

Mindfulness: Finding Peace in a Frantic World

<http://franticworld.com/category/pain-relief/>

Website of the book

- [Home](#)
- [What is Mindfulness?](#)
- [What it can do for you](#)
- [Press](#)
- [Praise for the Books](#)
- [Resources»](#)
- [Authors](#)
- [Blog](#)
- [Contact](#)

Posts from the 'Pain Relief' Categor

Dec 16

Relieve Pain, Reduce Stress and Restore Wellbeing With Week Three of Our Mindfulness Meditation Course

Pain, illness and stress walk hand in hand together. They feed off each other in a vicious cycle that leads to ever greater suffering and disability.

Nothing creates stress with such brutal efficiency as the feeling of being *trapped* by illness. Painful questions can begin nagging at your soul: *Is it getting worse? Maybe they've missed something? Perhaps it's terminal and they won't tell me...*

Such negative thoughts are incredibly powerful and almost impossible to stop. One thought triggers the next, and the next, in a vicious cycle that can leave you burnt-out and broken.

But it's often far worse than this because such thoughts create tension in the body, aggravating illnesses and injuries. Stress also dampens the immune system and shuts down the body's self-repair mechanisms. Stress isn't just a miserable experience, it erodes physical health too.

Although it's impossible to prevent stress from arising, you can change what happens next. You can stop the spiral from feeding off itself and triggering the cycle of negative thoughts that makes suffering far worse.

Mindfulness helps you step outside such vicious cycles by teaching you a different way of dealing with stress. With practice you come to realise that stress (like pain) is a 'message' that tends to melt away of

its own accord once it has been ‘delivered’, or felt with full mindful awareness. When this occurs, an extraordinary thing can happen: a profound sense of happiness and peace fills the void.

Such bone-deep contentment isn’t just pleasant, it also boosts the immune system and restarts the body’s self-repair mechanisms. Even if you have an incurable condition, it will substantially improve your quality of life.

In previous weeks I taught you how to reduce pain using the Body Scan and Mindful Movement meditations. These were taken from our book *[Mindfulness for Health: A Practical Guide to Relieving Pain, Reducing Stress and Restoring Wellbeing](#)*. This week you will learn to reduce stress with the Tension Release Meditation. Follow the instructions opposite or download the audio track from www.franticworld.com/huffington

You’ll find Week One of the course [HERE](#).

And Week Two of the course is [HERE](#).

Tension Release Meditation

The aim of this meditation is to move your awareness around the body, paying special attention to areas of tension and discomfort, and then to gently breathe ‘into’ them.

If sitting, choose a straight-backed chair and adopt an erect but relaxed posture. If lying, allow your legs to gently fall away from each other, arms at your sides.

Close your eyes. Allow your shoulders, neck, back, and face to soften. Feel the points of contact between your body and the floor or chair.

Gather your awareness around the sensations of breathing. Can you feel it in the chest, the stomach, the back? Feel the whole body expand and contract as you breathe.

Guide your awareness to the first area of tension. Allow the breath to soothe and massage it for a few minutes. Saturate the breath with kindness. If it feels too intense, broaden your awareness to include the whole body.

Focus your awareness on the next area of tension. Follow your breath into it for a few minutes... Then focus on the next area...

Open your eyes and gently move your body.

Mindfulness Meditation Can Reduce Physical Pain by 90 Percent, Week Two of Our Course Shows You How

Three American psychologists once asked a group of students to watch cartoons and rate how funny they were.

Some were asked to hold a pencil between their lips, forcing them to mimic a scowl. Others watched the cartoons with the pencil between their teeth, simulating a smile. The results were striking: those forced to smile found the cartoons funnier than those compelled to frown. Smiling had actually made them happier.

The process works in reverse too. Frowning makes you unhappy. And a tense neck, back, or shoulders can trigger anxiety and stress. But it's not just emotions that are driven by such vicious cycles. Pain is too.

Pain creates tension in the body, which feeds back into the brain, which responds by turning up the 'volume' on its pain amplifiers, creating even more suffering.

As I explain in our book *Mindfulness: A Practical Guide to Relieving Pain, Reducing Stress and Restoring Wellbeing*, meditation is a powerful way of halting such vicious cycles. Clinical trials show that it can reduce pain by around 90 percent. With practice, you can watch as your pain and suffering evaporate like the mist on a spring morning.

Last week's Body Scan meditation began this process but you also need to work with the body on a more physical level too. Your body needs to 'unlearn' its tension and this is what you'll begin this week with the Mindful Movement meditation.

This meditation should be carried out once per day. Follow the instructions opposite, or download the audio track (which contains extra exercises) from www.franticworld.com/huffington It's best if you also continue with last week's Body Scan.

You'll find Week One of the course [HERE](#).

Dr Danny Penman is the co-author of the bestselling *Mindfulness*. His latest book *Mindfulness: A Practical Guide to Relieving Pain, Reducing Stress and Restoring Wellbeing* is published by Piatkus.

Mindful Movement Meditation

The aim of this meditation is to 'tune into' your body and breath as you move. This will help release any pent up tension.

Wrist rotations

Relax the shoulders and breathe as naturally as you can. Gently hold and support your right elbow with your left hand. Smoothly rotate your right hand around the wrist in a circle for 30 seconds. Keep the breath soft and even. Turn your wrist in the other direction for another 30 seconds. Relax your arms.

Notice the effects of the movement on your right hand and arm. Does this side feel different from the left? More alive, perhaps?

Repeat the movements for the other hand. Then relax your arms so they hang loosely at your sides. Close your eyes. Gently shake your hands and arms. What sensations do you feel?

Warm, hugging arms

Start with your arms hanging loosely at the sides of your body. Tune into the breath for a few moments.

On the in-breath, extend both arms outwards to shoulder level, palms facing forwards. As you breathe out, very gently draw both arms across your chest, cross the arms and give yourself a light hug. As you do so, feel the upper back broadening and opening. Imagine the hug is saturated with warmth and kindness.

On the in-breath, open your arms until they are fully extended. As they open, feel a corresponding opening in the chest, with the shoulder blades gently drawing together.

Repeat this movement for one minute (or for as long as you feel able). Let the hands hang loosely at your sides and give them a little shake. Feel the breath in your whole body and the sensations of being alive.

You'll find more mindful movement exercises at www.franticworld.com/huffington

Dec 6

Can Mindfulness Meditation Really Reduce Pain and Suffering by 90 percent? This Three Week Course Shows You How To Begin.

Living with chronic pain and illness can be intolerable. Even after taking the maximum dose of painkillers, the aching soon returns with a vengeance. You want to do something, anything, to stop the pain, but whatever you try seems to fail. Moving hurts. Doing nothing hurts. Ignoring it hurts.

But it's not just the pain that hurts; your mind can start to suffer as you desperately try to find a way of escaping. Pointed and bitter questions can begin nagging at your soul: What will happen if I don't recover? What if it gets worse? I can't cope with this . . . Please, I just want it to stop ...

It's only natural to want to fight back against pain and illness in times such as these, but what if this struggle actually made your suffering worse? What if it was more effective to explore the sensations of pain and illness as they rose and fell in your body? This may seem like the worst thing imaginable, but the latest medical advances show that it can be more powerful than the most commonly prescribed painkillers.

Such an approach forms the core of a new treatment for chronic pain and illness that is based on an ancient form of meditation known as 'mindfulness'. Mindfulness meditation has been shown in clinical trials to reduce chronic pain by 57 percent. Accomplished meditators can reduce it by over 90 percent.

Imaging studies show that mindfulness soothes the brain patterns underlying pain and, over time, these changes take root and alter the structure of the brain itself, so that patients no longer feel pain with the same intensity. Many say that they barely notice it at all.

Hospital pain clinics now prescribe mindfulness meditation to help patients cope with the suffering arising from a wide range of diseases such as cancer (and the side effects of chemotherapy), heart disease, diabetes and arthritis. It is also used for back problems, migraine, fibromyalgia, coeliac disease, chronic fatigue, irritable bowel syndrome and even multiple sclerosis.

As I explain in our book *[Mindfulness: A Practical Guide to Relieving Pain, Reducing Stress and Restoring Wellbeing](#)*, meditation achieves these remarkable results because it turns down the 'volume' control on pain.

A typical meditation involves focusing on different parts of the body and simply observing with the mind's eye what you find (see box below). This allows you to see your mind and body in action, to observe painful sensations as they arise, and to let go of struggling with them. When you do this, something remarkable happens: your suffering begins to melt away of its own accord.

After a while you come to the profound realisation that pain comes in two forms: Primary and Secondary. Each of these has very different causes – and understanding this gives you far greater control over your suffering.

