



# STRONG BODY STRONG MIND

## BULLETIN

**You might not think it, but how you walk matters.**



I've been watching the way people walk for 20 years. I've found that, as I watch a patient walk into my office, I often can figure out exactly where their problem is. The way they shift their weight, which direction they lean, and how they pick up and put down their feet are all indicators of where they are experiencing pain. My wife and I are both physical therapists and have a bad habit of staring at strangers while they walk, analyzing where their problems are. And then, we end up arguing: me saying it's a knee problem, my wife thinking it's an ankle problem. My children get embarrassed and wish we wouldn't. But, honestly, it's a habit now: our jobs are literally to watch the way people walk.

In my opinion, there are a thousand different ways to walk, but only one way that is efficient.

And, strange as it may sound, our best teacher is actually a baby learning to walk.

You likely don't remember how you first walked. After all, you were tiny. But, undoubtedly, at some point you have seen babies toddling about, whether they were your own kids or someone else's. You've seen how they don't look down, but straight ahead. They stand up tall and fall forward, catching themselves by taking a step. They have been practicing for months: lifting their head, kicking their legs, and crawling, strengthening their neck, core, and back muscles. All of this is preparation for holding themselves upright and walking.

This idea, that the act of walking is falling forward and catching oneself by stepping on an outstretched leg, is a well-researched one. Walking is not about the art of stepping but about shifting your entire body weight from one side to the other using forward momentum.

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I'm serious. Walking right is one of the simplest and most important ways to keep your knees, hips, and back from hurting.

There are many different ways to walk, but not all of them keep you from pain and enable you to walk long distances without tiring. Some people pound their feet into the ground as if they are soldiers. Others strut or sway, imitating gangsters and performers, trying to look cool. But, as unique as these walking styles are, they are cheap replacements for the way you were born to walk, and certainly don't help your body hurt less.

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FROM PG 1

I encourage you to walk like a baby. Use your core and back muscles to hold yourself upright and look straight in front of you. Engage all of your senses, aware of what each part of your body feels like. You will be able to identify where your leg is and whether your knee is bent or straight without even looking at it. As you fall forward and catch yourself with your steps, you will be able to feel how your weight moves through your feet, how it passes from your heel to the middle of your foot to your big

toe. Your weight will pass from one side of your body to the other with each subsequent step, forward momentum swinging your legs almost effortlessly. Listen to your steps, noticing how quiet they are now. You aren't pounding the ground anymore but gliding forward, and doing so will significantly relieve the amount of pain you experience.

Walking isn't complicated: it's simply falling forward and catching yourself with your steps.

## Motivation to Change

BY EMILY SCHMIDT



*Emily Schmidt is a recent graduate of CSUSM with a Bachelor's in Literature and Writing Studies. She is curious, with an unquenchable thirst for learning and a love for helping others. When she isn't working at Genuine Care Physical Therapy, you can find her working as a freelance watercolor artist, traveling and exploring, or spending time with friends and family.*

We often know the right thing to do but have trouble actually doing it. We understand how our bad habit is harming us or why a new, healthy habit would benefit us, but we still don't feel motivated to change. This habit might be exercising three times a week, consistently eating healthy food, or stopping smoking. Even if we are given a list of all the ways our behavior changes will benefit us, sometimes it still feels impossible to make any progress towards our goals. One helpful way to tackle this problem is to look at what hinders motivation and what creates it.

One core hindrance to motivation and effective behavior change is a poor image of ourselves, both in terms of low self-esteem and a low concept of self-efficacy (meaning, very little belief in our capacity to accomplish anything). Interestingly enough, our opinion of whether or not we are likely to succeed dramatically impacts our likelihood of success.

Our experiences, the people we surround ourselves with, and our self-talk shapes our concept of self-efficacy. When we succeed, our self-confidence is boosted, and when we fail, our self-confidence can take a nose-dive. It is essential that we surround ourselves with positive mentors and models whose successes' can inspire us, whose failures' can remind us of the inevitability and importance of failure, and whose lives can motivate us towards positive self-change.

