Pronounced: Noh-see-septors – it is easier to pronounce the word PAIN!)

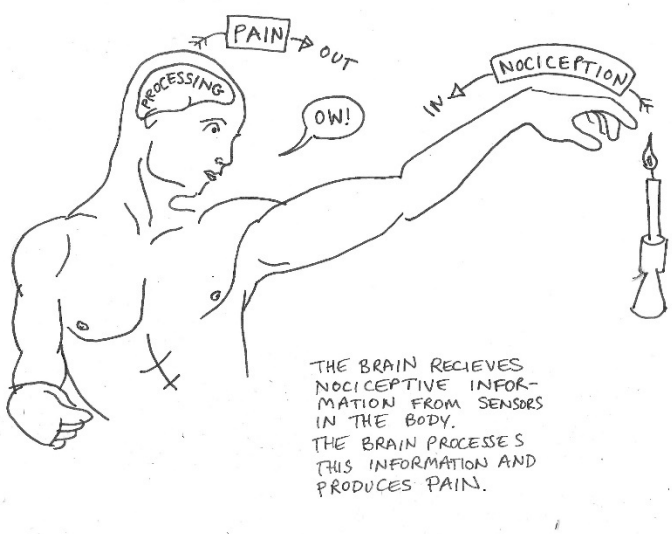
Having sensed these potentially damaging changes in the body tissues, nociceptors create very rapid long-ranging electrical signals that are relayed through the spinal cord to higher brain centres. This electrical signal activity is called NOCICEPTION.

When these messages are received in the brain, various areas in the brain work together like an extraordinarily powerful computer processor (also incredibly quickly) to try to work out how much danger your body tissues are in.

If this process determines that danger is present, the brain then creates a complex variety of responses including the beginning of the healing response. As part of this protective response it also produces unpleasant sensory, emotional and psychological experiences that are what we then perceive as PAIN.

This pain response is actually part of the brain's attempt to protect us from further injury.

- Nociception is the INPUT part ie: signals to the brain.
- Pain is the OUTPUT part ie: signals to the body and other parts of the brain and nervous system.



NB: As stated, pain is a protective mechanism and so it is a GOOD thing. A small number of people have been identified who genetically lack the wiring for pain. These people end up with multiple deformities due to unprotected injuries that become further damaged.

Damage and pain aren't always related

The very interesting thing that research has discovered consistently is that PAIN can be created by the brain without any NOCICEPTION input at all.

The brain can create a pain response even if it just thinks that there is danger present!

And quite often the amount of pain that the brain creates is out of proportion to the amount of input signalling, depending on many factors.

Finally, pain can persist long after injury healing is complete and after the tissues have re-adapted if danger or any threat is still perceived for ANY reason.

So, the brain has a 'pain equation' to work out -

**** Pain will be present and persist as long as the brain perceives that there is more evidence of 'danger' than there is of 'safety' ****

This process is also influenced by individual genetic and psychosocial factors, the context of the problem and past experiences. In actual fact, in the majority of the situations it is the CONTEXT of an injury that is the best predictor of then degree of pain and the overall outcome and not the structural changes discovered.

For example, this is one of the biggest reasons why people recover comparatively very well in a 'sporting' context, yet relatively very poorly if in a 'compensation' context. Studies show that if people simply have someone to blame for their injury, chronic pain is more likely to result. This pain is similarly very 'REAL'; it is not imagined.

ALSO - most people can think of either personal experiences or stories that illustrate situations where pain was not felt but a significant injury was present. An injury like this was either not associated with fear ie: there was no awareness that it happened, or the situation was such that not having a fear response and not producing pain was a more important priority (eg: for survival) at that time.

Neuropathic Pain

Neuropathic (Nyoo-row-pathic) pain usually refers to a situation where nerves are physically damaged or compressed. This type of pain is more susceptible to amplification, probably because of direct nerve involvement. Like degeneration and disc injury, we will often see nerve compression on scans with minimal pain and with no pain at all.

