An anatomical illustration of a human back, showing the spine, muscles, and nerves. The spine is highlighted in red, and the nerves are highlighted in yellow. The muscles are shown in a blue, semi-transparent style. The background is black.

# Conquering Low Back Pain: Simple Solutions for a Complex Problem

**Dr. Dave Candy, PT, OCS, ATC, FAAOMPT**

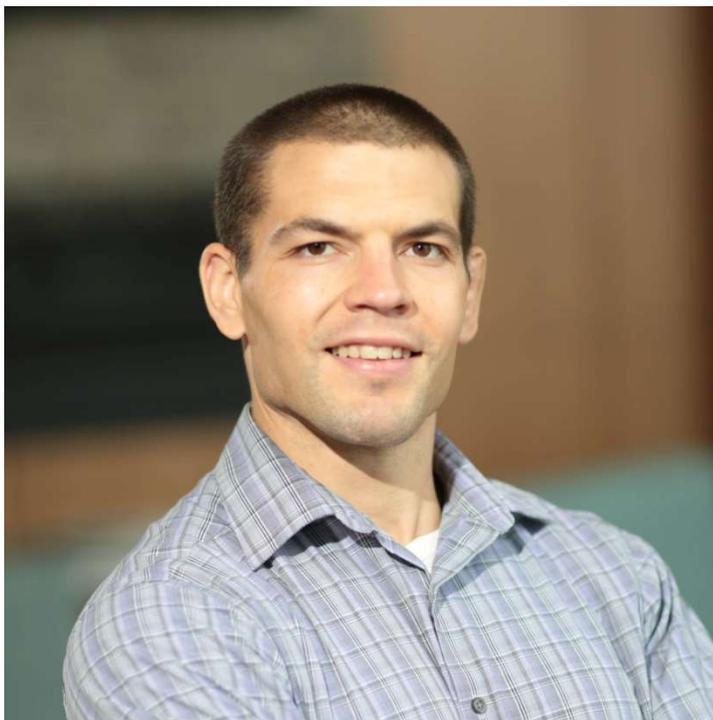
# **Conquering Low Back Pain: Simple Solutions to a Complex Problem**

**By: Dr. Dave Candy, PT, OCS, ATC, FAAOMPT**

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St. Louis, MO**

## **About the Author:**

Dave Candy received his Bachelor's in Rehabilitation Science from the University of Pittsburgh in 2005 and his Doctor of Physical Therapy degree from the University of Pittsburgh in 2008. In 2012, Dr. Candy graduated from a two-and-a-half year fellowship program in orthopaedic manual physical therapy through the Manual Therapy Institute. In 2015, he completed a certification in trigger point dry needling through Myopain Seminars. Dr. Candy is a Board Certified Specialist in Orthopaedic Physical Therapy and a Certified Athletic Trainer. He is a Fellow of the American Academy of Orthopaedic and Manual



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## Introduction

Low back pain affects 60-80% of people having low back pain at some point during their life,<sup>27</sup> and it has become the leading cause for disability worldwide.<sup>22</sup> 85% of cases of low back pain are classified as *nonspecific*,<sup>1</sup> meaning the exact structural cause of the pain cannot be identified even with MRI. This is likely because many of the structural changes of the spine traditionally thought to be associated with low back pain - bulging discs, herniated discs, degenerative disc disease, degenerative joint disease - are actually also very common in people *without pain* (see table below).<sup>4</sup> Low back pain is now seen as a complex, multi-system, condition, meaning that beyond just muscles, bones, and joints, many other systems are involved. These include the nervous system, endocrine system, cardiovascular system, and respiratory system.

Percent of adults by age who demonstrate structural changes on MRI.

Age	20	30	40	50	60	70	80
Disk degeneration	37%	52%	68%	80%	88%	93%	96%
Disk signal loss	17%	33%	54%	73%	86%	94%	97%
Disk height loss	24%	34%	45%	56%	67%	76%	84%
Disk bulge	30%	40%	50%	60%	69%	77%	84%
Disk protrusion	29%	31%	33%	36%	38%	40%	43%
Annular fissure	19%	20%	22%	23%	25%	27%	29%
Facet degeneration	4%	9%	18%	32%	50%	69%	83%
Spondylolisthesis	3%	5%	8%	14%	23%	35%	50%

Data From: Brinjikji W, Luetmer PH, Comstock B, et al. Systematic Literature Review of Imaging Features of Spinal Degeneration in Asymptomatic Populations. *AJNR Am J Neuroradiol*. 2014;ajnr.A4173-. doi:10.3174/ajnr.A4173.