Primary pain arises from illness, injury or damage to the body or nervous system. You could see it as the raw information sent by the body to the brain. Secondary pain is the mind's reaction to Primary pain but is often far more intense and long lasting. Crucially, it is controlled by an 'amplifier' in the brain that governs the overall intensity of suffering.

In recent years, scientists have begun to work out how the mind's pain amplifier is controlled, but more importantly they have discovered ways of turning down the 'volume' control on suffering.

It turns out, the human mind does not simply feel pain, it also processes the information that it contains. It teases apart all of the different sensations to try to find their underlying causes so that you can avoid further pain or damage to the body. In effect, the mind zooms in on your pain for a closer look as it tries to find a solution to your suffering. This 'zooming-in' amplifies pain.

As your mind analyses the pain, it also sifts through memories for occasions when you have suffered similarly in the past. It is searching for a pattern, some clues, that will lead to a solution. Trouble is, if you have suffered from pain or illness for months or years, then the mind will have a rich tapestry of painful memories on which to draw – but very few solutions.

So before you know it, your mind can become flooded with unsettling memories. You can become enmeshed in thoughts about your suffering. It can seem as if you've always been ill and in pain, that you've never found a solution and that you never will. You can end up being consumed by future anxieties, stresses and worries as well as physical pain: What will happen if I can't stop this pain? Am I going to spend my life suffering like this? Is it going to keep on getting worse?

This process happens in an instant, before you're consciously aware of it. Each thought builds on the last and quickly turns into a vicious cycle that ends up further amplifying your pain. And it can be worse than this because such stresses and fears feed back into the body to create even more tension and stress. This can aggravate illnesses and injuries, leading to even more pain. It also dampens down the immune system, so impairing healing. So you can all too easily become trapped in a vicious downward spiral that leads to ever greater suffering.

But even worse, such negative spirals can begin wearing tracks in the mind so that you become primed to suffer. Your brain begins fine-tuning itself to sense pain more quickly – and with greater intensity – in a futile bid to try to avoid the worst of it.

Over time, the brain actually becomes better at sensing pain. Brain scans confirm that people who suffer from chronic pain have more brain tissue dedicated to feeling the conscious sensations of pain. It's almost as if the brain has turned up the volume to maximum and doesn't know how to turn it down again.

It's important to emphasise that Secondary pain is real. You do genuinely feel it. It's only called Secondary pain because it is the mind's reaction to Primary pain and has been heavily processed before you consciously feel it. But this same processing also offers a way out; it means you can learn to gain control over pain.

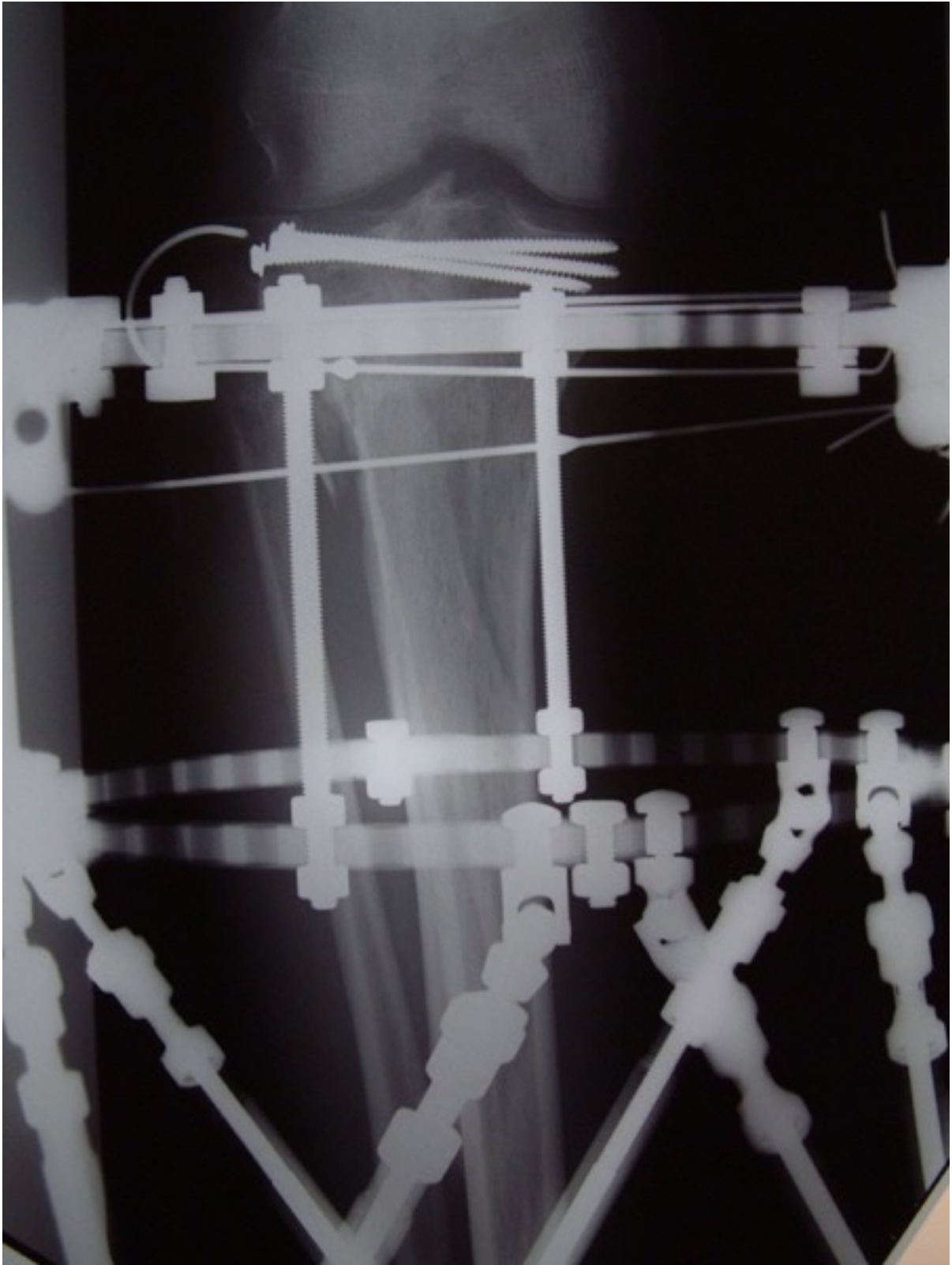
It is possible to learn to step aside from suffering and begin to handle pain very differently indeed. In effect, mindfulness hands back to you the volume control for your pain.

Brain scans confirm this. Mindfulness soothes the circuits that amplify Secondary pain and you can see this process happening in a brain scanner. In effect, mindfulness teaches you how to turn down the volume control on your pain. And as you do so, any anxiety, stress and depression that you may be feeling begins to melt away too. Your body can then relax and begin to heal.

On top of these benefits, hundreds of scientific trials have now shown that mindfulness meditation is extremely good at relieving anxiety, stress, depression, exhaustion and irritability. Memory improves, reaction times become faster and mental and physical stamina increase. In short, regular meditators are happier and more contented than average, while being far less likely to suffer from psychological distress.

Over the next three weeks I'll lead you through three meditations from our book *[Mindfulness: A Practical Guide to Relieving Pain, Reducing Stress and Restoring Wellbeing](#)*. They are based on solid science as well as our own experience.

I used mindfulness to cope with the extreme pain of a paragliding accident. Seven years ago I fell 30 feet onto a rocky hillside. The resulting impact drove the lower half of my right leg several inches through the knee and into my thigh. The injury required three major operations and two years of physiotherapy to correct. I found mindfulness to be an extremely powerful painkiller and I'm convinced it also accelerated my healing.



The aftermath of Danny's paragliding accident.

The programme in the book was developed by my co-author Vidyamala Burch following two serious spinal injuries that left her in continuous pain. This programme has helped tens of thousands of people worldwide cope with pain, suffering and stress.

This week I will lead you through the ten minute Body Scan meditation. Carry it out twice each day.

Follow the instructions below, or preferably download the free audio track

from www.franticworld.com/huffington

Next week I will lead you through another pain reduction exercise. The following week I will teach you a meditation to dissolve stress and speed recovery.

Dr Danny Penman is the co-author of the bestselling *Mindfulness*. His latest book '*Mindfulness: A Practical Guide to Relieving Pain, Reducing Stress and Restoring Wellbeing*' is published by Piatkus.

Body Scan Meditation

This is best carried out in quiet surroundings. The idea is to hold each region of the body in the mind's eye, observe – or 'feel' – what you find, and then move on to the next area.

