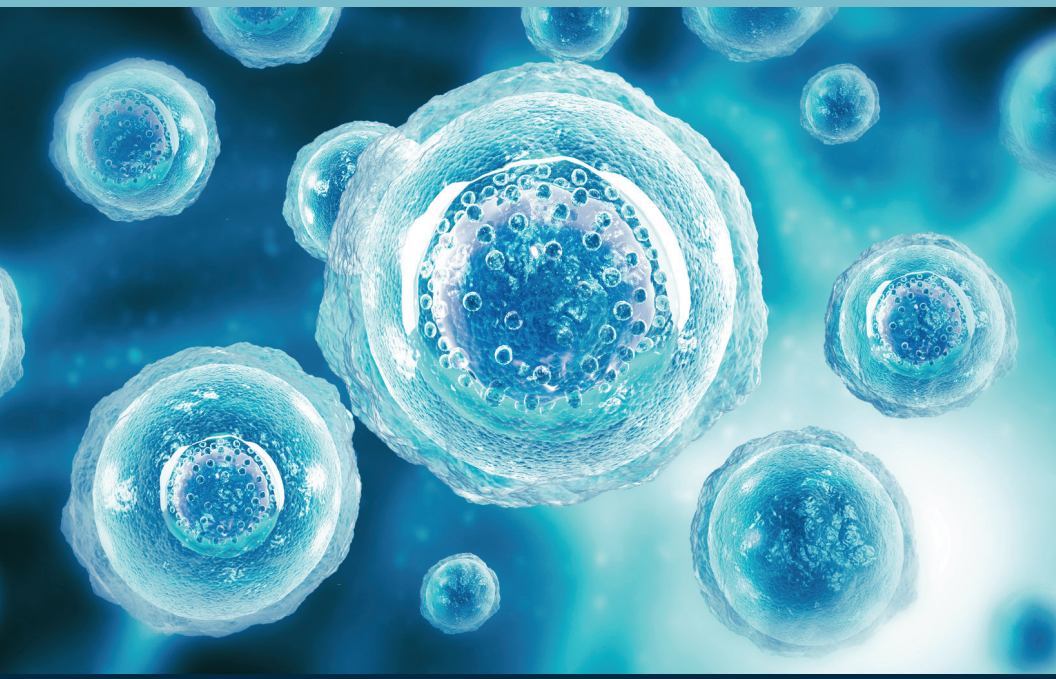
REGENERATE YOUR BODY *& HEAL!*

A DOCTOR'S GUIDE TO AVOID INVASIVE SURGERIES



OLIVER GHALAMBOR
MD, DABA, FIPP, DABIPP

Regenerate Your Body and Heal!

A Doctor's Guide to Avoid Invasive Surgeries

Oliver Ghalambor,
MD, DABA, FIPP, DABIPP

Regenerate Your Body and Heal!

Independently Published

Published in the United States of America

250111-02618.3

To my mother, Pari, for always expecting perfection while believing in me. To my son and future colleague, Ryan, to whom I hope to pass on the torch in the field of regenerative medicine. And to Kadee, my future wife, whose unconditional love and support motivates me to push harder in life.

Here's What's Inside…

Introduction

For patients dealing with persistent pain, the journey to healing is often fraught with confusion and fear. I understand well the anxiety that comes when traditional treatments fail, and the prospect of invasive surgery looms. During more than 17 years of practice in my specialty—enhanced by fellowship training and triple board certifications—I have witnessed the transformation that regenerative medicine can offer. My own experience with Platelet Rich Plasma (PRP) therapy, which cured a decades-long knee injury, confirmed that non-invasive, evidence-based regenerative medicine can help restore not only function but quality of life.

This book is not about lofty promises or unattainable miracles. It is about reliable, real-world solutions backed by modern science. Here, you will find a clear explanation of how regenerative therapies work, what to expect from them, and how they differ from conventional surgical and nonsurgical treatments. My aim is to provide you with the information needed to make an informed decision about your treatment options—favoring those that reduce risks and bolster your long-term health.

I share these insights because I have seen firsthand the toll that chronic joint and spine issues can take on every facet of life. Whether you have struggled getting results from traditional therapies like physical therapy, medications, or even surgery, this guide presents new pathways grounded in evidence-based research.

The methods discussed are not experimental. They are proven alternatives designed to empower you on your journey toward recovery. Even if you have been struggling with a bad knee with arthritis for years, have had a bad back for more than a decade, or tore your rotator cuff playing football in high school and it has never been the same, I am here to tell you it is actually possible to get back into top physical and mental shape and maintain it for a lifetime.

In these pages, you will learn about the science behind regenerative medicine, including PRP, stem cell treatments, shockwave therapy, and supportive natural approaches. More than just a presentation of options, my hope is that this book offers you a thoughtful explanation of how a doctor's personalized protocols can help restore function and relieve pain without the need for invasive procedures.

Oliver Ghalambor, MD

Preface

My Journey to Healing: A Physician's Personal Account

When I was 22, I was at the peak of my physical performance. I was not very athletic when I was in high school, but as soon as I started medical school, I found a passion for fitness. I was doing a rather old-fashioned version of Karate—Kyokushin Kai—three days a week. I also did weight resistance training twice a week. On the weekends, I hiked, biked, and swam a lot with my friends and like-minded medical school colleagues.

All that came to an abrupt end after a ski injury. It was a typical ski day in the mountains north of Tehran. Everything was going fine until I suddenly found myself on the ground, sitting on my left knee and, with the ski still attached to the boot, rotated 180 degrees inwards. Being a Martial Arts athlete, I tried to ignore the pain and truck through, to no avail. I could not put any pressure on it, and by the next day, it had ballooned to a worrisome size. I went to an orthopedic specialist who, after examining the knee, stated, "You tore your meniscus and some ligaments, but you are

lucky no surgery is needed." Back then and in my country, getting an MRI was not an option. The doctor put my knee in a long cast from hip to toe for 40 days. After the cast was removed, the size of the left leg was half that of the right. I was advised to do some physical therapy, and voilà! That was all. Unfortunately, my left knee was never the same. Anything other than walking would cause extreme pain. Being a medical student, I asked for second and third opinions, and the answer was always the same: Do more physical therapy, avoid "extreme" exercises, and no surgery needed. I could no longer hike, do martial arts, do much leg resistance training, or even run without later paying for it. I gave up sports except for some light upper-body weight training.