It is unsurprising that failure can cause us to doubt our ability to succeed. The important thing to remember is that failure is one of the key steps of learning. No progress can be made without some failure. Failure is not a reason to quit but an opportunity to try again, learn, and grow. By setting small goals, we feel a sense of progress which motivates us and increases our likelihood of success. At the same time, we need to keep our eyes on the bigger picture, the larger

goal. That way, even when we inevitably make mistakes along the way, we can remind ourselves of why we are trying in the first place. We can celebrate our successes while not becoming derailed by failure.

Our self-talk is incredibly important and intrinsically tied to how motivated we are. There is a technique in psychology called "Motivational Interviewing". It is used in counselling sessions to help individuals feel more motivated to actively take steps towards their goals. One tactic is to evaluate the pros and cons of change and stagnation, envisioning what each different future could look like. This enables a person to rationally choose which future they desire more, motivating them to work towards it. Another tactic is to discuss a person's values. This provides room for the individual to contemplate what truly matters to them and gives them space to look at whether or not the behavior in question supports or undermines those values. You can use these same techniques in your thought life in order to motivate you. Look at the behavior that you want to start or stop doing. How does it align with the future you want or the values you want to reflect?

In fact, all of the mental strategies mentioned, whether it be the mentors we seek to emulate, the stories we tell ourselves about our failures, or the logical contemplation of potential futures and the nature of our values, are useful to tools to motivate ourselves to work towards our goals.

Another essential part of motivation and completion of our goals is our social identity and social connections. There has been extensive

research done as to how social identity impacts addiction, especially how isolation perpetuates negative behavior. Building community with others around healthy habits (such as joining a running group if you want to start running consistently) and even just with people who are positive influences on you, increases the likelihood of you succeeding with your goals. Their successes can motivate you to work hard for yours, and their positive input can counter lingering negative self-talk. In a similar vein, negative social pressure can keep you stuck in bad habits. Recognize the power of peer pressure and use it to your advantage by surrounding yourself with positive influences.

One significant hindrance we have to breaking bad habits is the natural dopamine response in our brain that makes bad behavior addictive. Our body is literally reinforcing our negative behavior, making it even harder to quit. One way to counter this dopamine response is to implement environmental changes to make our bad behavior more difficult. Some examples of this include not having any junk food in the house or changing your grocery store route. If the habit you are trying to break is physically harder to accomplish, you will be less likely to fall back into it.

All of these strategies are ways to motivate yourself towards accomplishing your goals, making you far more likely to succeed. Behavior change takes hard work but it is possible. Take small steps, recognize your progress, and remember to cheer yourself on! You can do this!

## BS surrounding back pain



BY YOUNGSUN KIM

Let's talk about the BS surrounding back pain. I call it BS because, frankly, it is. Let's get started.

Unfortunately, people like you who suffer low back pain experience a roller coaster ride of emotion. For the first few days, you are hopeful. You feel the pain radiating in your back but hope that, one morning, it will magically disappear. When it doesn't, you start to search online. We call this "consulting Dr. Google". The problem starts right here. I get numerous phone calls asking panicked, nonsensical questions like, "I have back pain. Is it because of cancer?". They have searched online and found that low back pain can be a symptom of cancer. I tested it out and found that, if you search online for back pain, the number one search result says that low back pain is a symptom of cancer. In my twenty years as a physical therapist, I

have never once seen a patient with low back pain because of cancer. Probably less than one percent of back pain patients have cancer as the root cause. But Dr. Google's scary suggestion convinces you that you might have something seriously wrong with you. You become desperate to do something, try anything, to make the pain go away: take pain medicine, buy some patches, try steroid injections, or consider surgery. But despite your best efforts, your pain goes up and down, and you begin to feel discouraged and stressed, wondering if Dr. Google was right: that something is seriously wrong with you.

Your doctor is reluctant to order an MRI and prefers to prescribe you pain medication, but it makes you feel sick and sleepy, and doesn't even help that much. The pain keeps getting worse and worse and, now, you are considering even more options than you were before. Your friends suggest chiropractic care, acupuncture, inversion tables, new, different braces, massage therapy, among other things. You head back to your doctor's office and ask for something different, hoping that either you will finally get that MRI to put your fears to rest or your doctor will dole out some miraculous cure that can fix your ridiculously persistent back pain.

Instead, you are offered stronger pain medication or a steroid shot. You start to worry even more. You wonder if you'll have to have surgery. You worry that you won't be able to work, play the sports you love, spend time with your family. You worry you will be stuck at home, suffering and alone. You feel stuck, spending money on ineffectual solutions. You wonder if there is any hope at all.

