



**ELIMINATE PAIN, REPAIR JOINTS AND HEAL
NERVES WITHOUT DRUGS OR SURGERY**

**FIFTY SHADES OF
PAIN**

**HOW TO CHEAT ON YOUR SURGEON
WITH A DRUG-FREE AFFAIR**

DANESH MAZLOOMDOOST, MD

**FIFTY SHADES OF PAIN:
How to Cheat on Your Surgeon
with a Drug-free Affair**

By: Danesh Mazloomdoost, MD

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Wellward Regenerative Medicine
101 N. Eagle Creek Dr.
Lexington, KY 40509
Tel: (859) 275-4878
info@wellwardmed.com

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Dedicated to my clinical team, without whom I could not do what I do...

...and to my family who gave me love to overcome being vulnerable.

Table of Contents

Introduction	xi
Chapter 1: Flying High.....	1
Chapter 2: Shades of Pain.....	5
Chapter 3: Bondage to Pills	13
Chapter 4: The Sadism of Surgery	27
Chapter 5: Hear the Message Spoken Through Pain.....	35
Chapter 6: Envision the Life You Want to Live	39
Chapter 7: Alleviate Pain	42
Chapter 8: Leverage Healing	46
Chapter 9: The Safe Word is Hope.....	50
Chapter 10: Top 5 Questions to Ask About Pain	61
Afterword	65
Bibliography	68

Introduction

Pain is often the first manifestation of our body's limitations and the way pain is conventionally treated is sorely unsuccessful. Despite the growing number of surgeries, despite opioids being the most prescribed drug in America, and despite the fact that neither of these remedies are relieving people in pain, we continue to beat the same drums and debate about how to continue these lines of treatments in a "better" way. Solutions offered from the highest echelons of medicine and legislation focus on better ways to continue using these treatments, but these conversations side-step the more pressing questions. Is our standard of care for pain even effective? If our treatments are simply making people worse, is trying to find a safer way to use these treatments even a relevant argument? Is there a way to address pain without introducing these problems?

For reasons that will soon become clear, I have been asking myself these questions since I was a teenager. These questions took me to some of the country's best institutions. I studied with brilliant minds on the frontiers of science at Johns Hopkins University. I explored the most complex pain issues at MD Anderson, the preeminent cancer institution in the world. As an anesthesiologist, I had rotations through Hospital Special Surgery in New York, one of the most progressive orthopedic institutions in the country. My training focused on the most cutting-edge treatments for pain that conventional medicine had to offer.

Yet, once I started applying what I had learned in my practice, I was woefully disappointed. By the time I received patients from other clinicians, they had long ago resigned to a lifetime of chronic pain, the best of orthodox medicine—steroid shots, opioids, surgery—having failed them. Shrouded in mystery and myths about their condition, confused about what they can and can't do, their hope had

FIFTY SHADES OF PAIN

completely evaporated. Despite all the skills I had accumulated, my patients were not improving. I was simply watching over them as they smoldered away, and I was bound by what insurance dictates or what tradition promotes. I could not continue to watch over people I cared for as their aspirations withered away and the future they had once envisioned disappeared. A revolution is long overdue.

Age humbles all of us with changes and in spite of all the best efforts, inevitably, the complex machinery of our body shows signs of wear and, consequently, pain. We need a resource that understands the origins of pain, is well-versed in the spectrum of its causes and repercussions, and one that can demystify the experience of healing. This primary care for pain sees patients when the pain is new, *before* they have developed chronic pain, *before* they are exposed to a surgically-inclined workup, *before* their nervous system wilts with opioids, and *before* their hope has been muddled by misinformation. I wish to catalyze this model.

In the pages ahead lies a blueprint for change that not only works, but empowers patients to reclaim health. I call to challenge conventional medicine and undo processes that unintentionally promote surgery, drug dependency, and despair for millions of Americans. This model reprioritizes and redirects resources in your body to overcome the limitations that hinder the future *you* envision. If you get nothing else from reading this book, I wish to at least restore hope that chronic pain is not incurable. Chronic pain is not the end. It is the beginning to greater resiliency, to deeper understanding about our bodies, and a stronger endurance to cope.

Chapter 1: Flying High

One summer when I was sixteen, I learned how to fly. My little sister and I were just two physics nerds jumping on a trampoline, giggling over how—if we timed our jumps just right—we could pass kinetic energy to each other and almost double our jumping height. We had not taken the volatility of our trajectory into consideration and on one jump in particular, I took flight straight into a brick wall. Most pain you forget, but some you never do. I remember coming down in slow motion, my thigh making contact with the waist-high brick and flipping me over and onto the grass. At first, I was quite concerned with the gash on my thigh, until I started to recognize an aching building in my back.

It became clear within a couple of weeks that the fall had caused a substantial injury to my spine. As a teenager at summertime with a full docket of plans, nothing could have been more catastrophic. First of all I hurt, and I quickly learned firsthand how pain affects everything from what you can do to how you view the future. Ruminating thoughts squatted in my mind. I would imagine the moment it happened and how I could have done things differently, or would fixate that I was doomed to life-long crippling pain. I understand the hesitation to move, the fear of making things worse, the depression. Isolation became my mistress who seduced me away from friends, activities, and happiness. I had the good fortune to be treated by doctors who safeguarded me from conventional treatments, many of which hinder healing and promote disability. Anyone who has endured a chronic injury recognizes that the mind scars just as much as the body does. They absolutely need encouragement and optimism as a counterbalance to the fears and opposition that normalizing movements would amplify the pain. To my surprise, with a little support, the more I moved the less I hurt.

FIFTY SHADES OF PAIN

Over the course of the next eighteen months, my physicians safely helped me recover and return to a (relatively) normal life. I saw firsthand that their treatments for physical *and* emotional recovery are successful. Their commitment and dedication to my mending evolved into the mentorship that inspired me to pursue medicine. Eventually, I would return after training to take over the practice that had so inspired me to build upon my mentors' foundation. These doctors were my parents.

My mother was a psychiatrist and my father an anesthesiologist and together they established Kentucky's first multidisciplinary pain clinic, so I received what at the time was cutting-edge care. Their way of looking at pain stemmed from the medical training they received in Iran and the United States, which was a nice blend of eastern and western medical traditions. They deeply understood that the body is a marvel of biological engineering, and is designed for repair. Unlike many of the clinics that started around the same time and grew to be enormous mega-practices, my parents' clinic intentionally remained small. Their goal was to get patients functioning and productive and to help them cope with their pain and limitations.

My fate could have been much different. In my medical career, I regularly see patients with injuries similar to mine. Most of them have a stereotypical course of care: an initial trauma, surgical evaluation, surgery, chronic pain management. This translates to a lifetime of pills, shots, pain, and inevitably, more surgery—the state of modern medicine today. It hinges on numbing pain but not necessarily addressing the problems, and anticipating inevitable surgery. However, surgery for pain issues has an unacceptably high failure rate. Only 20 percent of orthopedic surgeries have solid studies showing their superiority over non-operative techniques¹. Since the early part of the millennium, spine fusion surgeries

increased nearly three-foldⁱⁱ but only one third of those patients report improvements after fifteen monthsⁱⁱⁱ.

This mindset of first numbing, and then operating, also helped create the largest drug epidemic in history. Within five years of my injury, Oxycontin prescriptions had grown ten-fold in my state making Kentucky counties among the heaviest prescribers in the nation, by as much as seven times the national average^{iv}. In the small rural communities where patients struggled to find even a single primary care doctor, one could easily find six or seven bustling pain clinics. Their business model was built around volume, and they were booming, not just in Kentucky but across the nation. Once a patient entered a clinic, they became a predictable revenue stream for life.

This was not just a problem of rogue healthcare providers; it affected the entire industry. Insurance companies preferentially paid for pain pills, considering them just as effective and much cheaper than a comprehensive approach like that which I received. First-line physicians, like primary care providers and emergency rooms physicians, were heavily targeted by pharmaceutical marketing. Together they accounted for two thirds of all opioids prescribed, more than surgeons and more than pain clinics^v. There was a coordinated effort to create echo chambers of sound bites that promoted opioids through key opinion leaders, policy initiatives, and medical board guidelines—all sponsored by pharmaceuticals. I attended some of these programs during my training. I felt frustrated, even angry about the manicured “science” that omitted many of the details that would deter such excessive opioid use. Yet, too many attending practitioners felt emboldened to use these tools, unaware of the deeper science and oblivious about to the impending catastrophe in their communities.

Many misquotes and misrepresentations of scientific studies became "facts" and reverberated throughout the healthcare industry and the general public. Most patients have no idea that the risk of

FIFTY SHADES OF PAIN

opioid dependency spikes after only three days of use. If consumed for thirty days, you have nearly a ten-fold increased risk of staying on opioids for months^{vi}. People dependent on opioids do not feel “high” from taking them. They take them to feel normal. Their nervous system rapidly shifts, turning off its own production of opioid-like chemicals, exacerbating the pain in their bodies, making them far more sensitive.

I was inspired by the combination of all these factors to follow in my parent’s footsteps and continue their legacy. When I finished my training, I returned to Kentucky, eager to make a dent in the opioid epidemic and influence my medical community toward a healthier, more sustainable process of addressing pain. I dedicated myself to a regenerative approach, one that establishes my practice as the primary care for pain—a resource that understands the origins of pain, is well-versed in the spectrum of its causes and treatment repercussions, and one that can demystify the experience of healing. This model of care sees patients when the pain is new, *before* they have developed chronic pain. This first-line in pain care treats patients *before* they are exposed to a surgically-inclined workup, *before* their nervous system wilts with opioids, and *before* their hope has been muddled by misinformation.

My personal history has helped me fortify, tweak, and refine this model for treating pain. Through the hope that my parents instilled in me during my darkest hour, I aspire to do the same for anyone enduring pain.

Chapter 2: Shades of Pain

In order to heal pain, we first have to understand why it acts the way it does, why it seems to travel throughout the body, and how our brains interpret pain. Pain can seem to have a mind of its own, but by breaking down the causes of pain, we can begin to understand how to navigate our pain relief processes. Essentially, we are answering the question, “Why do we hurt?” We can begin to answer this question by putting the body’s biologic systems into perspective. The cells in our bodies are constantly growing, living, reproducing, dying, and making room for new cells. This is the fundamental process by which we live. This is biology. Being alive means that there is a balance between this decay and recreation. As children, our body regenerates much faster than it decays. But as we age, the repair cells get weaker and fewer, thus tipping the balance in favor of breaking down and our bodies accumulate more problems than it has solutions.

One common pain issue that arises as we age is osteoarthritis and although it hardly needs any introductions, osteoarthritis occurs when cartilage erodes in a joint. It may come as a surprise, but our joints have been eroding every day since the day we were born. So why doesn’t it hurt from day one? As it erodes, new cells line up to fill the gaps. The erosion and repair balance each other, but if the integrity of the joint is compromised from accompanying ligament issues that cause the joint to move in directions for which it was not designed, the repair processes are ultimately surmounted by that damage. Only then are pain signals sent, which is your body’s mechanism to protect itself from further damage.

FIFTY SHADES OF PAIN

Every pain issue, including osteoarthritis, can be broken down into three parts: tissue, nerves, and brain. By way of analogy, think of the relationship among a radio, an amplifier, and speakers. Radio stations produces sound signals picked up by the radio which are sent to the amplifier. The amplifier can modify the sound and make it louder or quieter before sending it on to the speakers. When the signal reaches the speakers, music comes out which you either like or dislike.

