



# Explain Pain *Supercharged*

*The clinician's manual | Moseley & Butler*



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*Healthy notions of self through neuroscience knowledge* | [noigroup.com](http://noigroup.com)

## Fifteen years of Explain Pain

*Explain Pain* (EP) was first published in English well over a decade ago. It has now been translated into five other languages and converted to an ebook and an audio book. A second edition arrived in 2013 and although it looked pretty much the same as the first and the key messages remained intact, the 'implications' section underwent a significant revamp. Additions came mainly on the back of another 100 new scientific articles and evidence that its clinical effects had been endorsed by a number of independent research groups in several different countries and languages.

EP was and still is, in many ways a revolutionary addition to the pain library – with striking artwork from Sunyata, it provides an entertaining and somewhat irreverent introduction to modern pain science. We aimed to make it a conversation piece, in some ways lighthearted, yet entirely respectful of the complexity and magnificence of our in-built protective systems.

Since EP was first published, we have had countless conversations with clinicians, patients, health departments, sports people, politicians and artists about what works and what remains a challenge, about their favourite (and least favourite!) pictures and their most useful chapters; about patient responses (good and not so good) and about their own attempts to more effectively integrate the material with their clinical practice.

One theme that has emerged time and time again is the need for another resource. Something that fills the void that sits between EP and the scientific literature. This is, remarkably, a substantial void – many have pleaded in frustration for something that takes them beyond EP but doesn't put them to sleep or intimidate the whoopsies out of them – something that is written in a way that does not bamboozle but does not condescend. It became very clear from:

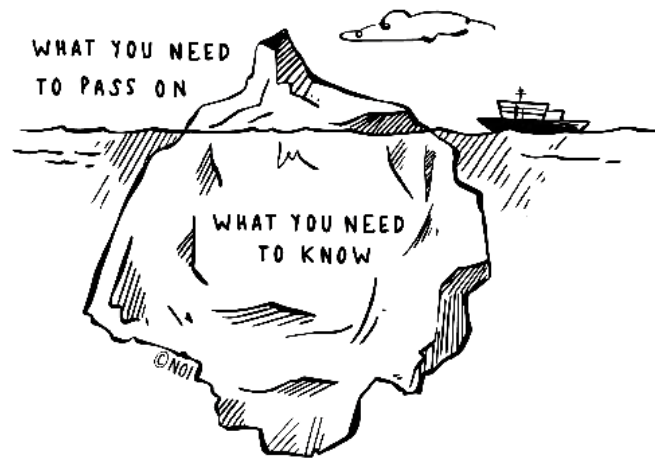


Figure 1.1 The clinician's iceberg of knowledge

- **students** – who are increasingly expected to have an understanding of pain science that exceeds what is presented in EP, to
- **clinicians** – who appreciate that what they need to know greatly outweighs what they need to pass on (Figure 1.1) and that they require educational skills and language to transfer an effective EP story, to
- **scientists** – who need a language with which they can bring their science alive in the hands of those at the coalface, and finally to
- **curious, clever and highly committed people in pain** – who just want to know more.

We needed a kind of EP Plus, or EP In More Detail. So here it is... *Explain Pain Supercharged*.

We want *Explain Pain Supercharged* (EP *Supercharged*) to be the go-to resource for people who seek more knowledge about pain, and who want to learn more about how to Explain Pain. As you may realise, we have taken on a very ambitious and serious challenge. It is a challenge made all the more important by a worrying trend we see emerging across the world, of

people seeing the commercial value of the Explain Pain Revolution without seeing the critical importance of *actually understanding* what is going on. 'Brands' have emerged and products are being aggressively marketed, with what seems to be little care for quality control and for really equipping clinicians with the resources to Explain Pain well. We have seen clinicians fork out precious dough, only to be given scripts and low quality imitations. They arrive at our email door with comments such as 'I did the [insert branded name of explaining pain here] and it didn't work'. Of course it didn't! You need to 'get it'<sup>1</sup> and getting it can be hard.