I went through medical school, residency training in Internal Medicine, and then Anesthesiology without any change in my condition. Ironically, I went through my Fellowship in Interventional Pain Management at the prestigious Massachusetts General Hospital, Harvard Medical School, in 2008. I often took care of patients with similar problems without knowing that a non-surgical solution might exist at some point. As I was not interested in any surgery on my knee, I had accepted my fate and was at peace with it. I thought my fate was that I would never be able to run, swim,

play tennis, hike, or pretty much do any exercise except elliptical and upper body exercises.

Fast forward a decade to 2018. Unfortunately, I had recently gone through a divorce and was single again. I needed to get back in shape, and I was ready to get there at all costs. I hired a Personal Trainer who would not take “my knee hurts” as an excuse. I started doing lunges, weighted squats, burpees, and going through ibuprofen like crazy. After three weeks of doing this, I realized it was time to do something different. At this point in my professional career, I had already begun offering PRP to my patients. Most of the cases I had done were tennis elbow cases, with a few knee PRP injections. I finally talked myself into doing the PRP injection on myself.

After the procedure, I gave the knee about two weeks of rest (walking only). Gradually, I started leg exercises. We started with limited range-of-motion squats. Then, over a couple of weeks, I transitioned to a full range of motion and back to my least favorite exercises of all time: Lunges and Burpees. This time, though, it was without ANY pain! I was convinced that this was too good to be true. Surely, the problem would come back at some point. It has been almost seven years, and every Monday, I have a leg day doing full range-of-motion squats and lunges without any problems (knock on wood).

Now, by no means do I want anyone here to think this is the "typical" result of any regenerative medicine treatment on any pathology. That would be false advertising. However, in this study N of 1, I have been 100% pain-free after one treatment for a problem I had for more than two decades.

To show how complex and, at times, frustrating treating musculoskeletal conditions can be, I am going to share my struggles with the right shoulder and right elbow as well.

My right shoulder pain did not start suddenly because of an injury. I really have to think hard to remember when it started. When I was about 30 years old, I was waking up with a sore shoulder. By about the age of 35, it had begun to wake me up at night, forcing me to change position. Then, when I was about 40 years old, I could no longer sleep on it. Again, being in the medical field, I asked for more than ten opinions from my orthopedic surgeon colleagues, pain management colleagues, physical medicine doctors, and chiropractors.

By this time, I had done three MRIs of my right shoulder, and they all came back "normal." There was no rotator cuff tear, no labral tear, no arthritis, nothing! Needless to say, this was very frustrating. I had tenderness over the front of the shoulder, the proximal

biceps tendon, so the clinical diagnosis was biceps tendinitis. Stretching and PT were not helpful. Massages helped, but the relief was only temporary. My personal trainer was focusing more on my "posterior chain," thinking the front muscles of my shoulder were more developed than the back. A steroid injection helped for a week or two, but the two subsequent PRP injections failed to provide long-term relief. The problem went on until our practice acquired a Shockwave Machine. After doing five sessions of that, voilà! It went away and never came back.

How?

It turns out I never had a real "structural" problem with the shoulder joint. As a side sleeper, I always slept on my right side with my arm above my head (which is a no-no!), resulting in ongoing irritation and inflammation of the shoulder structures.

After two or three decades of ongoing inflammation, what do you think will happen to any tissue? Yes, the development of scar tissue! The problem with scar tissue is that it is not easy to get rid of. You can stretch or do a deep tissue massage for some relief. Steroid injections would only help temporarily. No regenerative medicine therapy will help the scar tissue because there is no need for the structure to be "repaired." The last thing you want to do for any scar

tissue is surgery. You can go in and surgically "clean" the scar tissue, but the moment you are done with the surgery and have closed the site, the body will start making even more scar tissue. Shockwave therapy is an excellent tool to break down scar tissue in the musculoskeletal system. In my case, it resulted in 100% lasting relief.

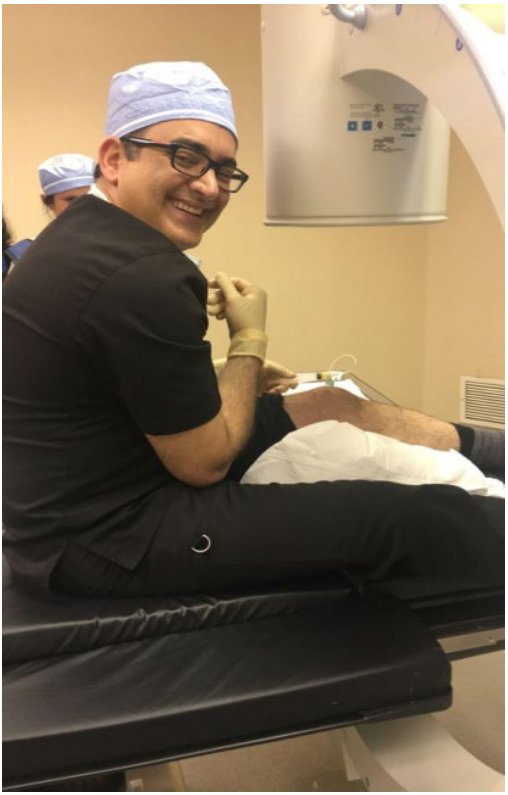
The challenging part in this case was that, first, it took me a while to figure out the correct diagnosis. In the first 10–15 years, I had this problem, and effective shockwave therapy was not available yet. For me, it has been delightful to witness the growth of our knowledge base as well as the rapid evolution and improvement of our treatment options during my career. I feel truly blessed to be involved in the exciting and evolving field of regenerative medicine. That is why I felt obligated to write this book to share my excitement and knowledge.

