

Explaining Pain

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This is a short information slide show to help understand why pain sometimes becomes a persistent or chronic problem.

If you have had an injury or an operation, then pain is a useful protective signal. If you've broken your leg then it tells you to protect the injured part & not to jump up & down on it! This can be called ACUTE PAIN.

If the pain carries on after everything has healed, this is called PERSISTENT OR CHRONIC PAIN. This is often diagnosed after you have had pain for 3 Months. But we now know that the changes in the nervous system that amplify the pain and can make it more persistent can happen very quickly



CHRONIC OR PERSISTENT PAIN

There are lots of ways of describing chronic or persistent pain. For most people, perhaps the best way is to say that the pain carries on long after healing of an injury would have been expected to be finished. In this situation the pain is **not** useful – indeed it stops you doing things that you used to do & causes suffering & disability.

Chronic pain is very common. Around 1 in 5 people have continuous pain, some worse than others.

Of course pain is worrying to you. You feel that some damage is going on. Even if nothing can be found to explain your pain through seeing your doctor, a specialist, or doing tests, your nervous system carries on behaving in the same way - as if something was damaged.

This can be confusing for doctors as well as patients. Doctors are trained in diagnosing & treating diseases. If you have a chronic pain without an obvious cause, or if you have been told that surgery would not be useful, you can end up feeling that your doctor can't help you or understand your pain. Often you can get the feeling that everyone thinks that it is "all in your head". You may have been told you'll "Just have to put up with it"

This short slideshow aims to make sense of chronic pain, which can be a great first step in thinking about how to manage it.



If we take the example of back pain, doctors & patients are usually thinking in terms of something being damaged. We can do Xrays to have a look at the bones or an MRI scan to see discs & nerves.

In many cases though, the investigations aren't much use. For instance, this Xray is of a young man with back pain & it doesn't show any problem with the bones at all. If we are thinking in terms of damage, then this might lead the doctor to tell you that there isn't any sign of a problem & that you shouldn't be having so much pain – perhaps that it'll get better by itself – or that you might need more tests to find out where the damage is!

See the Sheffield Back Pain website for more info.

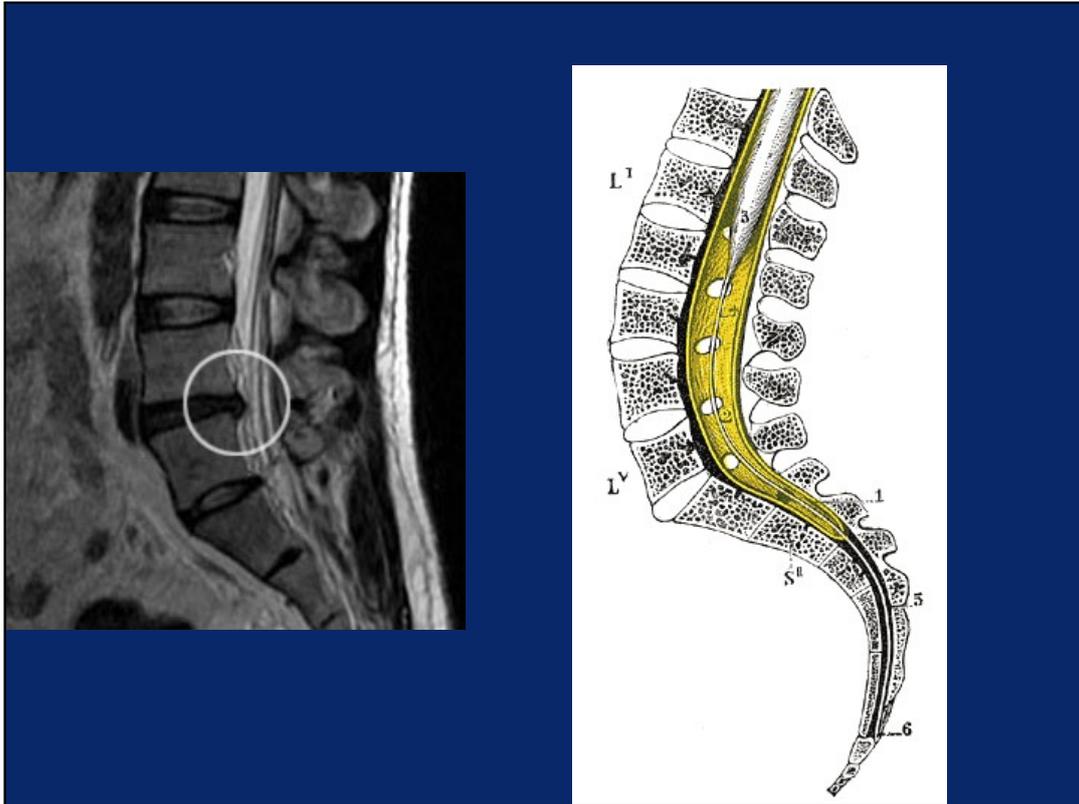
<http://www.sheffieldbackpain.com/professional-resources/learning/language-usage>



This Xray shows lots of changes - extra growth of bone (Osteophytes) & curvature (scoliosis) of the lower back. Interestingly though, this is an Xray of an 85 year old lady, who had never had any back pain in her life. The reason she had her Xray was for a bowel problem.

Doctors should know that age related changes in Xrays are a natural part of life & don't necessarily cause any symptoms. However if we're tied into the "pain means damage" way of thinking (which is how medical schools teach it) then finding changes on Xrays or MRI scans can often be something that's given quite worrying names – such as "wear & tear", "degeneration" or "arthritis".

