

Persistent pain: kicking the habit



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This article introduces the idea that unconscious habits can lead to persistent pain development; a habit that occurs beyond the individual's awareness and is never their intention. Understanding that mechanism of the belief system of a person who is convinced that they have structural, tissue-based pathology or damage causing their pain, can remove the fear underpinning the automaticity of thoughts, breathing patterns, movements and feelings involved in the persistent pain cycle. It can also help to identify how to support the patient in taking responsibility for their own recovery, and how habituating new behaviours can lead to pain reduction and perhaps result in a life free from persistent pain (Ashar *et al* 2021).

LEARNING OUTCOMES TO SUPPORT PHYSIO FIRST QAP

- 1 Recognise the potential relationship between habitual behaviours / thoughts in persistent pain.
- 2 Understand the principles behind habit formation.
- 3 Feel confident in compassionately challenging patient beliefs about persistent pain.
- 4 Understand the principles of reversing habits and feel encouraged to integrate this viewpoint into the clinical setting.

Introduction

The approaches to helping those in persistent pain have progressed so much since the cartesian theoretical model of pain that dominated medical practice for hundreds of years. Some pivotal viewpoints (Melzack & Wall 1965;

The cartesian theoretical model

Over time, our healthcare systems have, metaphorically, separated our minds from our bodies in terms of pathology. The medical professionals we see when something is wrong with our minds are different from those who care for our physical health. This often causes individuals to be misdirected in appropriate pathways of care and can create more problems than it ever solves. Pain is physical, psychological, emotional and involves a multitude of contextual and situational cues. Understanding this provides an opportunity to offer the most appropriate help for the patient, should they choose to seek and explore it.

Engel 1980; Moseley & Butler 2017) have brought us so far, yet for patients and clinicians there is more that can be learned beyond the change in practice and enlightenment inspired by these pioneers.

A snapshot of the number of people affected by chronic pain at any one time gives a staggering picture. The prevalence of individuals, i.e. more than a billion worldwide in the adult population, experiencing persistent low back pain alone is estimated at around 20% (Fatoye *et al* 2019). There are many poor outcomes from the variety of traditional approaches to tackling chronic pain (Chou 2009; Jonas *et al* 2019; Khan *et al* 2014; Kirkley *et al* 2008). These can be seen in the surgical treatment of low back pain, knee pain and other invasive treatments for chronic pain conditions. Chronic pain commonly compared to the numbers

of those with cancer, heart disease and stroke, and this illustrates what a widespread and difficult issue it has become when considered against other large-scale health concerns. This places pain in a pandemic context long before COVID-19 ever entered our psyche.

Despite what appears to be a bleak picture, there is room for optimism. The increased confidence in helping those in persistent pain is typified in the title of a Lorimer Moseley Master Session given on the NOI group in 2021 where he discusses how there is hope of recovery from persistent pain, even for those individuals who think it is not possible for them.

In reality, recovery has always been possible; humans have not suddenly evolved a miraculous capacity to recover from pain, we have always had it. For every person who hasn't recovered from pain whether due to a physical issue or emotional event, there will be another with the same issue who has recovered. By understanding this variability of outcomes, and scientifically unpicking the mechanisms behind pain, those in persistent pain can regain the ability to learn healthy, self-preservation recovery skills that will enable a return to a life free from constant pain. ➡

Pain and behaviour

Many chronic pain conditions have been linked in pathophysiology (Kindler 2011), but could they be more strongly related to subjective behaviours that subsequently lead to pain and pathology?

How people respond to a painful experience varies greatly, and their perception of pain can influence how they respond both consciously and unconsciously, which can lead to a variability in the output of automatic behaviours that dictate whether a person will, or will not, recover from pain.

This suggests some accountability is attributed to the individual in pain, e.g. the person who sits at their desk too long and then complains of back pain. However, blame plays no role in analysing persistent pain or its resolution. What if the behaviour leading to pain was unconscious and developed from habits beyond the conscious awareness of that individual? This places a compassionate perspective on that behaviour and sees the patient and their pain in the proper context of that experience.