I also want to share my rather frustrating experience with my right elbow pain. I promise this will be the last personal problem I will be sharing with the entire world here. Lately, I have been trying to practice what I preach and stay healthy and active as much as I can. About a year ago, I was pushing myself to get better at what I have always been struggling with: pull-ups. After an intense day of training involving some pull-ups, I started having pain in my right elbow. It felt

different than the regular muscle soreness, so I tried to use a massage gun and took an anti-inflammatory, but it did not seem like it wanted to go away. After dealing with it for two weeks, I had to stop doing pull-ups, but now, any exercise involving the biceps would create intense sharp pain in the elbow at the end of the biceps tendon.

Being a physician in this field, I knew what was at risk. If I had a partial tear of the distal biceps tendon and pushed myself too hard, I could rupture it and then need open surgery to reattach the biceps tendon to the radius. I did an MRI, but until the results were in my face, I was still in denial. There it was: Moderate distal biceps tendinosis and a partial tear. As a bonus, we found moderate medial epicondylitis (Golfer Elbow), even though I have never played golf in my life. It has now been eight months since that MRI, and I have undergone three ultrasound-guided PRP injections by my colleagues, have done weekly shockwave therapy, and recently, EMTT therapy. I probably sit at about 95% symptomatic relief. I am back doing upper body and biceps exercises at 90% intensity compared to before my injury. I have also kept away from pull-ups. I needed to share this last experience with you, so you do not think all is perfect and rosy in our field.

Not everyone and every condition respond perfectly to these treatments. The goal is to get better by combining every effective non-surgical intervention there is to expedite and accelerate recovery. That way, you can get back to doing exercises while trying to avoid invasive surgeries. While these treatments are not perfect, every year, we keep getting better and better at them.



Giving myself an X-ray guided knee PRP injection in 2018 was a game changer.

Chapter One

Understanding Regenerative Medicine: Facts and Misconceptions

Why don't all tissues just heal on their own after an injury? A lot of soft tissues in our bodies, such as tendons, ligaments, and cartilage tissue, lack blood flow (vascular supply). Many of our bodies' "cushions," such as discs in the spine, meniscus in the knees, and labrum in the hip and shoulder joints, also lack blood supply.

When tissue with a good vascular supply, such as skin or muscle, gets injured, the body's healing power in the blood, particularly platelets, white blood cells such as macrophages, as well as many enzymes, readily reach the injured area and start the healing process. The healing process has three phases: blood clotting (homeostasis), inflammation and proliferation, and then remodeling. Let's say you cut your skin. First, the platelets get there to form a clot. They release growth factors to signal dormant stem cells that reside in the blood vessels (called pericytes) to wake up and migrate to the wound. Then, we have the proliferation phase, during which the stem cells differentiate into

the cell types needed to create wound healing by laying down more collagen to regenerate the damaged tissue. Finally, there is the remodeling phase, where the collagen matures back to normal status.

If the tissue lacks or has insufficient blood supply, the body's healing power is unable to reach there. No circulation means no access to platelets, growth factors, and enzymes. That means no three phases of the healing process. That is how our body is designed. It is our natural biology. Everyone wants to bounce back from any injury as soon as possible. However, when you get a meniscus injury like I did, the healing is painfully slow and, at times, never happens. Until about a decade ago, we had accepted this as the fate of our species. We would recommend "other" stuff, such as massages, stretching, physical therapy, etc., to remedy the symptoms. What if I told you we are now able to "cheat" biology, get the body's healing power from where there is plenty of it (blood or bone marrow), and place it where there is not enough of it? Today, we are absolutely able to do this. It is called Regenerative Medicine.

It sounds too good to be true, yes? I have many patients who look at me sideways when I tell them we are now able to alter the natural biological course of healing. Once I am able to give them pain relief and restore function to a joint they have struggled with for

years, they think I walk on water. They are extremely relieved they do not have to come back every six months for the rest of their lives.

Case Study: Jason's Knee Treatment Journey

Jason is a 47-year-old male who has been managing knee pain for over 20 years. He had previously received cortisone injections every six months and consulted orthopedic specialists. Despite being told he had "bone-on-bone" degeneration and needed a knee replacement; he was considered too young for surgery. His initial options were limited to cortisone injections, physical therapy, and anti-inflammatories.

Our Treatment Protocol

After a thorough examination and review of his MRI, we implemented our comprehensive knee protocol. The steps included:

- Initial Inflammation Reduction:
    - Administered a low-dose steroid injection to decrease joint inflammation.
- Regenerative therapy:
    - Performed a PRP (Platelet-Rich Plasma) injection under X-ray guidance to

leverage his body's natural healing properties.

- Synergistic Support:
    - Injected gel formulations of hyaluronic acid to enhance the regenerative effects of PRP.
- Adjunctive Therapies:
    - Conducted six sessions of shockwave therapy and Class IV laser therapy on a weekly basis.

Outcomes and Follow-Up

Short-Term Results:
Jason experienced significant pain reduction by the end of the protocol, though not complete relief.

Three-Month Follow-Up:
A follow-up phone call revealed that Jason reported complete (100%) relief of his knee pain.

Long-Term Success:
Four years later, while treating him for an unrelated issue, Jason remained symptom-free in his knee. He was relieved to learn that, based on our updated data, regenerative medicine is proving superior to knee replacement, even in advanced cases. This new

approach suggests that when symptoms return, a knee replacement may not even be necessary.

Jason's experience fundamentally shifted his mindset from believing he was "doomed" to require frequent injections or an eventual knee replacement. Instead, he now embraces a future with improved knee health and fewer interventions. I highly recommend you ask your doctor to review your current treatment protocols in light of recent regenerative medicine data.