Much like the radio, healthy and damaged tissues produce signals all the time, broadcasting them via a network of nerves. Healthy tissue sends clear signals your brain hears as normal sounds whereas damaged tissue sends abnormal signals—much like static on the radio. These signals are received by your body’s amplifier, the spinal cord, which processes, sorts, and prioritizes them. Depending on status signals the spine receives from the brain, it can mute or amplify these signals before sending them to the speakers, or your brain. If the volume is low, the static may be tolerable and you can even sing over it to drown out the static. However, if the volume is turned all the way up, the static is loud and simply cannot be tolerated. This is equivalent to chronic pain and is impossible to ignore.

Chronic pain can result from a problem in any one of the three components of the radio system: tissue, nerves, or brain. Understanding pain at the tissue level is simple. If there is a tissue injury, static occurs on the radio and pain will be present for as long as the tissue is damaged. Damage to the skin, muscles, ligaments, tendons, nerves, and cartilage tissues all produce different types of pain sensations. Skin may sting, but a joint aches, and a tendon throbs, and each shade demonstrates different injuries and offers clues as to what is causing the primary pain. Deciphering these signals simply requires an understanding

of what different sensations of damage feel like, something we are not accustomed to teasing apart.

In some painful conditions, the tissue is healthy but the problem is in the amplifier, as is the case with diabetic neuropathy. Excess sugar circulating in diabetic patients accumulates inside nerves causing them to misfire with sounds unfamiliar to the spine. As a busy processing center and multitasker, the spine gets confused, wires get crossed and signals mix together. The amplifier has a hard time sorting these new signals and sometimes labels normal sounds as distress and vice versa. Even your favorite song turned up too high can be unbearable. This mislabeling problem is why diabetic patients feel pain but cannot feel normal sensations like movement or touch. If left unaddressed, the confusion created within these processing centers of the spine can create new connections. They may inappropriately connect with the opposite side of the body or amplify other regions connected within the same network of nerves—for example shoulder to wrist.

The spine has other functions that can go awry and cause distress too. In addition to processing normal signals like movement, touch, or discomfort, the spine also processes what I call “autopilot nerves,” or what is formally called the autonomic system. This system controls instinctual functions, like the “fight or flight” or the “rest and digest” reflexes, as well as regulatory functions like where your blood circulates or how quickly your hair, nails, and skin grow. When injured nerves send confusing signals to the spinal cord, the autonomic nervous system does not know what to do and becomes dysregulated too. This plays a role in patients with phantom limb amputations, spinal cord injuries, or Complex Regional Pain Syndrome, an uncommon condition that causes severe pain after a very modest injury. In the absence of nerve signals it expects to see, the spine fills in the gaps with

FIFTY SHADES OF PAIN

the autonomic system which is why a lot of nerve-related pain causes changes in color or temperature of the area affected.

Finally, chronic pain can also perpetuate or result from speaker problems. The parts of your brain that process distress share the same pool of chemical resources available for emotional and physical pain, which means that when coping with physical distress, your brain is using resources that would also be allocated to emotional well-being. This is why depression often accompanies chronic pain. The opposite is also true, when depressed or emotionally drained, your ability to process and deal with discomfort is limited, augmenting the impact it has on your life. Coping is not an easy skill to learn but especially difficult when resources are limited and the body feels imminent danger. When the speakers are affected, the tendency is to focus on the pain with hopes of finding a solution, but this is often counterproductive. It's as if you are in a closed room filled with smoke. If you can't see where the fire is, you will have a hard time putting it out. Sometimes you need to vent the smoke in order to find the fire. Talking with a mental health expert or taking medications that kickstart the drained resources in your brain may not only help with mood, but also refresh the means to cope with pain.

Understanding these patterns requires a thorough understanding of how the body is wired or how this radio system works. The dividends of this understanding is significant. If abnormal signals can be intercepted before the spine processes them into a repetitive pattern affecting other nerves, conditions can go away immediately. But if ignored, or if numbed with pain pills prior to identifying the root cause or building in a thorough treatment plan, these circuits can develop a routine and persist as chronic pain. This is why a preventative model of managing pain and quality of life is so important.

We need a paradigm by which we can itemize and prioritize what someone in pain needs to heal. Patients need structure to gauge the care they are receiving and reappropriate good care when it falls short of their standards. This necessity is what inspired this book. We have developed a model that works. Our customizable treatment is based on four basic principles that when applied to any pain condition, will provide a solution for anyone in chronic pain.

I call this new paradigm the HEAL model. Stage one is diagnosis: Hearing the message represented by pain, and Envisioning the goals you wish to reach. Stage two is treatment: Alleviating pain, and Leveraging healing. There is some overlap and fluidity in this process, but working through a pain problem systematically helps to tease apart its complexity and create a framework by which patients can minimize the need for surgery and avoid drug dependency.

Hear the message spoken through pain

For you to get an accurate assessment of what bodily damage is causing the original pain signal, and what structures are secondary or causing pain as a response to the original problem, we use Pain Mapping. Pain Mapping provides a systematic process to define pain in far greater detail with much greater certainty than conventional diagnostic tests. It allows the clinician to look for and examine potential causes of pain under live x-rays or ultrasound imaging and tease apart problems resulting from tissue, nerves, or brain. By inspecting bones, joints, ligaments, tendons, and even nerves while stressed or moving through the motions that hurt, we can correlate the patient's pain with imaging in real-time. By numbing nerves or processing centers in the spine, we can differentiate radio problems from amplifier

FIFTY SHADES OF PAIN

problems. Finally, by talking with a patient, getting to understand how pain has affected their lives, we can determine if the speakers need attention as well.

Pain Mapping is tailored for each patient and starts with examining the clues collected from a patient's history, how the problem began and evolved, treatments that have been attempted and failed, reviewing x-rays and MRIs records, and in the physical exam. No one of these clues alone can be used to identify the problem, but when analyzed in combination, these clues provide a list of possibilities and problems.

We progressively develop an accurate assessment of the primary and secondary damage causing pain, the amplifiers, and problematic circuits in the brain that process pain in harmful ways. Once we have identified the problems, we can prioritize them and then confidently develop treatment plans for the subsequent stages of the HEAL process. Hearing the message your body is sending with pain is critical to lay the foundation for the others components of the HEAL model.

Envision the life you were meant to live

Chronic pain quickly becomes the focal point of people's lives. We need to reconnect with the core of who you are, shift emphasis away from pain and more toward function. This does more than refocus the mind and unwind some of the circuits in the brain that amplify pain. With each cycle of hope and despair from failed treatments, motivation erodes. Identifying realistic goals re-affirms hope as an ally to recovering from a painful injury. Walking to the mailbox or grocery shopping in one trip may seem like simple goals but they can be major measures of success that continue to reinforce the gains you make in healing. A mentor once said, if you eliminate ninety percent of someone's

pain, with the wrong attitude, the remaining ten percent becomes the new hundred percent. Pain has subjective elements and our memory of its intensity fades making comparisons hard. Think about the last time you had a pain that went away. Do you remember how intensely it hurt or what it felt like? Or do you remember how it made you feel and what restrictions you had? People tend to remember the functional limitations more than their pain. Envisioning the life you want to live gives us guidance on how to develop the treatment that fits *your* needs.

Alleviate Pain

Living with chronic pain day-after-day depletes the chemical resources in the brain that help people cope. Once exhausted, not only is it harder to cope, but the reserves available for turning the amplifiers down are emptied. It sets up a vicious cycle in which chronic pain intensifies itself. We call this effect “wind-up” or “central sensitization.” These chemicals replete slowly and are not restored with painkillers. The goal of alleviation is to identify circuits we can interrupt and give the brain the time and space to refill its tanks. We look at the patient as a whole, taking into account every factor that can help reset the brain and lower it from red-alert to yellow or green. Sometimes it requires behavioral changes and education. For instance, people with chronic pain cannot rest well or sleep and that alone hinders the brain from resetting; chemically promoting sleep does not work but relaxation and meditation has been shown to restore chemicals similar to sleep. Other times, we use ultrasound-guided nerve blocks or injections to push the reset button and allow the amplifier or parts of the brain and nervous system to reboot with a fresh stock of resources. There are many tools we can employ to alleviate pain, but a key to remember is

FIFTY SHADES OF PAIN

pain reflects damage and the primary goal is to heal that damage, which leaves us with L.

Leverage your body's ability to heal

Regenerative medicine studies the healing process and we have identified ways in which the process can be aided and amplified. This stage of the treatment plan looks at the entire body to identify what is limiting an injury from healing. By removing obstacles to healing and amplifying the natural processes within your body that fix injury, many problems (osteoarthritis, neuropathy, disc degeneration, etc.) can be slowed if not reversed. People need specific cellular resources to heal. Sometimes, simply supplying those resources is enough to kickstart repair. Other times, we need to give the body direction on what to repair through controlled movements and exercises. Working collaboratively with physical therapists or exercise physiologists we can develop the strengthening movements and lifestyle that give your body the direction it needs. With more advanced techniques, we can use growth factors derived from your own stem cells or blood products to enhance the repair processes in your body. I will discuss these techniques in more detail but the growth and excitement in this arena is creating a wave of revolutions in orthopedic and neurologic issues. We just need to consider the tools in healthcare from a different perspective to facilitate the body's natural healing process.

Chapter 3: Bondage to Pills

The moment she walked into my office, everybody looked up. The waiting room is usually filled with middle-aged men and women, so to see a young female was out of the norm. She went to the window and said, “Hi, I have an appointment at three. My name is Heather.”

Any time I get a young patient complaining of chronic low back pain, I know it’s serious: either there has been major tissue damage that exceeds what the body can heal alone, or there is an obstacle that prevents the body from doing what it needs to do. These obstacles come in many forms. It could be a routine or behavior that keeps reinjuring the damaged tissue that smolders the healing process rather than enlivening it.

Heather was an avid equestrian accompanied by her parents. Her father had recently received a job offer in Kentucky—the heart of horse country—and felt that it would restore his struggling and depressed daughter with a sense of purpose. I invited her to share the origins of her injury, her experience with pain, and her grief.

Among the horses she rode, Morgan was Heather’s favorite. She had named him after Morgan Freeman because according to her, this horse had Mr. Freeman’s temperament in his movies—calm, reassuring, reliable, and sometimes made you feel like you were talking to God.

When Heather was fifteen years old, she was riding alone in a field she had never been with Morgan. Generally, he had nerves of steel. He rarely startled and was quick to respond to commands even in unfamiliar settings. That day, Heather sensed Morgan wasn’t himself: he winced a few times as they started out. The farrier had recently visited and re-shoed Morgan, and she wondered if he had a bad nail or a bruised sole. As they were trotting along, she heard a

FIFTY SHADES OF PAIN

growl followed by an angry bark. When the dog barked again, Heather turned to survey the scene and saw a large unfamiliar German Shepherd darting toward them. With Morgan a little bit more on edge today, at that very moment, he shot off. With her body turned, Heather was unprepared and landed hard on the saddle. She immediately sensed a bolt start in the low of her back and it shot down to her right foot. Somehow she was able to stay on the saddle and slow Morgan back down. Beneath all the bravado, the German Shepherd actually ended up being a very friendly dog. Nonetheless, the damage was done.

Heather called her parents and they came to get her. She felt like she couldn't move. Her back and legs felt as if they had turned to glass and any movement could shatter them. Her back pulsed and periodically resent the same bolts down her leg. They took her to the emergency room and a quick CT scan identified a concern with a disc in her low back.

Within a few weeks she was on the operating table. Her surgeon seemed resolute and certain that if they didn't take the pressure off the nerve, her injury could become a permanent problem. Just before her surgery, she had started wondering how necessary it was. The bolting pain had reduced in frequency, and only happened on occasion and with certain movements. She continued to feel stiff and achy, but not nearly as bad as when she was first injured.