### Self-Limiting Condition?

Low back pain was once described as a self-limiting condition. Most people will return to their normal activities in about 1 month after an episode of low back pain and the pain will often get better in 2-4 months without treatment. However, a rising percent of patients experiencing an episode of back pain will go on to have chronic low back pain lasting 3 months or longer. This small percentage (5-10%) of chronic cases account for over 75% of low back related-costs healthcare and occupational costs (\$100 to 200 billion each year in the US alone). Additionally, we know that about 60-80% of people who do "recover" from an episode of low back pain have a recurrence of their back pain within one year.<sup>20</sup> Thus, the current thought is that *low back syndrome* is more of an ongoing chronic disease process that may have periods with and without pain. This is similar to other chronic diseases such as heart disease and diabetes in that symptoms may not appear for months or years after the onset of the problem. Also similar to other diseases, medications and other therapies may help with the *symptoms* of the problem, but the only long term cure is *sustainable lifestyle change*.

The purpose of this e-book is to help you learn some of these changes as well as to find ways to start to make these sustainable lifestyle changes. The concepts are simple, but real-life application is certainly not. However, by making the effort to incorporate some of these changes, you can start to take back control of your life and get back to doing the things that make life worth living.

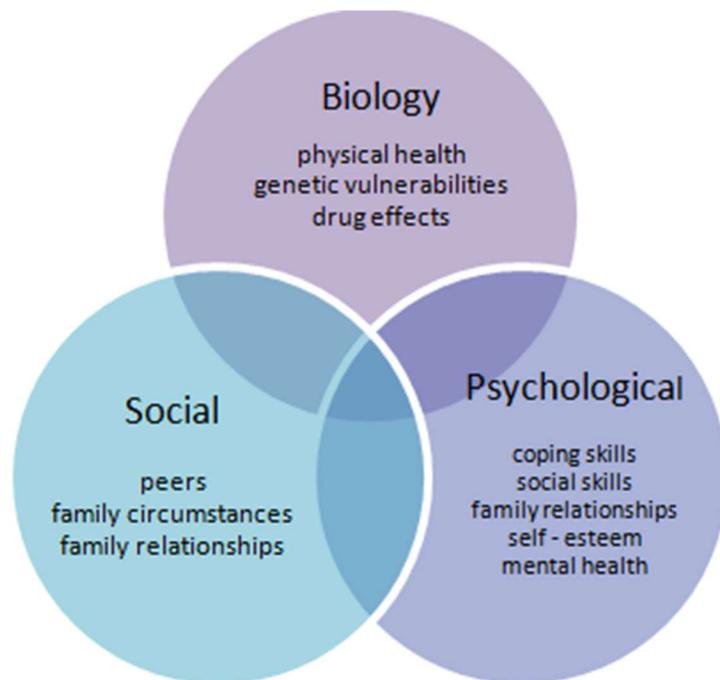
## What exactly is pain and what causes it?

### The Biopsychosocial Model of Pain

The [International Association for the Study of Pain](#) defines pain as “an unpleasant *sensory and emotional* experience associated with *actual or potential* tissue damage, or described in terms of such damage.” Note the sensory (the signals our body sends to our brain) and emotional (how our brain interprets those signals) components of the pain are both always present. Our current understanding of pain is that pain is associated with threat.<sup>5,6</sup> It is protective for our survival. When the brain has more credible evidence of danger than of safety, it produces an unpleasant response (pain) that calls us to take action in order to get out of danger, which we understand as pain. So, in summary: **danger = pain, safety = no pain**. Seems pretty simple...right?