Developments in Regenerative Medicine

The main difference between traditional medicine and regenerative medicine for musculoskeletal pathologies is that traditional medicine tries to treat the symptoms. We prescribe anti-inflammatory medication to reduce inflammation and pain in a part of the body that is not recovering. We try muscle relaxants to try and ease the muscle spasms, which are the body's natural reaction to pain. We try low-dose opioids to decrease human suffering from a structure struggling to heal. Even advanced image-guided injections such as knee intra-articular steroid injections or epidural steroid injections are only able to decrease the inflammation temporarily. However, if the target tissue is unable to heal, the symptoms will come back.

With regenerative medicine, our aim is to treat the cause and not the symptoms. For example, once someone's rotator cuff tear is healed using regenerative medicine, we no longer need to constantly use anti-inflammatory medicine to decrease the inflammation, use muscle relaxants, massages, or trigger point injections to combat muscle spasms. Muscle spasms are a natural reaction of the surrounding muscles to the ongoing pain from the non-healing shoulder structures.

I recently saw a patient with knee arthritis at my clinic. A colleague surgeon had told him, "Injections wouldn't fix arthritis," and that his only option for long-term relief was surgery. My problem with those kinds of statements mostly coming from my colleague surgeons is:

What is the "fix" to arthritis?

Suppose you were able to recreate exactly what the Lord had initially designed, a perfect natural knee joint, then yes. By all means, we, the regenerative medicine doctors, will gracefully bow out and let you replace the old arthritic knee with an identical young knee. The problem is you do not have this perfect natural knee joint! What the knee is being replaced with is a very unnatural, metal, artificial joint. By no means do I want to take away from the amazing

advances both in the technological as well as surgical side of modern knee replacements.

With all the advancements, the success rates for knee replacements have been higher every year, and they have become less invasive. However, they are still very invasive, and the new "joint" is unnatural. Making matters worse, the new artificial knee will only last 10–15 years. Then, you will have to surgically remove the artificial knee and put in another one. In my past life as an anesthesiologist, I have witnessed how brutal the removal of an artificial knee can be. It is bloody. It is messy and rather barbaric. It is no wonder why the success rate of a knee "revision" surgery is significantly less than the first knee replacement surgery. Knowing this, even if you are "doomed" to have a knee replacement, wouldn't you at least want to push the timing back as far as you can so you never need to have the brutal second revision surgery?

Shots before Surgery

In the mind of the vast majority of my colleague surgeons, especially the older ones (yes, I just said that), when we talk about "injections," all they think about are steroid injections. I agree that too many steroid injections are not good and can deteriorate any given joint. However, even steroid injections, if done

in the proper setting and under image guidance, are much more reasonable to be tried before considering any surgical interventions. When a patient says, “I had an injection at the ortho office by the physician assistant that did not work,” it does not mean these injections do not work.

The sad reality is the goal of that injection was to “check the box” for the insurance companies that you failed the injection therapy, so they can get the surgery approved. My injections and my colleague’s regenerative medicine injections’ goal is not to get the surgery approved but rather to prevent surgery altogether. We are trained to do it and only do it under image guidance to ensure proper placement of the medication at the target.

To no surprise, I have seen much better results from these types of injections compared to the ones done without image guidance at an ortho office. And that was only regarding the cortisone anti-inflammatory injection. As you can see in this book, we now have access to many more advanced regenerative interventions, which have been highly successful in many studies to improve pain and function via non-surgical means.

My suggestion to patients and doctors alike, who think the only “fix” to any musculoskeletal problem is

surgery, is to open your mind. Welcome to the new age, and read this book!

I am exaggerating, of course. There are many well-written medical books on the topic of regenerative medicine for physicians, some of which are written by orthopedic surgeons. Even if surgery is indicated, regenerative medicine can still be used as an adjunct to increase the speed of recovery postoperatively. For example, multiple studies on the use of PRP after rotator cuff surgery have shown improved functional outcomes, reduction in post-operation pain, and decreased chance of "re-tear" of the rotator cuff.

Relieving Knee Pain

Three weeks ago, I was honored to attend the lecture of and meet one of the pioneers of regenerative medicine, Dr. Hernigou. We met during the International Orthobiologics Foundation (IOF) seminar in Scottsdale, Arizona. Dr. Hernigou, an orthopedic surgeon in France, and his team have been offering autologous Bone Marrow Aspirate Concentrate (BMAC) stem cell therapy for the last 40 years to over 10,000 patients, showing the safety and effectiveness of these treatments. One of their studies was conducted over the course of ten years. This study consisted of comparing pain score, function, and patient satisfaction between knee replacement and BMAC

stem cell injections. This was done on patients with bilateral knee osteoarthritis in need of knee replacements. What made this study unique is that the patients themselves were the control group, further reducing the bias in the study. The results of this study were quite encouraging. The joint treated with BMAC stem cells had a lower complication rate, quicker recovery, lower pain scores, and higher satisfaction than the joint that was surgically replaced.

Although more studies need to be done, at this point in time, we have started pushing the boundaries for regenerative medicine to the advanced stages of the disease, such as bone-on-bone knee or hip arthritis. We have shown that, with appropriate patient selection and treatment techniques, these therapies could be superior to the time-tested old-fashioned hip and knee replacements. They also offer a quicker, less painful recovery, getting you on your feet faster and out enjoying your life.

Chapter Two

Regenerative Medicine vs. Longevity Medicine: Differences and Similarities

We all want to live longer and better. While that goal is something almost everyone wants, the knowledge about how to get there has been elusive so far. With advances in medicine, we are finally starting to have a better understanding of the aging process. As we learn more about how and why we age, we will have better ideas of what we need to do to live longer.