We all know that 'Entrepreneurs sans Scruples' emerge whenever something seems truly good, but here the stakes are really high because we are messing with the lives of real people in real need. We want you to deeply understand Explain Pain, or therapeutic neuroscience education, or pain neuroscience education<sup>2</sup> or whatever you want to call it. We want you to be able to think and to adapt as new knowledge emerges. We want you to be able to use *EP Supercharged* every time you stumble, to work out why you stumbled and how to get back up.

Figure 1.2 gives you an idea of where we see this book fitting. It builds on *Explain Pain* [1] and refers to it. It utilises *The Explain Pain Handbook: Protectometer* [2] – an interactive guidebook for taking on the EP journey. It also draws on the metaphors and stories in *Painful Yarns* [3]. *EP Supercharged* provides the reader (or we prefer to think of you as an adventurer) with the more complete scientific story that underpins these other resources, their content and their application.

## A note on referencing

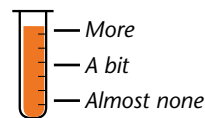
Throughout this book we will be referring to the other Explain Pain tools. Look out for these symbols, for example [EP11] refers to page 11 of Explain Pain, and [PY55] refers to page 55 of Painful Yarns.

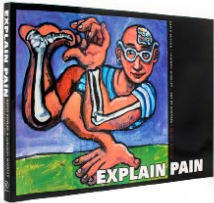
1 To 'get it' means you really understand it so well you can feel it in your bones.


2 Although let's face it Dorothy – you are not just in neuroscience anymore.

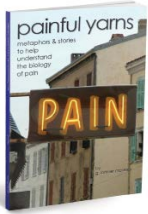
## The Explain Pain resources

### Scientific Jargon Meter



 EXPLAIN PAIN  
For pain sufferers, their clinicians and anyone interested in pain.

 EXPLAIN PAIN HANDBOOK:  
PROTECTOMETER  
For pain sufferers to use on their own or with clinicians.

 PAINFUL YARNS  
Metaphors and stories for pain sufferers and anybody interested in pain.


 EXPLAIN PAIN SUPERCHARGED  
For clinicians and interested pain sufferers.

Figure 1.2 The Explain Pain resources

## Explain Pain in a nutshell

To put *EP Supercharged* into context as you embark on this adventure, it is worth iterating six of the key themes in EP.

### 1. Pain is very normal and very amazing

The systems that serve to protect our body are very sophisticated. The most sophisticated of these systems is the *feeling system* – the system that produces our feelings. Pain,<sup>3</sup> one of these feelings, is perhaps the most potent experience as far as making us behave in a certain way. It depends on a glorious system that is predictive, intuitive, evaluative, infinitomodal,<sup>4</sup> dynamic and modifiable. It is also however, a brutally effective system for the very reason that pain is usually so unpleasant. Pain hurts!

If you have pain right now you are not alone – about 20% of humans have pain that has persisted for more than 3 months. For everyone in pain we can say one thing for sure – it hurts because your brain is convinced that *your body needs protecting*. This is the simple bit – it really is simple.

If your brain thinks a part of your body is in danger and needs protecting, then the brain will make that part of your body hurt. You have no say in this. It is happening outside of your awareness or control. It is your brain's conviction.<sup>5</sup>

Simple? This is also the *huge* challenge of pain – there are many situations in which pain does not seem to match the amount of danger your body tissues are truly in. The massive amount of scientific research on this is clear – pain depends on your brain's evaluation of danger and the likely benefit of protective behaviour, not on the true danger level and the true benefit of protective behaviour. EP walks us through some of these amazing pain stories.

3 Anger and lust might also be considered for the gold medals here.

4 Infinitomodal is a word we just made up. We had written 'multimodal' but that seems to downplay the reality that pain can be influenced by anything really, so long as it has some danger or safety relevance (keep reading), so infinitomodal seemed more fitting.