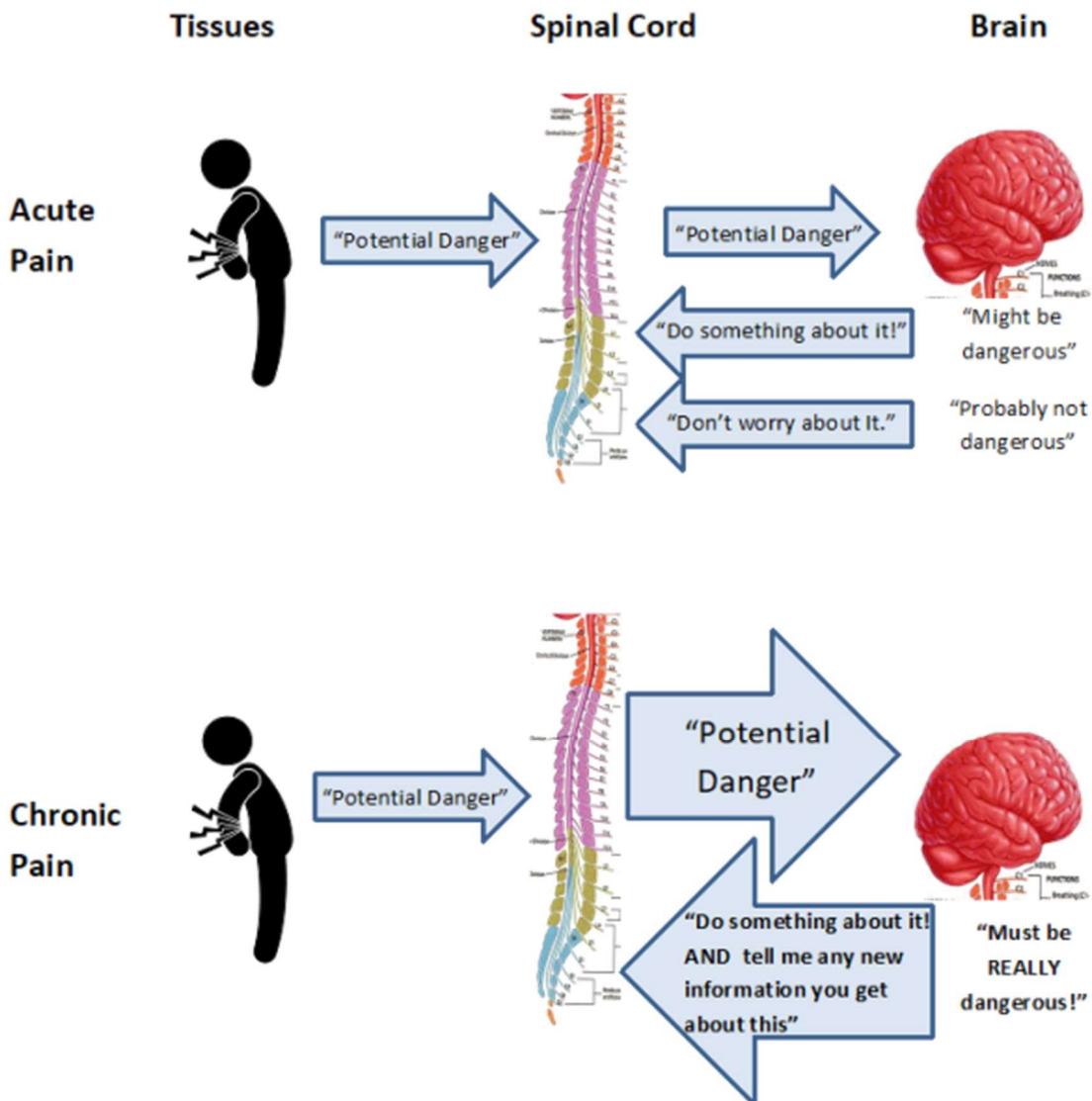
The difficult part though is that there are many different things that can give us evidence of danger or safety. The sensory messages we get from our body are one part. Other things like the amount and quality of sleep, thoughts and feelings (i.e. stress, anxiety, depression, anger, fear), activity level, diet, culture, values, and past experiences also play a role. Our brain's job is to process all of this evidence and come up with a response that is the most beneficial to our well-being.

Most of the time this process works pretty well and produces appropriate responses. However, sometimes the system malfunctions and pain lasts longer than it should, even after tissues have completed their healing process. Keep reading to learn the difference between acute pain and chronic pain.



## Acute Pain

Acute pain is mostly driven by the sensory signals that come from our body. Imagine for example, that you twisted your ankle. Your brain would send an immediate response to your ankle telling it to get out of that position. You may have some residual signals coming from the tissues due to inflammation, and your brain may tell you to avoid putting weight on the ankle or wear an ankle brace for a few days. The key is that your tissues are sending signals to your brain, your brain is receiving them in proportion to what they should be, and your brain is making appropriate decisions based on that information. This type of pain is *adaptive*, or beneficial to our well-being.