The medical field dedicated to finding out how to live longer is referred to as "Longevity Medicine." Not long ago, anyone speaking of trying to live longer would be laughed at. While everyone has been fascinated by Centenarians (people who live longer than 100 years), no one knew for sure how these people could live so long. Genetic background, lifestyle with low stress, faith, wine, etc. had been suggested to be the likely factors without concrete evidence. Aging was supposed to be a normal phenomenon with no way to alter, reduce its speed, or stop it. Until now…

In the field of Longevity Medicine, aging is not considered inevitable but pathological, and the goal is to try and "treat" this pathology. We are still in the infancy of Longevity Medicine. There are many skeptics, and rightfully so. There are many diets, supplements, medications, etc., often advertised without any clear science or effectiveness. However, one thing is for sure. We have started to be able to at least measure the speed of aging. Not only can we measure the speed of aging of any given individual, but more precisely, we can measure the speed of aging of every single organ in our bodies. We have learned that our chronological age (how old we are) is not necessarily our biological age. One could be 40 years old but have a biological age of 50 years. Even more interesting is that the same person's liver could be 35 years old, lungs 40 years old, heart 60 years old, etc. Once we can "measure" aging more precisely, we will then be able to measure the effectiveness of the "anti-aging" treatments.

What about Regenerative Medicine?

How is Regenerative Medicine different from Longevity Medicine? While the emphasis of Longevity Medicine is to "live longer," most people agree that they want to live longer while being "healthy." The concept of "Health Span" (as opposed

to “Life Span”) is about how long you can live healthy and free of disability or disease. What is the point of living to the age of 120 if, during the last 20 years of it, you can no longer walk, cannot remember, and need assistance for activities of daily living? Or even worse, what if you are constantly in pain? I would personally prefer to live to the age of 70 or 80 and be healthy, able to exercise, continue to work at least part-time, be able to make love to my significant other, etc., than a day longer without being able to do so. To me, like many others, my Health Span is far more important than my Life Span.

How can one stay free of disability and disease?

Case Study: Mark’s Journey to Wellness

Mark is a successful 70-year-old businessman who is still actively managing his company. Recently, he decided to prioritize his health and well-being.

Initial Meeting:

I encountered Mark while waiting for the red-light therapy room, where we were both going for treatment. Mark shared with me that he has been getting Cryotherapy, Red Light Therapy, NAD and Vitamin infusions.

Wellness Goals:

Mark, a self-confessed wellness fanatic, is determined to live a longer, healthier life. Despite staying active, he has been limited by a shoulder injury that hinders his physical activity.

Clinical Recommendations and Approach

- Exercise as a Longevity Pill:
  I emphasized that exercise is the most potent 'drug' for longevity. Anything impairing his ability to exercise, such as his shoulder injury, must be addressed.

- Work Up: MRI study of Mark's left shoulder was positive for combination of arthritis and rotator cuff pathologies.

- Treatment Strategy:
  Instead of surgical interventions—which Mark preferred to avoid—we discussed a regenerative medicine approach. The treatment protocol targeted his shoulder, which included:

  - PRP Therapy: Aimed at repairing a partial rotator cuff tear and regenerating tissue.

- Hyaluranic Acid Therapy: Synergistic treatment with PRP which acts as lubricant and shock absorber in the joint

- Shockwave Therapy: Focused on breaking down scar tissue from chronic inflammation and overuse.

Outcomes

Post-Treatment Results:
At the end of his regenerative medicine protocol, Mark reported over 80% relief from his shoulder pain. This significant improvement allowed him to increase his activity levels, enabling him to take full advantage of the benefits of exercise for longevity.

Mark's case illustrates that, even with advanced age and a demanding lifestyle, focusing on regenerative treatments can lead to meaningful improvements in health. Although we cannot precisely measure added longevity in years, enhancing his ability to exercise—nature's strongest medicine—represents a significant win.

Exercise as a Longevity Drug

Everyone in the medical community is aware of the two top diseases responsible for mortality and

morbidity in older age: cardiovascular diseases and cancer. We have made significant strides in the prevention (especially cardiovascular diseases) and treatment of these two pathologies. What is often missed, however, is that none of these is the leading cause of "disability" in the elderly population. Musculoskeletal pathologies, which consist of problems of the spine and joints, are, in fact, the most common reason for disability as we age. Therefore, "Physical Wellness" now becomes the single important factor in determining our "Health Span."

In Mark's case, as well as many others, most longevity medicine experts agree that "exercise" is, by far, the most potent longevity "drug."

The problem is that as soon as just one out of thousands of structures of our complex musculoskeletal system malfunctions, we lose access to this marvelous drug. In my case, a small tear in my left knee meniscus denied me full access to exercise for two decades. What makes the importance of a healthy musculoskeletal system even more crucial to our Health Span is that our Physical Wellness directly impacts our Mental Wellness. Mental health specialists also agree that exercise is the single most important non-pharmacological treatment for Major Depressive Disorder.

Do You See What Is Happening Here?

We have many discs and joints in the spine and many cushions in our joints, such as the labrum and menisci. We also have many tendons and ligaments attaching these structures, all with limited ability to recover from any serious injury because of their limited vascular supply. Any long-term malfunction of one of these structures can have a significant negative impact on our Physical and Mental health. That, ladies and gentlemen, is what the field of "Regenerative Medicine" is all about.

The goal is to help regenerate and repair damaged tissues and structures that are unable to heal on their own so we can live the life we have to the fullest.

Why did I write this book? Yes, there are many well-written, more scientific, more detailed books on Longevity Medicine written by colleagues smarter and more knowledgeable than I am. There are many good books regarding specific diets, medications, supplements, and interventions with a focus on how to slow down or supposedly reverse the aging process.

The main goal of this book is not how to live "longer" but how to live "better." The focus is to help our bodies rehabilitate quicker from any spine or joint injuries or ongoing pathologies. That way, you can enjoy your life free of disability and continue to have

access to the most important longevity drug called "exercise". This, in turn, will also significantly help with your Mental and Emotional Wellness.

How Does Regenerative Medicine Work?

Regenerative medicine works by giving the body a "Biological Boost." This means it gives a boost to any tissue struggling to heal itself, using what are called Orthobiologic treatments.