**I'm here to say  
there is.**

**...You've Been  
Lied To...**

You read above about the emotional roller coaster ride of those with low back pain.

We covered the terrifying suggestions fed to you through the internet and the ineffectual solutions presented. And now, you need to know who's behind that wrong information.

I'm sure you won't be surprised to learn that it's the drug companies selling pharmaceuticals and the large medical centers profiting from imaging and surgeries, among other businesses, who are pushing this information. They don't have your best interests at heart, but are trying to scare you into action, hoping that you will choose one of the options they have presented to you. Dr Tim Flynn, a renowned back pain expert, asserts that, "The modern U.S. medical industrial complex has created, promoted, and sustained an epidemic in back pain."

There's a lot of BS because there is a lot of money backing that BS.

People in the U.S alone spend \$90 billion dollars annually on the management of low back pain. This amount is 10 times more than the initial funding approved by Congress for the Coronavirus response. 10 times more. Where money and power exist, there is corruption. Unfortunately, this misinformation created by rich, powerful companies affects human quality of life—your quality of life—and even length of life.

The biggest BS has been created by the pharmaceutical industry. They suggest that your pain can be solved by their pain medications, that the side effects are minimal, and the consequences nil. I have been a physical therapist for 20 years and was the director of a hospital rehabilitation center for 5 years. I watched how the pharmaceutical industry successfully lobbied Congress to change the rules so that medical professionals could sell more drugs. They didn't have the patient's best interests at heart. No, they cared about the profit margin, and that's it.

The result of this money-grubbing endeavor is an opioid epidemic. One in 3 patients who is over 65 receives an opioid prescription and one in 4 of them become long term abusers. 128 people die per day due to an opioid overdose. These people's lives have ended because a pharmaceutical company decided that it was profitable to prescribe addictive drugs to mask patients' pain.

There are now 3 times more steroid injections, 4 times more prescriptions for MRIs, 3 times more spinal fusion surgeries than there ever was before. There are young people fighting for their life in the ICU because they overdosed on opioids. There are policemen fielding calls for opioid related psychiatric problems, leaving them unable to respond to other calls that are crime related.



The medical industry has created this crisis, all in order to make more money.

My outrage at this situation prompted me to quit my high paying job as a director and open my own physical therapy practice. I chose to speak out against the healthcare system that exploits back pain for its own financial gain. My passion is to help you make the best decision for your health and provide the most effective and harmless solution for you. I am not interested in helping the healthcare system profit from your pain; I want to help you.

I know that, when you have back pain, you desperately want to know how to get rid of it and how long that process will take. When you don't see any progress, you feel frustrated and hopeless, sick of being in pain. As I mentioned before, the medical profession, Dr. Google, and friends and family all offer strategies and solutions, but you just end up feeling more confused. One of the most common suggestions is the advice to get an MRI taken to see what's going on. People ask me all the time: "Should I get an MRI?" And, honestly, the answer is, probably not, but I'll get more into that later.

Maybe you have already gotten an MRI done and you are having a hard time deciphering the medical jargon on your report. Words and phrases like 'disc herniation', 'grade II spondylolisthesis', 'bone spur', 'disc protrusion', 'narrowing of the disc space', 'stenosis', and 'DJD' all make your head spin. You have no idea what they mean but guess that they can't mean anything good: your body must be seriously messed up.

I have good news for you. You aren't messed up and broken beyond repair. In most cases, all of those scary words mean nothing. I say that they mean nothing because most people with all of these spinal issues don't have any back pain at all! Popular ideas about back pain indicate that these conditions are responsible for your pain and must be fixed through pain killers and surgery, but this couldn't be further from the truth.

The first research telling the truth about back pain was published in 1990.... That was 30 years ago! The study involved 63 volunteers who had no back pain whatsoever. As part of a medical study, they all had MRI's taken. These showed

remarkably concerning spinal issues, including discs herniating up to 36 percent, discs bulging up to 60 percent, and degenerative disc issues in 93% of the studies' participants who were over 60 years old. In all instances, the patients felt no pain. The results of this study led to articles recognizing the possibility of patients wrongly choosing back surgery, convinced that the issues revealed in an MRI are the cause of their difficulties when another issue is actually at the root of their pain. In the years since the study, referrals for MRI's have quadrupled and spinal fusion surgeries have tripled. More people than ever end up on long-term disability, suffering depression and surgical complications. The number one reason why people take opioids is chronic back pain, and 128 people die every day due to an opioid overdose. Surgery didn't fix these patients' pain, and the interpretation of the MRI's they received wrongly pushed them in that direction.