Scans don't tell the whole picture

Most doctors will agree that what they see in patients and what is generally seen on x-rays and scans does not correlate all that well at all with how people actually feel.

SO –

people can feel lots of pain and have very little to see on examination and on scans / other investigations,

AND ALTERNATIVELY –

people can have little or no pain and have much to see that looks damaged or worn out on scans,

AND-

There is everything in between as well!!

THEREFORE-

It is VERY important to look at the whole situation and not just worry about the scan.

IN FACT-

If you worry excessively about the scan YOUR PAIN WILL LIKELY BE WORSE!! And now you know why …

*** because FEAR / CONCERN / CONFUSION influences PAIN more than anything else ***

The body is usually an AMAZING healing and adaptational machine, but this works best if the body and the brain are working together. The great majority of injuries heal very well and the very great majority of degenerative, 'wearing out' conditions either DON'T result in pain or only produce pain for short periods of time while the body and the brain re-adapt to the changed situation.

ALL degenerative structural changes can be observed in people with LITTLE or NO symptoms

There is no evidence that the discovery of degenerative changes has any positive connection to future pain outcomes. Degenerative changes are normal changes that we all have as we grow older. The vast majority of such changes cause NO symptoms or minor symptoms, so it is not a DISEASE at all by definition despite very commonly being described as 'degenerative disease' by health experts.

So be very wary if you are told otherwise as this information will probably just worry you needlessly and then it is quite likely that your pain will be worse.

It is interesting that despite advances in technology, therapy options and surgical innovations in the past two to three decades, persistent spinal and other musculoskeletal pain has increased substantially in the same period, especially in Western Society and this is across all age groups. This implies that we have a problem with our current approach.

How is this all happening? - The brain's hand on the pain dial.

Positive information and a positive context can facilitate a PLACEBO effect. Most people know placebo as a "sugar tablet" and know that this can produce a positive response despite being inert ie: having no active ingredients. Placebo studies have shown that this is not just a psychological effect but results in actual physiological changes which can be measured!