Behaviours and habits

A behaviour is a response to a stimulus or a situation to pursue a feeling that forms new neural pathways that, with repetition and sufficient level of emotional charge in the presence of a cue, dictates a response, e.g. an expression of pain. A habit is a behaviour that becomes automatic as it no longer requires conscious effort (Duhigg 2014; Fogg 2020). Myelin is laid down throughout that neural circuitry to make it fire faster, stronger and become more fluent in making behaviour automatic (Coyle 2009). Once formed, the behaviour becomes unconscious to the individual undertaking it and studies show that brain activity drops during periods of automaticity (Duhigg 2014). Any change in behaviour or new behaviour on the presence of the cue creates a “reward prediction error” that presents the brain with an alternative

“HOW PEOPLE RESPOND TO A PAINFUL EXPERIENCE VARIES GREATLY AND CAN BE INFLUENCED BY THEIR PERCEPTION OF PAIN”

behaviour to encode and, if it is rewarding or “feels good”, dopamine is released to create new neural circuitry. In most cases, unconscious circuitry occurs much faster than conscious awareness which is why patients experiencing persistent pain, and many clinicians, get the interpretation of that pain or diagnosis wrong.

The evolutionary advantage of automaticity is that it frees the conscious mind to concentrate on non-habitual tasks and not waste time and energy on basic behaviour and routine activities. Unconscious habitual behaviour is also known as the habit loop (figure 1) and consists of a cue, a routine and a reward (Duhigg 2014; Wood & Neal 2016). For example, someone with persistent low back pain may have had so many experiences where it hurt to bend forward, they are no longer surprised by the pain experience when they do. They may have developed protective habits, thoughts, movements, breathing patterns and emotions

to mask or prevent the pain. In the presence of a cue that suggests the potential for that pathway to fire and pain to be experienced or increased, e.g. lifting heavy shopping, the automatic behaviours will kick in.

The protective routine behaviour could be to immediately consider refusing the task, or they might experience an automatic change to a shallow breathing pattern, or a tensing of their muscles in an automatic protective movement pattern. The emotion behind all these behaviours may be fear, but whatever its basis it will prevent the person from even attempting the task. The reward of the protective behaviours is a place of safety from reoccurrence or increase of pain.

Research has pointed to the average time to achieve automaticity being 66 days, with a range from 18 to 254 days (Lally *et al* 2009). However, Fogg (2020) dispels this focus on numbers and describes how the emotional investment in the behaviour determines the

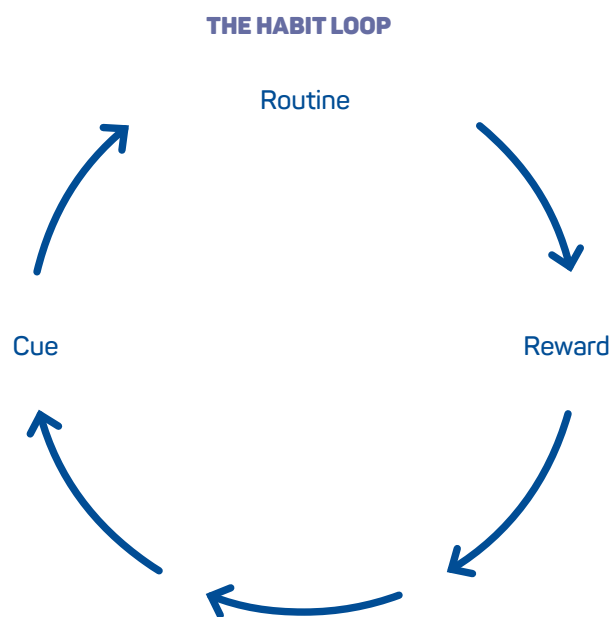


FIGURE 1: The habit loop (Duhigg 2014)

formation of habit and not the repetition alone, suggesting that habits can be formed in an instant. This view fits more understandably with the thinking that the experience of pain is linked to the behaviours behind it, i.e. if emotional intensity dictates habit formation, only one repetition of behaviour would be required to form a habit if the emotional intensity was sufficiently high.

For example, how often would an individual need to burn their hand on a cooker or experience the grief of losing a loved one to know how to behave to prevent the experience, or deal with the feelings if it happened again? When the emotional charge in a behaviour is that intense, the answer would usually be once.

How habits can create pain

Habits, such as impulses and routines, are controlled by two areas of an ancient processing region of the brain called the striatum (Korb 2015). Impulses are actions driven by a momentary desire and encoded through dopamine release as pleasurable in the nucleus accumbens. Routines are encoded in the dorsal striatum, but in this instance, dopamine release creates a compulsion to carry out the routine (Korb 2015), which is how things that initially feel pleasurable, if repeated enough, eventually just become habit.