You will realise that your mind repeatedly wanders. It's what mind's do, so try not to criticise yourself.

When it happens, simply bring your awareness back to the region of the body from where it wandered.

Try not to judge what you find. Simply observe. Or perhaps smile inwardly to yourself.

The Scan

Lie on the floor and allow your legs to gently fall away from each other. Place your hands loosely on your stomach. Close your eyes. Sink into the floor. Focus on the natural breath as it flows in and out of the body. Is it deep or shallow? Smooth or 'ragged'? Spend a few minutes feeling the rhythm of the breath in as much detail as you can.

Does the breath 'echo' in the groin? The lower back? What do you find in these regions? Are they warm or cold? Do they ache? Is it sharp or tingling pain? Gently probe the edges, then move closer. Spend a couple of minutes exploring the rhythm of the breath. Do you notice that discomfort is more 'fluid' than you thought? Does it feel more distant and less 'personal' than you expected?

Move your awareness to the middle back and observe what you find for a minute... Then the upper back...

Observe the whole back as one for a few minutes... And the shoulders... The neck... The face... The arms... hands.

Move your awareness through your legs and 'feel' what you find. Do your hips ache? Is it sharp or dull? Gently probe the edges and move inwards. If it begins to feel too intense, gently broaden the

focus of your awareness so that you hold the discomfort in a wider space. Does that make it less intense?

And finally, spend a couple of minutes observing the whole body breathing as one.

Gently open your eyes and soak in the world around you. Can you carry this flavour awareness with you as you continue with your day?

You can download the free audio track of this meditation from www.franticworld.com/huffington

[Chronic Pain](#), [Chronic Pain](#), [Chronic Pain](#), [Meditation](#), [Mindfulness](#), [Sleep](#), [The Third Metric](#), [Anxiety](#), [Depression](#), [Irritability](#), [Irritable Bowel Syndrome](#), [Stress](#), [Wellbeing](#), [UK Lifestyle News](#)

Nov 19

Can Mindfulness Meditation Really Reduce Pain and Suffering by 90 percent?

Claire stared at the computer screen before cocking her head slightly to one side. She winced as a sharp pain angled its way through her neck and down her left arm. Her fingers went numb and then began to throb. Claire's youthful good looks dissolved and she suddenly looked twenty years older. She stretched her arm and slowly began rubbing her neck to loosen the muscles. Her shoulders and neck had cramped up, making her whole upper body look tense and contorted. She reached for a glass of water and gulped down two more painkillers.

Why won't this pain just stop? Why won't these blasted painkillers work any more? They're useless. I'm so sick and tired of this.

Three years previously Claire had been injured in a car crash and suffered two broken ribs, a fractured wrist and whiplash. Her ribs and wrist had healed completely within three months, but the after-effects of her whiplash refused to go away. The doctors were puzzled by her pain. Several scans had shown that her neck had completely healed, but the pain stubbornly remained. It was worse if she stayed in one place for too long. After twenty minutes, sharp jagged pains would arc up and down her neck. When she finally did move, she would feel stiff and achy all over.

Claire felt increasingly trapped and broken. Her doctor had prescribed several courses of physiotherapy without any long-term success. Now she was forced to continually take painkillers and anti-inflammatory drugs. They worked, more or less, but often left her feeling washed out and jaded. They were OK for stubborn 'achiness', but did nothing for the frequent sharp twinges of pain. Lately,

her doctor had begun suggesting antidepressants to lift her mood. Her response was always the same: 'I'm not depressed,' she'd snap. 'I'm angry because that man who drove into me has taken my life away. I used to dance all night. Now I can barely walk!'

Experiences like Claire's are not confined to injuries such as whiplash, but are common across a range of diseases. Conditions such as 'bad back', migraine, chronic fatigue syndrome and fibromyalgia can all cause pain long after the original injuries have healed or without any obvious cause that shows up on scans or tests. And even when there is a clear physical cause, as with illnesses like arthritis, heart disease or cancer, the pain often comes and goes without any apparent rhyme or reason. Doctors then feel forced to prescribe long-term courses of painkillers, but these can have side effects such as memory loss, lethargy and even addiction.

Claire and millions of others exist in a world of suffering; a place where even the simplest of tasks can amplify their pain. This often leads to anxiety, stress, depression and exhaustion, each of which serves to further enhance suffering in a downward spiral. Such vicious cycles are driven by newly discovered psychological forces that underlie the perception of pain. And crucially, this discovery offers a wholly new approach to the management of pain and illness that has the potential to transform suffering.

WHAT IS PAIN?

The commonsense view of pain is that it arises from damage to the body. This attitude was formalised in the seventeenth century by the French philosopher René Descartes with his 'rope-pull' model of pain: just as pulling a rope in a church steeple rings a bell, Descartes thought that damage to the body is a tug that causes the awareness of pain in the brain. For centuries after Descartes, doctors regarded pain in a similar light. The intensity of pain was thought to be directly proportional to the degree of damage to the body, which would mean that if different people had the same injury they would experience the same amount of pain. If no obvious physical cause was found, the patient would be regarded as malingering or making it up.

Since the 1960s, science has come to accept another model of pain known as the 'Gate Theory' developed by Ronald Melzack and Patrick Wall.¹ They suggest that there are 'gates' in the brain and nervous system that, when open, allow you to experience pain. In a sense, the body sends a continuous low-level 'chatter' of pain signals to the brain, but it is only when the gates are opened that

the signals reach your conscious mind. These gates can also close, which is what happens when your pain lessens or fades away. Opening and closing these pain gates is a phenomenally complex process. Although the details are still being worked out, it is clear that pain is far more subtle and complex than the traditional idea of damage signals being sent to the brain which are then passively felt. Pain is a sensation, which means that it is an interpretation made by the brain before it is consciously felt. To make this interpretation, the brain fuses together information from the mind as well as the body. In practice, this means that the thoughts and emotions flowing through your mind, both conscious and unconscious, have a dramatic effect on the intensity of your suffering. Not without reason did the ancient Greek philosophers consider pain to be an emotion.

PRIMARY AND SECONDARY SUFFERING

Suffering occurs on two levels. Firstly, there are the actual unpleasant sensations felt in the body – this is known as ‘Primary Suffering’. This can be seen as the ‘raw data’ that is sent to the brain from, say, an injury, an ongoing illness or changes to the nervous system itself (this is believed to lie, at least partly, behind such conditions as chronic pain syndrome and phantom limb syndrome). Overlaid on top of this is ‘Secondary Suffering’, which is made up of all the thoughts, feelings, emotions and memories associated with the pain. These might include anxiety, stress, worry, depression and feelings of hopelessness and exhaustion. The pain and distress that you actually feel is a fusion of both Primary and Secondary Suffering.

This insight is crucial because it reveals a path away from suffering. For if you can learn to tease apart the two flavours of suffering, you can greatly reduce – or even eliminate – your pain and distress. This is because Secondary Suffering tends to dissolve when you observe it with the mind’s compassionate eye. Mindfulness allows you to see the different elements of pain laid out in front of you. And when you see this vista, something remarkable begins to happen: your suffering gradually begins to subside and evaporate like the mist on a summer’s morning.

It’s important to understand that although the sensation of pain is created by the mind, your suffering is still real. You really do feel it. It exists and it can be genuinely overwhelming. But once you understand the underlying mechanisms of pain, you can begin to temper its power and the hold it has over you.

To go back to Claire, had she been asked to look inside herself a little more closely she would have realised that there was not one single ‘thing’ that she could label as an ‘ache’ or as a ‘pain’. Both were ‘bundles’ of different feelings that were constantly changing; becoming either more or less intense. There was the underlying unpleasant ‘tightness’ of the muscles and tendons in her neck, which were twisting her vertebrae slightly out of alignment and creating the most pronounced of her painful feelings. There were also twinges of outright pain – which felt like sharp spikes of electricity running through her muscles and down into her arm. And then there were patches of ‘numbness’ in her left arm and hand. These would alternate with pins and needles. Those were the obvious sensations of pain. This was her Primary Suffering.

But there were other feelings too – powerful emotions and disturbing thoughts that would frequently sweep across her mind, often with no apparent rhyme or reason. Stress, worry and exhaustion had become a way of life. Troubling thoughts constantly nagged at her soul: Why won’t this just stop? The doctors must have missed something, surely? Maybe I’m going to end up a cripple, or even dead. Are they too afraid to tell me? Such thoughts and emotions were constantly bubbling away in the background. And while they were often less obvious than the nagging feelings of pain, ultimately they were far more significant because they were central to the way that her mind interpreted and felt the raw feelings of pain. In a sense, they controlled the intensity or ‘volume’ of her pain. This was Secondary Suffering; and Claire had it in spades.