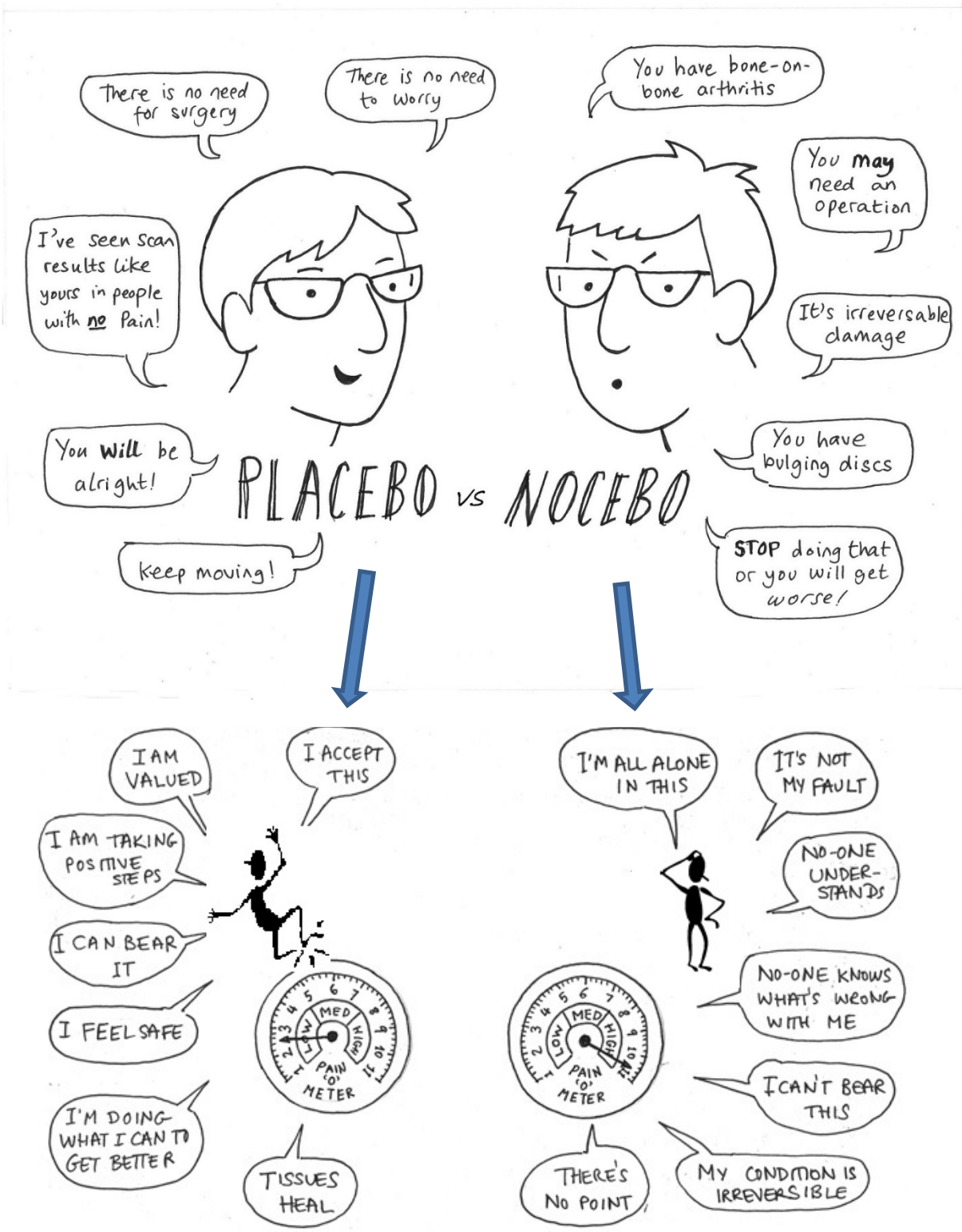
BUT – placebo has an evil twin brother called *NOCEBO !!* ie: the opposite occurs.

A negative context or negative information can create the opposite psychological / physiological response which can result in alteration to neurotransmitters (nervous system chemicals), changes in the immune system, increased inflammation, AND PAIN.

UNFORTUNATELY, the current orthopaedic medical system contains quite a lot of NOCEBO information. 'Expert' opinion may, and often does, contain scientifically questionable conclusions and speculations which are perceived as factual by patients. This can be a major problem if these are inaccurate and then feed into the 'DANGER' / PROTECTIVE part of the brain's pain equation unnecessarily. Speculation and inaccuracy is not uncommon – please consider how many different body based diagnoses are offered to people in chronic pain. They can't all be correct, can they?

** In reality, in the vast majority of cases, the human body is a WONDERFUL adapting and healing machine **

BUT I REPEAT, for this to happen optimally, THE MIND AND THE BODY HAVE TO BE WORKING TOGETHER AS A TEAM.



PAIN SENSITISATION & NEUROPLASTICITY

UNFORTUNATELY the longer and more persistent the PAIN is, the better your brain is at creating and amplifying the pain experience for you. This is like a broken central heating thermostat system that keeps warming up the house because it is not reading the temperature properly. It is called SENSITISATION.

This eventually changes and becomes an imprecise process which explains why the pain often seems to change, 'spread' and 'amplify'.

NB: This pain can also be remarkably resistant to almost all forms of management, even very strong painkillers including morphine. Pain is surprisingly common after surgery that is considered structurally successful and was intended to manage the pain in the first place.

BUT, the best way this horrible process can be turned around safely is to first fully understand how pain is processed and then be guided through a rehabilitation program progressively, with perspective and confidence that no harm is being done, and to 'NORMALISE" your activity as much as possible.