When a patient gets an MRI taken first instead of beginning with physical therapy, they are 6 times more likely to get surgery. In reality, only about 2% of patients with back pain require surgery, while physical therapy is proven to actually help. In order to truly ascertain if a patient requires surgery, it is necessary for the doctor to thoroughly examine you, spending enough time to know your symptoms and history, check your motions, sensations, reflexes, and levels of strength, and watch you sit, walk, and move. Your clinical presentation must match the results of the MRI in order for surgery to be warranted. Many surgeons simply recommend surgery based on MRI results. If this has been the case with you, please get a second opinion before deciding to move forward with the surgery.

There are very few patients who actually need MRI's or X-ray images: those who are suspected to have suffered a spinal fracture, those who have a history of cancer and present with other cancer symptoms, and those are suspected of having Cauda Equina Syndrome.

To elaborate, if someone has been involved in recent trauma, are osteoporotic and have fallen, or are a long term steroid user who has fallen, and then present with back pain, an MRI or X-ray is needed to rule out a fracture.

In order for cancer to be the suspected cause of back pain, and an MRI or X-ray to be needed, a patient needs to have a history of cancer along

*A physical therapist will screen for all of these issues and, given the high probability that these problems are not the cause for your back pain, will be able to begin a treatment plan with you that could actually help you fix your back pain.*

with other cancer symptoms, such as unexpected weight fluctuation and unusual fatigue and tiredness. Back pain is rarely indicative of cancer. In fact, only 0.6% of back pain cases are caused by cancer.

Finally, an MRI might be needed if Cauda Equina Syndrome is suspected. However, this condition is high specific and also includes unique symptoms. The syndrome involves damage to the nerves at the end of a person's spinal cord. Key symptoms include changing sensation in the private area along with urinary and bowel issues.

Obviously, these three different situations that warrant imaging are extremely specific and do not fit most cases on back pain. A physical therapist will screen for all of these issues and, given the high probability that these problems are not the cause for your back pain, will be able to begin a treatment plan with you that could actually help you fix your back pain.

I urge you to reconsider the suggestion to get an MRI and discourage you even more from jumping right into a surgery. Get a second opinion. Try physical therapy. I think you'll be surprised at how much hope there is for you.



# Driving, **Anger**, and the Importance of Breathing

Even though I only drive to work for 10 minutes a day I am still astounded by how many fellow drivers act as though they are Formula 1 racers! I used to believe that the drivers in Los Angeles were terrible, but San Diego makes them look tame. In LA, young male drivers tend to dominate the driving scene with their souped-up Honda's, yet in San Diego it isn't uncommon to see both male and female drivers racing their Porsches down the highway to get their kids to school on time. It seems that in San Diego everyone is a Michael Schumacher! But then again, it comes as no surprise, really, because America's Plymouth of the West is all about speed and maneuverability. That having been said, the incidences of violence directly involving road rage have escalated dramatically over the last few years, and San Diego is no exception. While we may think we value communication more than in the City of Los Angeles, we fall prey to the same irritation and anger that our neighbors feel on a daily basis.

I am not totally innocent in this, either. According to my wife, I too suffer from road rage at times. The truth is I do try to calm down and be mindful when I drive, but doing that became a lot harder when I opened my own business and started juggling so many different responsibilities. I had to start thinking of ways to manage my stress and reduce my irritation; if I didn't, I could have ended up hurting myself, or worse still, hurting someone else out on the roads.

One of the best ways I managed to control my anger in the car was 'breathing'. Yes, that's right. I started experimenting with breathing techniques whilst I was a waiter in a very busy restaurant years ago. During that time the restaurant was extremely popular and the customers often ended up standing in a que while they were waiting to be seated. Ultimately, hunger set in and their agitation levels rose dramatically; I had to move fast, think fast, be patient, and most importantly, I had to smile. This was not easy,

especially when my feet ached and my head was pounding. Of course, the faster I moved, the less agile and alert I became; I often ended up dropping bottles and plates at an alarming rate. Humiliated, embarrassed, and angry, I used to ask God to help me calm down. He did, of course, but I realized I need to make the effort to create a better frame of mind for myself. Hence, I started using useful breathing techniques.