After surgery, the pain changed. In some ways it was better. The bolting pain in her legs had almost entirely gone away, but now it felt like her muscles were in knots. Heather diligently followed her surgeon's physical therapy instructions, but her progress was stagnating. Confused and at a loss for why Heather's pain wasn't improving, her surgeon started prescribing pain medications for her. He encouraged her to take them regularly, repeating a common myth that she needed to stay ahead of the pain—advice that was marketed

heavily but based on misinterpretation of scientific studies. At first they seemed helpful, and Heather was able to keep up with physical therapy, but as time carried on, the pills either wore off too quickly or did not do enough. Her surgeon increased the dose a few more times, but eventually even he started to feel uneasy about increasing the dosage.

When she saw her surgeon again few months later, he shook his head and expressed concern for the lack of progress. He worried that the injury not only affected the disc, but also the joint capsule. He explained that every vertebra is like a tripod, one leg being disc, the other two legs being joints. If one is injured, it creates an unsteady tripod that puts more stress on the other legs. So he attributed the continued pain to instability created by the injury and suggested fusing the joint on that side of her body. Reluctantly, Heather succumbed to another surgery. Once the recovery period was over, Heather was devastated. She did not feel any better. It felt as if the knots in her back were knotted even tighter. She could barely twist or bend without feeling what she described as a knife cutting across her.

Heather's pain affected her performance in school; she stopped hanging out with friends, and her outlook became darker and darker. The only thing that made her smile, was Morgan. But she knew that Morgan was also an older horse. She had known him her entire life. As if things could not get any worse, eighteen months after her initial injury, Morgan came down with pneumonia and passed away.

What little she talked before Morgan's death, came to an entire halt afterwards. The only predictable regularity in her life became her medications. She was viciously punished if she missed a dose. It hurt to move, so she stopped doing her exercises and fell into a deep depression.

As Heather told her story, her parents slumped deeper into their chairs. All three of their faces showed matching sorrow. They

FIFTY SHADES OF PAIN

went for other opinions and Heather was run through the typical routine of injections with limited effect and continued pain pills. They explained that several physicians would give her reassurances and hopes, and when their treatments only provided short-term relief or failed entirely, the physicians threw up their hands and said this is best she should expect and that her only hope was to survive with pills. It's no wonder that despair had set in.

In medicine, we call this catastrophizing, a cycle that evolves after an injury. It's quite common among people with chronic pain. In the context of an injury that completely disrupts your life, it's hard to push away the thoughts that you are broken beyond repair. You are not only dealing with fear and uncertainty, but you are also panicked to get out of discomfort. When left unchecked, this evolves into what I call the "Broken-Beyond-Repair Syndrome" or a complete resignation that the body is broken and nothing will ever fix it. The body and the brain are very adaptable and these patterned thoughts are hardwired in our brains. When an injury occurs, certain parts of the brain light up. The new circuitry of the brain evolves around the injury. Chemistry changes, neural electrical firing reroutes, and your perception of reality shifts to a much darker view. All of this makes patients vulnerable and many just simply give up.

So much of our healthcare system reinforces this notion. As they take the pain medicines that falsely promise enduring relief or undergo the surgery assuring an immediate cure, they enter into a progressive cycle of hope and despair. Fueled by uncertainty and complex terminology, patients quickly adopt a vocabulary they do not understand, one that implies the worst. Patients talk about degenerative disc disease, a torn knee ligament, or their osteoarthritis as if these are stagnant conditions that only stand to get worse with time. But often, these terms are simply intended to convey the state of a person rather than the future of pathology or disease. They

engage with a healthcare system that whittles away the belief that the body can rebuild and heal.

Heather described her pain like an oppressor, someone who had taken possession of her life and dictated what she could or could not do. She and her parents felt helpless and hopeless. She was broken and felt defeated from enduring surgeries and pills which had not helped her to feel better.

After she fully explained her story, I reviewed Heather's imaging and surgical reports, and gave her a physical exam. Then we started to talk.

"I can see you've been through a lot," I said. I imagine this has been really tough on all three of you. It seems you're lost and have given up so much, Heather."

"I have," she said, her eyes welling up as she spoke. "I think to myself, 'is this the best it can be? Am I going to be disabled for the rest of my life?' We have tried everything from shots to exercises to surgery and nothing seems to be fixing the problem."

More than anything, I felt like Heather had lost a sense of self. Her life had been derailed and now the focal point did not revolve around the topics most teenagers see—not school, not hobbies, not boys. Everything was around pain and how to escape it. No wonder she had grown so used to her medication. It was the only variable that gave her some periodic comfort, but she did not realize at what cost.

"What would you do to get your life back? What would you do to regain yourself?" I asked.

"Anything! I just can't keep going through this process without hope of recovery."

"I agree. Let me ask you a tough question, what effect do you think your pain medicine is having on you?"

"I don't know, I just know what it feels like when I miss a dose."

FIFTY SHADES OF PAIN

“What does that feel like?” I asked. I’ve had this conversation with so many patients that I predicted exactly what she would say next.

“My entire body hurts, I feel like something awful is taking place inside me. I panic.”

“Why do you think that is?” I asked.

“I don’t know, I wonder if I’m hooked on these pills, but I can’t imagine how I could endure without them. Maybe I’m just broken. They keep telling me there’s nothing they can do. They just keep giving me these pills.”

“Do you think they’re helping?”

“I hurt every minute of every day and these medicines take the edge off. But I feel judged all the time. I didn’t want to come today but I need someone to take over writing my meds since we just moved here” she said, her voice diminishing.

“Is that why you think you’re here?” I asked.

“Yes, what else could there be? They’ve already tried everything.” She pulled back and sat up straight.

“I know you feel judgment and pressure about the medications and it’s a delicate topic since it does give you some comfort, but you may not know exactly what is happening in your body because of them. Have you ever considered that the pills may be part of your problem?” I asked with a firm but caring voice.

“I don’t see how that is possible,” Heather replied with a defeated voice.

“The truth is most people who’ve been taking pain medicine for a long time lose perspective on what normal feels like. Like every other hormone in the body, your brain regulates how much natural pain medication circulates. If you start taking a pain pill, the body shuts down production of its own natural chemical. Your body no longer has the ability to self-regulate. On top of that, when your nerves get used to seeing a higher than normal level of medicine, they adapt.

The moment that unnaturally high level of medicine is absent, they go into red-alert, and intensify the pain.”

“So if you’re saying the pain medicine is *not* working, and according to you, it’s actually harming me, then what’s the hope? I can’t live with this pain without the medicine.”

I knew she was frustrated. She didn’t know where to turn. I patiently explained to Heather and her parents that pain medications have an illusory effect. This is a very difficult concept for patients to understand. “Let’s pretend you’re watching TV. You can see the picture moving, but you can’t hear it. So you turn the volume up. Then, what happens when they cut to a commercial?”

“I go deaf. Commercials are always louder than the TV shows” Heather replied.

“Right. You can see the picture but can’t hear the sound. The same thing happens with pain and opioids. Your brain is smart enough to recognize there are pain signals coming in, but opioids dull the sound. So your brain turns up the volume. The moment the mute goes off, as in the opioids wear off, the pain signal is now exaggerated and intolerable. If we add more pills to mute the sound even more, it just keeps amplifying. It doesn’t make sense to try to keep suppressing it. We’re just fighting a losing battle. This is where you’re at with the medicine.” Heather looked at me with skepticism, but somewhat curious at the same time. She was smart enough to recognize the road that laid ahead of her if she continued traveling down the same path she had been on, but she was clearly hesitant.

“I’m scared,” she said after a long pause.

“Most people are at this stage. What are you most scared of?”

“Hurting, obviously, but I think maybe I’m more scared of hoping and being disappointed again. I’ve just gone through this before, and in the end I keep coming back to this point—no one can do anything but prescribe my meds. If I can’t take my pain pills, am I just gonna have to suffer?” She feared change. It meant flirting with

FIFTY SHADES OF PAIN

hope again. She was exhausted from the cycle of hope and disappointment. Sometimes, the lure of familiar discomfort is far greater than the unknown, unsubstantiated comfort.

“No, I can’t stress enough that the pills are creating an illusion of comfort. Once your body is not depending on them for daily maintenance, it reinitiates its ability to regulate pain with its own internal opioid-like molecules. In the big picture, it is not as bad as people think. It is at first but after we pass the initial stages it gets easier. I have a lot of tricks to help, too. I’m not going anywhere, this is a road we take together.”

“Would you like me to explain my HEAL model to you?” Heather didn’t say anything. She just nodded with tears silently welling and streaming occasionally. Her mother put her arm around her and I began.

“To give you an overview, the goal is to understand what’s taking place in your body that causes pain. I call this hearing the message. Then we establish some realistic goals so that we don’t cycle through hope and despair. We need to start envisioning the life you want to live, not the one you resigned to. All along, we work to alleviate the pain by reducing its intensity. We may not be able to eliminate it entirely, but we can definitely make it more bearable without hindering forward momentum. We then figure out how we can leverage your body’s ability to heal on the cellular level to rebuild the damaged tissue. This is what the L stands for, leverage. Your cells are far more capable of generating the finesse in cellular architecture than I or any surgeon could do. They really are our greatest tools.”

“That sounds ambitious,” she said with a hint of skepticism.

“It is if we’re looking at the last steps without building the plan with the first steps. Think of it like two problems—the first is your original pain which we still need to identify to treat, but the second is the roller-coaster response your nerves have to pain because of the medication. We need to address both simultaneously.”

“So where do we start?”

“There are a number of ways we can start normalizing your nervous system. The goal is to reduce the highs and lows. One way would be to just start reducing the medication and allow your body to adjust. We can add other medications in the short run to make it more tolerable. Another method that I prefer is using intravenous infusions of a medication called ketamine which has been shown to reduce the sensitivity caused by pain medication.”

Ketamine is an old anesthetic used for many years, but because it is hard to absorb when taken by mouth, its use has been limited; however, its effectiveness in reducing the increased sensitivity caused by opioids is impressive. The first patient for whom we used ketamine reduced his medication routine twentyfold in a single setting. When reducing pain medications, it’s easier to make big steps at higher doses. Once we get to lower doses, smaller steps are needed, so with subsequent infusions we reduced his medications 30 percent each time. He was a fighter. He worked hard for these big steps, and the ketamine infusions made it a lot easier.

I told Heather about the successes we had with this patient. “In the end, he felt different. He acknowledged pain, and sometimes even had brief periods of increased pain since taking his medications. The trade-off, however, was that he felt more connected with his identity and was no longer numb to the love and support he had been receiving from his family throughout his struggles. Pain and pills stopped being the center of this life, and he started to write again. He always dreamed of being a writer.”

“It goes against everything I feel right now, but I don’t like the way I’m living either.”

“It’s a leap of faith. I know how scary this is and how skeptical you may feel. Your parents and I will surround and support you. The patient I told you about, his wife and kids were with him the entire time to support and love him. That makes it easier when you have

FIFTY SHADES OF PAIN

your identity and your family to fight for. This is part of the E stage of envisioning your life that was derailed. To combat the fear, you need to find the faith that you can have a better life, and you deserve it.”

Heather teared up a little more when I said this, but I could see the determination lining up. Many patients who have endured pain respond emotionally when they are reminded that they deserve a life that resembles normal for most people. Pain and chronic illness can erode our sense of self-worth. Perhaps it’s because we rely on other people for assistance and take for granted the exchange of affection for assistance. When on the receiving end, it’s easy to forget how gratifying it is to help someone you love. Nobody wants to be a burden on their loved ones, but if this exchange of affection is kept in mind and gratitude is relayed, then it’s never a burden even when it’s hard.