Claire’s Secondary Suffering had its roots in the five days she spent in hospital after her accident. They were the worst of her life. She was in considerable pain and on a morphine drip for the first twenty-four hours. She could cope with the physical pain – just. Far worse, however, were her turbulent emotions: her fears and worries for herself and the future. Neither she nor the doctors could predict the outcome of her neck injuries. Would she be partially paralysed? Would she be in pain for the rest of her life? There was also a sense of anger mixed with bitterness. The man who crashed into her didn’t appear to care. He just walked away from the accident with no cuts or bruises at all. He’d been drinking, but was just inside the legal drink–drive limit. Was he insured? It turned out he wasn’t. Every time she thought about it, Claire’s anger boiled over. Such thoughts and overwhelming emotions constantly washed across her mind. It was mental pain and just as real and tormenting as her physical injuries.

She lay in her hospital bed at night crying quietly to herself. She was wracked with fears and worries for the future, and ‘what ifs’ filled her mind. If only she had left home a minute or two later, then none

of it would have happened. She'd had a feeling something was wrong before she had left home. Why hadn't she waited just a few minutes longer?

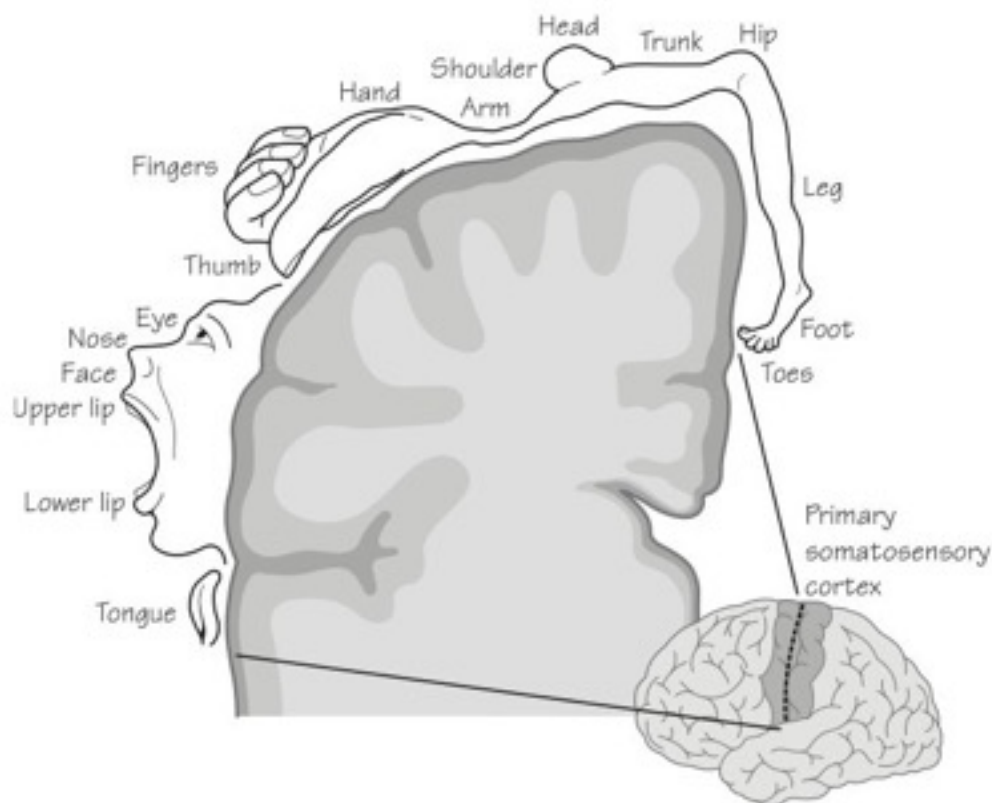
After the accident and the subsequent months of physiotherapy, a new emotion was added to the list: depression. Claire refused to believe that she was depressed, but it was there none the less, gnawing away at her in the background. It wasn't an all-consuming depression. It simply drained her of all energy and enthusiasm for life. Such powerful emotions as anxiety, fear, anger, worry and depression can feed into the mind's perception of pain. Other feelings, too, can have an incredibly strong effect. Feeling tired and overwhelmed, fragile and broken, stressed and anxious, can all magnify suffering and tip you into a downward spiral. How often has the intensity of your suffering increased when you felt anxious, stressed, exhausted or sad? These emotions act like amplifiers in the mind's pain circuits. They can open the floodgates of suffering.

The effect of such emotions can be observed with a brain scanner. Work at Oxford University,⁷ for example, shows the significant impact that even mild levels of anxiety can have on pain. Scientists at the university's Department of Clinical Neurology induced low-level anxiety in a group of volunteers before burning the back of their left hand with a hot probe. As anxiety built, you could see the waves of emotion sweeping through the volunteers' brains. This primed areas of the brain that collectively make up the 'pain matrix'. It was almost as if the volunteers' minds were turning up the volume on their pain amplifiers ready to 'hear' its first 'notes', so that they could take action to protect themselves. This meant that when the skin of the anxious volunteers was actually burned, they experienced far more pain and suffering than the 'non-anxious' volunteers. You could see this extra pain represented in the brain scans too. As the Oxford neuroscientists noted, anxiety primes the 'behavioural responses that are adaptive to the worst possible outcome'. In other words, anxiety and other powerful 'negative' emotions prepare the body to sense pain quickly and with great intensity.

The reverse is also true. Reducing anxiety, stress, depression and exhaustion can lower the perception of pain and even eliminate it completely. This is one of the main routes by which mindfulness helps reduce suffering. Mindfulness soothes the mind's perception of pain – essentially Secondary Suffering – by replacing it with a sense of peace and wholeness.

Neuroscientist Fadel Zeidan and his team at Wake Forest University School of Medicine in America decided to investigate this effect using scanners to map activity in different parts of the brain.⁸ They did this by exploiting a curious quirk of brain anatomy. Every part of the body is reflected in a specific

part of the brain known as the primary somatosensory cortex. So if the sole of your left foot is brushed with a feather, an area of the primary somatosensory cortex lights up; if you feel a pain in your lower back, a different part becomes active. Neurosurgeon Wilder Penfield charted this brain region and produced a 'map' that reflects the human body overlaid on the brain (see illustration below). It was termed the cortical 'homunculus'.



Fadel Zeidan and his team reasoned that if mindfulness affected the perception of pain, then this should be visibly reflected in the level of activity in the corresponding regions of the primary somatosensory cortex. To test this, Zeidan studied the perception of pain in a group of students. The students first had the back of their right calf burned with a piece of hot metal while their brain was scanned with the latest functional Magnetic Resonance Imaging (fMRI) scanner. Each was then asked to rate both the intensity and unpleasantness of the pain. If pain was music, 'intensity' would be the volume and 'unpleasantness' would be the level of emotion it aroused. As expected, when the students'

legs were burned the 'right calf' region of their primary somatosensory cortex lit up as the pain swept over them.

The students were then taught mindfulness meditation and the experiment was repeated. The results could not have been more different second time around. Activity in the 'right calf' region of the primary somatosensory cortex had diminished to such a degree that it had become undetectable. But not only that. Meditation increased activity in regions of the brain related to the processing of emotion and of cognitive control – areas where the sensations of pain are actually interpreted and 'built'. These brain areas modulate the sensations of pain and give it 'meaning' before it is consciously felt. What's more, experienced meditators (those who scored higher on a standard scale of mindfulness) tended to have enhanced activity in these regions and to experience less pain. That is, they tended to devote more brain power in this region to moderating the pain-related information – and to, in effect, turning down its 'volume'.

Zeidan's co-worker Dr Robert C. Coghill explains:

These areas all shape how the brain builds an experience of pain from nerve signals that are coming in from the body. Consistent with this function, the more that these areas were activated by meditation, the more that pain was reduced. One of the reasons that meditation may have been so effective in blocking pain was that it did not work at just one place in the brain, but instead reduced pain at multiple levels of processing.

And what of the students' conscious experience of pain? On average they experienced a 40 per cent reduction in pain intensity and a 57 per cent lessening of pain 'unpleasantness'. Perhaps the most surprising thing was the amount of practice required to achieve this level of pain relief: just four training sessions of twenty minutes each. Remarkable though these results were, they masked something even more intriguing. The more accomplished meditators suffered far less than these averages might suggest. They experienced a reduction in pain intensity of 70 per cent and its unpleasantness was reduced by 93 per cent. This meant that it could barely be felt and hardly bothered them at all. Overall, said Zeidan, mindfulness produced a greater reduction in pain than standard doses of morphine and other pain-relieving drugs.