Here's how you can do it too:

- Begin by closing your eyes; sit so that the back of the chair supports your body and your feet touch the ground.
- Breathe in and out and consciously feel the air move around your body. Feel it entering through your nostrils and filling your belly and chest. Be aware of the air as it shifts within you, understand the rhythm of it, and be grateful for the life God has given you today.

- Without altering your breathing, quietly observe the gap between your inhalation and exhalation.
- Repeat the process until you feel relaxed and aware of your peace of mind returning.

Research has consistently proven the benefits of relaxation, meditation, and breathing. Not only does regulated breathing lower your blood pressure, combat stress, reduce the risk of heart attack and strokes, and even fight depression,

it can also REDUCE PAIN and give you peace of mind. That's right. Breathing techniques can decrease your pain.

So, take a few minutes out of your busy day to relax, breathe, and thank God for this moment. Creating a healthy habit focused on breathing exercises will give you a healthier, fuller life with reduced pain and increased fulfillment.

**Let me introduce you to a new member of our Genuine Care PT Family:**

*Emily*



*Stay safe and smile!*

Can you believe we hired a new star employee without actually seeing her face once?

We all know that we have to wear masks in public and we certainly didn't make an exception while interviewing her in person. We received 300 applications and decided to interview 5 people. Emily was one of them. As soon as we interviewed her, even while her face was half-covered by a mask, we all fell in love with Emily. This was an absolutely unbiased decision, based on who she is not on what she looks like.

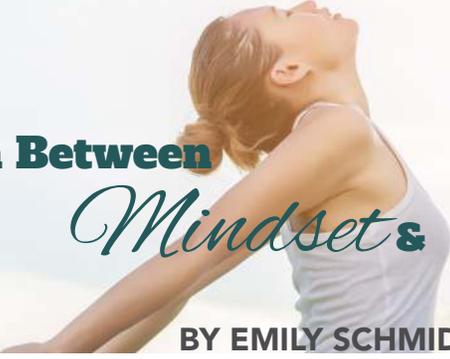
You might wonder how we reacted when we finally did see her face for the first time when we had a coffee break on her first day. We were so disappointed, and things didn't go as well as we planned. Joking we liked her even more... Yeah.

So, here are a few reasons why we loved her. First, she was a great listener: she leaned forward to hear what we said and listened very actively. Game over. One of our core mottoes is to listen carefully to what our patients are saying. One of my mentors said, "Listen carefully. Then your patient is going to tell you what is wrong and even how to solve it." Very often this is true. At the moment, one of the biggest problems in the medical field is that providers spend too little time with their patients. They often don't listen to what their patients have to say and rush through their appointments with them. But Emily is not like this: she has a big ear to hear you.

Plus, her 4.0 college GPA proves her very diligent work ethic, and we already see how things are changing in our office. She graduated from California State University in San Marcos with a Bachelor's degree in Literature and Writing Studies, making her communication skills excellent. You are going to hear how articulate she is!

And, that is not all! A few more fun facts: she is a watercolor painter and is originally from Australia. Please welcome her on our Facebook page!

This strange time of social distancing means that we can't shake hands or hug each other. We can't express ourselves with a simple smile or a funny face. It's difficult, and we don't like it, but we still have each other! Please keep in mind that Emily has a lovely smile hiding behind her face mask and welcome her to our Genuine Care Physical Therapy Family.



# The Connection Between *Mindset* & **CHRONIC PAIN**

BY EMILY SCHMIDT

Chronic pain is highly complex. Oftentimes, we think of pain as stemming from a physiological issue and nothing more. Our knee hurts, and we think that the problem must be in the knee and only there. But this perspective forgets that all pain is processed by the central nervous system. Your nerves through your spinal column and up into your brain combine with your neural pathways to communicate to you the sensation of pain. This process means that there can be differences in how pain is perceived and experienced. Our mindsets affect, in very tangible and real ways, how much pain we experience and how much that pain affects our quality of life.