“Once the pain responsiveness is closer to normal, what are we going to do to figure out what’s causing the pain and how can we fix it?” Heather asked.

“First we want to hear what your body is trying to say with pain to determine what’s wrong. We do something I call Pain Mapping. Pain Mapping creates the roadmap for what we need to accomplish in order to maximize your body’s ability to keep up with you. Knowing what your goals and aspirations are helps us use that map to develop your treatment plan, which takes us into the Alleviate and Leverage steps to the HEAL process. Then I want to get to know you better and understand your goals. This is where I really need your help to envision what you are meant to do in in this world. What brings you to life and gives you a sense of purpose or direction? This is important because we can’t let pain become the principal driver of your life. Even people with catastrophic disabilities accomplish amazing things when they have clarity and direction.”

“Horses. I’ve always wanted to ride horses or do something with them. My connection with every horse that I’ve ever ridden gives me a sense of purpose.”

“Is riding the only thing? What about taking care of them? Do you enjoy that?”

“Yes, but what’s the purpose if I can’t ride them?”

“Let’s step back and see what that really means. If you can’t ride a horse, then you can’t enjoy their presence, your connection with them, the care you provide and the love you get back. Is that right?”

“No, I mean, it’s so painful to not be able to ride that being around them is just a reminder of that.”

“Maybe, but do you see how you’re restricting yourself from a lot of joy because you can’t have the one you idealize? This will be the case throughout your entire life. How you respond to limitations is far more important than overcoming them. I’d like you to think about that. I’m not even going to suggest you can’t ride horses, we don’t have enough information to make that assumption. But I do want you to consider what else you could do that would give you sense of purpose even if riding isn’t an option.”

“I see what you’re saying, but it’s not easy.”

“I never said it was. Let’s establish some baby steps that gets you closer to the life you were meant to live. Is there anything that you can do with horses now that seems just slightly out of reach?”

“Yes, I can still go to a barn and help with the grooming. It’s just that I have a trouble standing long enough.”

“That’s a great start. We’ll figure out how we can progressively improve your stamina for standing. What can we do in the meantime to help you remain engaged with that goal?”

“Well, I guess I can bring a stool to take breaks on while I work.”

FIFTY SHADES OF PAIN

“Fantastic! I love the idea.” I could already see a hint of a smile tugging at the corners of her mouth. “I think just simply getting into the barn and connecting with the horses and your friends again would be a strong motivator. You think you can also find a pool to just start moving again? My concern is that you’ve been immobile for so long that a lot of your muscles need to be exercised again.”

“Yes, I think I could do that. There aren’t that many shows to watch on Netflix anyways.” We all laughed, as the tense mood started to dissipate.

* * * * *

Heather’s case resonated with me. As much as I try to maintain objectivity while guiding patients under my care, I had a hard time doing so with her. What made her case unique for me was the we had a lot in common. We were both teenagers when we injured our spines. While the mode of our injuries was different, the effect was the same. In a different life, I could have been her. My back was treated with non-surgical treatments and insightful attention to the invisible scars on the mind and spirit; hers followed a surgical path that ended with drug dependency. The initial response and actions of her attending physician followed the protocols I often see in these cases. By conventional medical standards, she received the best care. But these are the standards of care protocols that I bring to question. Her doctors assumed the changes they saw on her imaging as the primary cause of pain, and they acted on it without confirmation.

This is what makes the H stage of the HEAL model so important. She did not undergo the thorough workup I advocate that patients get prior to surgery. Her case and many others like her disillusioned me with conventional approaches to treating pain and nudged me toward regenerative medicine. Seeing patients like her reminds me of my own history with pain and underscores why I

practice a regenerative model of pain care. I know, however, that my experience is often the exception and not the norm. If I did not have insightful parents who had learned that there is an interplay between physical injury and mental anguish, my condition and status could have gone far differently. I've seen many patients with similar injuries with far different outcomes.

Chapter 4: The Sadism of Surgery

Diane's husband, David, described her as "the bullet," tiny but deadly. Diane was a thin-framed go-getter who only heard "no" when it was followed by "problem." They had two daughters, Summer, the eldest, and Amber. Diane had survived stage III breast cancer, built a franchise from her family store, loved her grandchildren to pieces, and could not dance at Summer's wedding—the final straw that "broke" her back. She came to consult with me because she had already seen several doctors and although the cause of her pain had been established, none of the treatments were helping her feel better. So, naturally, she was angry about the runaround she had received when her back had started hurting years ago.

"What hope is there? I won't take pills," Diane declared. "I won't have surgery, I'm sick of the steroids they keep pumping into me. They only make me anxious and gain weight. I've been a triathlete since I could walk. I can overcome pain, but this is different. I've seen five specialists and I keep going in circles. What can doctors do for me other than waste my time!?!"

"You sound frustrated. I would be too. How did this begin?" I asked.

"Well, for the past five years..." Diane began.

David immediately interrupted her. "*Five?* No, dear, this has been going on since Amber was born. You've just been trying to do something about it in the past five years."

"No, you're absolutely right, David. I'm not a complainer so I'd just been dealing with it. But I really can't function anymore without it nagging me to death." Diane turned back to me. "After Amber was born, I felt a slight click on the right side of my back and occasionally when that happened I would feel a jolt of pain. Since it

FIFTY SHADES OF PAIN

was brief, I functioned normally for the most part. I didn't give much thought to it."

"How has the pain been worse since your pregnancy?" I asked.

"I had a harder and harder time running. David and I used to run marathons together. I'd say 'I'm feeling winded' but really my back was hurting. So, we dropped down to half-marathons and then finally in the past couple years, I've had to stop running entirely. Besides being able to lift up my grandchildren, that's what I miss the most."

"So, what has been done so far?" I asked

"You name it," said David. "We got her into massage and chiropractics first. It may have helped a little, but I never saw her without her scrunchy face for any period of time."

"Yeah, it would settle down but not go away," she continued. "I went to physical therapy, and that may have helped the most. I got better enough to get through the next few years, but if I stopped doing the exercise for any length of time, the pain would start right back up. So, it finally got to a point where I couldn't take it anymore, and I went to see David's orthopedist."

"What did your surgeon suggest?" I asked.

"He did a couple of steroid injections into my back which helped, but after a few months they stopped working. Then he sent me to a pain specialist. She did a series of shots which helped temporarily. They repeated all my imaging, told me I have disc issues, so they changed the injection to a different set, which didn't help at all. I finally gave up. My pain doctor said I have two options, some kind of implant in my spine or pain pills the rest of my life. Neither of those are acceptable to me."

She continued, "So I went back to my surgeon and he said we should fuse the spine. I hated that option, so I went for a second opinion and then a third, fourth, and you're the fifth. I am just

disgusted with the whole process. I feel like everyone is just guessing. I said I would just live with this, but I can't anymore. I can't imagine those aggressive treatments are all that's out there." She stopped for a moment to compose herself. David reached out and held her hand.

I could imagine most of her life, Diane spoke with a natural authority. She commanded attention with her presence. I bet at meetings she sat upright and poised for anything. But as her intake interview progressed, she started shifting her weight side to side. She was getting more and more agitated as she continued to speak. These changes were clearly a big deal. David reaching out to hold her hand suggested how infrequently she showed signs of vulnerability.

"I'm just so tired of this problem," she continued. "You know, I've worked hard my entire life. I know how to solve problems. And you can't solve a problem without definitively knowing what's wrong. They keep offering fixes that seem very drastic or fruitless but no one can say with confidence what's going on. That's what frustrates me most about this issue. In the course of seeing all these doctors, I don't feel like anybody has properly examined me or thought critically about what's going on. No one can tell me exactly what's broken and I don't want to go through life like my mom did."

She went on to explain that her mother had a disc issue with minor pain that her surgeon operated on, saying she would be disabled if he did not operate. One surgery turned into five, and ultimately Diane's mother was wheelchair-bound, not because she was paralyzed, but simply because it hurt too much to stand. Given Diane's level of activity, surgery and its possible complications was a fatal option.

"I'm terrified of anything that permanently sits inside my body. We don't put metal into trees to keep the branches from falling. We prune the trees and let it regrow. It's biology. How can we be so arrogant to think we know better than biology? We are organic beings, and sometimes we just need a little bit of help. But it seems

FIFTY SHADES OF PAIN

like everybody wants to bombard my body with drugs or tinker with it through surgery. I'm smart, I read the statistics. I know a lot of back surgeries fail, so why is that the next step?"

I agreed with Diane. I'm not sure how we got here. It seems to me as if our standard of care puts the cart ahead of the horse. We don't give biology enough of a chance. Salamanders can regrow their tails, and to a lesser degree, so can we. Our body re-grows more than we realize, but in our zeal to fix a problem, we overlook what the body can do on its own or with minimally-invasive assistance. Every physician has a desire to help. Sometimes, we just need to sit back and let nature work, or figure out how we can assist rather than take over.

She continued, "I blame the insurance companies. They dictate how medicine is practiced. They tell you what is covered and what's not necessary. I know it takes time to figure something out, and they don't pay you to do that. It just feels like I'm stuck on a conveyor belt, and it doesn't matter who comes before me or after me, we are all getting the same treatment. Insurance pays for expensive imaging or if I agreed to surgery, that would be covered. I know how expensive these things are. My deductible is ridiculous. I see all our health bills and I have to pay them. I wouldn't mind doing so if it gave me some clarity or got me better. But I just feel like I'm getting the runaround. What I want is time with an expert. I want to sit with someone who will really figure out what's wrong."

Diane's was one voice, but her frustration was the same as many of my other patients. The truth is, insurance companies are a large part of the problem in our healthcare system. The increasing cost of care in managing pain parallels that in other fields of medicine, all of which originates from shortsighted decision-making to mitigate the cost of care. The artificial barriers created by insurers for cost-containment has increased the cost in contradiction to the insurers intent. The number of healthcare administrators needed to approve,

process, and regulate what services are provided to patients exceeds the number of physicians in the healthcare system. It's a Cold War. Insurance creates a barrier, healthcare providers work harder to compensate, and ultimately the patient loses in declining quality of care with increasing costs. In our healthcare system, decisions are sometimes made based on what insurance covers and what's least likely to end up in a lawsuit. It creates a hastiness to jump to treatment, sometimes before exhausting all the tools available for simpler solutions.

Premiums and deductibles have become so expensive, that patients are forced into a box accepting whatever level of care their insurance provides for them. But this dictated care is not always effective or inexpensive. Let's consider a joint replacement. This can easily cost families their \$10,000 deductible and the insurance system tens of thousands of dollars more. Problems in our healthcare delivery have a great financial toll, but have an even greater impact on the quality of life people live on a daily basis. Our healthcare system is one of the most expensive in the world but our health outcomes are less than optimal. Nowhere in healthcare is this more evident than in managing pain. Instead of replacing a joint or even delaying treatment until the joint needed to be replaced, had this patient used a regenerative technique when the pain started, the dollars and quality of life outcomes would have been a fraction of the cost of our conventional model.

I jumped in, "What's frustrating, I find, is that there are plenty of doctors who know how things could be done better. But their hands are tied by the system and after a while, when they have fallen into a pattern of care, it just becomes the norm. It stagnates innovation. That's the reason I went in the direction I did with my practice. I see the role of physicians as facilitators, not as doers. I tried the "doing" in the conventional way. I tried to fix things by suppressing inflammation, burning nerves, and doing the things that

FIFTY SHADES OF PAIN

you described experiencing through the care you have already received. But all of this ignores the process by which the body heals, and I never saw patients getting better. They might for a short while, but they'd be back for more treatments, month after month, year after year. No wonder our cost of care keeps growing. We are just band-aiding problems instead of fixing them. It just seemed like a revolving door. Using regenerative medicine, the study of how biology repairs, we can facilitate and supercharge healing by creating living, functional tissue from your own cells."