## Chronic or Persistent Pain

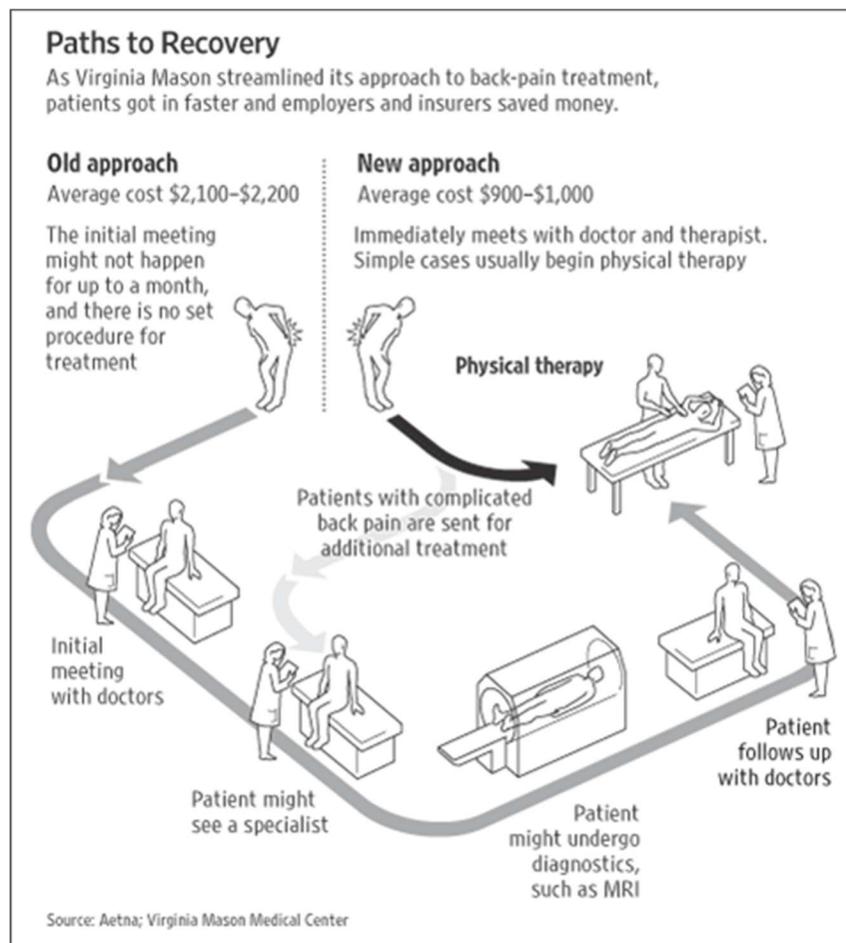
Chronic or persistent pain is pain that lasts longer than the normal expected recovery time. Unlike acute pain, the signal from the tissues is a much smaller (but still important) part of the pain experience. Your tissues send signals along your nerves to the spinal cord which acts as a relay center to the brain. Based on how much danger the brain perceives though, it can “turn up” or “turn down” how much information is allowed to pass through the spinal cord to the brain. If something seems important, the brain will want a lot more information, whereas if something is not important (i.e. the feeling of clothes on our body), the brain will not want as much information about it. Thus, if there is more credible evidence of danger than safety, the spinal cord will magnify how much signal is allowed to pass from the tissues to the brain. The brain receives the out-of-proportion signals and makes appropriate decisions based on incorrect information.<sup>5,6</sup> Patients with chronic pain often worry that other people may think they are crazy or think “it’s all in your head”. Note though, that your brain is making **good** decisions based on the information it receives...it just so happens that that information does not accurately reflect what is going on at the tissues. This type of pain is *maladaptive*, meaning it is of no benefit to us. The protective responses that our brain produces may tell us not to do things such as being physically active, returning to work, or doing normal household chores for fear that doing so will cause further harm. In reality though, doing these things has been shown to result in better improvements in pain and function than does resting.<sup>10</sup> Remember from previously that pain is associated with the *threat* of danger, not necessarily tissue damage. In chronic pain, research shows that just knowing that pain is not harmful can help you move forward in taking steps to improve your pain. Some of this research will be shared later in this book.