5 We are not really as brain-centric as this sounds and we clarify our language throughout the book. That we can attribute this to your brain is a simplification, but it is a passable simplification at this stage. Hang in there...

### 2. Nerves are loaded with mechanical, thermal and chemical sensors

Most sensors are in the brain. However, all over the body there are sensors that are opened by a potentially dangerous change in their environment. The nerves on which these sensors ('danger receptors') are placed are called nociceptors. If enough sensors are opened a signal is triggered in the nociceptor and an alarm signal saying 'danger' is sent to the spinal cord.

At the spinal cord the danger message causes chemicals ('neurotransmitters') to be released at a synapse. These chemicals join a gaggle of other chemicals which together might have an effect on the second neurone – the spinal nociceptor ('danger messenger') which travels to the brain. A word of warning – we will dig deeper into this stuff and you will realise that Explain Pain presents a rather substantial simplification of what really happens. This synapse is the first place at which the danger signal from the tissues is processed (see box below). If it does send a danger message to the brain, the brain then draws on a huge array of inputs and may or may not decide '*yes, this body part is in danger and this organism (that's you) needs to do something to protect itself*'. If it decides this, the orchestra in the brain (using EP speak) produces protective responses, including pain in that body part.

Here is the first obvious example of *EP Supercharged* taking you beyond EP. The notion that the synapse in the spinal cord is the first processing site as we clearly articulated in EP needs expanding. Incoming messages are actually processed to some extent in the dorsal root ganglion (DRG). Here they interact with immune-mediated processing such that quite profound computational capacity is possible at this level. The principles driving that processing are complicated and beyond our capacity to fully understand. Moreover, they are not as clearly predictable and intuitive as events occurring at the spinal nociceptor, which is why we told that little fib in EP. That is not all – the interaction between the primary nociceptor and the spinal nociceptor, and between descending projection neurones and the spinal nociceptor is also not that simple. Recent research has uncovered an extensive system of interneurons within the dorsal horn that seem to be very important in generating that initial stage of central sensitisation that occurs in a couple of hours. *EP Supercharged* will give you the 'behind the news' version rather than the more superficial 'breaking news' sound bite. We aim to give you a more complete understanding of the biology of pain.

### 3. The danger detection sensors have adjustable sensitivity

If body tissue is inflamed or damaged the danger sensors become more sensitive. The pattern of sensitivity varies according to the type of tissue involved. EP describes these variabilities and some of the characteristic patterns that emerge depending on where the danger sensors are located (muscle, skin, nerve, etc).

### 4. The danger transmission system has adjustable sensitivity

The sensitivity of spinal neurones that carry danger messages to the brain can also increase. EP covers the basics of this sensitivity change, which results in allodynia and hyperalgesia, hallmarks of central sensitisation. If pain persists, then we see changes in the brain too – the networks of brain cells that produce pain – or an immune response or a movement response – become more sensitive. It is, as we say in EP, as though the orchestra in the brain is stuck on the pain tune [EP78-79].

Remember that *any credible evidence of danger* to body tissue triggers protection. If the brain networks that actually produce pain become more sensitive, then *all* of the cues have a larger effect on pain – the thoughts, beliefs, movements, behaviours, sights, sounds, smells etc. etc. They have a larger effect on other protective outputs as well. Think of this as an internal protection meter, the level of which determines protective outputs.

### 5. Pain is just one of our protective systems

There are many protective systems – others include the sympathetic, motor, immune and cognitive systems. They all work together, influencing each other, changing the way our body works, the way we feel, all in an orchestrated attempt to move us out of a dangerous situation and help us learn and heal as quickly as possible.