"What do you mean by facilitator?" asked David.

"Our role as facilitators ought to be aiding the body's natural healing processes. We are organic, biologic beings and biology heals. It adapts to change. We see it all around us. We see it anytime we cut our skin or stub our toe. Things fix themselves. If you continue to hurt, something has not healed or has an obstacle to healing. Rather than replacing the part, we need to figure out how to remove the obstruction and let the body do what it does best. We sometimes forget that in medicine."

"So how do we facilitate my body to heal? I've already missed dancing at Summer's wedding. I will be damned before I miss dancing at Amber's wedding in the fall. I have two beautiful grandchildren who beg me to lift them..." Her voice maintained but was cracking just a little, "...but I can't. I'm just so tired of dealing with this."

"You sound so tired, Diane," I said and she nodded. "I can assure you there is room for improvement. Let me explain the process we can guide you through. We call it the HEAL model for treating pain."

When I explained the HEAL model to her, she asked, "why couldn't they fix me if they knew what was wrong?" It's a great question. The problem is tunnel vision. In healthcare we view inflammation as the enemy. Diane's doctors were only treating her as they had been trained to do. Anti-inflammatories and steroids are the

choice first-line therapies to treat pain. But inflammation and pain are not our enemies. They are a natural part of the body's healing process. Your body fixes itself by instinct. It recognizes the injury, giving it rest, and filling in the gaps where the damage has occurred. That process takes place because of inflammation. Inflammation sensitizes nerves for a reason, to recognize the damage and prevent re-injury by instinct alone.

The inflammation does a lot of other things too. The swelling that happens with an acute injury is intentional. Not only does it restrict motion for as long as the body needs to repair, but it also creates highways for cells that repair damage to move liberally around the injury. The inflammatory fluid contains growth factors and nutrients that the body needs to heal. There are chemicals within the inflammatory fluid that not only sensitize nerves but also relay instruction from the nerves and other cells active in the repair process. It's the telecommunication and service roads of the repair cells within the body.

Once the foundation is set, inflammation starts to subside on its own. It leaves behind new cells with a scaffold that directs their maturation and the fertilizer and nutrients that fuel their growth. As the new cells sprout, replicate, and flourish, they need testing in order to know what capabilities they need to develop. Different cells in your body do different things. Some act as steel rebars, while others act like bungee rope. Stem cells can promote the proliferation of most of these varieties, but need instruction. Only through exercising or rehabilitation can the body test the limits of the new tissue and get the signaling for how they need to evolve to better suit the stresses your body demands of them.

Therefore, routinely suppressing inflammation is not the best approach to treating pain. It may quell the pain, but it can also limit repair. If cycled over and over for years, the opportunity for repair becomes less of a possibility and an imperfect surgical attempt may

FIFTY SHADES OF PAIN

be the only option. Repetitive damage in an area creates scarring that becomes much harder to fix. This scarring is part of the problem that creates chronic pain and one of the main culprits to why despite her good health, Diane continued to decline.

Chapter 5: Hear the Message Spoken Through Pain

The first step needed for both Heather and Diane was to start unraveling their pain problem. Thinking back to our radio-amplifier-speaker model, our first goal for any patient is to determine what is creating the static, or where that pain signal is coming from. Different shades of pain help to define the tissue injury. This can be fairly straightforward if it's just one problem, but most pain scenarios are a combination of different shades. One area of damage causes a chain reaction affecting other cells that normally work in concert with the injured part, causing the different shades and sounds to overlap and complicating the diagnosis. During the H stage of the HEAL model, the goal is to tease apart these overlaps. By using the radio-amplifier-speaker model, we can use the pain to not only identify the tissue and nerves affected but also to prioritize which of these three systems need the most immediate attention. Is the main problem with the radio signal (the tissue damage), the amplifier (nerves in heightened sensitivity), or the speakers (brain over-processing or misprioritizing the pain)?

We do this with a systematic approach that I call Pain Mapping. This is a methodology that goes beyond conventional radiologic examinations (X-rays, CT scans, MRIs) which are performed with the patient at rest. Conventional diagnostic tests can overlook the cause of pain or find abnormalities that are not necessarily the cause because they are done in a state of rest instead of action or pain. How much better would it be to examine abnormalities in real-time and see if they overlap with the pain? To get an accurate assessment of what bodily damage is causing the original pain signal, we need to learn the language the body uses to

FIFTY SHADES OF PAIN

relay problems. The only way to figure out what's wrong is to listen intently to what signals your body is sending through pain, and then trace them to identify the original damage and the ensuing problems that may have occurred as a result of it.

These tools existed to confirm whether Heather's original injury would have benefitted from surgery or not. Her symptoms were assumed to be a result of a disc and nerve root injury, and that likely played a role, but it was not the full picture. Patients that present with back pain that extends to the legs are assumed to have a possible plethora of injuries, including nerve root compression, sciatica, a pinched nerve, a bulging disc, or many others for which surgery is the most common answer. But we would like to make sure that surgery is the right answer.

Perhaps the greatest advantage with Pain Mapping is that suspicious structures can be numbed while we are visualizing them. By depositing small amounts of local anesthetic on the specific structure of concern, we confirm or rule out problems. If multiple problems are suspected, we can numb the nerves to a wider region and take specific elements out of the equation to clarify the problem, helping us tease apart a tendon problem from a joint problem, for example. We confirm our theories about the problem with Pain Mapping in real-time.

Through this process, we reevaluated Heather from square one, pretending like we knew nothing about what was causing her pain. Through history, imaging, and physical examination we built a short list of possible causes of pain (in medicine we call this the differential diagnosis), and we prioritized the most probable. Then, through a series of movements viewed under ultrasound and fluoroscopy (live x-rays), we were able to visualize each of these conditions under stresses that would examine their integrity and produce pain.

Hear the Message Spoken Through Pain

Anything we found suspicious, we injected with numbing medicine to determine how much it was contributing to her pain. In this manner, we teased apart pain originating from the different elements of her spine—muscles that coordinate movement and stability, bone and joints that form structure, nerves that signal motion and relay sensitivity, ligaments and discs that hold everything together and cushion the spine. None of this could have been evaluated as thoroughly through conventional methods, especially following the surgery that changes the anatomy and creates artifacts in imaging because of the hardware.

Ultimately, we identified Heather's main problem was the muscle scars from her surgery. Sometimes tissue cannot recreate its native state when so dramatically altered with surgery. Once cut, the muscles never reformed to do the work they are intended to do: distributing the load away from vulnerable structures like her joints and discs. When she stood, the muscle coordination was off because certain muscles were scarred and out of commission. This loaded structures that were not designed to take that stress. When the body risks injury, it signals pain and further destabilizes the mechanical chain. So until we were able to remodel the muscles and retrain them with therapy to coordinate appropriately, she would continue to have pain.

During Diane's Pain Mapping session, it was evident that one side of her pelvis had a complete loss of integrity. The damage to her sacroiliac joint was significant. Contrary to popular belief, the sides of joints are rarely in contact with each other. They float and are held apart by muscles, tendons, ligaments, and lubricating fluid inside of a joint. If the joint loses its integrity, it no longer floats and starts to erode. This was evident in Diane's case. No amount of anti-inflammatories or steroids would recreate the integrity of that joint. If anything, every injection that gave her temporary relief, softened the ligaments and moved her closer to irreparable damage. This helped

FIFTY SHADES OF PAIN

us to identify the best courses of action for the subsequent stages of her treatment.

Chapter 6: Envision the Life You Want to Live

Identifying the pain source is only part of the problem. We also need to determine how this pain has impacted patients' lives. Chronic pain quickly becomes the focal point of people's lives. But pain is not always the cause of distress; what the pain steals from you often is. Most patients would agree that if they could function, pain would go from suffering to a distraction. Shifting your focus away from pain and more toward function reduces the burden of pain and helps you cope. Remember, hope is the greatest vulnerability when it comes to recovering from pain. Setting up unrealistic expectations causes unnecessary cycles of hope and despair. Confirming achievements helps reinforce defenses around our hope.

Both Heather and Diane at one time had the drive and stamina to get better, but these were progressively fading. As they navigated the healthcare system, they underwent a cycle of hope for a cure followed by despair for failure. That void left is a vulnerability, filled by anything that gives an ounce of relief. Enter pain pills. Heather was drowning in pain medications and felt trapped. Since I have treated so many patients in her position, I could hear buried in her words, that she knew the pain medications were contributing to her progressive decline. They had become a crutch to her coping and the focal point to her hope for a future. When I voiced my concern that the pills only masked the problem and made her sensitivity to pain worse over time, she did awaken to what she already knew.

Shifting her focus to her goals became a strong motivator for her to take the first necessary step to decreasing her opioid use and restoring function. She identified her goals in her first visit. In the short term, she wanted to increase her standing stamina, and in the

FIFTY SHADES OF PAIN

long term, she aspired to riding again. She recognized that she may never become a competitive rider. While difficult to accept, Heather worked to develop other accomplishments that would give her an equal sense of gratification. She continued to do maintenance exercises, and continued to actively coordinate her muscles when standing and walking, but ultimately, reengaging with her equestrian identity really helped propel her healing process.

Over time, Heather was able to stop her pain medications entirely, albeit the last two months were the most difficult. She felt moody and depressed, and her body just ached for several weeks. But this was a girl with grit; she was not defeated easily. Heather once admitted to me part of her depression stemmed from her own internal criticism because she felt like she had given up. This was not in her nature. The confusion and lack of direction from people she deemed as experts was a big blow to her. With guidance on what she could safely do, and what she should aspire to do was all she needed. Her tolerance for pain had grown and her ability to push the margins when a goal was set in front of her impressed her parents and me.

Diane felt cornered and was given few options other than the one she feared the most—an invasive surgical procedure to fuse her back, with no assurance that it would fix her pain. She envisioned there had to be better options than what was most commonly advised. Her core being was in doing. She was admired by all of their friends as the unstoppable woman. After all, she had already overcome cancer and the obstacles of growing the business. She seemed unstoppable, hence her nickname, “the bullet.” But when it came to addressing her health, she was naked and vulnerable. Her biggest fear was committing to a life-altering procedure without confirmation that it was the right thing to do. She refused to believe those were only options. Diane exercised, she ate well by most standards, and could not understand why her body failed to repair itself. Moreover, she

could not fathom replacing something instead of facilitating its repair. She was right.

Diane was very clear about her goals—she wanted to run again, play with her grandchildren, and dance at her youngest daughter’s upcoming wedding. In the course of her care she had seen a lot of respectable doctors, so we already knew what was causing her pain. It was the joint between her pelvis and spine, called the sacroiliac joint. This is a common problem, particularly for women because they have a wider pelvis. So, the H (hear the message) and E (envision the life you are meant to live) elements of our model were well established. Therefore, we focused on the Alleviation and Leverage components of HEAL.

Pain was neither Heather’s nor Diane’s primary problem. Despair was. As they navigated the healthcare system, they underwent a cycle of hope for a cure followed by despair for failure. Along the way, the magic of modern medicine was touted as their savior at the expense of a failed body. When you put all your hope into a savior that continues to disappoint, it’s crushing. Ultimately, you feel like you worshipped a false prophet.