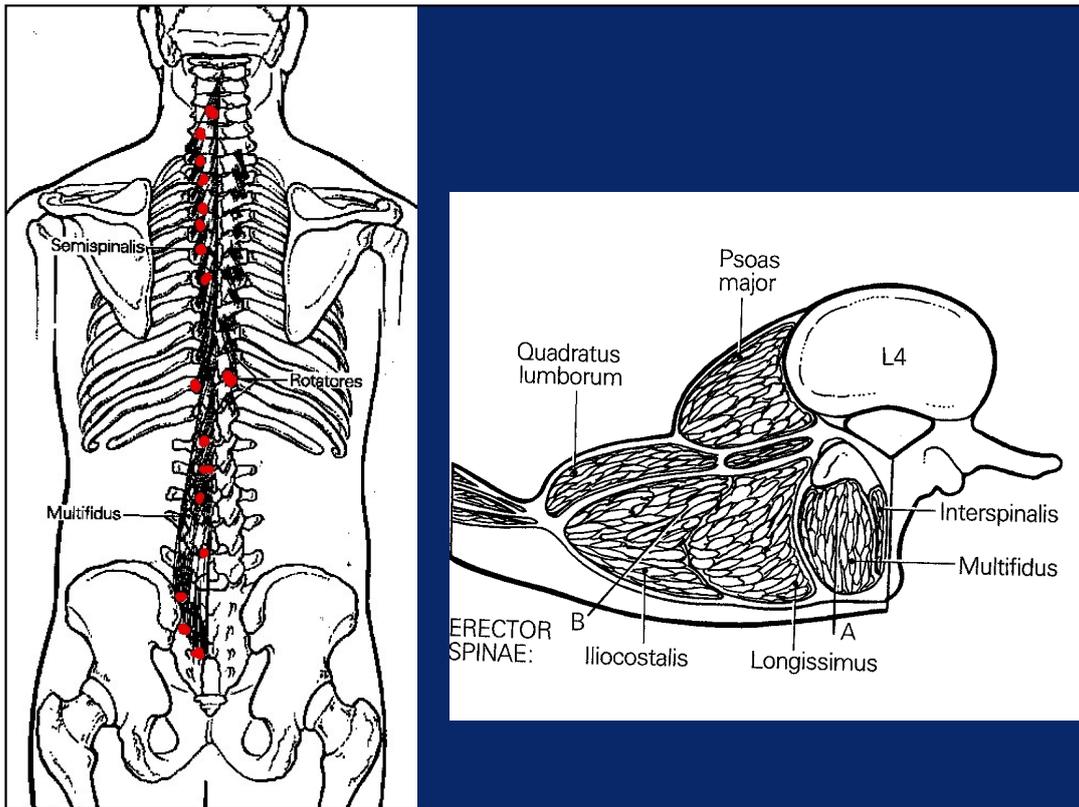
The same applies to injuries or operations. People can have the same operation and have very different amounts of pain. This is all to do with the fact that pain is a process in the nervous system and the amount of pain you are feeling is to do with the amount of nerve signaling that's going on.



This often causes confusion with MRI scans as well. Most people will have bulging discs found on MRI scans, even if they **don't** have any pain. The most important thing to think about when looking at the spine is – “Is there enough space for the spinal cord & nerves?” In this MRI there is a small disc bulge – the report would say “degenerative disc bulge or disease” – but there is plenty of space for the nerves – we can see the spinal fluid, which is white all around the black nerves.

The main reason for getting an MRI is to see if there *is* any pressure on the nerves, as sometimes this can be helped by neurosurgery. Even if the disc is touching a nerve, most people will get better by themselves, rather than needing an operation.

Neurosurgery does not seem to help when the main problem is with back pain.

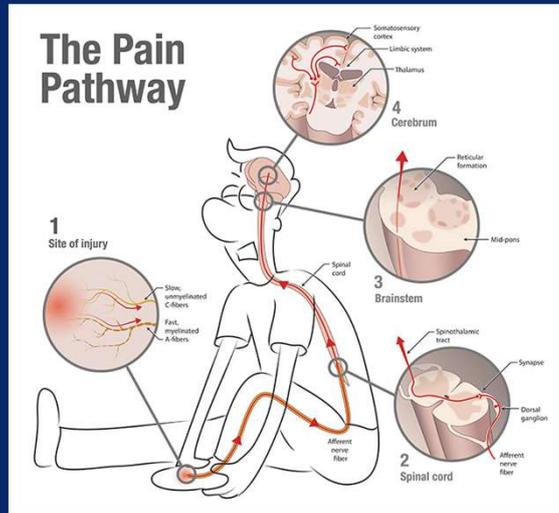


Usually, when I see someone with back pain, they have very tender trigger points in the muscles where they join into the back of the pelvis. Trigger points are lumps in the muscles, where they are intensely contracted all the time. This produces an aching & stabbing pain with spasms & stiffness. Often there's some burning as well & the pain may travel up the back or down the leg.

The big problems with trigger points are that –

- 1 – We don't learn much about musculoskeletal pain at medical school – we concentrate on the bones & discs.
- 2 – Pain isn't signaling damage – pressing very gently on the trigger points causes lots of pain, even though I haven't injured the patient. Or the pain can flare up for no reason.
2. Medication isn't much use for this sort of pain - people still have a lot of pain when pressing gently, even if they're taking really strong pain killers.

Where does it come from?