*** It is extremely important to be able to understand that even though it hurts, there is NO HARM ***

The process of NEUROPLASTICITY describes the way in which the brain's neural connections and pathways can be altered throughout life as an effect of environmental (the 'CONTEXT') & behavioural factors, thinking & emotions, as well as by changes resulting from bodily injury. This can occur in a negative way (this is called 'maladaptive neuroplasticity') and is then able to result in persistent sensitised pain. Importantly it can also be facilitated to occur in a positive direction ('adaptive neuroplasticity') and reverse the situation. This process reduces and de-sensitises pain back to normal protective levels. This re-adaptive process is based on a solid foundation of PAIN LITERACY (knowing pain).

KNOW PAIN. KNOW GAIN.

(PS: unfortunately for many this could also be ***"Know pain <u>OR</u> no gain!***)

References & Resources

There are a huge number of available scientific language references for the information provided here – these are available on request.

Some very useful patient resources and links to explore this area further are available on my website directly – www.painliteracy.com.au

PAIN IN THE SPINE

Spinal pain, and in particular low back pain, is a good common example of how things can go wrong.

Firstly, it is possible to have all the scans completely normal and yet pain occurs and persists. There may be a stigma associated with this pain and in certain circumstances there may be insinuations about the legitimacy of the complaint. This is a particular problem in compensation cases where there is often a perception of blame. Studies show that injuries in the setting of having someone or something at fault are associated with worse outcomes!

Next, people with identical changes in their spines shown on scans may have totally different pain experiences. In all cases the back problem may be sending out signals, but each person has a different pain experience. 'Context' factors that affect pain include sleep disturbance, fatigue, depression, stress, worry, previous pain experience, family or work pressures and medications.

Also, even when advanced changes can be shown on scans, frequently there is no pain. Over the age of 20 our bodies start to age (otherwise known as degeneration). The spine too undergoes changes involving the discs and the side 'facet' joints that show up gradually. About 30% of the population shows such changes by the age of 30 with early signs of disc space narrowing and by age of 40, 50% of the population shows changes, including osteoarthritic changes of the facet joints and disc bulges, with no symptoms or awareness.

As the joints age we gradually lose our flexibility. It may be that some change or sudden trauma stirs up / strains an already stiff degenerative joint; in other instances pain comes on gradually.

The interesting thing is that even when the pain is severe and the protective spasm sets in, scans cannot reliably detect the actual injured 'spot' in the spine. The changes can be small, invisible or non-specific. So, it is probably like having a 'small noise' next to a very large 'amplifier'.

If you are told that you have 'prolapsed a disc' or similar, it is simply most often not relevant to your pain. It almost certainly was there for a long time before your pain started.

These days many people are told their backs are 'unstable'. This is a concept which is not black and white and there is not much agreement on what it even means. Studies show that such 'instability', even when seen on scans as defects in the bones and vertebrae that aren't in a straight line, is present in as many as 11% of younger and middle aged people who do not know it is there and it doesn't change significantly with time.

However, all this information does is create concern and fear regarding the consequences, which then sets up the scene for amplified and potentially long lasting and disabling pain outcomes.

NB: There is research emerging that doing scans in similar situations is associated with WORSE outcomes, not better ones and that is a major concern. The likely reason for this result is that the findings create unnecessary anxiety if not interpreted properly, making the brain think that there is much more danger than there is realistically.

As stated before, what we also know is that the longer you have spinal pain, the more it tends to spread to nearby areas via neuroplasticity changes and sensitisation of the nervous system. Over time it can even spread from one side of the body to the other side and up and down the spine. Interestingly it can also spread to wider areas of the body as well. There are many names and theories for this type of result including the description 'fibromyalgia', but it is all almost certainly the same process.

This type of sensitised pain is more often poorly responsive to medication; even very strong and potentially addictive painkillers. If your brain and nervous system are sensitised and create this type of protective pain for you, then it does not behave like normal pain and does not respond predictably to treatment including surgery. Surgery can create a worse pain outcome even if structurally successful; this is then called 'failed spinal surgery syndrome'.