Sometimes, in their pit of their despair, I do a mental exercise with patients. Let’s pretend this is the end of the road and nothing more can be done. What next? Would knowing what you can and can’t do help? Even in the rare situations where the pain cannot be controlled, simply knowing what’s wrong and how to work around makes coping far more achievable. When we understand how your pain has affected your fundamental limitations and priorities, we can start tailoring plans that *can* meet a set of realistic goals. Establishing structured goals such as increasing your stamina for standing by five minutes or walking by one more block creates tangible benchmarks. It allows us to recognize growth and success as we treat the pain. There is no pain that cannot be improved upon.

Chapter 7: Alleviate Pain

Alleviating pain is key to normalizing movements and helping patients cope with rehabilitation. Opioids and other pain medications are not the only method by which we can control pain during this course. When we build the Alleviation plan, we take many factors into consideration and use the radio-amplifier-speaker model again to help formulate this plan. This helps to decide where intervening will have the greatest impact on alleviating the pain and moving us more toward leveraging healing.

As I mentioned before, pain causes changes within your nervous system that make you progressively more sensitive. Every scar or side effect from failed treatments adds to the sensitivity, putting the body on red-alert. The longer it goes on, or the more intense the pain, the more this cycle accelerates. Progressively, the nervous system develops a memory around that pain such that even when the tissue heals, the pain can continue because of the formation of that “memory.” These pain memories also affect the autopilot nerves mentioned previously. These nerves instruct the body on how to function and react, and are especially important around an injury. With pain memory formation, they can perpetuate inflammatory changes in the tissue and prolong pain problems. It seems as if your body does not want you to forget an injury in order to prevent you from repeating it again.

Alleviation’s first goal is to turn the volume down on these cycling nerves. Not only does this provide patients with relief but it also interrupts that memory formation. How well can you remember your grocery list when your child or partner keeps interrupting? These interruptions limit how much your nerves can form a memory around pain. Moreover, they also affect the autonomic nerves

responsible for the changes in your body's function and physiology which may be the correction needed to promote the healing response.

With specialized techniques using an ultrasound, we can visualize the nerves suspected to be relaying the pain symptoms. If the nerve is entangled or scarred over, it can swell and be seen but generally we cannot see the inflammation. Yet these nerves are often in red-alert. This means they are sensitized to send pain signals more readily than normal and start creating pain memory. They need to be reset to get them off of red-alert and start acting normal. Numbing them even temporarily resets their sensitivity. While the numbing may not last more than a few hours, just resetting the nerve and flushing some of the inflammation with an injection can give prolonged relief.

In Diane's case, I doubt her prior physician's steroid injections were doing much. Rather, I believe her doctors were just pressing the reset button on the pain fibers and cycling this process. The reason it worked sometimes and not others had more to do with where the medication spread. Whether the medication was accidentally placed along the appropriate nerves or intentionally inside the joint like conventional training teaches would determine if the injection worked or not. Creating an alleviation plan helped Diane consistently receive relief when she needed it, but it also gave her peace of mind. She knew that if she caused a flare-up with rehabilitation or unexpected movement, we had the tools needed to reliably get her pain under control again.

The second objective in the A stage is to support the injured tissue to minimize the need for it to send pain signals. This supplemental support should not hinder healing. With the conventional model where the goals are suppressing pain and inflammation, RICE (Rest, Ice, Compression, Elevation) is often recommended. These techniques may reduce inflammation and pain, but they can also hinder the healing response. In fact, Dr.

FIFTY SHADES OF PAIN

Mirkin, who first introduced the acronym RICE has also recently come out against it acknowledging that ice slows healing. Particularly when dealing with a new injury, we need to take steps that make the injury tolerable but do not increase the odds of it becoming a chronic pain. So a thorough alleviation plan may involve retraining support muscles to help brace the injury or even incorporate external bracing to give the damage some rest.

In Heather's case, the muscles of her back were completely disoriented and uncoordinated. During both surgeries access to her spine meant cutting through the muscles overlaying it. When they reform, they do so with scar tissue in a zigzagging alignment. So, when she stood for any longer than a few minutes, her back muscles would go into spasm causing pain. We were able to understand this through her pain map, and release the spasms with our initial desensitization injections and treatments. Then, rather than trying to medicate the pain away, we taught Heather what was causing her pain, and educated her on a stretching routine for when it struck. No amount of medication would have the same effect as breaking the spasm with specific stretches and allowing the muscles to relax on their own. Additionally, Heather knew that if she was unable to break the spasm on her own, she could come in for a simple injection that would release the muscles immediately. This reassurance along with a greater sense of autonomy meant that Heather felt empowered over her pain rather than victim to it.

Similarly, Diane needed to retrain her body. She had been coping with the pain for so long that it had completely altered her gait, and the balance of muscles in her body. She had become hesitant to move in certain ways or add stress to other parts of her body that needed to remain strong. As a result, even though she was actively exercising, specific structures were getting weaker because of either overuse as a means of compensation, or underuse as a means of

unnecessary protection. We call these changes in movement “Pain Avoidant Behaviors.”

She was surprised when I told her this, considering how active she was. But I explained that this is very common for chronic pain even among active people. If you were to sprain your ankle, you would limp around. Imagine limping around for years to accommodate that sprain. Even if you were active, that ankle may never see normal movement and will progressively lose certain functions. Similarly, in spite of her activity, the balance of her spine was off.

As part of her alleviation plan, the first thing Diane needed to do to reduce strain on specific parts of her spine was to retrain her movements and posture. Diane also needed reassurance that if her pain reached uncontrollable levels, we could control it without limiting the inflammatory repair process. After our Pain Mapping, we knew exactly what targets needed numbing to push the reset button and normalize her pain sensitivity.

Chapter 8: Leverage Healing

The most critical step in the HEAL process is understanding the obstacles that prevent healing. Rather than focusing solely on the pain, the L stage looks for the obstacles preventing repair, removes those obstacles, and amplifies the natural processes within your body that fix injury. Leveraging your own cells to fix the problem does so without leaving scars and without the risks imposed by surgery. It also negates the need to take pills forever. It's like having thousands of miniature surgeons trained by your own body, working inside you to fix a problem. Whatever gains are made with regenerative techniques are lasting effects unless a new injury occurs. It's less about taking over biology and more about working with it. This involves looking at the patient as a whole, and identifying the individual's lifestyle, behavior, nutritional habits, hormone levels, and constitutional basis of cell healing. Many problems such as osteoarthritis, neuropathy, and disc degeneration, etc. can be slowed, if not reversed. We just need to reconsider our tools in healthcare to use them differently.

After an injury, the swelling and inflammation is actually the first step in recruiting the damage repair cells, or stem cells, into the area. Stem cells mobilize and act as the demolition team that clears out damaged cells and the construction crew to recreate the damaged parts. As children, we have a seemingly infinite supply of stem cells in the body. Injuries readily heal because of this. As we age, however, the number of cells diminish. Their activity lessens. Injuries take longer to heal and sometimes they fail to because you simply cannot recruit the critical mass needed for repair. Advanced regenerative techniques use growth factors, stem cells, and tissue scaffolds to better facilitate the body's ability to heal. These advanced regenerative procedures recruit more of the cells needed for repair in

concentrations that your body cannot naturally produce. Various methods can be used to help the body regenerate.

Most of these tissue engineering techniques use your own cells to repair. Platelet-rich-plasma (PRP), for instance, uses the tiny cells called platelets that stop you from bleeding out when you cut yourself. Use of PRP has become very popular thanks to prominent athletes who are returning to the field in record time with fewer surgeries. Platelets contain a large number of growth factors that instruct other cells in your body where they are needed and what they need to do. Harvesting these from your blood stream starts with a simple blood draw but we then separate out the components and concentrate the platelets in a lab. In doing so we can generate 5x, 10x, 20x or even greater concentrations of platelets, far more than what your body can amass at the site of injury. These cells provide a significant boost to the repair cells in a damaged area.

When greater damage has occurred and there is an actual loss of cells—a significant rotator cuff tear, moderate to severe osteoarthritis, or a dislocating joint—we can heal in stages using multiple rounds of PRP but sometimes we need more potency. In these cases we use stem cells. Stem cells can be harvested from many sites but they are in highest concentration in bone marrow and around your fat cells. Some labs have developed a process to harvest growth factors from newborn placentas, or the afterbirth tissue. Many claim they have living stem cells, but studies have not shown that to be the case. While they have a high concentration of growth factors and can be helpful, they do not contain your own cells as a medium for growing new tissue.

Tissue engineering with either PRP and stem cell-derived products originated with Prolotherapy—the use of medications to initiate repair and proliferation (hence, the name Prolotherapy). It studies how the body moves and how every part of the body is connected integral to movement. Understanding prolotherapy helps

FIFTY SHADES OF PAIN

to prepare structures and also maintains the integrity of those structures for years to come. Sometimes, prolotherapy alone is enough to stabilize a joint and allow the body to fix itself with the resources it has. In Heather's case, for instance, we started with prolotherapy coupled with a specific exercise routine to prepare the area and then we conducted a PRP injection. Heather's problem resulted from the structure and misalignment of the muscles around her fusion hardware. Her body needed to remodel the scars that had formed and fill in gaps where the muscles had not properly reestablished anchors for movement.

Diane had a number of obstacles that were preventing her body from repair. To begin with, she was postmenopausal which means that her hormone balance favored loose joints. This laxity made multiple structures throughout her body vulnerable to injury and re-injury. Joints that move the way they were designed erode far less than when their integrity is compromised and they start to move in directions outside of their design parameters. So, rebalancing her hormones helped to lay the groundwork for rebuilding joints.

Next, we evaluated Diane's diet. This came as a surprise to her. In spite of having seen her primary care and five other specialists, no one had even considered her nutrition as a contributing factor to her body's inability to repair the damage. Even though she ate lots of fruits and vegetables, few processed grains, no soft drinks, and rarely fast foods at home, when she was stressed or away for work, her nutrition severely suffered. For weeks throughout the year, she admitted to finding comfort in junk foods that had little value to her health. It is a surprise to many how critical diet is in repairing injury. We tend to think of nutrition as an appeasement to our appetite. But what we feed our bodies is critical to our overall health. This is not often discussed in healthcare, but it's the difference between building a house out of straw or bricks.

Every cell in the body needs the proper resources to thrive. Sometimes nutrition can be the single difference between a nuisance and a crippling pain. The gut can't absorb the appropriate nutrients if bacterial overgrowth of one strain limits resources needed for the full spectrum of bacteria your gut needs. The flora of bacteria in your gut is critical in managing absorption of all the nutrients and resources needed for healthy living. Changing the diet, avoiding certain foods, decreasing animal proteins, and increasing fruits and vegetables can be enough to dramatically alter bodily function and reduce pain.

Finally, we needed to supplement Diane's repair cells since her body was not amassing enough for repair. Using our Pain Map, we knew which structures just needed simple support and which ones were damaged badly enough that they needed a significant investment of repair cells. Fully trained regenerative specialists have a spectrum of tools and they can advise you on which ones are appropriate. In Diane's case we opted for stem cells.

Chapter 9: The Safe Word is Hope

Heather

I received a message from Heather's mother one day asking to set up an appointment. It worried me. Her parents were not known to be the helicopter type; Heather had taken the lead on most of our conversations and decision-making. Her mother's request was a surprise.

"I thought she was doing great," she said with urgency over the phone. "Up until now, she had been distant and quiet, but since the last ketamine infusion a few days ago, we have barely seen her at all. She's asked to eat in her room and only comes out to go to the restroom. I asked her if she's OK and she keeps reassuring me, but this isn't like her. Should we be concerned? What was that infusion supposed to do?"