Loosening the bonds of pain

Secondary Suffering can be seen as resistance to pain. It is entirely natural to struggle against and resist pain with all of your might. You want to eliminate it. Stamp on it. Do anything at all to get rid of it. This is absolutely understandable. But what if this was also precisely the wrong approach? What if, in your bid to eliminate pain, you were actually creating far more of it instead? This is the lesson from Zeidan's research and from many other studies too. And this holds true not just for pain, but for many other disease symptoms as well. Stress, exhaustion and depression can all be made far worse through resistance.

But if the act of resisting pain can make it worse, the converse is also true. Acceptance of your pain can actually diminish it – and might even get rid of it completely. Allow us to explain this seemingly outrageous idea. Neuroscientists have a saying: 'What we resist persists.' In other words, if you resist the messages that your mind and body are sending you, those messages will keep on being dispatched (and felt) until you accept them. This holds true not only for messages of pain, but also for thoughts, feelings, emotions, memories and judgements. If you mindfully accept (or feel) these messages, they will have done their job and will tend to melt away of their own accord.

Mindfulness meditation creates a sense of safety, of space, in which you can begin to tentatively explore the raw sensations of pain and, as such, it is the vehicle through which you can begin to accept these messages. And when you do so, you will often find that pain waxes and wanes quite dramatically. There can be long moments of normality followed by flickers or spikes of pain. There are often different sensations too. Some are hot. Others cold. Some feel 'tight', others throb, while still others feel sharp or stabbing. Not all are completely unpleasant. The different sensations often rise and fall like the waves on the sea. They constantly change in character and intensity. By exploring each of these different sensations, moment by moment, you come to accept that they are like black clouds in the sky: you can watch as the sensations arise, drift past and disappear again. Your mind is like the sky and individual thoughts, feelings, emotions and sensations are like different types of cloud. So in a sense, mindfulness teaches you to observe the weather without becoming embroiled in it. And no matter what happens, the sky – your mind – remains untouched by it.

It is important to realise that mindful acceptance is not resignation to your fate. It is not the acceptance of the unacceptable. It is simply the acceptance of the situation as it is, for now, at least. It is a period of allowing, of letting be, of non-resistance, so that you cease to struggle. And when this struggle ceases, a sense of peace takes its place. Secondary Suffering then progressively diminishes. Often as not, Primary Suffering will begin to do so too.

We can explain this to you in minute detail. We can cite numerous scientific trials that prove the point. We could even show you scans of your own brain as it 'builds' the sensations of pain from all of your thoughts, feelings and emotions – but only when you have experienced the power of mindfulness for yourself will you truly believe it.

This is why it is called a practice. Accepting pain can be difficult. It's just better than the alternative, which is to live in a state of perpetual suffering.

Countless participants on our Breathworks courses have discovered this for themselves. Claire was one. She found that when her neck began to hurt she was also assailed by fear, anger, stress, sorrow, hopelessness, despair and exhaustion. So not only did she feel the initial unpleasant sensations in her neck, but she was also swamped with yet more suffering. It was almost as if she was struck with an arrow, and when she reacted to it she was then hit by a second one. Now she had to bear the pain of two arrows – that from the second being caused by resistance to the first. It is an entirely natural response. In fact, in cases of acute, rather than chronic, pain, it might even be the best response because it's a powerful driving force to take yourself out of danger. When it comes to chronic pain and illness, however, it is often precisely the wrong solution because it simply compounds your suffering. And, of course, it can then seem as if you're pierced not by two arrows, but by many, many more.

Accepting the sensations of Primary Suffering allows the Secondary Suffering to take care of itself – and to progressively diminish. Claire discovered that she could resist pain for days or even weeks. She could distract herself with alcohol, cigarettes and food. She could squash the pain with powerful drugs. If those failed, she could ignore the pain – for a while, at least. But all this came at a cost: the rest of her life. She discovered that in ignoring and walling off the pain she had also isolated herself from all that is wonderful and precious about life. The world became increasingly wan and grey. Food lost its flavour and texture. She no longer laughed or cried. Her love life declined into irrelevance. All this meant that when she could no longer maintain the struggle, she simply crashed and burned. So not only did the pain return, but, with all of the things that normally sustained her love of life having evaporated, she was left feeling fragile and broken. No wonder her doctor wanted to prescribe her antidepressants.

After three years of struggling, Claire embraced mindfulness – not because she believed that it would work, but because she was desperate. And when she began to mindfully explore the sensations of pain, something remarkable and counter-intuitive began to happen. Not only did the pain begin to subside,

but she began to experience all of the good things that had been squeezed out of her life too. It opened the door to a wealth of emotions such as happiness, love, compassion and empathy, as well as sadness. Claire realised that life is bittersweet, and when she let go of expecting it to be either wholly wonderful or truly distressing and to hold in an honest heart a delicate mixture of the two, she felt increasingly relaxed and open. Through facing up to and becoming sensitive to her own predicament, she became a happier and more centred person with greater empathy for others. She also began to heal.

Taken from our new book *[Mindfulness for Health: A Practical Guide to Relieving Pain, Reducing Stress and Restoring Wellbeing](#)* by Dr Danny Penman and Vidyamala Burch

Buy from Amazon UK

‘A beautiful and compassionate book, Mindfulness for Health will put you back in touch with the extraordinary person you already are’ Professor Mark Williams, University of Oxford

‘This book provides an extremely effective and elegant mind-body approach to healing . . . Highly recommended’ Jon Kabat-Zinn, PhD, author of *Full Catastrophe Living* and *Coming to Our Senses*

‘In a world of much suffering this book is a gift of wisdom and practical help’ Professor Paul Gilbert, PhD, OBE, author of *The Compassionate Mind*

References

1. Wall, Patrick D. & Ronald Melzack, *The Challenge of Pain* (Penguin Books, 1982), p. 98; Melzack, R. Wall, p. D. (1965), ‘Pain Mechanisms: a new theory, *Science*, 150(3699), pp. 371–9.
2. Cole, Frances, Macdonald, Helen, Carus, Catherine & Howden-Leach, Hazel, *Overcoming Chronic Pain* (Constable & Robinson, 2005), p. 37; Bond, M., Simpson, K., *Pain: Its Nature and Treatment* (Elsevier, 2006), p. 16, offers an alternative definition from the International Association for the Study of Pain as acute pain (lasting less than one month), sub-acute pain (lasting one to six months) and chronic pain (lasting six months or more).
3. ‘Health Survey for England 2011’, Health, social care and lifestyles, Chapter 9 Chronic Pain, The Health and Social Care Information Centre (NHS) 20 December 2012, www.ic.nhs.uk/catalogue/PUB09300.

4. Gaskin, Darrell J. & Richard, Patrick (2012), 'The Economic Costs of Pain in the United States', *Journal of Pain*, 13(8), p. 715.
5. 'Health Survey for England 2011', Health, social care and lifestyles, Chapter 9 Chronic Pain, The Health and Social Care Information Centre (NHS) 20 December 2012, www.ic.nhs.uk/catalogue/PUB09300.
6. NOP Pain Survey (2005), 23–25 September, on behalf of the British Pain Society.
7. Ploghaus, Alexander, Narain, Charvy, Beckmann, Christian F., Clare, Stuart, Bantick, Susanna, Wise, Richard, Matthews, Paul M., Nicholas, J., Rawlins, P. & Tracey, Irene (2001), 'Exacerbation of Pain by Anxiety Is Associated with Activity in a Hippocampal Network', *Journal of Neuroscience*, 21(24), pp. 9896–903.
8. Zeidan, Fadel, Martucci, Katherine T., Kraft, Robert A., Gordon, Nakia S., McHaffie, John G. & Coghill, Robert C. (2011), 'Brain Mechanisms Supporting the Modulation of Pain by Mindfulness Meditation', *Journal of Neuroscience*, 31(14), pp. 5540–48. See also the accompanying comments regarding morphine effectiveness by Fadel Zeidan of the Wake Forest University School of Medicine at <http://ow.ly/i8rZs>.

Sep 4

Relieve Pain, Reduce Stress and Restore Wellbeing with Mindfulness for Health

Pain always seems worse at night. There is something about the silence that amplifies the suffering. Even after you've taken the maximum dose of painkillers, the aching soon returns with a vengeance. You want to do something, anything, to stop the pain, but whatever you try seems to fail. Moving hurts. Doing nothing hurts. Ignoring it hurts. But it's not just the pain that hurts; your mind can start to suffer as you desperately try to find a way of escaping. Pointed and bitter questions can begin nagging at your soul: *What will happen if I don't recover? What if it gets worse? I can't cope with this ... Please, I just want it to stop ...*

We wrote *Mindfulness for Health* to help you cope with pain, illness and stress in times such as these. It will teach you how to reduce your suffering progressively, so that you can begin living life to the full once again. It may not completely eliminate your suffering, but it will ensure that it no longer

dominates your life. You'll discover that it is possible to be at peace, even if illness and pain are unavoidable, and to enjoy a truly fulfilling life.