Myth busting

There are a lot of myths regarding chronic / persistent pain - here are a few answers.

1. ***Degeneration is always progressive and the pain can only get worse.***

    - Degeneration is usually painless and therefore there is a good chance that any pain will again settle once it re-adapts no matter how bad it 'looks'.

2. ***If it hurts to move then it is better to rest.***

    - Too much rest is harmful for the spine. Sometimes the protective pain will inhibit movement and then a vicious cycle results in progressive stiffness through avoiding activities causing more pain. It is better to try to stay as active as possible.
    - Improving general fitness via regular aerobic exercise, not smoking and some weight loss if required is VERY beneficial, but it is probably best to get advice from an appropriate reassuring professional on how to progress if you are unsure.

3. ***Regular manipulation or similar treatment can reverse the degeneration seen on x-rays.***

    - No medical or other therapy can ever reverse degeneration, but it is thought by many that therapy may help relieve stiffness and reduce input to pain.

4. ***Pain is a sign of damage. Severe pain must mean something is seriously wrong.***

    - Pain is determined by the brain's perception of danger and is not proportional with tissue damage. The context of the pain is the main influencing factor.

5. ***Once pain has set in it will never go away.***

    - This is NOT true at all unless in very unusual circumstances or if you believe it to be true.
    - It is important even after a long period of pain to try and remain positive, and understanding how it all works can make a big difference to slowly switching off the 'protection'.
    - Once you understand pain, other treatments then work better!
    - Other treatments are emerging, including medications which assist to de-sensitise the nervous system. When appropriate, these have a role but are best applied once pain is understood properly. They should be considered a 'circuit-breaker' rather than the total solution.

6. ***Surgery will 'fix' the problem.***

    - Surgery changes the structure; it doesn't restore it to 'normal'.
    - Surgery unavoidably creates varying degrees of scar tissue extending all the way to the skin. This can and does produce nociceptive and neuropathic signalling input to pain.
    - A few accepted orthopaedic surgical procedures have now been subjected to 'fake surgery' comparisons with similar outcomes ie: they work indirectly through a placebo effect when success is perceived. Most operations for pain have not been studied in this way yet and may prove similarly ineffective via direct effects.
    - Surgery is never without risks and complications that can be life changing and irreversible. Surgery is then a 'point of no return'. It should be considered very carefully.
    - Surgery can be completely structurally successful and pain can persist or even worsen. Now you know why.

Where to from here? – pathways back to wellbeing

1. EDUCATION:

- The first and most important step is to understand what it is all about and have the full perspective on your condition. Hopefully you are on your way to that, then …

2. ACTIVE REHABILITATION:

- You've heard the term "use it or lose it". It is true! If we just lie around and rest all day our muscles wither away, our bones become brittle and our joints stiffen up. Regular exercise is important for the back and all other areas, even if you are feeling sore.
- Start a guided and appropriately reassured rehabilitation program, increasing intensity progressively. Have confidence that no harm is being done, and commence 'normalising' your activity as much as possible.
- Initially it will probably hurt but with time it should gradually get easier. Physical therapists can assist with an exercise program that is achievable.
- Think of it in terms of a 'pain hill' that you need to climb to get to the other side. Just take small steps forward initially and it is perhaps best not to make the pain hill 'too steep' (ie; stimulate too much pain) or you may simply roll backwards again.
- It is only through regaining movement, fitness, confidence and normality that pain can settle via a positive and re-adaptive neuroplasticity process.
- Rather than looking too far ahead, this is best done by setting goals, achieving them, and then setting another goal.