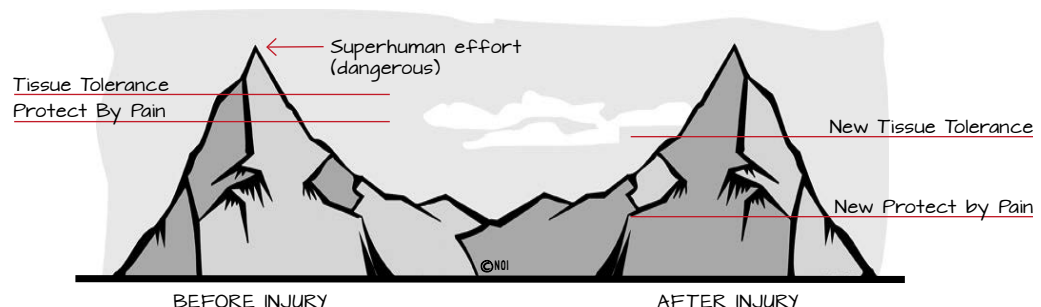


Figure 1.3 The Twin Peaks Model from Explain Pain [1]

## 6. Complex problems sometimes need complex solutions!

There is a range of methods of engaging with the process of recovery. EP talks about the orchestra model and we expand on that model in this book. It also discusses the 'onion skin model', in which nociception is integrated with attitudes, beliefs, behaviour – and all of these influence pain.

In our experience, there are usually no quick fixes for chronic pain,<sup>6</sup> but there are slow fixes that require patience, persistence, courage and coaching. The tried and tested route to recovery is centred around threat identification and graded exposure. Threats can hide in very difficult to spot places. Graded exposure is not rocket science, but it is also not unimodal. Graded exposure has historically been confined to physical upgrading only, but we think that this must change and our view on this is supported by the vast body of scientific data. Now that we know pain is infinitomodal, to presume a solely physical graded exposure is daft. It requires merging with the complexity of context, and for us the most powerful and liberating context of all is knowledge.

In EP the Twin Peaks Model (Figure 1.3) captures the idea of graded exposure and it is the figure that most often has tongues wagging (in a good way). Before injury, the buffer between the 'protect by pain' line and 'tissue tolerance' line is far smaller than the buffer after injury. Here, our bioplastic bodies have lifted protection and pain is just one of our enhanced protective systems.

These six themes are elaborated and expanded in *EP Supercharged* where you will recognise them as Target Concepts – integral parts of an Explain Pain intervention.

## The bio-revolution revs up!

Finally, we heartily welcome you to *EP Supercharged*. We really hope that as you read you feel part of something bigger, you feel part of a kind of revolution – something we called a 'neuro-revolution' in 2003, but what we now realise is more like a 'bio-revolution'. This revolution is resulting in fundamental and wide-reaching changes in the way that pain is managed and treated around the world. The revolution is injecting significant and true hope into the lives of millions of people suffering from pain. What is more, it is transforming their lives – slowly but surely.

As you read, remember that the power behind the revolution lies in the hands of the large number of people slowly uncovering the mysteries of human experience and behaviour – the scientists. It lies in the hands of the rapidly growing group of clinicians who have moved beyond their comfort zone and embraced the complexity of human experience and behaviour. Most of all though, the power of the revolution lies in the hands of the vast number of people who can now say, after weeks, months, years or decades of pain, that they get it and that they have switched paths from a downward spiral of pain and suffering to a slow and steady road to recovery. We receive dozens of emails every week from people telling this kind of story. They are all different – occasionally miraculous overnight recoveries, to weeks, months or even years of gradual improvement, but every single story reminds us how lucky we are to be researchers, clinicians and educators in the pain field at this moment in history.

So, read on fearless adventurer and Supercharge yourself...

**¡Viva la (bio) Revolución!**

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<sup>6</sup> Although the idea of radical/rapid conceptual change is becoming more viable (Chapter 5).

## References

1. Butler DS & Moseley GL (2013) Explain Pain. 2nd Edn. Noigroup Publications: Adelaide.
2. Moseley GL & Butler DS (2015) The Explain Pain Handbook: Protectometer. Noigroup Publications: Adelaide.
3. Moseley GL (2008) Painful Yarns: Metaphors and stories to help understand the biology of pain. Dancing Giraffe Press: Canberra.