### What does this mean to me?

Low back syndrome is a complex, multi-system, biopsychosocial condition, meaning that beyond just muscles, bones, and joints, many other systems are involved. These include the nervous system, endocrine system, cardiovascular system, and respiratory system. Many studies have shown that thoughts and feelings (belief that pain is harmful, fear of movement or activity, fear that pain will persist, anxiety, depression, job dissatisfaction) and lifestyle habits (smoking, poor diet, lack of physical activity, poor sleep) are better than MRI findings at predicting which patients will get better and which patients will have long-term pain and disability. **This is good news! This means you are in control of whether or not you will get better!** In the following sections, you will be able to learn tips to help take control of these factors to not only get you better, but to *keep* you better.

## Early access, early recovery

As you learned in the previous section acute and chronic low back pain are very different animals, and understanding which you have affects the approach you will need to take in order to get it to feel better. Tissue based approaches (stretching, ice, heat, anti-inflammatories, etc.) work well for acute pain, but chronic pain is much more in depth and takes longer to get better. The best possible situation is to catch the pain in the acute stage and prevent it from becoming chronic. Staying as active as you can within the limits of your pain usually helps, but if your pain lasts longer than a few days, seeing your physical therapist quickly results in quicker improvements at a lower cost than if you wait to see if the pain will get better before seeking treatment.<sup>7,9,11,12,14,19,31</sup> In all 50 states, there is now at least some form of direct access to physical therapy, meaning you can see your physical therapist without needing to see a medical doctor first. Going directly to physical therapy can drastically reduce the cost of care as evidenced in this diagram from an [article in the Wall Street Journal](#). As you can see in the diagram below, going directly to a physical therapist rather than seeing a physician, having imaging, and then being sent to physical therapy anyway saved on average about \$1200 on a typical case of low back pain.



## Stay Active

It has long been known and advised by the medical community that staying active is better for low back pain than resting. However, what particular mode of exercise or other physical activity has been left up in the air. Walking is frequently recommended as a form of exercise that is beneficial for low back pain. A recent research study<sup>33</sup> on chronic low back pain sought to find if walking was more effective than other types of exercise for improving pain, disability, quality of life, and beliefs in patients with chronic low back pain. To do this they searched for results from previous randomized controlled trials, which are considered to be one highest levels of research. What they found was not surprising...both walking and other exercise were good at improving chronic low back pain, disability, and quality of life. One was not more effective than the other, and adding one to the other did not improve the results. This study echos the results of other studies<sup>2,25,26</sup> showing that no one type of exercise is better than others with regards to low back pain.

### Take-Home Points

The specific type of exercise (or other form of physical activity) isn't that important. What is important is that you **JUST MOVE**. For someone who has not exercised in a long time, "physical activity" may mean taking a trip to the grocery store and walking instead of using an electric cart. "Exercise" has come to be a term associated with sweating, pain, and exhaustion...a necessary evil to being healthy. But exercise should be enjoyable. The **BEST** type of exercise *is the one you'll do*, and if you enjoy something, you're more likely to actually do it. Chopping wood, cleaning the house, cutting the grass with a push mower, gardening, or riding bikes or playing basketball with your kids are all good forms of physical activity.

Whatever form of physical activity you choose, it's important that you *start slow* and gradually increase. Trying to take on too much too soon can be overwhelming at best, and at worst, if you get really sore from your first few exercise sessions, that may make you less excited about doing it in the future. Simply finding ways to spend more time moving each day will have big payoffs for your back, your heart, your sleep, and your happiness. If you are uncertain how to get started contact your [physical therapist](#), and they can help get you set up on a program that will work based on your unique interests, goals, and lifestyle.

## How you Move Matters

The human spine is incredibly strong. It has evolved to allow us to function upright on two feet using only a minimal amount of muscular effort. The structure of the discs makes them able to withstand tremendous amounts of compression – such as gravity pushing down us or carrying heavy loads. Some people, like weight lifters take this to an extreme and demonstrate how much load the human spine can truly handle!