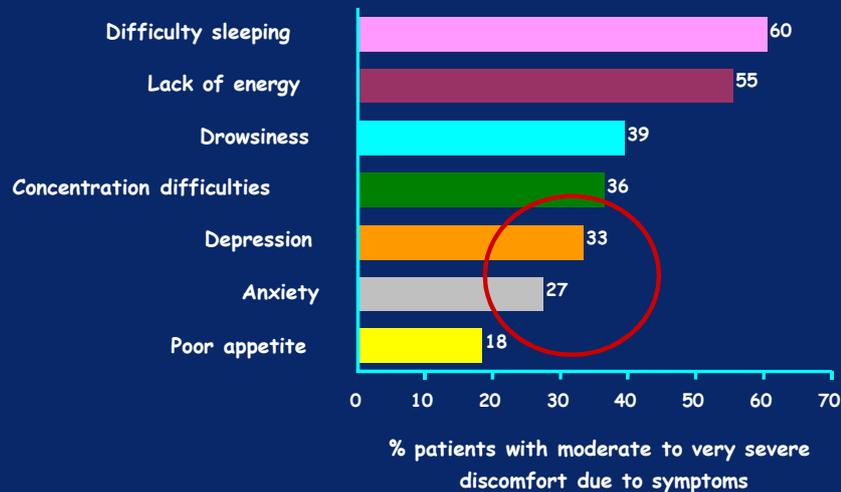


Stimulation of the nerves in your body, might be due to tissue damage, stimulation of sensitised nerves or spontaneous firing of nerves that are damaged or hyperactive.

The signals in nerves connect with nerves in the spinal cord - this can cause reflexes, when we hit the tendon below the knee or at the ankle and it makes the muscle contract. There is some filtering of signals here, but sometimes the pain can be amplified and passed on up to the thalamus – the junction box at the base of the brain.

The brain – makes sense of pain, decides what we do about it – but there are also lots of unconscious responses to pain – figuring out “How dangerous is it, really?”

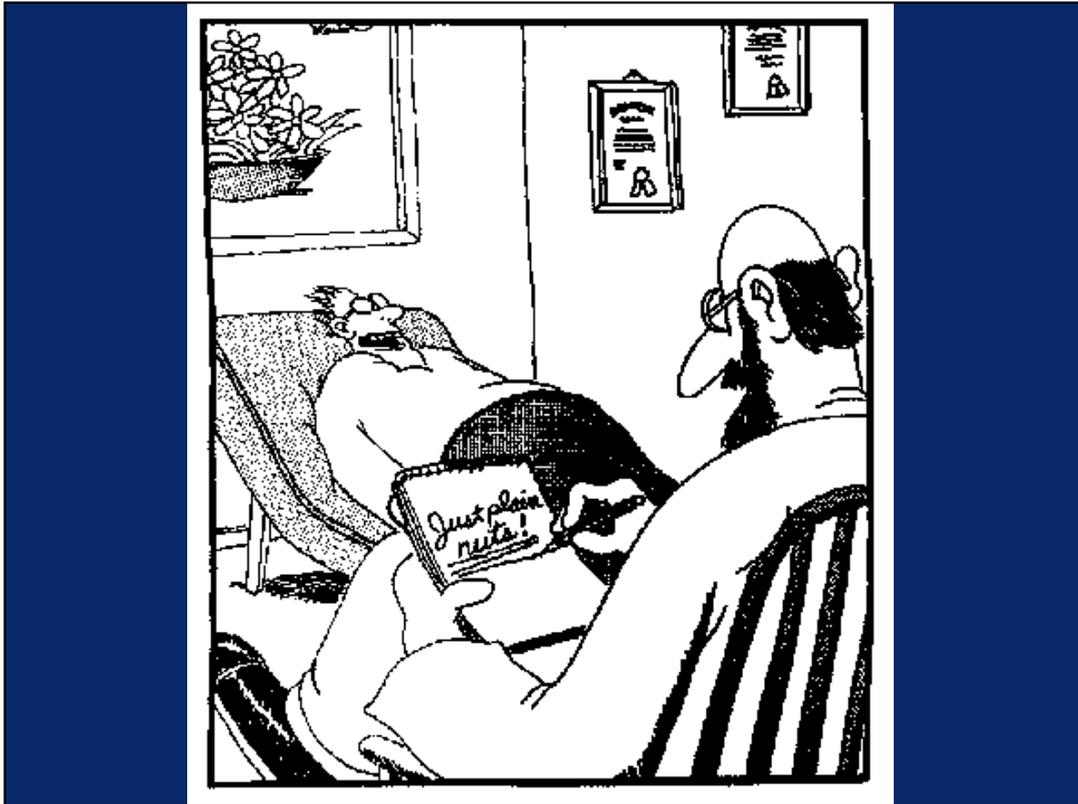
Problems associated with pain



Meyer-Rosberg K et al. *Eur J Pain* 2001; 5: 379-89.

Often with pain that goes on & on, people develop problems with their sleep. They feel worn out during the day & can't concentrate. No one can explain why you have the pain or perhaps you have got conflicting opinions from different doctors & physios. You can end up confused and angry – why me?

Anxiety & depression often go together with the pain, but this is a natural reaction to your continued suffering, the fact that no one is making you any better & the change in your quality of life.



This can lead to confusion & difficulty understanding your pain.

Relatives & friends may see you being able to do things on a good day, then completely unable to do anything when your pain has flared up. Sympathy can wear, when you aren't able to do things together or if something you've planned has to be cancelled. You're taking lots of pain killers but you still have the pain. There's often nothing to see – to explain the pain.

You can get the feeling that doctors don't believe how much pain you are suffering. They might think that you have a low pain threshold, that it's down to anxiety & depression or even completely imaginary.

On the other hand they may tell you that there's quite a bit of wear & tear, but you're getting pain killers & there's nothing else that can be done.