What is an "Orthobiologic" treatment? The term "Orthobiologics" or simply "Biologics" is a new, fancy, trendy name for any type of injection in the field of regenerative medicine. Injections of PRP, stem cells, and anything similar driven from our body or from an external source that triggers the healing cascade are currently being categorized as Orthobiologics.

Chapter Three

PRP Uncovered: The Holy Grail of Regenerative Medicine

PRP stands for Platelet Rich Plasma. This is the part of our blood, plasma, which is full of platelets. In my opinion, this is a "misnomer". At first, we thought the only regenerative effect came from the platelets. Hence, the idea was to take the platelets out of the blood, discard the rest, and inject them.

Do not take me wrong. Platelets are full of growth factors, but we now know they are only part of the reason PRP works. There are cells such as Macrophages. There are enzymes that also assist with tissue healing. In my opinion, a better name for PRP would have been "Plasma Concentrate," as what we are truly doing during the process is first removing the red blood cells from the blood, leaving us with the plasma. Then we spin the water out and what we have left is a concentrated plasma, which so happens to be full of platelets as well.

The Mechanism of Action of PRP Involves:

- Release of growth factors such as platelet-derived growth factor (PDGF)
- Vascular endothelial growth factor (VEGF)
- Transforming growth factor (TGF)

This decreases inflammation, enhances tissue repair, and activates stem cells. PRP also provides a "scaffolding matrix" for new tissue formation and helps modulate the immune system, thus reducing the risk of infection and scar tissue formation. PRP also can enhance angiogenic response which is essential for restoring vascularity in degenerative cartilage and tendon disorders, and promotes nutrient delivery, waste removal, and cellular regeneration.

What Conditions Benefit the Most From PRP Treatments?

PRP really caught the attention of the medical community in 2014 after the publication of a randomized, double-blind study of 230 patients at 12 centers over five years. This study, published by Mishra *et al.*, showed an 83.9% success rate for patients suffering from tennis elbow who were treated by PRP. Once PRP started to become an accepted, safe treatment modality, we started to use it first for other "tendinopathy" or tendon disease conditions similar to

tennis elbow. A few examples include golfer's elbow, biceps tendinitis, Achilles tendinopathy as well as rotator cuff tendons. Then we started to inject them into the joints for indications of labrum and meniscus tear as well as arthritis. As more research and studies have been done, our understanding has improved and resulted in the optimization of the preparation and use of PRP. At this point in time, I would say ANY musculoskeletal disease unresponsive to less invasive therapies is a candidate for PRP therapy.

Angela's Elbow Story

Angela, an acquaintance, began experiencing pain in her right elbow. On physical examination, she showed tenderness along the lateral epicondyle, consistent with tennis elbow (lateral epicondylitis). As a close friend, I initially referred her to an orthopedic surgeon for further evaluation.

Initial Evaluation and Treatments

Diagnosis:

- An MRI confirmed tennis elbow.
- Physical therapy was recommended for six weeks, but Angela did not notice any improvement.

Cortisone Injections:

- After unsuccessful physical therapy, Angela requested a cortisone injection.
- At that time, I performed a "blind" injection (without ultrasound-guided intervention) at the lateral epicondyle.

Outcomes:

- The first cortisone injection provided nearly 100% relief for about eight months.
- Subsequent injections gave approximately 90% relief but lasted only five to six months.
- Over time, repeated cortisone injections became less effective and raised concerns about potential damage to tendons, ligaments, muscles, and even bone.

Transition to Regenerative Medicine

Clinical Concerns:

With repeated cortisone injections, I observed muscle atrophy and skin discoloration around the elbow. Angela's symptoms were severe during flare-ups, significantly impacting her daily activities, such as cooking, driving, and handling groceries.

PRP Treatment:

In 2016, when I started my own practice in Texas, I began offering PRP injections with ultrasound guidance. Angela flew to Texas for her first PRP injection. Four months later, she reported about a 90% improvement in her symptoms.

Before her second PRP treatment in 2017, I noted the disappearance of skin discoloration and some recovery of muscle tone around the elbow. Since then—now in 2025—Angela has regained full function, and her elbow symptoms have not returned.

Angela's case clearly demonstrates that regenerative treatments like PRP can provide long-term relief where cortisone injections eventually lose effectiveness and cause adverse side effects. Her journey highlights the importance of transitioning to regenerative medicine for sustainable recovery, particularly when traditional approaches fail.

How Safe and Effective Is PRP Compared to Invasive Surgeries?

The PRP safety profile is exceptional. Compared to any surgical intervention, the risks of PRP injections are extremely low. The risk of infection is even lower in the case of PRP versus corticosteroid injections, as

the PRP contains disease-fighting cells that circulate in our blood. As far as effectiveness, it greatly depends on the pathological structure and its severity. A small tear of the meniscus in the knee (such as mine) responds much better to PRP than bone-on-bone knee arthritis. Part of PRP effectiveness depends on how the PRP was prepared.

When drawing blood for PRP preparation, it is imperative not to hemolyze the Red Blood Cells. Appropriate centrifuge time and settings are needed to obtain a sufficient number of platelets. There are some suggested guidelines for the recommended dosage of platelets. For example, at least ten billion platelets in 7 ml are recommended for knee injections and 3 billion platelets in 2 ml for tennis elbow injections. Equally important to the quality and number of platelets in the PRP is the administration and injection technique. Proper training and image guidance with X-ray or ultrasound are key for having good outcomes from any regenerative medicine therapy.

Leukocyte Poor vs. Leukocyte Rich PRP

Leukocyte Poor (LP) and Leukocyte Rich (LR) types of PRP are determined by the way the PRP is being prepared. LR has more White Blood Cells and is often mixed with some Red Blood Cells. It has a pink or dark pink color. Both White and Red Blood Cells will

trigger more inflammation. This is beneficial if you have ligament instability or muscle tear.

LP is often preferred for injection in the joint or in the epidural space as the biochemistry of these milieus is already inflammatory, so the addition of inflammation, even a "healing" inflammation, could result in significant post-op pain and reduction of effectiveness of these treatments.