We know this to be true because we have both experienced terrible injuries and used an ancient form of meditation known as 'mindfulness' to ease our suffering. The techniques in this book have been proven to work by doctors and scientists in universities around the world. In fact, mindfulness is so effective that doctors and specialist pain clinics now refer their patients to our Breathworks centre in Manchester and to courses run by our affiliated trainers around the world. Every day we help people find peace amid their suffering.

Mindfulness for Health and its accompanying CD reveal a series of simple practices that you can incorporate into daily life to significantly reduce your pain, anguish and stress. They are built on Mindfulness-Based Pain Management (MBPM), which has its roots in the ground-breaking work of Dr Jon Kabat-Zinn of the University of Massachusetts Medical Center in America. The MBPM programme itself was developed by Vidyamala Burch (co-author of *Mindfulness for Health* book) as a means of coping with the after-effects of two serious accidents. Although originally designed to reduce physical pain and suffering, it has proven to be an effective stress-reduction technique as well. In fact, the core mindfulness meditation techniques have been shown in many clinical trials to be at least as effective as drugs or counselling for relieving anxiety, stress and depression. When it comes to pain, clinical trials show that mindfulness can be as effective as the main prescription painkillers, and some studies have shown it to be as powerful as morphine. Imaging studies show that it soothes the brain patterns underlying pain and, over time, these changes take root and alter the structure of the brain itself so that you no longer feel pain with the same intensity. And when it does arise, the pain no longer dominates your life so much. Many people report that their pain declines to such a degree that they barely notice it at all.

Many hospital pain clinics now prescribe mindfulness meditation to help patients cope with the suffering arising from a wide range of diseases such as cancer (and the side effects of chemotherapy), heart disease, diabetes and arthritis. It is also used for back problems, migraine, fibromyalgia, coeliac disease, and a range of auto-immune diseases such as lupus and multiple sclerosis, as well as being

effective for such long-term conditions as chronic fatigue syndrome and irritable bowel syndrome. It's also useful for coping with labour pain. In addition to all these uses, clinical trials also show that mindfulness significantly reduces the anxiety, stress, depression, irritability and insomnia that can arise from chronic pain and illness. Researchers are continually finding new conditions that can be eased with mindfulness.

Mindfulness Dissolves Pain and Suffering

Mindfulness-Based Pain Management uses ancient meditations that were largely unknown in the West until recently. A typical meditation involves focusing on the breath as it flows into and out of the body (see box, below). This allows you to see your mind and body in action, to observe painful sensations as they arise and to let go of struggling with them. Mindfulness teaches you that pain naturally waxes and wanes. You learn to gently observe it, rather than be caught up in it, and when you do so, something remarkable happens: it begins to melt away of its own accord. After a while you come to the profound realisation that pain comes in two forms: Primary and Secondary. Each of these has very different causes – and understanding this gives you far greater control over your suffering.

Primary pain tends to arise from illness, injury or damage to the body or nervous system. You could see it as raw information being sent by the body to the brain. Secondary pain follows on close behind, but is often far more powerful and distressing. Secondary pain can be seen as the mind's reaction to Primary pain.

Pain's volume control

The mind has tremendous control over the sensations of pain that you consciously feel and how unpleasant they are. It has a 'volume' control that governs both the intensity and duration of the sensations of pain. This is because your mind does not simply feel pain, it also processes the information that it contains. It teases apart all of the different sensations to try to find their underlying causes so that you can avoid further pain or damage to the body. In effect, your mind zooms in on your pain for a closer look as it tries to find a solution to your suffering. This 'zooming-in' amplifies your pain. As your mind analyses the pain, it also sifts through your memories for occasions

when you have suffered similarly in the past. It is searching for a pattern, some clues, that will lead to a solution. Trouble is, if you have suffered from pain or illness for months or years, then the mind will have a rich tapestry of painful memories on which to draw – but very few solutions. So before you know it, your mind can become flooded with unsettling memories. You can become enmeshed in thoughts about your suffering. It can seem as if you've always been ill and in pain, that you've never found a solution and that you never will. So you can end up being consumed by future anxieties, stresses and worries as well as physical pain: *What will happen if I can't stop this pain? Am I going to spend my life suffering like this? Is it going to keep on getting worse?*

This process happens in an instant, before you're consciously aware of it. Each thought builds on the last and quickly turns into a vicious cycle that ends up further amplifying your pain. And it can be worse than this because such stresses and fears feed back into the body to create even more tension and stress. This can aggravate illnesses and injuries, leading to even more pain. It also dampens down the immune system, so impairing healing. So you can all too easily become trapped in a vicious downward spiral that leads to ever greater suffering.

But even worse, such negative spirals can begin wearing tracks in the mind so that you become primed to suffer. Your brain begins fine-tuning itself to sense pain more quickly – and with greater intensity – in a futile bid to try to avoid the worst of it. Over time, the brain actually becomes better at sensing pain. Brain scans confirm that people who suffer from chronic pain have more brain tissue dedicated to feeling the conscious sensations of pain. It's almost as if the brain has turned up the volume to maximum and doesn't know how to turn it down again.

It's important to emphasise that Secondary pain is real. You do genuinely feel it. It's only called Secondary pain because it is the mind's reaction to Primary pain and has been heavily processed before you consciously feel it. But this same processing also gives you a way out; it means you can learn to gain control over your pain. For this reason, Secondary pain is best described as suffering.

In practice, you can be in pain but you need not suffer. Once you realise this, deep in your heart, then you can learn to step aside from your suffering and begin to handle pain very differently indeed. In effect, mindfulness hands back to you the volume control for your pain.

The benefits of mindfulness on overall mental and physical health have been demonstrated in a wide range of scientific studies. Despite this, you might still be a little sceptical about meditation. When the word is mentioned a whole cascade of stereotypes can spring to mind: Buddhist monks, yoga classes, lentils, brown rice . . . So, before we proceed, we'd like to dispel some myths:

- Mindfulness is not a religion. It is simply a form of mental training that has been proven in countless scientific trials to help people cope with pain, illness, anxiety, stress, depression, irritability and exhaustion.
- Meditation will not trick you into passivity or resign you to your fate. On the contrary, mindfulness boosts mental and physical resilience.
- Meditation will not seduce you into adopting a fake 'positive' attitude to life. It simply creates a form of mental clarity that helps you to enjoy life and achieve your goals.
- Meditation does not take a lot of time. The programme in our book takes around twenty minutes per day. In fact, many people find that it liberates more time than it consumes because they spend far less time having to cope with chronic pain, illness and stress.
- Meditation is not difficult or complicated, although it does require some effort and persistence. You can meditate on more or less anything (we even include a Coffee Meditation in our book). You can also do it virtually anywhere – on buses, trains, aircraft or even in the busiest office.

MINDFULNESS FOR HEALTH

Our book operates on two levels, which unfold week by week. The core mindfulness programme takes eight weeks and there is a chapter dedicated to each step. Each week you'll be asked to carry out two meditations on six days out of seven. These take just ten minutes each.

You'll also be encouraged to break some of your unconscious habits of thinking and behaving. These can embed a surprising amount of suffering because much of what we think and feel is locked in place by ongoing ways of approaching the world. By simply breaking some of your more ingrained habits you will help dissolve away your suffering. Habit-breaking – we prefer the term 'habit-releasing' – is straightforward. It can be as simple as watching the clouds from a park bench or waiting for the kettle to fully boil before making a cup of tea or coffee (rather than rushing to switch it off).

The programme in our book is best carried out over the recommended eight weeks, although you can do it over a longer period if you wish. Many people find that mindfulness gives them so many benefits that they continue with it for the rest of their lives. They see it as a journey that continuously reveals their true potential.

It can be a long and fruitful journey. We wish you well.

[Buy Mindfulness for Health from Amazon UK](#)

The Benefits of Mindfulness Meditation

Thousands of peer-reviewed scientific papers prove that mindfulness enhances mental and physical wellbeing and reduces chronic pain. Clinical trials show that mindfulness is at least as effective as the main prescription painkillers while also enhancing the body's natural healing systems.