Scientific research has shown that pain is a complex experience deeply influenced by psychosocial factors, including how one thinks about their pain. A negative mindset is shown to both increase pain and increase the level of disability a person suffers. Aspects of a negative mindset include fixating on pain, catastrophizing about pain, seeing one's identity as irrevocably connected to pain, and viewing everything (including one's pain and the implications of it) in extremes. Incredibly, the more one thinks negatively, the easier it is. Given that negativity increases pain, this also cements neural pathways to trigger more pain in the future. We are not powerless, though, in the face of increasing pain, and there are various strategies that we can use to help alleviate pain and, even, increase our happiness level.

One such strategy is mindfulness. Mindfulness is, quite simply, awareness, and uses simple strategies such as focusing solely on the rhythms of one's breath or fixating on all aspects of a sensory

experience, such as the texture, flavor, smell, or temperature of a food while eating it. These strategies might sound simple and unrelated to pain relief, but they are very effective because they allow you to mentally step back from the negative thoughts and sensations you are experiencing, gives your mind something else to think about and allows you to experience positive emotions in place of the previously negative ones. In doing all of this, mindfulness allows you to curate your emotional experience, giving your brain a distraction from the pain, thus lowering your pain levels.

Mindfulness can also be used as a gratitude practice. This is not some "Pollyanna" optimism that ignores everything bad and conjures up fake positivity; instead, mindfulness, when used as an awareness tool to notice the good things about your life and the positive

slants of negative experiences, can actually open your mind to be able to identify the good. Instead of mindfulness acting as a blindfold to negativity, it is instead a pair of lenses that helps you recognize

and acknowledge the good things. Gratitude can replace destructive thought patterns such as the catastrophizing of pain, the blaming of oneself and the fixation on potential negative outcomes and show you a brighter side to life.

In pain science research, there is such a thing as "positive affect". Both mindfulness and the cultivation of gratitude help create this. Positive affect refers to positive emotions and positive moods, and collectively has been shown to reduce pain, especially because positive emotional states are associated with higher levels of resilience, greater optimism, more self-efficacy, greater levels of autonomy, and, overall, a better quality of life.

Pain can become a vicious emotional cycle because of the nature of what pain is. At a base level, pain is an alert that signals to your body that something is wrong. It often begins because of an acute injury and is there so that you are prompted to remove yourself from a dangerous situation and seek help. When pain becomes chronic, however, the acute phase has passed

but the neural processing hasn't recovered. Whether the issue is still there or not, your body is having a hard time letting go of it. Pain can be a self-protective measure: your body's efforts to keep you safe and prevent you from getting hurt again.

Given this, how you think about your pain dramatically changes how you experience it. If you catastrophize it, view it as a permanent thing, and allow it to consume you, you will end up suffering more. You will be more likely to avoid behaviors and activities that could worsen your pain, and inactivity will then be added to the mix as a trigger for increased pain. This cycle can be stopped, but it takes enormous effort.

Rewiring thought patterns is hard work, but it is worth it. Don't underestimate the power of your mind. Intentional habits of mindfulness, gratitude, and positive thinking strategies not only change the way that you perceive your pain but also how much you feel it.