Another variation of PRP is called Platelet Lysate (PL).

It consists of first obtaining the PRP from the patient, but then the platelets and any remaining cells in the PRP are lysed (broken down). The most common way of making PL is to first obtain a leukocyte-poor PRP and then place it in the freezer overnight. During the process of thawing the frozen PRP, the ice crystals will break up the platelets. This will result in the release of growth factors from the platelets into the serum.

Advocates of PL argue it is more anti-inflammatory than PRP and is fast-acting. The downside of PL is that it will dissipate quickly from the area of injection, and it will create less "healing" inflammation. Platelet lysate is not frequently used currently, and when it is used, it is mainly for use in the epidural space.

Personally, I am not a big fan of PL as it does not "stick around" after injection at the target area and quickly dissipates.

Chapter Four

Stem Cell Therapy: The Hype and The Truth!

There are two types of Stem Cell Therapy: Autologous and Allogeneic

Autologous stem cells are taken from our own body, and it is mainly from either our Bone Marrow or Adipose Tissue (Fat).

Bone marrow stem cells—otherwise referred to as BMAC (Bone Marrow Aspirate Concentrate)—are taken from the patient using a bone marrow aspiration technique. Most of the time, we use the back of the hip bone (Posterior Superior Iliac Spine) to harvest the bone marrow as it contains the highest concentration of mesenchymal stem cells (MSCs). The bone marrow aspirate is then processed in a centrifuge to separate and concentrate the desired stem cells and growth factors, creating the BMAC. MSCs are multipotent, meaning they are capable of differentiating into more than one cell type.

Fat stem cells—often referred to as autologous Micro-Fragmented Fat or MFAT—are harvested during liposuction, where fat is collected through a cannula. Adipose-tissue-derived stem cells are mesenchymal stem cells, which have the capacity for self-renewal and can also differentiate into adipocytes, chondrocytes, myocytes, osteoblasts, neurocytes, etc. MFAT could be used alone, or it could be used along with PRP for its scaffolding properties.

Which autologous stem cell injection is better? The jury is still out on that. We definitely have some diehard fans of MFAT. We also have physicians who claim the effectiveness of stem cells in fat tissue is not the same as that in bone marrow. Most of my colleagues and I use PRP as the first line of regenerative medicine therapy—except in a handful of conditions—and only resort to MFAT or BMAC if the pathology is not well responsive to PRP. I make sure that I have "stacked" my PRP with other synergistic therapies I will discuss in the next chapters.

Allogeneic stem cells are tissues harvested from someone else. Allogeneic stem cells typically include embryonic tissue OR amniotic membrane fluid/umbilical cord blood or the actual umbilical cord tissue (Wharton's Jelly), which are often referred to as "birth tissues".

Needless to say, obtaining live cells from a live embryo raises significant ethical concerns. Therefore, it is more common to use birth tissues. The theoretical benefits of allogeneic stem cells versus autologous—depending on their source—are that they are readily available, and we do not need to harvest them from fat or bone marrow.

Compared to autologous stem cells, which are typically older cells, allogeneic stem cells are much younger and theoretically more effective, but the jury is still out on this. Another theoretical argument for using allogeneic cells is the fact that the number of stem cells in our body dramatically decreases as we age. We know that the number of stem cells is directly related to effectiveness. Having said that, we are at a point where we can get the few stem cells of our bone marrow and then "culture and expand" them to increase the number. Thus, this argument in favor of allogeneic stem cells will be moot in the near future.

The Downside of Allogeneic Stem Cells

The downside of allogeneic stem cells is that they are "foreign" to our body. Therefore, they will be cleared by our immune system. To think that these young stem cells will enter our body and start regrowing tissue, such as cartilage in our knee, is completely false. No outsider cell will survive in our body, and it has a

limited lifespan. If we inject enough of them, they can potentially gang up against our immune system, which is referred to as "Graft vs. Host Disease." In this scenario, the transplanted stem cells attack the recipient's tissue.

The results of allogeneic stem cell therapy have been mixed. Currently, there are no robust studies showing their effectiveness in musculoskeletal problems.

How do allogeneic stem cell therapies help even though the cells die within days in our body? One theory is that they secrete exosomes (which will be explained later) before the immune system clears them. This then raises the question: Why wouldn't we simply use exosomes instead of someone else's cells?

The Exciting Science of Cell Expansion

Regardless of whether we are using autologous or allogeneic stem cell therapy, we could choose to "*expand"* these cells. Stem cell expansion is a process during which the stem cells are cultured and grown *in vitro* (outside the body) to increase their numbers.

This is an extremely useful and exciting way to increase the effectiveness of any stem cell therapy. We know that with an increased number of stem cells, the chances of a successful stem cell injection would

increase. Unfortunately, current regulations in the United States do not allow the commercial availability of stem cell expansion to patients. I was recently at an Orthobiologics conference where I met a colleague from New Zealand. He shared with me that, for many of his patients, he harvests fat tissue stem cells (MFAT) once, and then cultures and expands the sample and can use it as many times as needed.

Oftentimes, he even stores some of it in "frozen" form for future expansion and use. The conference was held in Scottsdale, AZ, so there was no mention of stem cell expansion in the curriculum because of the FDA's strict guidelines in the United States. However, after a discussion with a couple of faculty members, they did share with me that some of their stem cells are currently stored in an undisclosed location outside the United States. This is for a good reason. We know that, as we age, the number and quality of our stem cells decrease. If someone has the financial means, the sooner we harvest, expand, and store the stem cells, the better.

One of my hesitations about using BMAC on my patients is the fact that it is rather invasive. While harvesting their bone marrow stem cells, I am, in fact, "depleting" the harvest site from the mesenchymal stem cells for a period of time. For patients with multiple musculoskeletal pathologies, we simply

cannot obtain enough stem cells from one bone marrow aspiration session. BMAC expansion and culture will hopefully become a widely available option for patients in the United States. I believe that once a certain number of patients start using this option, the price will become more reasonable.