We all have routines like this; encoded behaviours that take us away emotionally from a painful or stressful situation. They can start with a logically desired pleasurable intent and be immediately identified as the quickest mechanism with which to relieve stress when it appears, or the behaviour may have formed as a way for an individual to feel good about themselves or to remove them from a stressful or unpleasant situation in their early life where they held the perception that they were not good enough, loved, or worthy. At whatever stage the behaviour was formed, it is one that takes the individual towards a place of relative safety. We all have physical or emotional experiences from our childhood that might, at some

level, formed our behaviours in later life. Any behaviour which distracts from an unpleasant feeling or gives a sense of purpose, identity, or validation could be wired as desirable in this way. Research from the groundbreaking study on Adverse Childhood Experiences (ACEs) (Filetti *et al* 1998) points to how these events can create a predisposition to develop chronic pain and become a leading cause in death in adults. Perceptual changes leading to behaviours resulting in those effects may stem from the coping strategies used in those childhood moments to survive them. It follows that personality traits influenced by those experiences may also affect the incidence of chronic pain. This has been supported in studies examining the relationship to pain and certain personality profiles and characteristics (Ibrahim 2020; Castro *et al* 2001).

Many behaviours that we may initially desire, and that we know make us feel better, can, however, potentially cause problems. Behaviours that become habits can create physical or emotional pain when they are overused as a method of short-term stress relief. For example, eating chocolate, sex, drugs, alcohol, shopping, gambling, work and exercise can all provide a desirable short-term mechanism of distraction or pleasure but when used to excess they are all habits that can have serious effects on health, and any use of these mechanisms to resolve physical or emotional pain are only ever distracting or short-lived.

The perfect storm

Suppose pain removes the ability of the individual to use a behaviour. In such cases, the inability to access a behaviour can create a craving for it. Alternatively, if overuse of a behaviour is the cause of pain, the individual is faced with a real dilemma as the thought of carrying out that behaviour while in pain now represents fear, and cravings to do it, while not being able to do it creates frustration (Korb 2015). These emotions drive the stress response and cause more dopamine release in the habit controlling dorsal striatum. This in turn automatically activates the coping strategy for stress, which is the same routine behaviour that creates the fear and frustration behind the on-going stress in the first place (figure 2). For example, a person who combats stress by running, and who subsequently develops knee pain from that activity, may ignore the warnings of an overuse injury because of adrenaline, or just feels compelled to continue the activity that has felt like it always alleviated their stress.

The individual now has both the stress response from the pain, and the stress from the situation that may have caused the pain. They will have lost easy access to their default coping strategy for dealing with stress and pain and the cycle becomes complete, irrespective of whether it was the pain that brought the stress or the stress that brought the pain. The physiotherapist's caseload is predominantly filled with patients who have entered the pain cycle through these mechanisms. 🔄

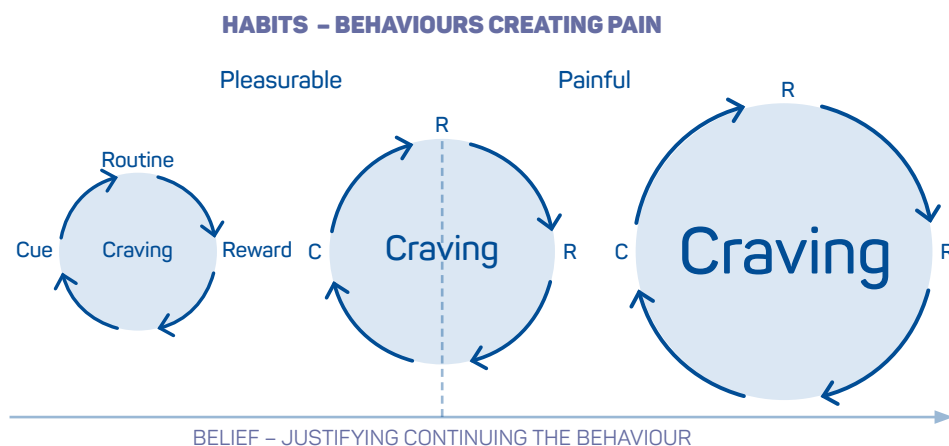


FIGURE 2: Illustration of how a behaviour moves from a pleasurable experience to a painful one

Unconscious transition

This is the move from something that was once consciously pleasurable in an individual's life to something which is now constantly painful and that traps them in a habit of the cue, routine, and reward feedback loop that can spin their life out of their control (figure 3).