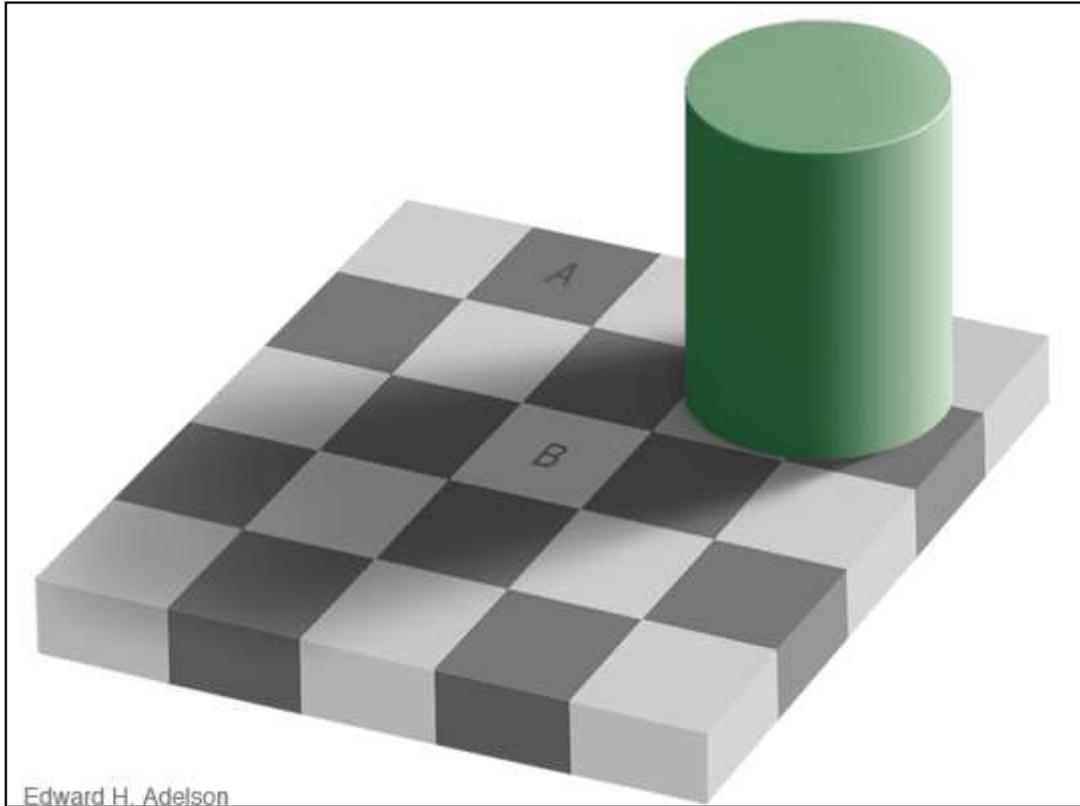
The problem is that we are stuck with an explanation of pain which was thought up by a philosopher called Rene Descartes in the 17th Century. That's more than 300 years ago! In the last 20 years we have learned a lot more about how the pain system works, but what doctors get in medical school is still the “push button” theory of pain. You do some damage & that sends pain signals up to your brain – the more damage the more pain. **THIS IS WRONG.**

When someone has an injury, there's often not ANY pain at the time. For instance a patient told me about his motorbike crash 20 years ago. He was dazed & in shock, but didn't feel any pain. He told me he even tried to run off the road, though his leg was broken below the knee. He was still having problems with nerve & muscle pains after all these years, even though now everything had healed up.

You know that your pain can flare up even if you've done something really trivial – making an awkward movement or even if you're just sitting watching the TV. You've not done any damage but there's lots more signaling going on in the nervous system Your muscles might be tight or have spasms – again this is to do with the way that nerves work.

What we have come to understand in the last 20 years is that – of course – most of your nervous system is inside your head. The way that your brain works is a lot to do with why pain becomes a chronic long term problem & also why it causes so much suffering & misery.

This sounds a bit like saying “The pain is all in your head” & it is. This is not at all saying that the pain is not real or that it's imaginary. Don't worry - it's a difficult idea to get your head round – especially for doctors!

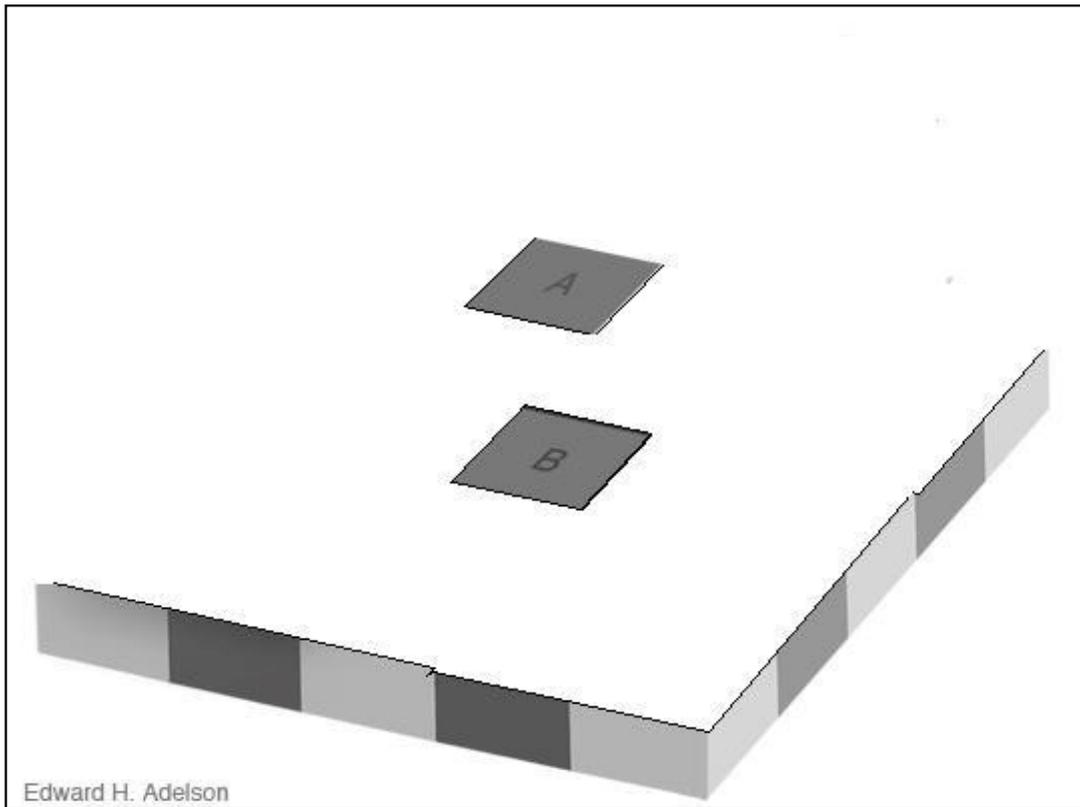


One of the best ways I've found to explain it is to look at the way your brain deals with something else apart from pain. Pain seems to have all these value judgments that go along with it. I think that the underlying reason for this is to do with evolution. A weaker animal is a danger to the group & will be picked off by a predator. If a lion's sneaking up on a herd of zebra, he'll probably go for the one that's limping or using crutches.