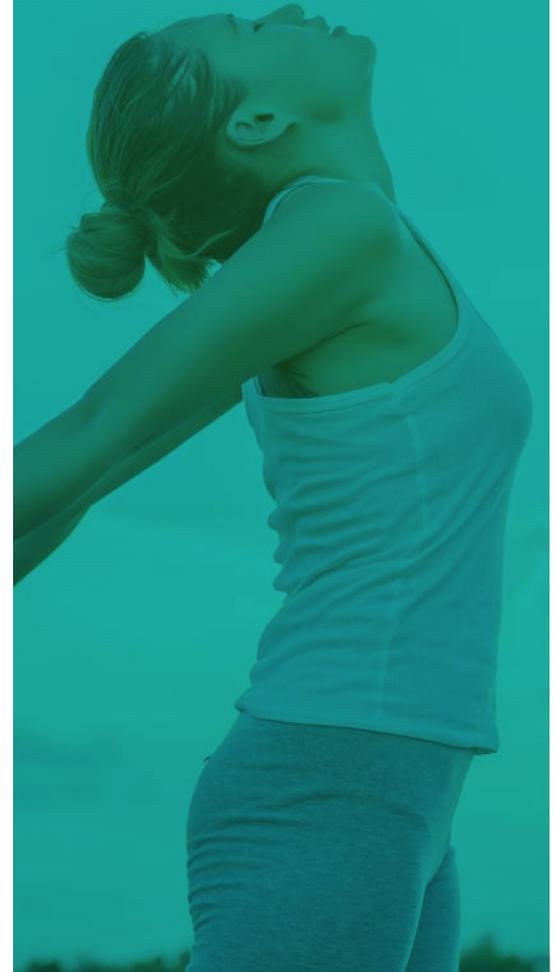
Pain, by nature, is interruptive. This is effective when pain is acute, but when pain is chronic, this can be debilitating. The fascinating thing, though, about pain's interruptive capabilities, is that the level of interruption is not universal, and can be lowered if there is a strong enough competing motivator. Behaviorist Wilbert Fordyce is known for having said, "Pain patients would suffer less if they have something to do." Passions, goals, and a life outside of pain are essential for chronic pain sufferers. Pain fights to be the only thing in your mind, but you don't have to let it succeed. You are more than your pain, and it does not rule you. The positive effect mentioned earlier can result from doing things that you love. Don't let the fear of pain stop you from living, because that fear will not only stop you from living, but it will also make you feel more pain than you did before.

A meaningful social network is also essential to managing chronic pain. Negative experiences, of which life offers plenty, have a negative effect on pain levels, causing them to increase, but this effect can be mitigated when that negative experience is shared with someone else. Suffering alone increases your suffering. I encourage you to build meaningful connections and spend time with those you love. Your mental and physical health will be better off because of it.

These tools of mindfulness, positive thinking, meaningful goals, and rewarding interpersonal connections are ones that you can use to lower your pain. Chronic pain is more complex than an isolated physiological issue; it is a complex experience that is affected by

numerous biological, psychological, and social factors. You can use the powers of your mind and your habits to shape your experience with pain and not have it be the determining factor in how you feel inside and how you live. There is hope!

*Don't let the fear of pain stop you from living, because that fear will not only stop you from living, but it will also make you feel more pain than you did before.*





# TELOMERES:

## Cellular Indicators of Length of Life

BY EMILY SCHMIDT

Our human bodies are extraordinarily detailed and complex. We are made up of microscopic cells that duplicate and differentiate themselves, becoming various organs, tissues, and body parts. Hidden inside those tiny cells are double-helix strands of DNA: the unique codes of proteins that contain the information needed to make every single part of our bodies. That DNA is stored in pairs of chromosomes and the ends of those chromosomes are capped with repeating proteins called telomeres, a safeguard for the essential information held inside those chromosomes. Each time a cell divides, duplicating itself, those telomeres get a little bit shorter. Eventually, telomeres get shortened to the extent that

the cell can no longer divide without corrupting genetic information, and the cell dies. Telomeres are essentially our markers of cellular age which determine our mortality. When an insufficient number of our cells can successfully divide, we can no longer sustain our own life. In an all-around healthy individual, telomeres shorten naturally over a long period of time, leading to death at an old age. Unfortunately, telomeres can also be excessively shortened through a variety of lifestyle factors, leading to early death. These lifestyle factors are diverse and are still being researched. Several factors stand out, including a person's level of psychological stress, quality of diet, and amount (and type) of exercise.

Psychological stress has long been tied to physical health issues, and this trend extends to telomere length. Chronic stress is connected to the release of certain hormones within the body that have been shown to reduce the level of antioxidant proteins, leading to DNA damage and faster telomere shortening. In fact, in one study, the difference between the telomeres of chronically stressed women and those of women who weren't was the equivalent of ten fewer years of life! Clearly, this dramatic impact on mortality is a powerful motivator for us to seek out stress management techniques that work for us, such as meaningful social connections, mindfulness or meditation techniques, and regular exercise.