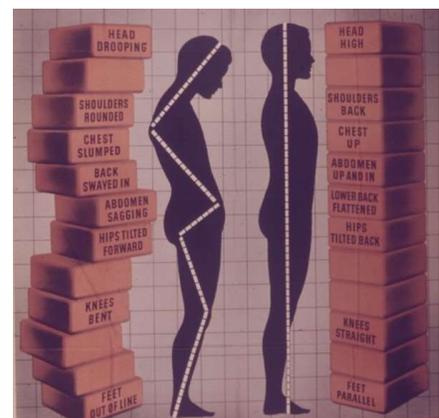
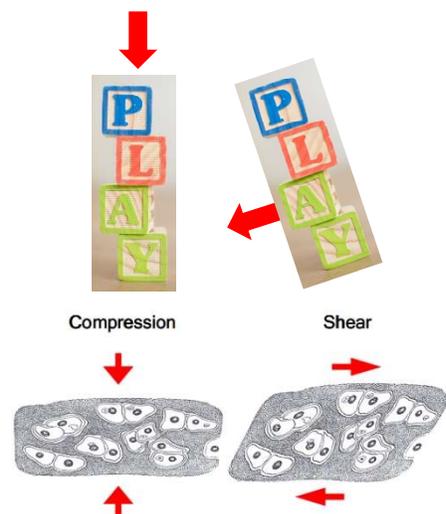
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On the other hand, the spine is not well suited to handling large amounts of shear force (see picture).

The key is, that the spine is like a stacked tower of blocks. If all of the blocks are stacked up on top of each other, everything works just fine. If the blocks get off kilter, then it takes a lot more muscle force to keep the tower of blocks from toppling over. So, keeping the spine in the posture that it was designed to be in is incredibly important.

The truth is, there is no one ideal posture for every person. What works well for a 6'0" muscular man is much different than what works for a 5'2" thin, flexible woman. The ideal alignment for any activity is that which allows the body to function most efficiently using the least possible amount of energy. In general, if your head, shoulders, spine, and pelvis are all lined up, then you are probably pretty close to ideal alignment.

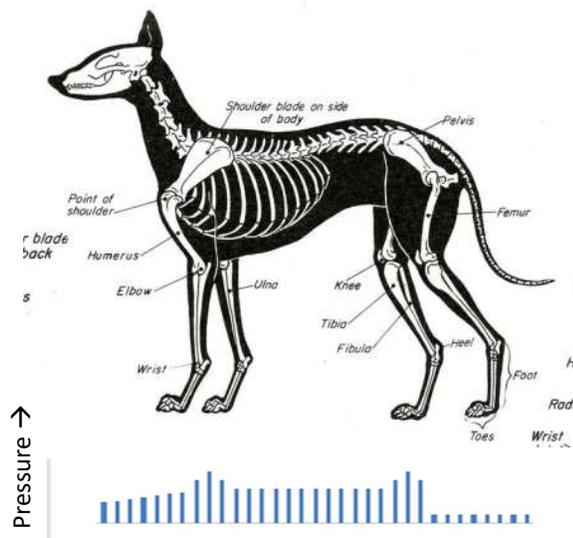
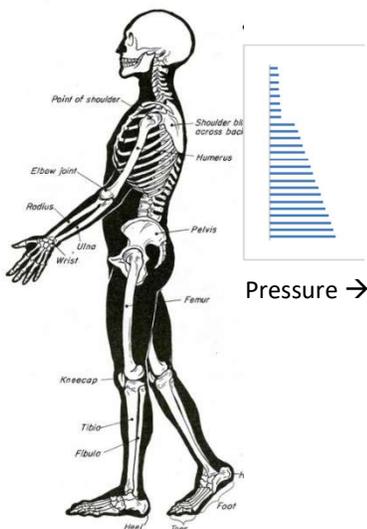
A [physical therapist](#) can help you learn to use this type of posture for various activities such as standing, sitting, bending, lifting, etc.



## Knowledge is Power

Physical activity is an essential component to recovering from low back pain. As mentioned earlier in this book though, just understanding pain better can actually reduce the pain itself. Two recent studies have demonstrated that adding pain education to an exercise program can improve results versus just exercise alone. In the first study,<sup>24</sup> fifty adults age 50-93 with chronic low back pain were given a single education session to challenge common misconceptions that people have about low back pain. Subjects experienced immediate improvements in pain and fear without having to apply any other type of treatment. In the second study,<sup>15</sup> 56 patients with chronic low back pain were put on a 3-month exercise program. Half of them were also given education about pain. At the end of the 3 months, the patients who also received the education had significantly less pain (an average of 2.2 points on a scale of 0-10) than those who only exercised. These findings are in line with those of previous studies, which have shown that education plus exercise is effective for preventing an initial episode of low back pain<sup>17</sup> as well as preventing recurrence in those who have had previous low back pain.<sup>29</sup> The results of these studies show that KNOWLEDGE IS POWER. Below are some important take-home points to remember:

1. The human spine is very strong and adaptable to many different activities. It is designed to be able to withstand huge amounts of compressive forces, *when then the vertebrae are oriented in the correct postural alignment.*
2. Spinal degeneration is common to the human condition. Notice the differences in pressure distribution at various levels of the spine between a human and a dog.



Because humans stand vertically, the weight is cumulative the lower down the spine you look, thus causing the greatest amount of pressure at the lowest levels of the back. The “degenerative” changes that you may see on an x-ray or an MRI are a natural result of this. These findings are common in people with and without pain, and findings become more common with age. However, *these changes do not necessarily have to be painful.*

3. Most patients with low back pain return to normal function within 1 month and have resolution of their pain within 2 months.<sup>19</sup> Notice, function improves before the pain goes away. Therefore, you *should not* wait until your pain goes away to resume your normal activities.
4. 85% of cases of low back pain have no specific structural cause.<sup>1</sup> *Tissue damage is neither necessary to have pain, nor is tissue damage alone enough to cause pain.*
5. Thoughts and feelings (belief that pain is harmful, fear of movement or activity, fear that pain will persist, anxiety, depression, job dissatisfaction) and lifestyle habits (smoking, poor diet, lack of physical activity, poor sleep) are better than MRI findings at predicting which patients will get better and which patients will have long-term pain and disability.<sup>7,8,13,14,16,18,30,31</sup> *This is good news! This means you are in control of whether or not you will get better.*
6. Although back pain usually gets better quickly, about 60-86% of people have a recurrence of their back pain within one year.<sup>20</sup> Exercise and education programs have been shown to lower the risk of recurrence.<sup>17,20,28,29</sup> *Therefore, your treatment is not over when your back feels better. Staying healthy requires long-term lifestyle changes.*
7. If you do have a recurrence, **seeing your physical therapist quickly results in better outcomes** than if you wait to see if the pain will get better before seeking treatment.<sup>7,9,11,12,14,19,31</sup>

## Live in the Moment

We live in a busy world. Stress is everywhere and between taking care of yourself, your home, your job, and possibly a spouse, children, and/or parents, it's easy to get caught up in rushing from one responsibility to then next and lose track of the moments. However, doing so releases your body's natural stress hormone, cortisol. Cortisol is meant to help us react to urgent, stressful situations in order to assure our survival. It releases sugar into our blood and increases our heart rate and blood pressure to allow us to run or fight or do whatever else we need to do to get out of danger. It stores energy as fat to help us fend off starvation, and it is a strong anti-inflammatory and pain reliever. However, when cortisol levels remain elevated for a long time, the body adapts by decreasing the amount of cortisol it releases and/or causing the receptors to which cortisol binds to become cortisol-resistant. The net effect is just the opposite of the acute cortisol response: widespread inflammation and increased pain result. Fortunately, managing stress can help reverse this process. Studies have shown that practicing mindfulness – non-judgemental awareness of the present moment – helps lower cortisol levels,<sup>32</sup> decrease pain and depression, and increase quality of life.<sup>3,21</sup> releases opioid-like chemical that are powerful pain and stress relievers. These chemicals are 18 to 33 times stronger than morphine,<sup>23</sup> but without the side effects. There are many ways to practice mindfulness. Below are just a few of many options.

### Diaphragmatic breathing

Lay down in a quiet room away from any distractions. Put one hand on your stomach and the other hand on your chest. Slowly breath in by pushing your stomach out into your hand. Your hand on your chest should not move much. Breath out by letting your stomach fall. Repeat this process trying to focus on the rise and fall of your belly and the flow of air into and out of your lungs. Try not to let other thoughts enter your mind as you are breathing. If your mind wanders, acknowledge that it did and then re-direct your attention to your breathing. Start with 2-5 minutes, but try to work up to at least 10 minutes daily. This may feel like a long time at first, but if you do this regularly, it will get easier to stay focused, and you will notice that you feel much more relaxed afterwards.