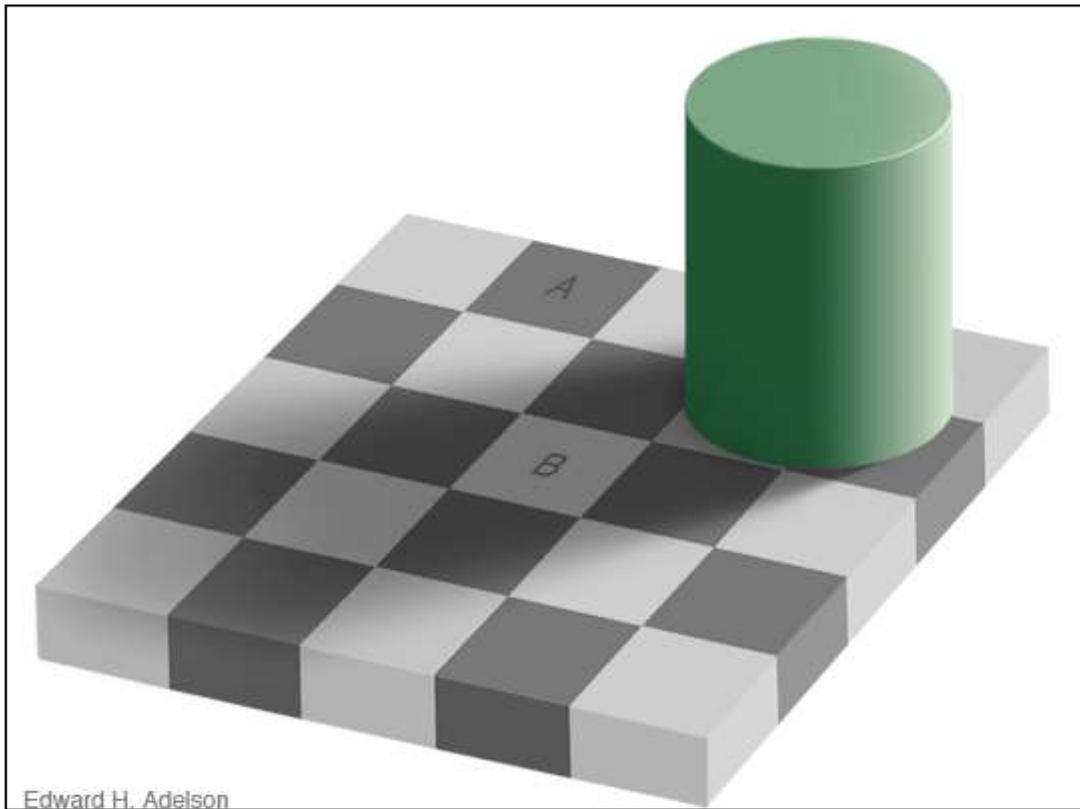
The other thing is that no one can see your pain - so you might be cheating – getting looked after & not doing any work.

So the way we'll look at how your brain's working is with vision instead of pain. Mostly we can agree about what we're seeing & there aren't the same value judgments that go on.

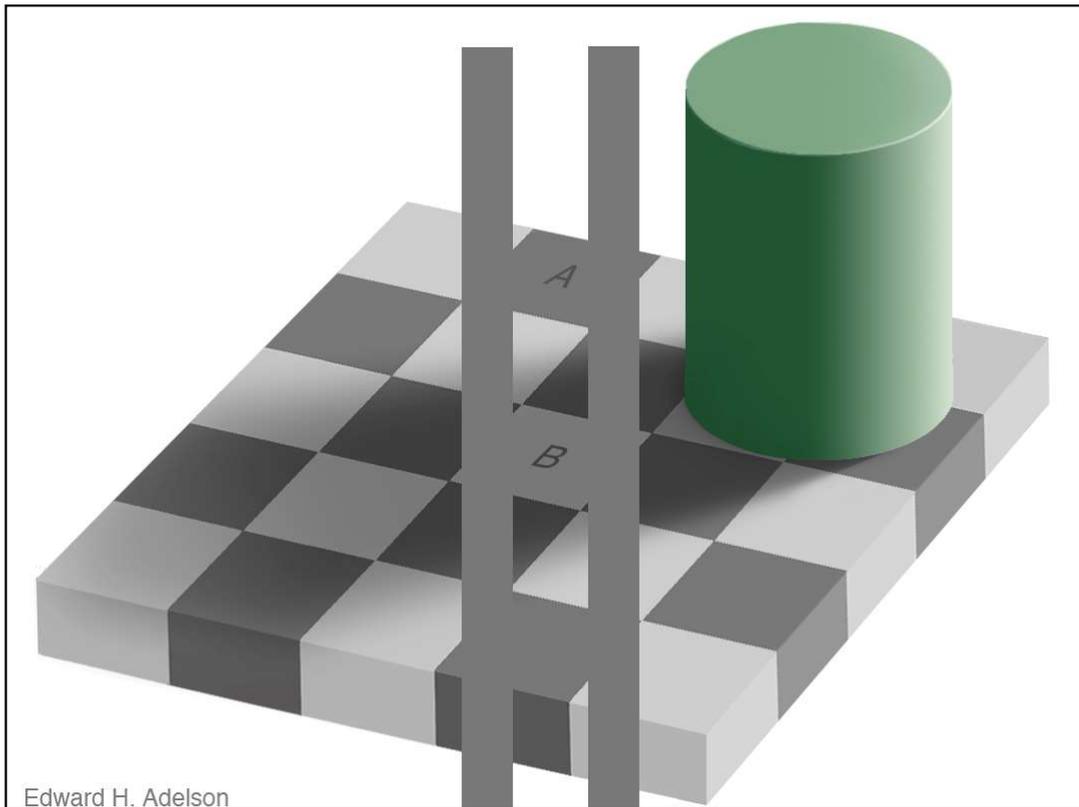
So – if we look at this picture of a checkerboard with a green cylinder on it – have a look at the 2 squares labeled A & B. Which one do you think is lighter & which is darker? Well B is obviously lighter & this is because there's more light coming off B & that's firing off nerves in your eye, which makes it look lighter in the picture in your brain. - easy – it's a bit like the push button theory of pain – the more light signals the lighter it looks.