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FROM PG11

Diet has also long been tied to both physical health and illness. Many diets, often drastically different from one another, are touted as being the "best." However, nutrition is both simpler and more complex than it is made out to be. Contrary to a lot of fad diets, healthy eating doesn't have to mean an array of fancy supplements, highly specialized food items, or dramatic eliminations. At the core of nutrition is a balanced array of real, unprocessed food. Of all of the diets out there, the Mediterranean Diet has a lot of backing; it emphasizes fruits and vegetables, whole grains, healthy fats, and lean protein sources such as dairy and fish. In research surrounding

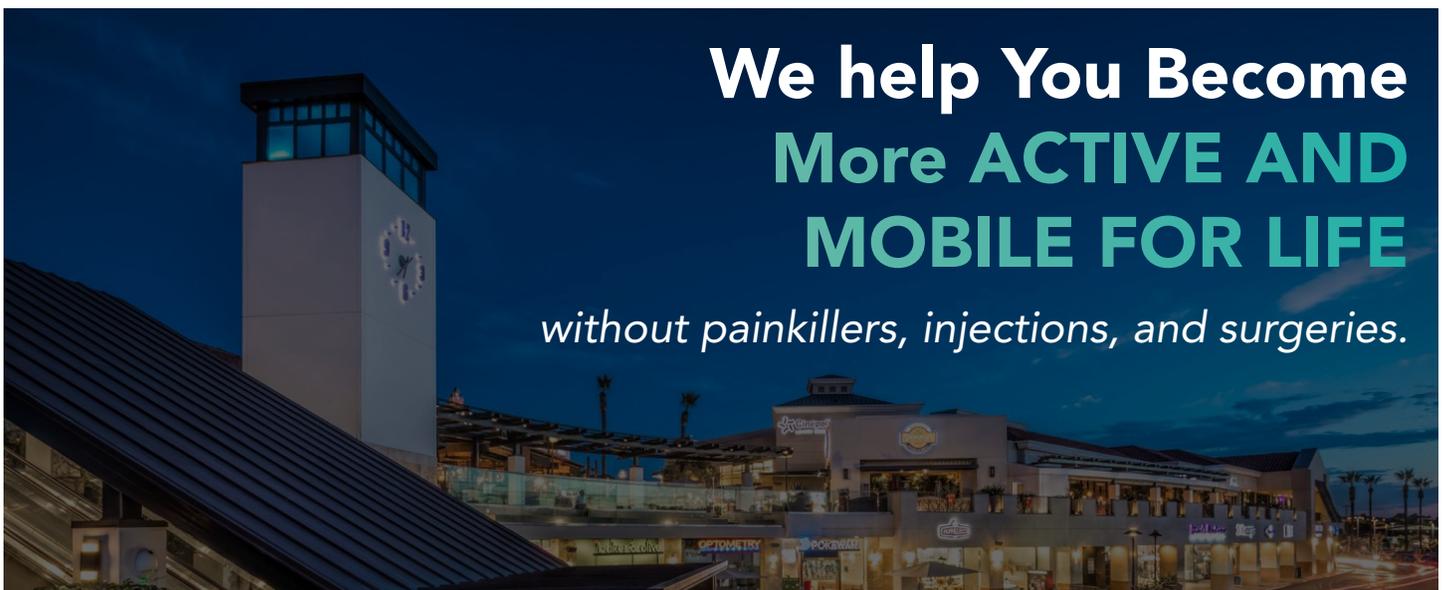
telomere length, the nutrients and fiber found in fruits and vegetables are key. Additionally, an overall lower caloric intake, including a lower amount of protein, was proven to be useful, keeping telomeres long, enabling a longer life.

Exercise also, unsurprisingly, is a positive contributor to health. In particular, aerobic exercise, in moderate levels, is extremely beneficial, reducing DNA damage and increasing telomerase activity (the enzyme which helps rebuild shortened telomeres in certain cells).

Some examples of aerobic exercise include brisk walking, running, cycling, among other activities. Interestingly enough,

both a low activity level and an overly high activity level are associated with shortened telomeres. Additionally, aerobic exercise or high intensity interval training were shown to be more effective than resistance training.

Within the realms of stress, diet, and exercise, some important things to remember are moderation, balance, and consistency. Health is a long-term goal, not a quick fix. Just as telomere length dictates the length of our life, our habits determine our quality of life. Start by making small changes and watch them build together to form lifestyle changes that will positively benefit you right now and far into the future!



# We help You Become More ACTIVE AND MOBILE FOR LIFE

*without painkillers, injections, and surgeries.*

Located in Del Mar Highland Town Center Between El Camino Real and Del Mar Height RD.