Here are a few of the main proven benefits of mindfulness meditation:

- Anxiety, stress, depression, exhaustion and irritability all decrease with regular sessions of meditation.¹ Memory improves, reaction times become faster and mental and physical stamina increase.² In short, regular meditators are happier and more contented, while being far less likely to suffer from psychological distress.¹⁵
- Mindfulness can dramatically reduce pain and the emotional reaction to it.^{5,6} Recent trials suggest that average pain 'unpleasantness' levels can be reduced by 57 per cent while accomplished meditators report reductions of up to 93 per cent.⁷

- Clinical trials show that mindfulness improves mood and quality of life in chronic pain conditions such as fibromyalgia⁸ and lower-back pain,⁹ in chronic functional disorders such as IBS,¹⁰ and in challenging medical illnesses, including multiple sclerosis¹¹ and cancer.¹²
- Mindfulness improves working memory, creativity, attention span and reaction speeds. It also enhances mental and physical stamina and resilience.¹³
- Meditation improves emotional intelligence.¹⁴
- Mindfulness is at least as good as drugs or counselling for the treatment of clinical-level depression. One structured programme known as Mindfulness-Based Cognitive Therapy (MBCT) is now one of the preferred treatments recommended by the UK's National Institute for Health and Clinical Excellence.¹⁶
- Mindfulness reduces addictive and self-destructive behaviour. These include the abuse of illegal and prescription drugs and excessive alcohol intake.¹⁷
- Meditation enhances brain function. It increases grey matter in areas associated with self-awareness, empathy, self-control and attention.¹⁸ It soothes the parts of the brain that produce stress hormones¹⁹ and builds those areas that lift mood and promote learning.²⁰ It even reduces some of the thinning of certain areas of the brain that naturally occurs with ageing.²¹
- Meditation improves the immune system. Regular meditators are admitted to hospital far less often for cancer, heart disease and numerous infectious diseases.²²
- Mindfulness may reduce ageing at the cellular level by promoting chromosomal health and resilience.²³
- Meditation and mindfulness improve control of blood sugar in type II diabetes.²⁴
- Meditation improves heart and circulatory health by reducing blood pressure and lowering the risk of hypertension. Mindfulness reduces the risks of developing and dying from cardiovascular disease and lowers its severity should it arise.²⁵

Buy Mindfulness for Health from Amazon UK

A Simple Breath-based Meditation

Meditation can be simple and does not require any special equipment. The meditation below demonstrates the basic technique and takes just a few minutes. It will leave you profoundly relaxed.

1. If your condition allows it, sit erect but relaxed in a straight-backed chair with your feet flat on the floor. If you cannot sit, then lie on a mat or blanket on the floor, or on your bed. Allow your arms and hands to be as relaxed as possible.
2. Gently close your eyes and focus your awareness on the breath as it flows into and out of your body. Feel the sensations the air makes as it flows in through your mouth or nose, down your throat and into your lungs. Feel the expansion and subsiding of your chest and belly as you breathe. Focus your awareness on where the sensations are strongest. Stay in contact with each in-breath and each out-breath. Observe it without trying to alter it in any way or expecting anything special to happen.
3. When your mind wanders, gently shepherd it back to the breath. Try not to criticise yourself. Minds wander. It's what they do. The act of realising that your mind has wandered – and encouraging it to return to focus on the breath – is central to the practice of mindfulness.
4. Your mind may eventually become calm – or it may not. If it becomes calm, then this may only be short-lived. Your mind may become filled with thoughts or powerful emotions such as fear, anger, stress or love. These may also be fleeting. Whatever happens, simply observe as best you can without reacting to your experience or trying to change anything. Gently return your awareness back to the sensations of the breath again and again.
5. After a few minutes, or longer if you prefer, gently open your eyes and take in your surroundings.

References

- 1 Baer, R. A., Smith, G. T., Hopkins, J., Kreitemeyer, J. & Toney, L. (2006), 'Using self-report assessment methods to explore facets of mindfulness', *Assessment*, 13, pp. 27–45.
- 2 Jha, A., et al. (2007), 'Mindfulness training modifies subsystems of attention', *Cognitive Affective and Behavioral Neuroscience*, 7, pp. 109–19; Tang, Y. Y., Ma, Y., Wang, J., Fan, Y., Feng, S., Lu, Q., et al. (2007), 'Short-term meditation training improves attention and self-regulation', *Proceedings of the National Academy of Sciences (US)*, 104(43), pp. 17152–6; McCracken, L. M. & Yang, S.-Y. (2008), 'A contextual cognitive-behavioral analysis of rehabilitation workers' health and well-being: Influences of acceptance, mindfulness and values-based action', *Rehabilitation Psychology*, 53, pp.479–85; Ortner, C. N. M., Kilner, S. J. & Zelazo, P. D. (2007), 'Mindfulness meditation and reduced emotional interference on a cognitive task', *Motivation and Emotion*, 31, pp. 271–83; Brefczynski-Lewis, J. A.,

Lutz, A., Schaefer, H. S., Levinson, D. B. & Davidson, R. J. (2007), 'Neural correlates of attentional expertise in long-term meditation practitioners', *Proceedings of the National Academy of Sciences (US)*, 104(27), pp. 11483–8.

3. Brown, Christopher A., Jones, Anthony K. P., (2013) 'Psychobiological Correlates of Improved Mental Health in Patients With Musculoskeletal Pain After a Mindfulness-based Pain Management Program', *Clinical Journal of Pain*, 29(3), pp. 233–44.

4. Zeidan, F., Martucci, K. T., Kraft, R. A., Gordon, N. S., McHaffie, J. G. & Coghill, R. C. 2011, 'Brain Mechanisms Supporting the Modulation of Pain by Mindfulness Meditation', *Journal of Neuroscience*, 31(14), p. 5540. See also the accompanying comments regarding morphine effectiveness by Fadel Zeidan of the Wake Forest University School of Medicine at <http://ow.ly/i8rZs>.

5. Kabat-Zinn, J., Lipworth, L., Burncy, R. & Sellers, W. (1986), 'Four-year follow-up of a meditation-based program for the self-regulation of chronic pain: Treatment outcomes and compliance', *Clinical Journal of Pain*, 2, p. 159; Morone, N. E., Greco, C. M. & Weiner, D. K. (2008), 'Mindfulness meditation for the treatment of chronic low back pain in older adults: A randomized controlled pilot study', *Pain*, 134(3), pp. 310–19; Grant, J. A. & Rainville, P. (2009), 'Pain sensitivity and analgesic effects of mindful states in zen meditators: A cross-sectional study', *Psychosomatic Medicine*, 71(1), pp. 106–14.

6. Brown, Christopher A., Jones, Anthony K. P. 2013, MD, 'Psychobiological Correlates of Improved Mental Health in Patients With Musculoskeletal Pain After a Mindfulness-based Pain Management Program', *Clinical Journal of Pain*, 29(3), pp. 233–44.

7. Zeidan, F., Martucci, K. T., Kraft, R. A., Gordon, N. S., McHaffie, J. G. & Coghill, R. C. 2011, 'Brain Mechanisms Supporting the Modulation of Pain by Mindfulness Meditation', *Journal of Neuroscience*, 31(14), p. 5540. See also the accompanying comments regarding morphine effectiveness by Fadel Zeidan of the Wake Forest University School of Medicine at <http://ow.ly/i8rZs>.

8. Grossman, P., Tiefenthaler-Gilmer, U., Raysz, A. & Kesper, U. (2007), 'Mindfulness training as an intervention for fibromyalgia: evidence of postintervention and 3-year follow-up benefits in well-being', *Psychotherapy and Psychosomatics*, 76, pp. 226–233; Sephton, S. E., Salmon, P., Weissbecker, I., Ulmer, C., Floyd, A., Hoover, K., et al. (2007), 'Mindfulness meditation alleviates depressive symptoms in women with fibromyalgia: results of a randomized clinical trial', *Arthritis &*