Ketamine is anesthetic that has shown new applications in a number of different arenas. Largely, it's gained popularity in anesthesia because of the opioid epidemic. When someone has been taking opioids at high doses or has an opioid or heroin addiction, their responsiveness to pain is very high and they don't respond to standard opioids or painkillers. Ketamine seems to reverse that and recreate a closer to normal response within the nervous system. It also seems to push the reset button on other neurologic and psychiatric circuits in the brain. So other pain conditions like diabetic neuropathy, phantom limb pain (where someone still feels pain in an amputated limb), and Complex Regional Pain Syndrome respond well to ketamine infusions even when all else has failed.

Ketamine also started finding applications in psychiatry. I've seen patients with deep, deep depression start breaking out of their cage after receiving a ketamine infusion. A lot of my neuropathic pain

patients tell me that the infusion benefits their mood sometimes even more than the pain. Living with chronic pain drains resources from the brain that also help cope with depression or emotional hits. Addressing either mood or pain can help fill the tank available to the parts of your brain that deal with both. Some patients hear this and think I am suggesting the pain is made up or in their head. That's not at all the case. These two systems are just related and there are many ways to help both issues in seemingly indirect ways. Ketamine is one of them.

My concern with Heather was that she was exhibiting the same signs that many patients exhibit when they start coming out of depression. There is this purgatory state in between depression and recovery during which patients have more energy but are still not out of the sadness. Many antidepressants carry the warning and caution for an increased risk for suicide when patients first start using them. Ketamine in these applications is too new to have developed guidance on these situations. I needed to gauge Heather's condition, so I asked my staff to get her in for an urgent appointment.

"Hi, Heather. How are you feeling?"

"I keep telling my parents 'I'm OK.' Really, I am," she said. I believed her. She did look better. She had a light behind her eyes that I had not seen before. "Here, I brought this to show you," she pulled out a notebook from her purse and started flipping the filled pages.

"Is this what you've been working on? Why didn't you just tell your parents this? Your mom asked for this appointment because she was worried about you."

"I know, I didn't know what to tell them. I kept reassuring them, but I didn't know what else to say. I didn't want to talk to them about this, because I feel like they've been through so much. What you said about that cycle of hope and despair really resonated with me. Every time we took a big step since the time of my injury, I feel like they had more hope and were more let down than me. I felt better

FIFTY SHADES OF PAIN

after the last infusion, but I didn't know how lasting the effects would be. I didn't want to disappoint them again."

"You mean you personally disappointing them? I don't get that impression from your parents."

"No, you know what I mean. I know they love me and I'm not the one disappointing them. I just see it in their faces how broken-hearted they are that I'm in this shape. I overheard my parents talking about me one night. My mom kept breaking down and sobbing. I know they feel responsible even though they had nothing to do with the injury. And how would they know that surgery would make me worse? We were only making decisions based on the advice we get."

Heather spoke with a maturity that exceeded her age. I often saw this in kids who had dealt with a chronic or life-threatening disease. When I trained at MD Anderson, I dealt with pediatric patients who had awful cancers that made you question why any being so pure and innocent would be afflicted this way. They all shared one commonality though: their souls did not fit inside their tiny bodies. They showed unexpected strength and wisdom that exceeded their size. People of any age show remarkable change when faced with their mortality or morbidity. For some, it does overwhelm and become crushing. But for many, you see a shade of light different than the average person. Heather was showing this light.

She continued. "Something changed inside after that last infusion. We had been steadily coming down on my pain pills. Yes it's been difficult, but it seems to also be giving me clarity. Since the infusion, it felt like a light switch. I had some visions while I was here, and I thought I would forget them. But I didn't. When I got home, I was afraid I would lose those visions so I started writing. And I kept writing, more and more and more. There is so much I wanted to say, I was afraid that if I stopped I would slump back into the fog."

She had mentioned "the fog" previously in another visit. She described it better than anyone else I'd heard. She said it felt like a

Sunday afternoon when you knew you had a paper due or a test on Monday and you really needed the entire weekend to prepare. But you didn't, and now you have no time left. It fills you with anxiety, like you know there's something you should be doing right now, but also despair, like what's the point? It's just this internal restlessness in which you can't relax nor get motivated. So you're left feeling just tired and burned out.

Heather did not look like she was in a fog today. Throughout the conversation a smile flickered on and off. The more she talked, the more she seemed in control of the conversation. She had points to deliver, and would steer the conversation back in that direction if we got off course.

"Do you feel like you're in any danger?" I asked, inquiring whether she was in that vulnerable stage between depression and recovery.

"No," she said with a little bit of hesitation, "I feel pretty good. I guess I'm just worried about falling back into the fog. That's mostly why I've kept to myself. Well, that and there is just so much I want to work out. I feel like what I've been through has a purpose. I'm not sure what that is, but I feel like I'm figuring it out."

"I can give you some reassurance. I think what you're feeling is a sense of being reconnected with yourself. Whether it's the pain or the drugs, people seem to lose the connection with their core. Initially, it's just shock and sadness realizing how much of an impact the pain has had on your life. All the things you feel you can no longer do, all the plans that evaporate, and more importantly the needless suffering that you feel you will have to endure, all of this weighs down on people and they feel helpless. It's very hard to maintain your core of who you are when you're dealing with so much despair. The fact that you have hope and awareness of that hope is a really good sign. I'm always amazed by how much people can endure when they have direction and hope."

FIFTY SHADES OF PAIN

“I get that. It’s pretty much what I’ve been writing about. The question that keeps coming up as I write is, “Who am I?” You asked me last time what makes me who I am. I was surprised by myself. My entire life, everyone described me as the Precocious Know-it-all. And I was. Among my siblings, I was the bossy one. I always had direction even if I didn’t know it. But I lost that when I got injured. I feel like I’m rediscovering that now.”

“And you’re worried about losing it. That’s why been hiding in your room. You don’t want to give your parents and your brother hope that you’re not sure will be there tomorrow,” I said as I watched her smile faded and her eyes tear up. “I know how scary that is. If this can provide any kind of safety blanket, I think the past few weeks demonstrates that we have a formula to keep you out of the fog. And now we have a definition of what that fog is. I think you can bring your parents in on where you stand. It’s terrifying when you stand on the side of a cliff and wonder if you can fly or if you will fall. The answer is less about your flying ability and more about having faith that in either case you have the ability to stand back up and try again. I imagine that’s hard to hear and even harder to believe.”

“It is but I feel hopeful. I want to get back to my friend’s farm. She has a horse that she offered to sell me. She knows where I’m at so she wasn’t going to charge me much but she said her horse is very mild-mannered. I’m wondering if I can ride again. I know, maybe it’s premature but I feel like I’ve made a lot of progress and I’m able to do far more with my rehab exercises since the last injection.”

“How long has it been, let me check...”

“Five weeks,” she responded faster than I could look through her electronic health record. “It’s been five weeks. You said it would take at least three to four weeks but I started feeling the effects after the second week. And I’ve progressively felt stronger with less pain when I do my exercises. I’m not standing as long as my original goal,

but I'm further along than I thought I would be. I wanted to ask if you thought I'd do any damage by trying to ride."

"Heather I think you know me by now. I'm going to nudge you off that cliff. Even if it's sooner than you can fly, I think that taking that leap too soon is better than waiting too long. With what we learned during your Pain Mapping session and alleviation stage, I know we can get things back under control if you take a premature step. But I'd rather us push the margin and take a chance on more pain than to wait and risk losing happiness. Why don't you try a very gentle ride and limit yourself to just a few minutes. If you do OK, then go back and start pushing your margins out. I'm happy for you."

She beamed. "I want to tell my parents how well I'm doing."

"Then you should! I think they will understand your hesitation. I haven't diagnosed pathology in either one of them." She laughed knowing I was joking. There was a grain of truth to that joke. People can be very supportive of each other even in the face of fear and failure but only if they aren't struggling with their own issues. Heather came from a very strong family. Even the sorrow that Heather overheard sounded like healthy venting rather than despair that could affect Heather.

"Nothing has been harder or given me a greater sense of achievement than overcoming this," she told me with a wide smile. Heather did ride later that week. And she did amazingly well. It wasn't long after that she was riding trails again with her friend. A weight had lifted off of her and I could see everyone around her felt it. She still struggled periodically when she pushed harder than she was used to but we all agreed that the risks were worth it because each time she was able to push further. She felt like she was a teenager again, not a sullen or in despair teenager but a vibrant, defy-the-parents type. She started teasing her brother again and ordering him around. It wasn't to his liking, but I'm sure he preferred that to her previous state of lifelessness.

FIFTY SHADES OF PAIN

Diane

Typically, you couldn't tell what Diane was thinking until she started talking. Whether she was in pain or in not, her composure stayed the same. This day felt different. She was bronze and had a positive glow.

"So, what's with the glow?" I asked.

"I feel great. I ran into my surgeon the other day, he didn't remember me until I refreshed him. He almost looked miffed when he remembered who I was. He asked me if I had had my surgery, and I told him, 'No, I didn't need it anymore.' He thought someone else had snuck the surgery away from him. But I told him that I was better. His concerned expression went away, and he just gruffly said, 'Good, I'm glad to hear it.' He didn't even ask what had happened."

"What you had going on was a fairly simple problem," I replied, "It just needed the right tools. I'm glad you didn't have that surgery. Knowing what I now know about what was causing your pain, I don't think it would've helped. It was just too much of a gamble, and it likely would have evolved into more surgery down the road."

"Yeah, I feel great. How long has it been since we did that stem cell injection?"

There was a knock on the door and David walked in, just as tan as she was with the same kind of palpable warmth. "Hey guys, sorry I'm late." He gave her a peck on the lips, and they seemed much younger than their years.

"You're fine," she said as she warmly held his hand, "I was just asking how long it's been since my injection."

"Looks like it's been four months," I said. "From what I hear you've been flying through physical therapy. Are you still going?"

"Oh gosh no. My therapist released me after six weeks. By then I was jogging again. I'm planning to do my first half-marathon in a six months. I haven't done one in years," she beamed.

“Yeah, she is starting to beat me again. I have to eat my Wheaties to keep up with her,” David said.

“Honey, you really need to make an appointment with him to talk about your shoulder.” She turned toward me. “He can jog with me, but we can’t play golf together and this time it’s not because of me.” She was clearly eager to get back to the active lifestyle she had left behind.

“Do you do that? Do you work on shoulders? I thought it would be outside your wheelhouse and was going to make an appointment with my surgeon.” David asked in a way like he was trying to settle a bet. I just couldn’t decide which side he was on.

“I tell colleagues that I’m the primary care for whatever hurts. I have the tools to figure out a pain issue better than most. We can figure out if surgery is avoidable and give you the full spectrum of options, and I can say with confidence that 75 percent or more of surgeries done for pain can be avoided.”

“Well darn, you were right Diane. It’s still hard for me to wrap my brain around how you can fix something without opening it up,” said David.

“Again, however minimally invasive surgery is, it’s still surgery. There’s so much more we can do with minimally invasive regenerative techniques. We’ve only scratched the surface. New techniques come out every day. Regenerative principles can be applied to any tissue that shows signs of aging. It’s not the fountain of youth, but from the feedback I’m getting, people don’t care,” I smiled back. “I can tell you more about that next time, I’m more interested in your back for today’s visit.”

“My back feels great. Really, I barely notice it anymore. At first I thought it didn’t work” said Diane.

“Yes, she was kind of irritable, even though we knew it would take a few weeks to start working. She’s impatient, but I helped her with that.”

FIFTY SHADES OF PAIN

“He’s right. I was anxious. I wanted to be back to normal for Amber’s wedding and I thought, ‘If this didn’t work, how quickly could I get in for surgery and recover?’”

Amber had just married. Diane had been anxious about this since the day I met her. She was so distraught that her back limited her during Summer’s wedding, that Amber’s wedding felt like her last opportunity to dance.