### Mindful walking

Take a walk and focus on all of your different senses. Take note of the feeling of the ground under your feet and with the breeze on your face. Take note of the sounds, smells, and sights around you. Try not to categorize them as good or bad, just as factual

observations. i.e. “I see a dog” or “I smell rotting bananas” rather than “That’s a cute dog” or “That smells horrible.” As you walk, try to stay focused on the present. Don’t think about the stressful situation that just happened at work or the pile of laundry that you have to do when you get home. Simply enjoy the moment, and if you happen to see some, stop and smell the roses.

### Mindfulness meditation

Mindfulness meditation is a form of Buddhist “Zen” meditation. This is traditionally done seated. Before you begin, set a timer for the length of time you want to meditate so you don’t have to think about it. Start by getting in a comfortable sitting position with your legs cross, arms relaxed on your legs, and your gaze downward or eyes closed. Try to focus on the feelings from your head down to your toes. Breathe in and out using your diaphragm as above, and focus on the flow of your breath. If you notice your mind wandering, simply acknowledge that it did and return your attention to your body and your breathing. It is hard to stay focused, especially if you are new to meditation, so don’t get frustrated with yourself if this happens. Just keep redirecting your thoughts any time your mind wanders. When your timer goes off, take a moment to notice how relaxed your body feels before getting up and resuming your daily activities.

### Gratitude journaling

Take a few minutes at the beginning or end of each day to focus on 3 things you are grateful for. Write them down each day. While you are thinking about these things, you can’t be focused on negative or stressful thoughts at the same time. When you are having a stressful day, looking back through your journal can help remind you of all the things you have to be thankful for and help distract you from negative thoughts that pull down your mood and increase your stress levels.

### Reframing negative thoughts

Negative thoughts are toxic to our health. Negative thinking increases cortisol levels which can lead to chronic inflammation, increased pain, anxiety, depression, and can even decrease the number of nerve connections in our brains. Fortunately, most situations are not inherently good or bad...their value is based on how we view them...such as a glass being half-full vs. half-empty. Reframing negative thoughts into more positive ones can help make you happier and healthier. Here are some examples:

<b>Negative Thought</b>	<b>Reframed thought</b>
<p>“My back hurts whenever I stand for longer than 10 minutes, and I have to sit down.”</p>	<p>“I can stand 10 minutes before my back starts to hurt. If I pay attention to my posture, I will be able to stand longer before I have to sit down.”</p>
<p>“This pain is horrible. My doctor says my discs are shot and my spine is degenerated. I don’t think I’ll ever recover.”</p>	<p>“The pain may be bad, but I can still do a lot of things. If I work at it, I will be able to do more despite my disc degeneration.”</p>
<p>“I can’t go walking with my friends because of my pain. I don’t want to hold them back.”</p>	<p>“I can walk with my friends, but I may have to slow down or take breaks. If they are real friends, they will be happy to see me even if I’m not at 100%.”</p>

## Conclusion

Low back pain can be incredibly painful, but in most cases, it is not harmful. Using the tips contained in this e-book will help you to navigate an episode of back pain. In most cases, staying active, not worrying, and being patient will allow you to get better. However, accessing care from a physical therapist early can help move things along versus waiting for the condition to become chronic. If you are in the St. Louis area, certainly feel free to contact me at 314-941-3970 or [dave@m4lpt.com](mailto:dave@m4lpt.com) to learn how Movement 4 Life Physical Therapy can help get you back to doing the things that make life worth living.

If you are not in the St. Louis area, keep in mind that physical therapists have varying levels of knowledge and experience. To help find one that has at least some degree of advanced knowledge or training, the following resources may be helpful:

American Board of Physical Therapy Specialists – Find a Specialist

<http://www.abpts.org/FindaSpecialist/> - search for an Orthopaedic Clinic Specialist

American Academy of Orthopaedic Manual Physical Therapists – Find a Fellow

[https://aaompt.org/Main/Member\\_Resources/Find-A-Fellow.aspx/](https://aaompt.org/Main/Member_Resources/Find-A-Fellow.aspx/)

I hope you found this e-book to be helpful. If you have any feedback on what would make future editions of this e-book better, please let me know at [dave@m4lpt.com](mailto:dave@m4lpt.com).

Thanks for Reading!

Dave Candy, PT, DPT, OCS, ATC, FAAOMPT

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