- Rheumatism, 57, pp. 77–85; Schmidt, S., Grossman, P., Schwarzer, B., Jena, S., Naumann, J., and Walach, H. (2011), ‘Treating fibromyalgia with mindfulness-based stress reduction: results from a 3-armed randomized controlled trial’, *Pain* 152, pp. 361–9.
9. Morone, N. E., Lynch, C. S., Greco, C. M., Tindle, H. A. & Weiner, D. K. (2008b), “‘I felt like a new person’ – the effects of mindfulness meditation on older adults with chronic pain: qualitative narrative analysis of diary entries’, *Journal of Pain*, 9, pp. 841–8.
10. Gaylord, S. A., Palsson, O. S., Garland, E. L., Faurot, K. R., Coble, R. S., Mann, J. D., et al. (2011), ‘Mindfulness training reduces the severity of irritable bowel syndrome in women: results of a randomized controlled trial’, *American Journal of Gastroenterology*, 106, pp. 1678–88.
11. Grossman, P., Kappos, L., Gensicke, H., D’souza, M., Mohr, D. C., Penner, I. K., et al. (2010), ‘MS quality of life, depression, and fatigue improve after mindfulness training: a randomized trial’, *Neurology*, 75, pp. 1141–9.
12. Speca, M., Carlson, L., Goodey, E. & Angen, M. (2000), ‘A randomized, wait-list controlled clinical trial: the effect of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients’, *Psychosomatic Medicine*, 62, pp. 613–22.
13. Jha, A., et al. (2007), ‘Mindfulness training modifies subsystems of attention’, *Cognitive Affective and Behavioral Neuroscience*, 7, pp. 109–19; Tang, Y. Y., Ma, Y., Wang, J., Fan, Y., Feng, S., Lu, Q., et al. (2007), ‘Short-term meditation training improves attention and self-regulation’, *Proceedings of the National Academy of Sciences (US)*, 104(43), pp. 17152–6. McCracken, L. M. & Yang, S.-Y. (2008), ‘A contextual cognitive-behavioral analysis of rehabilitation workers’ health and well-being: Influences of acceptance, mindfulness and values-based action’, *Rehabilitation Psychology*, 53, pp. 479–85; Ortner, C. N. M., Kilner, S. J. & Zelazo, P. D. (2007), ‘Mindfulness meditation and reduced emotional interference on a cognitive task’, *Motivation and Emotion*, 31, pp. 271–83; Brefczynski-Lewis, J. A., Lutz, A., Schaefer, H. S., Levinson, D. B. & Davidson, R. J. (2007), ‘Neural correlates of attentional expertise in long-term meditation practitioners’, *Proceedings of the National Academy of Sciences (US)*, 104(27), pp. 11483–8.
14. Brown, Kirk Warren, Ryan, Richard, M. (2003), ‘The benefits of being present: Mindfulness and its role in psychological well-being’, *Journal of Personality and Social Psychology*, 84(4), pp. 822–48;

Lykins, Emily L. B. & Baer, Ruth A. (2009), 'Psychological Functioning in a Sample of Long-Term Practitioners of Mindfulness Meditation', *Journal of Cognitive Psychotherapy*, 23(3), pp. 226–41.

15. Ivanowski, B. & Malhi, G. S. (2007), 'The psychological and neuro-physiological concomitants of mindfulness forms of meditation', *Acta Neuropsychiatrica*, 19, pp. 76–91; Shapiro, S. L., Oman, D., Thoresen, C. E., Plante, T. G. & Flinders, T. (2008), 'Cultivating mindfulness: effects on well-being', *Journal of Clinical Psychology*, 64(7), pp. 840–62; Shapiro, S. L., Schwartz, G. E. & Bonner, G. (1998), 'Effects of mindfulness-based stress reduction on medical and pre-medical students', *Journal of Behavioral Medicine*, 21, pp. 581–99.

16. See NICE Guidelines for Management of Depression (2004, 2009). Ma, J. & Teasdale, J. D. (2004), 'Mindfulness-based cognitive therapy for depression: Replication and exploration of differential relapse prevention effects', *Journal of Consulting and Clinical Psychology*, 72, pp. 31–40; Segal, Z. V., Williams, J. M. G. & Teasdale, J. D., *Mindfulness-based Cognitive Therapy for Depression: a new approach to preventing relapse* (Guilford Press, 2002); Kenny, M. A. & Williams, J. M. G. (2007), 'Treatment-resistant depressed patients show a good response to Mindfulness-Based Cognitive Therapy', *Behaviour Research & Therapy*, 45, pp. 617–25; Eisendraeth, S. J., Delucchi, K., Bitner, R., Fenimore, P., Smit, M. & McLane, M. (2008), 'Mindfulness-Based Cognitive Therapy for Treatment-Resistant Depression: A Pilot Study', *Psychotherapy and Psychosomatics*, 77, pp. 319–20; Kingston, T., et al. (2007), 'Mindfulness-based cognitive therapy for residual depressive symptoms', *Psychology and Psychotherapy*, 80, pp. 193–203.

17. Bowen, S., et al. (2006), 'Mindfulness Meditation and Substance Use in an Incarcerated Population', *Psychology of Addictive Behaviors*, 20, pp. 343–7.

18. Hölzel, B. K., Ott, U., Gard, T., Hempel, H., Weygandt, M., Morgen, K. & Vaitl, D. (2008), 'Investigation of mindfulness meditation practitioners with voxel-based morphometry', *Social Cognitive and Affective Neuroscience*, 3, pp 55–61; Lazar, S., Kerr, C., Wasserman, R., Gray, J., Greve, D., Treadway, M., McGarvey, M., Quinn, B., Dusek, J., Benson, H., Rauch, S., Moore, C. & Fischl, B. (2005), 'Meditation experience is associated with increased cortical thickness', *NeuroReport*, 16, pp. 1893–7; Luders, Eileen, Toga, Arthur W., Lepore, Natasha & Gaser, Christian (2009), 'The underlying anatomical correlates of long-term meditation: Larger hippocampal and frontal volumes of gray matter', *Neuroimage*, 45, pp. 672–8.

19. Tang, Y., Ma, Y., Wang, J., Fan, Y., Feg, S., Lu, Q., Yu, Q., Sui, D., Rothbart, M., Fan, M. & Posner, M. (2007), 'Short-term meditation training improves attention and self-regulation', *Proceedings of the National Academy of Sciences*, 104, pp. 17152–6.
20. Davidson, R. J. (2004), 'Well-being and affective style: Neural substrates and biobehavioural correlates', *Philosophical Transactions of the Royal Society*, 359, pp. 1395–1411.
21. Lazar, S., Kerr, C., Wasserman, R., Gray, J., Greve, D., Treadway, M., McGarvey, M., Quinn, B., Dusek, J., Benson, J., Rauch, S., Moore, C. & Fischl, B. (2005), 'Meditation experience is associated with increased cortical thickness', *NeuroReport*, 16, pp 1893–7.
22. Davidson, R. J., Kabat-Zinn, J. Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S.F., Urbanowski, F., Harrington, A., Bonus, K. & Sheridan, J. F. (2003) 'Alterations in brain and immune function produced by mindfulness meditation', *Psychosomatic Medicine*, 65, pp. 564–70; Tang, Y., Ma, Y., Wang, J., Fan, Y., Feg, S., Lu, Q., Yu, Q., Sui, D., Rothbart, M., Fan, M. & Posner, M. (2007), 'Short-term meditation training improves attention and self-regulation', *Proceedings of the National Academy of Sciences*, 104, pp. 17152–6.
23. Epel, Elissa, Daubenmier, Jennifer, Tedlie Moskowitz, Judith, Folkman, Susan & Blackburn, Elizabeth (2009), 'Can Meditation Slow Rate of Cellular Aging? Cognitive Stress, Mindfulness, and Telomeres', *Annals of the New York Academy of Sciences*, 1172; Longevity, Regeneration, and Optimal Health Integrating Eastern and Western Perspectives, pp. 34–53.
24. Walsh, R. & Shapiro, S. L. (2006), 'The meeting of meditative disciplines and Western psychology: A mutually enriching dialogue', *American Psychologist*, 61, pp. 227–39.
25. Ibid. 26. Kabat-Zinn, J., Lipworth, L., Burney, R. & Sellers, W. (1986), 'Four-year follow-up of a meditation-based program for the self-regulation of chronic pain: Treatment outcomes and compliance', *Clinical Journal of Pain*, 2, p. 159; Brown, Christopher A., Jones, Anthony K. P. (2013), 'Psychobiological Correlates of Improved Mental Health in Patients With Musculoskeletal Pain After a Mindfulness-based Pain Management Program', *Clinical Journal of Pain*, 29(3), pp. 233–44; Lutz, Antoine, McFarlin, Daniel R., Perlman, David M., Salomons, Tim V. & Davidson, Richard J. (2013), 'Altered anterior insula activation during anticipation and experience of painful stimuli in expert meditators', *Journal NeuroImage*, 64, pp. 538–46.

27. Baliki, Marwan N., Bogdan, Petre, Torbey, Souraya, Herrmann, Kristina M., Huang, Leijan, Schnitzer, Thomas J., Fields, Howard L. & Vania Apkarian, A. (2012), 'Corticostriatal functional connectivity predicts transition to chronic back pain', *Nature Neuroscience*, 15, pp. 1117–19.