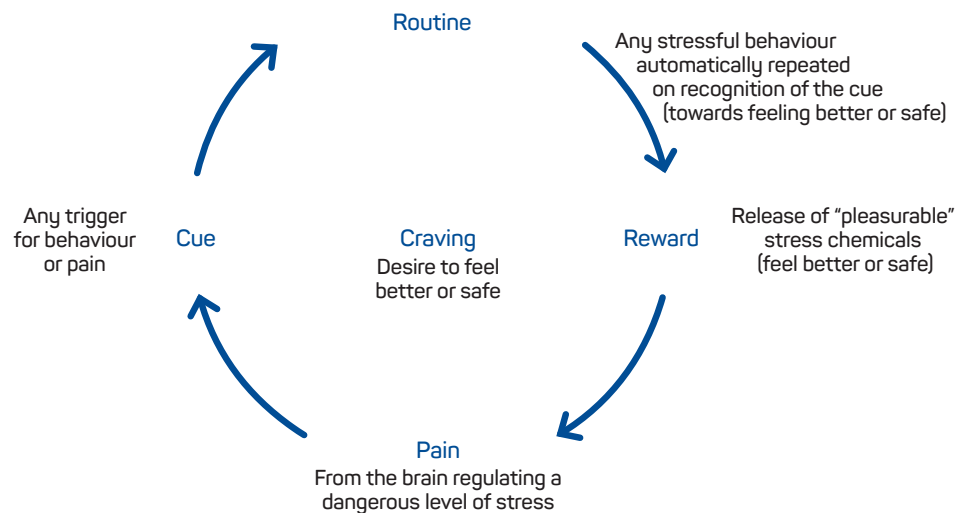
Because the cues and responses are often unconscious, only the presence of the reward can provide a clue to the habit. It is a reward based on the behaviour that will initially have been unconsciously encoded as desirable in its intent to move the individual towards a place of safety. But it will be one that has become an overly sensitive, unconscious neural pathway through repetition and overuse, and subsequently intertwined with cues, contexts, thoughts, emotions and movements to deliver the conscious non-desirable output of pain whenever triggered.

An example to illustrate this can be found in the earlier example of the person with persistent low back pain. The unconscious output has to be interpreted correctly by the conscious awareness of the individual. If they interpret the feeling of pain and fear, and believe it is based on damage, then all their unconscious / habitual behaviours will be based on a belief that is fundamentally flawed according to what we now understand.

If, on the other hand, they were to interpret those sensations / feelings / pain correctly as a signal of protection, they then have the opportunity to react appropriately to lessen the experience, rather than reacting with their default and amplifying that response.

Some might suggest that peptides drive behaviours and feelings, but by going back a step we can see that perception creates those peptides, and different perceptions create a different protein reaction at a cellular level, so changing perception must come first (Pert 2012).

EXAMPLE OF A HABIT BEHIND PERSISTENT PAIN



Beliefs, e.g. "I'm not good enough. I'm not worthy. I'm not loved. My pain relates to damage."

FIGURE 3: Example of a habit behind persistent pain

The brain and body react to subtle cues picked up within the 11 million bits of data per second perceived by the unconscious regulatory systems (DiSalvo 2013). That sudden, shocking, painful result of the neural pathway presents a paradox that fools the individual and many to whom they show their pain. Their place of safety now becomes a place of pain.

A patient will feel helpless and blind to the realisation that the on-going fear and frustration drive the pain, no matter where it is experienced in the body and how it originated. The pain is attempting to protect them, but they mistakenly, consciously interpret its meaning as damage or danger, and the stress that it brings repeats the cycle.

Awareness of pain originating from habits

Seeing persistent pain as originating from habitual behaviours is a paradigm shift that can offer a different outlook to recovery and sets a different scene to reverse it; one that may be difficult for patients to see and that many biomedically trained professionals also resist.

Compassionately viewing pain as a result of behaviour, and looking for the reasons for that behaviour, may help release the desire to only fix the effect of those

behaviours. Understanding the strange protective logic of pain explains pain patterns, persistence and, occasionally, its sudden resolution.

It also allows the opportunity for the patient to let go of fear-based perceptions associated with diagnosis, investigations, medical labels and clinical findings. We know these things can exist in pain-free populations, for every condition currently believed by the patient to be the cause of their pain, there is another person with the same physical characteristics who is pain-free. That can be hard for patients and practitioners to believe.