“How was the wedding?” I asked.

They paused to compose themselves before they spoke. On the scale of emotions expressed on Diane’s face, this registered as the pinnacle of joy. “It was amazing. Absolutely amazing. Amber always wanted to have a small wedding, so they decided to get married in Tuscany. She met her husband there when they were both studying abroad.”

“Yes, that part of the world is seeded for romance,” David jumped in. They were practically stepping on each other’s toes to rave about it.

“It truly is. The rolling hills remind me of Kentucky, and Amber timed it perfectly. Along every dirt road were clean rows of shrubs and these beautiful orange poppies.”

“It was really stunning. And Amber looked amazing,” said David.

“I was so afraid that I wouldn’t be able to dance. I can’t imagine how devastated I would’ve been. But I did. It was such a gift to not even think about my back that night.”

Diane and David continued to rave about their daughter’s wedding. It sounded like quite the event. I was happy that they enjoyed such an important evening, surrounded by her loved ones. The best part for her was being able to dance with her grandson, Elmo in the bright moonlight.

“Elmo is almost six, and she picked him up and pressed his cheek to hers and they danced the tango. I couldn’t decide what was

funnier. His expression or her moves!” His arms went up as he laughed, anticipating the blows she would fire at him lovingly.

“For years I was just spinning my wheels try to get something done. I could not have imagined it going away, but it did. It’s still a nuisance every now and then, but nothing like what it was before.”

“Diane, it was a really simple problem. Everybody just kept focusing on the abnormalities they saw on the MRI instead of looking for the root cause. That was the missing key. Once confirmed, it was a straightforward solution.”

“I just don’t understand why this approach isn’t the norm?”

“There are a lot of reasons, but in large part the pain field was derailed by very effective marketing. Decades went by during which so much attention was placed on the wrong tools that we failed to make the right tools the norm. Medicine went down a path that it still doesn’t realize is completely off course. We are making people worse. We numb the pain until surgery is unavoidable and then we medicate them more because surgery doesn’t fix everything. It’s the reason I’m writing a book. This is a movement that requires widespread attention. In many cases, conventional medicine is actually doing more harm than good when it comes to pain. Eventually, when things have gone on for too long without proper attention, people feel desperate and think they are out of options when the right ones have never been considered.”

“I need help from patients like you to help us transform healthcare,” I continued. “We need to dispel the myth that the body can only be healed from the outside. We need to reframe pain, understanding that it has a purpose which we cannot ignore. Rather than focusing on the pain—which is nothing more than the messenger—we need to identify the cause. Pain is separate from function and healing. Most patients are willing to put up with pain if they can function better or know that the process will eventually heal.”

FIFTY SHADES OF PAIN

“That’s so true, I noticed that when I jog,” Diane jumped in, “When I first start everything is achy, but it’s tolerable because I know it will go away. And I know it’s for the greater good, because I feel great after finishing a jog.”

“Exactly. I think most people agree that pain is secondary to function. Who you show the world, who you are, your aspirations, life goals, these are what matter. There will always be a reason to have pain, particularly as we age. What we do with that pain, how we treat it determines whether we overcome or we suffer. Sometimes I say we need to aim for functional discomfort if we can’t get rid of dysfunctional pain.”

“She’s definitely a changed person. I see it in her bounce again. She’s always been a morning person but the past few years, I was getting her out of bed. Now the tables are turned again. Her energy is better, she’s optimistic, and I’m back to struggling just to keep up with her. I love her this way. I mean I’ve always loved her, even when she’s cranky,” said David, a facetious grin lighting up his face. Diane winked at David.

“Although it hurt to get to this point, I’m glad I did for the realizations and growth. I have more confidence in myself and my ability to overcome. I may have minimized the toll my back took on me, because I’ve never been one to lament. But truly, the feeling I experienced during Amber’s wedding, I couldn’t have before. Going through this was an endurance exercise but I see it’s worth it because I embrace moments of joy and good health so much more tightly. It’s given me a greater appreciation for what’s important in life. And frankly, I’ll tell you what gets me out of bed every morning, David. It’s thinking about our grandchildren and then looking in the mirror at myself, and saying ‘Hello life. Get ready. I’m back.’”

Chapter 10: Top 5 Questions to Ask About Pain

Your health is the most valuable commodity you have. As our bodies age, our health changes, too. While our body may break down and cause pain, a healthy spirit fights to keep moving forward. The value of time only increases as we age. The reality of its scarcity becomes all the more evident with every passing year. Since our methods can't be in every neighborhood (at least today), I want to arm every patient who has pain with a list of questions to ask their healthcare provider. Whether it's a new or old injury, orthopedic or neurologic, age-appropriate or unexpected, from head to toe, these five questions are helpful in getting answers and directing the best care possible.

1. How can you be sure what is causing my pain?

There is a diagnostic tool or injection that can confirm any condition causing pain. In this day and age, I find no excuse for operating on a patient without confirming the origin of pain and considering whether less invasive treatments can replace the need for surgery. In fact, a more thorough diagnosis that goes beyond standard x-rays and MRIs to map out the various problems causing pain can accelerate recovery by building a comprehensive plan. Make sure that you understand what you are told is causing you to hurt. It must make sense to you. If you start to think about the mechanics of how you move, you can feel your "gears" moving on the inside. Use this to test out the prevailing theory for your pain. Your healthcare provider's explanation should fit with what you feel. It's OK to challenge their explanation. It will either lead to a better understanding of your issues or uncover new variables that may change your provider's outlook.

FIFTY SHADES OF PAIN

2. What are my options to treat this?

Part of the consent process is discussing alternative options. Very few conditions have only one treatment option. As the adage says, there are many ways to skin a cat. If you are not given multiple options, consider a second opinion unless you truly trust this doctor. It's OK to scrutinize a drug, test, or procedure before endorsing it, just don't go overboard; everything in medicine will have a laundry list of side effects. If it sounds too good to be true or promises too much, question it. Nothing in medicine is perfect. As clinicians, we tend to draw a rosier picture around what we do best. This is not a slight against any specialty. The truth is that medicine has become very complex. It's easy for a clinician to fall into a silo of their own expertise and not realize advances made in other fields. Do not hesitate to ask your clinician about alternative options. If they seem offended or put off by your question, take a hard look as to whether that is the right clinician for you.

3. What does my aftercare look like?

Many patients are surprised to find that even "magic bullet" cures can have a long recovery process. They had surgery, for example, with an expectation that it's a one-stop fix and do not realize that they need for physical therapy or rehabilitation is even more imperative afterward. Everyone needs rehabilitation after surgery to break down the scars and prevent them from becoming permanent. If your clinician doesn't give you a rehabilitation plan before surgery, pause and make sure that it is discussed. Their knife skills will never be superior to human biology and rehabilitation is a key element to injury repair. Ask for the realistic estimate for a return to function.

4. Can I talk to others with my condition who have undergone your care?

Unless it's a brand-new clinician, good doctors have a community of patients and staff who can easily vouch for their skills. Their willingness to share this community with you shows humility and transparency—they don't mind being tested or scrutinized. This especially bodes well when they keep up with their patients who have moved on or done well. It suggests your doctor can establish a good rapport and maintain healthy relationships. The time of gruff bedside manner is gone, or at least it should be. Doctors are largely overworked, but a good one will figure out how to allow for more patient engagement. Along this line, be willing to vouch for your doctor too. Every clinic needs to foster a nurturing community. That means give and take. The new age of healthcare can protect patient privacy and still harness the good things that have come from social networks and stronger connections.

5. Who is giving me my treatment?

This one is especially important. I see many clinics providing regenerative treatments but are run by healthcare practitioners inexperienced in regenerative medicine. I know how many years of conventional training, and additional years of post-fellowship training I had to go through to get to where I am. Regenerative treatments sound sexy and if run by the same conveyor belt model prevalent throughout conventional healthcare, they can be very lucrative. But it simply is not as easy as just squirting some cells in somewhere and hoping for the best. Sustainable outcomes only come through a thoughtful comprehensive plan that was built around proper diagnosis. Just because your knee hurts doesn't mean the problem is only in your knee. I hate to see this field diluted by inexperienced,

FIFTY SHADES OF PAIN

profit-driven businesses. A well-trained clinician in this field would be a physician board-certified in fields like anesthesia and pain, physical medicine and rehabilitation, orthopedics and sports medicine, etc. I'm not saying other fields of medicine cannot learn how to do regenerative work, but it does take a significant investment of time, curiosity, and frankly, money. Extra training outside of an academic program is expensive. Do not be afraid to ask how your doctor trained to do what they do.

Training in prolotherapy is fundamental to using PRP and stem cells. Any clinician can learn to inject the joint, whether with steroids or regenerative product. Few clinicians around the country have trained in using live image guidance like ultrasound and fluoroscopy to confirm they know where that medication is going. Even fewer have trained in prolotherapy techniques which incorporate concepts of joint stabilization using all the structures involved in joint movements. Make sure that whoever is injecting your body with a regenerative solution has been thoroughly trained in prolotherapy to know what structures to target as well as regenerative medicine to know which products to use.

Afterword

The greatest privilege I have as a doctor is living vicariously through my patients, learning their most intimate fears and aspirations, and sharing the joys and sorrows of their lives. I truly believe my patients are the heroes, and at best, I'm a sidekick. I am humbled by the grit and determination I see. People overcome amazing obstacles. These miracles happen every day, even in small incremental changes that step toward the big payoff of improved overall well-being.

Chronic pain, like many chronic diseases, strips people of the sense that they control their bodies and by extension, their lives. We do not do enough in healthcare to counteract this or inspire people on a personal level. Healthcare has become impersonal. It is overtaken by large institutions— large hospitals, insurers, pharmaceutical companies, device manufacturers, etc. There are far too many hands in the pot when it comes to this system, and what suffers is the direct connection between physician and patient. With soaring drug prices and six-figure joint replacements, what are we getting in return? Are we any healthier? As someone who practices in that environment, I can confidently say no.

Furthermore, healthcare needs an answer and a solution to the opioid epidemic.

This is what has launched our movement to reclaim health. The only way the system will change is if we take greater personal accountability to change it. If special interests push an agenda that drives profits over health, we need to push back. We can waste less and get more health with smarter delivery systems, those that focus on promoting health instead of just curing disease. I am awed by complexity of thriving cells and living organs. Rather than taking it over or replacing it, healthcare needs to find ways to facilitate and

FIFTY SHADES OF PAIN

amplify the body's natural processes. Regenerative medicine takes all of this into consideration. It is the primary care for quality of life. It is the starting point for identifying what's wrong, what's causing pain, and what prevents it from getting better.

In our practice, our motto is “Healing Beyond Medicine” because we view healthcare delivery as far more than delivering medicine. Healthcare is about prioritizing health, educating about priorities that maximize the body's potential, and guiding patients to help them make the decisions about their needs. People ask us why we included the two dots above our name Wellward. Wellness is not a direction we can take on behalf of our patients. It results from choices people make for themselves. I can amass the knowledge and share it, but I can't change your health alone. The two dots above our name reflects a promise to be your guide. But it starts with you. We're just here to help make it happen.

In the end, I've realized that healthcare has simply been colorblind when it comes to pain. When viewed from a different lens, not only do we see its different shades, but we can also focus on the message it brings. Until healthcare as a whole shifts from a colorblind tunnel vision in which there is a one-size-fits-all solution to pain, pain will continue to dominate lives and opioids will sap spirits. By opening our spectrum to the different shades of pain, we start to see a new language by which we can interpret our bodies and begin to heal beyond medicine.

For more information about pain and how you can optimize your health, please visit:

www.wellwardmed.com

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FIFTY SHADES OF PAIN

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