But if we rub out the rest of the picture then something really surprising happens. It turns out that A & B are exactly the same colour & now the nerves in your eye are signaling the same colour to your brain.



So now you know that I was tricking you – or that your brain was tricking you.

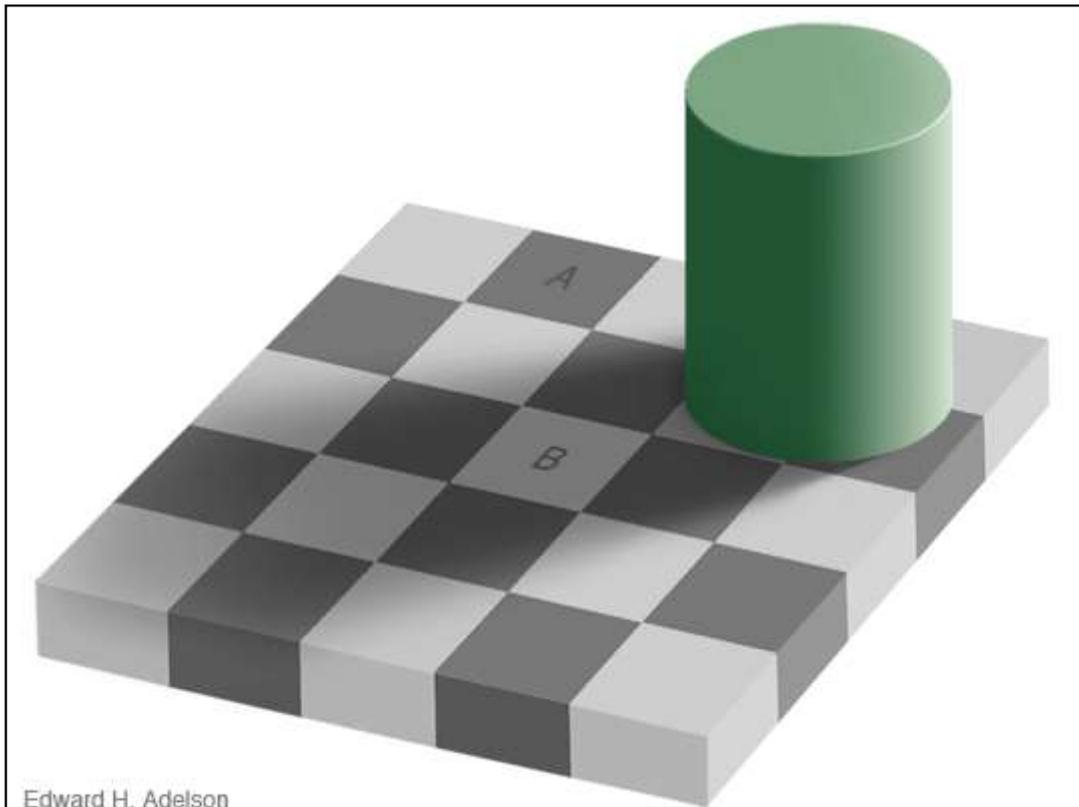


If we put in a band of grey across the picture we can see that A & B are the same colour again but if we take that clue away & B goes back to being light again.

Go on & try looking at the slides back & forward & even print it out. A & B are definitely the same colour, but there's no way you can make them look the same.