Explaining pain

All habits are underpinned by belief, and the habits around persistent pain are no different. Examining the patient's beliefs and exploring their logic can gently offer challenges to create an opening for recovery. Validating their experience of pain and revealing the fundamental belief, meaning and emotions behind it can be liberating.

Explaining that pain can be due to one system being overused in the stress response, or because a system has been neglected for an extended period, can illustrate pain as an indicator of potential damage and not a definitive sign.

Pointing out the protective nature of the patient's behaviours during stress, i.e. avoiding bending due to the belief that it will cause more damage to low back pain, and how that may be what eventually became the drivers for their pain, offers them an opportunity for understanding and control that they may have felt was unattainable.

Respecting all the changes found on MRI scans, X-rays and other investigations and retelling those stories, e.g. validating the pain of an individual who has no physical findings to explain it, and reassuring them that they need not fear their pain, can lessen any negative emotions linked to them. These then no longer need to be markers that are attached to events filled with fear, frustration, anger, resentment or regret. Instead, they should be celebrated as representing a remarkable life lived, merely indicating clues to moments in a person's history that have been survived and learned from (Brinkiki *et al* 2015).

Helping a patient to understand why they may be predisposed to persistent pain behaviours can remove any self-blame they might feel. Correlations with persistent pain and a history of adverse childhood experiences (ACEs) (Jones *et al* 2009; Sachs-Ericsson *et al* 2017), or those with certain personality traits (Ibrahim *et al* 2020), includes individuals who unconsciously developed protective self-preservation behaviours linked to persistent pain. It was never their fault.

These traits were potentially developed as their only known coping strategies at that time and, because they were repeated so often, they carried them into adulthood. In other circumstances, such traits may have brought accolades, rewards and much success, but using them to excess always risks pain.

Without the skills to access healthy self-care mechanisms, self-compassion, rest, love and an inner sense of calm, the body and mind will eventually break down. Pain is its "last chance saloon" of conscious awareness, where the unconscious system asks for help.

Robert Waldinger, the fourth generation director of The Harvard Study on Adult Development commented on this during his 2015 TED talk stating: "The clearest message from this 75-year-old study is that good relationships keep us happier and healthier" (https://www.ted.com/talks/robert_waldinger_what_makes_a_good_life_lessons_from_the_longest_study_on_happiness?rid=J7CiE5vP5I5t).

Perhaps if we viewed investing in these self-care skills as developing a relationship with ourselves as well as others, knowing the proven benefits the study suggests, then we may be happier to commit to them. Seeing pain as a guide to keep us on track with those skills may help us view it as a friend and not a foe.

Understanding pain in this way can change perception, something that is key to recovery and a route to physical improvement. However, with persistent pain there is often a focus on changing or influencing the physical element which is often undertaken in isolation.

The physical aspect of any pain is so important to consider. It is where the individual's pain is represented and it must be respected; whether as a sensitised neural pathway of a historical injury, a metaphor of circumstance, or a learned behaviour. Aiming for an improved physical condition can be a real, achievable target and need not be painful. Showing how to recondition their body gradually, while respecting any established physical changes and level of condition must be through a filter of safety and not one through fear.

Habituate to capitulate

The magical prefrontal cortex and our incredible bodies are linked to give us the tools to become pain free. However, a catalyst for epiphanic change can occur as soon as the perception changes from one of unhealed or damaged tissue to a requirement for change behaviours. Belief change is compelling but not always necessary, doing is always required. Through suspending belief for a moment and learning to build healthy

new habits, the individual can begin to reverse the cycle creating their pain. This may require the clinician to be prepared to accept the possibility that the patient's pain system may be misfiring and encourage them to move in ways that break with ideas of harm or re-wiring the brain.

Habits are formed both with and without conscious thought. If patterns around pain began unconsciously, this new awareness offers the opportunity to change by consciously installing a new habit.

The cues and rewards attached to habits always remain, so it is the routines linked to pain, such as thoughts, breathing patterns, movements and feelings / emotions that we have the power to change (Duhigg 2014). If the belief underpinning behaviours doesn't change through explanation, then we need to find and commit to alternative ways to help the patient understand the need to change, and this is a challenge that will require faith and dedication.

Commitment requires some level of serotonin based willpower, something that is quite often depleted in individuals with chronic pain, and even further reduced in those people with comorbidities such as anxiety and depression (Korb 2015).

The beauty of seeing recovery as a habit is that it requires minimal conscious effort, so any new behaviour is always tiny. The magic comes from using the dopaminergic system of reward, for example the individual may choose to carry out some gentle exercises before enjoying a bath. By wiring a reward for non-destructive behaviour (Fogg 2020), the individual will feel better, even if in the slightest way, and this takes them to a place of safety that becomes another catalyst for change.