3. DON'T IGNORE YOUR THOUGHTS OR EMOTIONS:

- Being in pain is exhausting and stressful. If you have trouble coping experienced psychologists can help. Depression, sleep problems, over-eating, negative and catastrophizing thoughts are all features that almost inevitably accompany the persistent pain experience.
- People often think that their psychological problems are secondary to their pain and the pain must be fixed to fix the psychological problem. The opposite is probably true but at very least you cannot reliably fix one without the other. They are linked tightly together.

4. MEDICAL PROCEDURES, TREATMENT & MEDICATION MAY BE PART OF YOUR RECOVERY:

- Sometimes the pain is just too great to move much and pain medication, injections or manual therapy may be used to reduce the spasm and take the edge of the pain. These interventions are rarely a cure; they just reduce the pain and spasm and allow movement which in turn stimulates the body to heal itself. They are best thought of as 'circuit breakers'. The treatment is the exercise rehabilitation with a foundation of pain literacy.

5. TAKE YOUR PAIN INTO YOUR OWN HANDS:

- The most important person who can help you is you. If you smoke or are excessively overweight you need to try to take control and try to do something about it.
- Work on your mental health. Find what works for you to calm the mind. This is your journey and your personal preferences are the keys to your recovery. It might be that meditation, gentle yoga, nature walks or a hearty laugh with friends is your best way of 'normalising', reversing the pain neuroplasticity processes and getting the most out of your life. Don't just sit around doing nothing.

- This next bit is confronting but important. There are broadly two relevant groups of people – 'victims' or 'survivors'. Don't be a victim and don't let the environment in which you find yourself in turn you into a victim. Surviving and thriving is much more difficult and hard choices need to be made.
- And always remember that pain is intended to protect you. However most often when pain persists in relation to your musculoskeletal system, it is there and can be very severe, but there is actually nothing to protect you from. All that is required for pain is that the perception of 'danger' is greater than the perception of 'safety'.

NB: If any new symptoms of concern develop, please bring these to your treater's attention to check out fully. It is important to ensure that there is no major illness evident, as very rarely medical problems can present with generalised or persistent pain but usually with other symptoms as well. These may require specific investigation based on these new symptoms. BUT REMEMBER, these are quite rare so don't worry unnecessarily.

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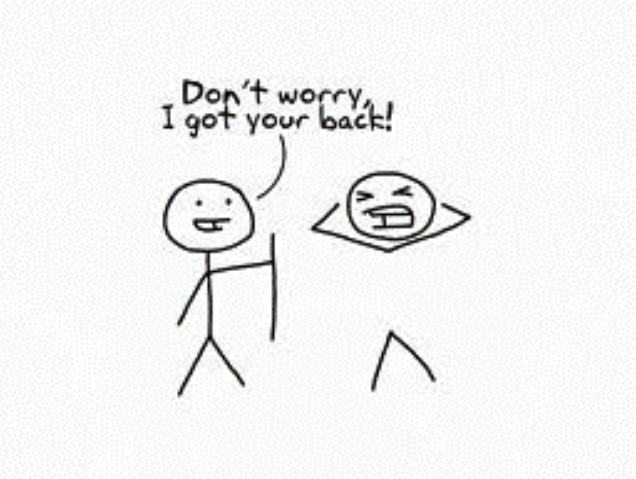
Any questions??
Feel free to ask.

Dr. Kal Fried MBBS FACSEP
Sports & Exercise Medicine Physician

REHABILITATION MEDICINE GROUP
Ground Floor, Suite 5, 999 Nepean Highway,
MOORABBIN VIC 3189
Ph: +61 3 95557769
W: http://www.thermg.com.au/
E: reception@thermg.com.au

BRIGHTON SPINAL GROUP
441 Bay Street
BRIGHTON VIC 3186
Ph: +61 3 95967211
E: manager@brightonspinal.com.au



NB: The material presented here is purely for information purpose and is intended to help patients better understand their health issues and to make informed decisions about their health care. Should you require management of a specific condition, you are advised to seek appropriate assistance from a suitable, qualified practitioner.