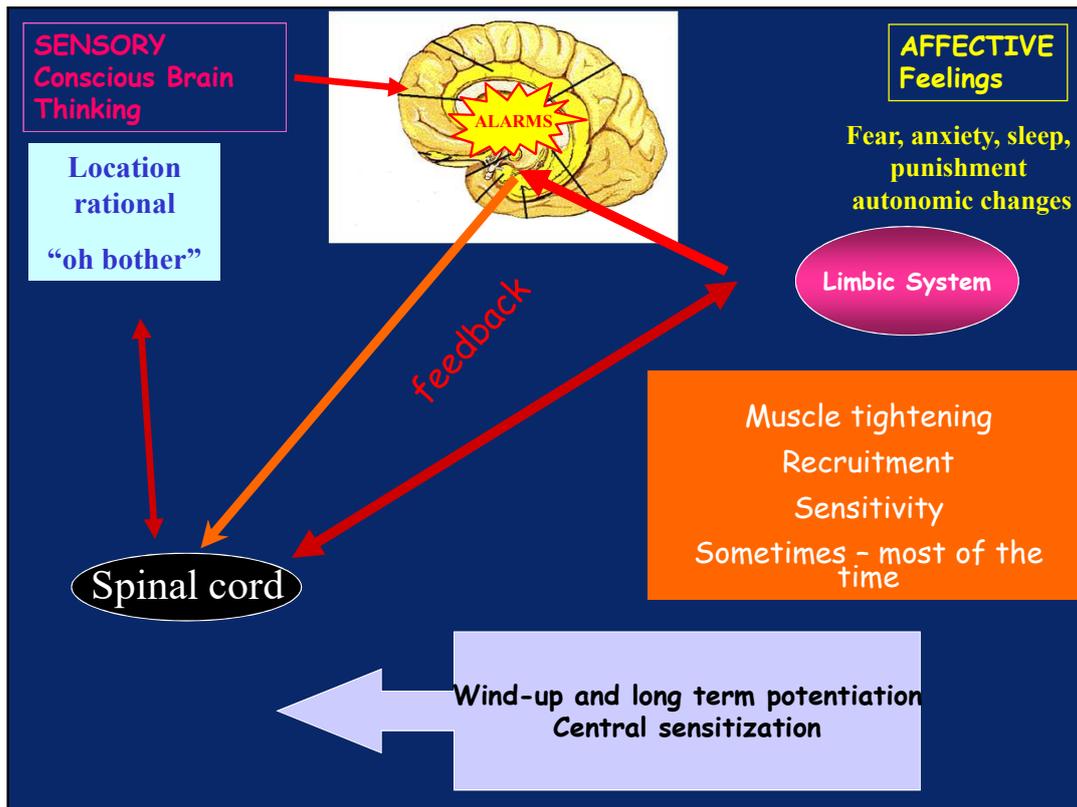
What this shows us is that the brain is handling information in different ways -

When we can see that the squares are the same colour, we're using the conscious, rational logical bit of our brain. This is the bit of your brain which is trying to figure out the reason for the pain & what to do about it. It's saying – should I take my pain killers, should I try & just ignore it or should I stay in bed in case I hurt myself more??? Most of all, this bit of your brain is going - this isn't fair, why is it happening to me & why can't things just relax & stop being so sensitive?



When we take the clue away & the squares look different colours. This is something your brain is doing for you. There are unconscious processes going on, figuring out that there's a big shadow going over here & the squares around B are much darker so B must be lighter than I'm seeing it. And it makes B look **really lighter** in the picture in your brain. Now this bit of your brain is much more important in pain processing than the conscious bit. The unconscious bits of your brain are getting pain or danger messages all the time from your back or your knee, or wherever you have your chronic pain. This sets off all the alarm bells! Damage messages from my back – we'd better have more information – and tighten up all the muscles there to stop any more damage happening. This is a really useful circuit if you've just broken your leg – it makes you suffer & feel really miserable – so you don't hop up & down on the broken leg & the muscles tighten up like crazy to hold the broken bones together. But in a chronic pain, where the problem is to do with too much signaling & tightening, it still does the same thing - increasing the sensitivity of the alarms & tightening up all the muscles. That's why, when I look at your painful part, you have tender points, where the lightest pressure sets off the pain signaling system & makes you jump.

The really annoying thing about this circuit is that even if you know the unconscious bit of your brain is going to give you unreliable information, you can't switch it off by force of will. It doesn't matter how much you **want** the squares to look the same colour - your brain still does that for you.



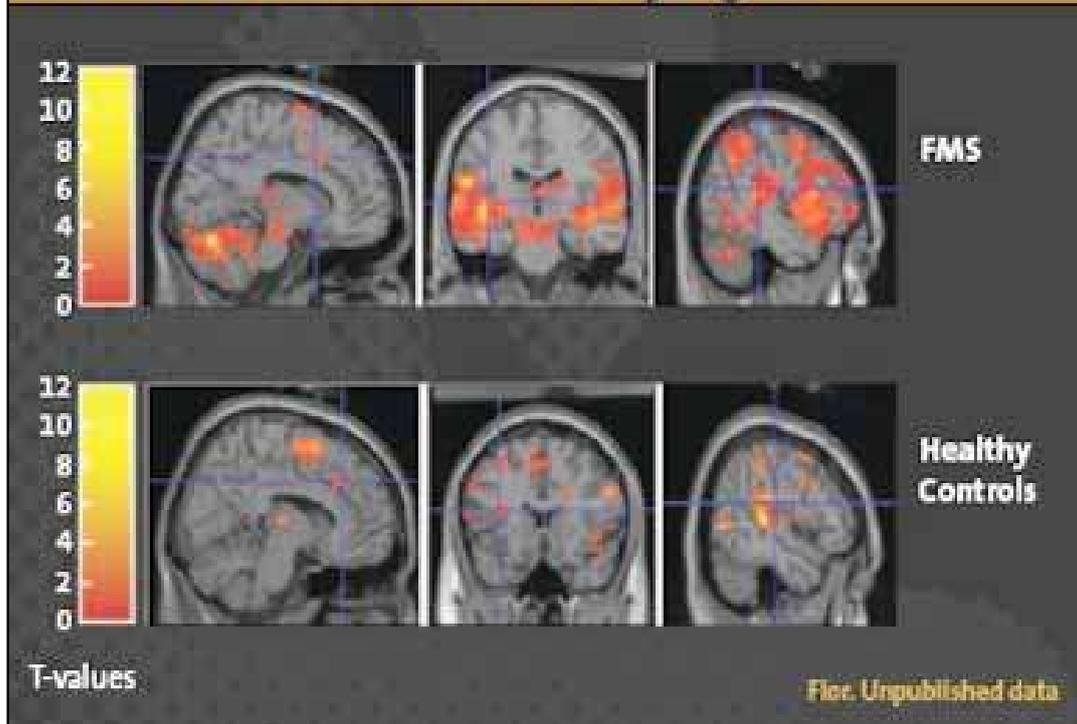
If we have a look at this diagram of what your nervous system is like, your conscious bit of your brain is going “oh bother – why can't things just relax & stop being so sensitive.” The important bit of the pain processing system is in the **unconscious** bit of the brain – the LIMBIC SYSTEM.