Setting a safe boundary for a new behaviour and linking it to a cue in the most pain-free, safest, and / or most comfortable environment possible, offers the best opportunity for success. Obtaining a commitment from the 🎯

patient for tiny behaviour changes allows them to set realistic goals and to use their mind to resist any compulsion to do the old, unconscious behaviour for that cue.

For those individuals with a driven trait, it is counterintuitive for them to “go small”. Their **modus operandi** is often to “go hard or go home” as they have learned this to be the quickest way to feel better about themselves.

If you can establish this tiny new behaviour and attach it to a cue, then the jigsaw’s final and most crucial piece is reinforcing this reward. By choosing a goal that the patient can achieve and repeat such as a calming breathing pattern, or a movement within a safety boundary, we can give them agency over their pain. It’s a reward for what may appear not especially justified from the patient’s perspective, but it has to be authentic, i.e. have real meaning for the patient and it has to come from within them. Any word that triggers a sense of pleasure from something they have done themselves will wire-in the new behaviour and make new habits in the new neural pathways they are creating. The more intensely this pleasurable emotion is felt, the quicker and more profound the change.

Anchoring and rewarding new behaviour creates a reward prediction error in the brain. The anchor can be an activity to which a thought, breath, movement or an emotion is attached within a boundary in which the patient feels safe and which, as the activity is established as a new, pleasure inducing behaviour, releases dopamine on recognition of the cue. This follows the Anchor, Behaviour, and Celebration (ABC) mechanism of habit change described by Fogg (2020) from his extensive work at Stanford University.

Conclusion

The brain looks for cues that prompts behaviour and forms habits. By recognising persistent pain as the result of habitual behaviours and using a dopaminergic system to attach an

internal reward to non-destructive healthy feel-good behaviours, we can start a patient on the path to recovery. This approach organically grows the small healthy self-care strategies for both body and mind and secures it with the positive emotional glue that links cues and behaviours, with the goal of helping the patient to become pain free.

We, as physiotherapists, can compassionately challenge the beliefs that keep our patients stuck in persistent pain and show them that recovery is achievable.

We can help them to face their fears as they take their first tiny steps, support them when they become frustrated with flare-ups and moderate them from pushing past their limits. By identifying triggers for persistent pain, rather than focusing only on physical cues, we can identify and encourage our patients to work on all the contexts and cues that present the current triggers for pain in their lives, introduce healthy self-care strategies to replace any historic defaults and demonstrate new ones for their future.

Exploring the protective response of pain when it appears without a proportionate or robust physical reason, leads to investigate how the patient feels before they experience an onset of pain, what they were in the process of thinking about, or what they may have been anticipating. This is often a breakthrough

moment when we realise the influence of stressful experiences at the moment the patient is feeling their pain. Through a safe framework of behaviour change, physiotherapists can educate patients, colleagues, the medical community and the general public about how, by habituating new behaviour, individuals in persistent pain can be given the power to capitulate their pain.


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About the author

Drew Coverdale is a physiotherapist in the UK and author of *The Pain Habit*, with 25 years of experience in treating patients with musculoskeletal conditions. He has a master’s degree in manual therapy and has worked in the NHS, private practice and as a university guest lecturer at undergraduate and postgraduate levels. His special interest in persistent pain involves writing, research, clinical practice and training. He is passionate about teaching patients and therapists how and why persistent pain develops and how to reverse the habits that have created that pain.

References

Full reference details can be found on our website at <https://www.physiofirst.org.uk/resources/in-touch.html> 

REVIEW SUPPORTING QAP

This article offers much food for thought. It makes sense that the neuroplastic changes associated with **developing** persistent pain can be similarly matched by those that bring our patients **out of** persistent pain, and this is a shift from the “learn to live with it” model for persistent pain to one of hope and possibility to be pain free, illustrating that neuroplasticity runs both ways. Our own choice of words that reassure, explain variations of normal, and compassionately tackle beliefs are key in this approach. Acknowledging the possibility that emotions and adverse childhood experiences can prime pain should influence the questions we ask. As physios, we are well placed to help encode new behaviours, to encourage progressive movement and breathing exercises to sooth the autonomic nervous systems and, by helping our patients to create new, healthy habits, break the pain-fear cycle.

Reviewer
Susannah Solt