You haven't got any conscious access to the pain signaling system or the circuits that are making your muscles tighten up. So your brain sends messages back down to the spinal cord saying “lets have more information from this bit – tighten the muscles so it doesn't move”

The other things that go on in this part of the brain are a lot to do with how we feel - anxiety & depression, concentration, attention, memory & sleep are all in here.

Think about the “Fight or Flight reaction” – this is really useful if a tiger's just jumped out of a bush. It makes your body produce lots of adrenaline & you can act to escape from danger without even thinking about It.... But think about being perfectly safe, in your living room , when something scary comes on the telly. You still get a Fight or Flight reaction even though the conscious bit of your brain knows it's just pretend & that you're perfectly safe! Often this can set off other emotions such as embarrassment or can make you laugh – think of a funfair ride.

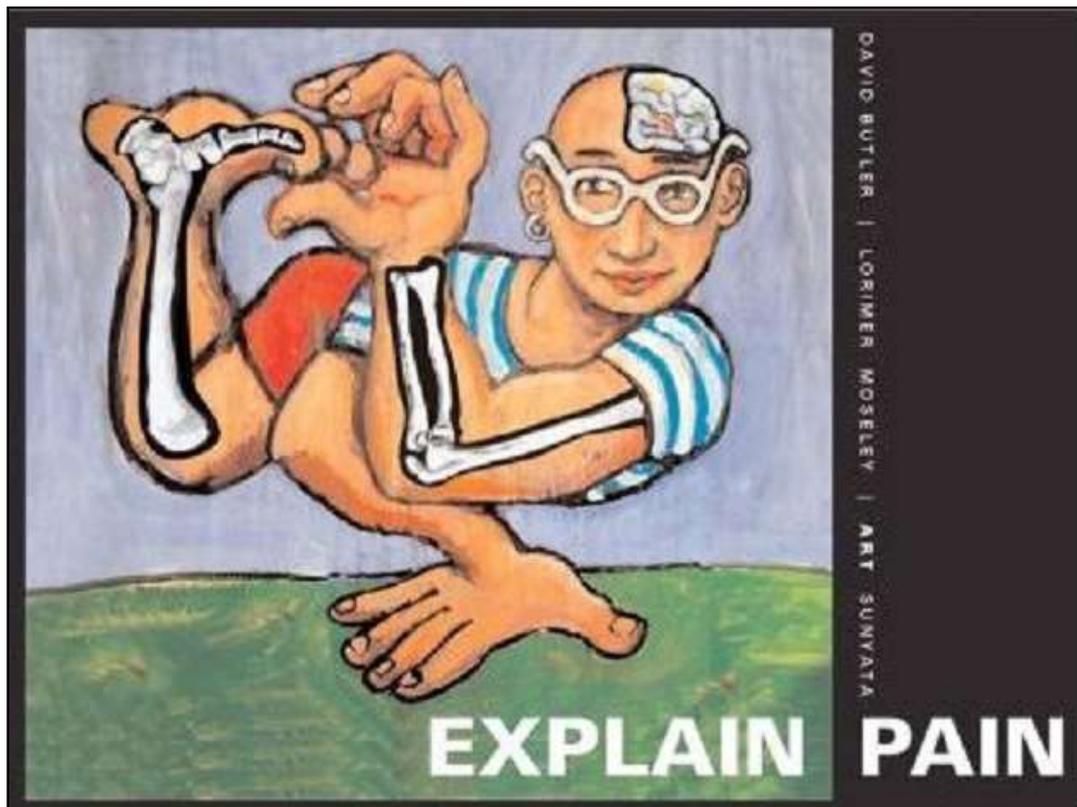
Brain Activation in Fibromyalgia



In the last few years there have been fantastic advances in our ability to understand what's happening inside the brain, using functional MRI Scanning. This lets us see the amount of blood flowing to different parts of the brain.

If we look at what's happening in someone who has fibromyalgia (where people have pain in the muscles & fibrous tissues) there's lots more blood flow – meaning more nerve activity – in the patient, compared with someone without chronic pain.

There is some early research showing that using feedback, where patients can see their scan & use relaxation & other techniques to reduce activity can actually reduce pain.



What I have tried to explain is that Pain isn't a simple push button system. It's tied up with emotions, how you feel & what the pain means. Your brain is trying to protect you & figure out "HOW DANGEROUS IS THIS REALLY?" The problem with persistent pain is that often the pain signalling system gets out of control due to feedback within the nervous system.

Because there are lots of connections with different receptors in these circuits, we can find that pain killers don't block the pain messages or make things go back to normal. Most people tell me that their pain killers "take the edge off the pain", only last a short time or don't make any difference when the pain is really bad.

In this situation we have to take a different approach to making the pain better..

1. Understanding – I hope you understand more about pain now. For a more in depth explanation, get "Explain pain" out of the library. This is a book which explains pain in language that anyone can understand, but after you have read it you'll know more about pain than most health professionals. You can also get more information from websites or Pain Association Scotland meetings.
2. Non-drug treatments – TENS, heat or cool packs, relaxation, moving in water,, massage, Tai Chi or Pilates.
3. Drugs – if they help & don't cause too many side effects. If your medication makes you feel a bit more relaxed or helps you sleep then it might be better in the long term to practice relaxation & improving your sleep.
4. Pain Clinic advice – sometimes pain specialists can help, but if the pain has been going on a long time, we often can't switch it off completely.
5. A rehabilitation approach – this is a joint approach to mind and body with advice from physios, occupational therapists & psychologists. This is often called a "Pain Management Programme". The aim is to improve function, control over the pain & reduce suffering.

This approach has the best scientific evidence for helping people with long lasting pain.