Hold Off on the Exosomes Treatments

Exosomes are small vesicles with membranes that are produced by cells to communicate with other cells. They are found to be beneficial in accelerating the body's healing processes. Exosomes could be harvested by culturing and expanding stem cells, which would release them. Potentially, they can have more than ten times the cytokine profile than PRP. This means they could have ten times more healing power. They could be a great alternative for a "standardized type" of regenerative medicine without exposing our body to "foreign" stem cells. This is because exosomes are "acellular". They contain no cells, so they have a higher safety profile. Despite the excitement and hopefully future scientific breakthroughs, there are currently no FDA-approved exosome therapies in the United States, and there is not much valid research showing their effectiveness.

At the time of publication of this book, I would recommend against solo exosome therapy in lieu of more traditional regenerative medicine therapies.

Word of Caution about Offshore Stem Cell Clinics

As mentioned, the FDA currently bans the use of live allogeneic stem cells in the United States, so patients need to travel to another country to obtain this type of therapy. Some of these clinics are currently being heavily advertised. My worry about these types of clinics and treatments is the lack of oversight over the preparation of stem cells and the credentials of the physicians offering those services. There are many diseases that can potentially be transferred to the recipient of the stem cells from the host, so rigorous testing is needed.

Even if their stem cells are disease-free and there are enough live, quality stem cells; the most important predictor of outcome is the physician's training and skill set in image-guided interventions. I would be very picky about how an offshore clinic prepares the stem cells, but equally as important is how well-trained their physicians are in the field of musculoskeletal medicine.

How to Tell If a "Stem Cell" Clinic Is "Shady"

Here is what I have heard from some of my unfortunate patients over and over again:

> *Hey Doc, I went to a "Stem Cell Therapy" seminar put on by a local chiropractic office, and they claimed they could regrow new cartilage in my bone-on-bone knees. They even showed me before and after X-rays of some patients. Then they told me that my stem cells were too old, so they used stem cells taken from birth tissue.*

First, no stem cell or any other regenerative medicine therapy in existence will regrow large amounts of new cartilage in a bone-on-bone knee. Second, there are currently no living and functional stem cells commercially available birth tissue products in the United States. Hence, the claims of these seminars are a scam.

That is not to say these therapies cannot help. Many of these products do contain growth factors and may provide some relief. However, given a choice, I would rather use something from my own body, such as PRP instead of the birth tissue of someone else. It is safer and likely more effective and cheaper. Also, it gives not only pain relief but peace of mind.

Case Study: Advanced Knee Arthritis and Regenerative Therapy

Background and Injury History

John, a 55-year-old former athlete, lived an active life until an unfortunate injury changed everything. Years ago, he injured his knee during a weekend basketball game. Instead of seeking proper medical attention, John opted to self-treat with over-the-counter painkillers, natural anti-inflammatory remedies, various unproven pills, and home remedies. Over time, his attempts to manage the pain only led to further deterioration, culminating in advanced, bone-on-bone knee arthritis.

The Downward Spiral

- **Self-Treatment Attempts:**
    - John relied on painkillers and a mix of salves he had bought on the internet, hoping they would mask the pain.
    - His self-treatment delayed proper diagnosis, allowing the knee damage to progress.
- **Development of Severe Arthritis:**
    - Without guided intervention, his knee pathology advanced significantly to a bone-on-bone stage.

- Daily activities became a struggle as the pain intensified and his mobility decreased.

Initial Regenerative Interventions

- **PRP Injection Protocol:**
  - We initiated a comprehensive knee protocol using PRP injections.
  - Unfortunately, due to the severity of his arthritis, the response was limited, with only a 20–30% improvement in his condition.

Transition to Bone Marrow Stem Cell Therapy

- **Bone Marrow Stem Cell Injections:**
  - Recognizing the advanced nature of John's knee arthritis, we transitioned to bone marrow stem cell injections.
  - This treatment provided him with a marked improvement, achieving roughly 80% relief that has lasted for more than two years.
- **Patient Outcome:**
  - John experienced significant relief in pain and improved functionality.

- His quality of life increased dramatically, allowing him to resume many daily activities with less discomfort.

John's case underscores the risks of self-treatment in the face of serious joint injuries. Early intervention with regenerative therapies can be crucial. However, the severity of damage may demand more advanced treatments like bone marrow stem cell injections. In his situation, transitioning from PRP to stem cell therapy was key to restoring mobility and reducing pain significantly.

A Word of Caution

I have seen clinics offering IV stem cell therapy. The claim, oftentimes, is that the stem cells are "smart". Even if we put them in your blood, they will figure out what part of your body needs to be repaired, and they will travel there and do the job. The truth is the stem cells injected in your veins will end up in your lungs (pulmonary first pass effect) and not the tissues you want to heal. To date, there are no published studies regarding the effectiveness of IV stem cells on any spine or joint problem. In order for any regenerative medicine therapy to work, the treatment needs to be placed at the location of pathology.

I am going to go one step further and say this: If a provider is offering you any type of regenerative medicine therapy without the use of image guidance, such as an X-ray or ultrasound, you need to run for the door.

The Future of Stem Cell Therapy

Although not widely available yet, I wanted to share my excitement about what is in the pipeline in the field of regenerative medicine: iPSCs.

Induced Pluripotent Stem Cells (iPSCs) are, in my opinion, the future of stem cell therapy and regenerative medicine. I am not sure if this is a treatment that would be readily available for routine medical use in my lifetime, but I would love to briefly talk about it.

The idea is that we harvest adult cells from our body (skin or blood) and then reprogram them in the lab to an embryonic-like state. They would then have the capacity for unlimited expansion and are the only type of stem cells that could regrow new tissue. These are adult cells taken from our own body, reprogrammed to resemble embryonic stem cells (ESCs), offering a pathway to generate any cell type in the body without the ethical issues associated with ESCs.

As you know, we all come from one cell—made after the sperm and egg meet—that carries our DNA. That cell is called "totipotent" or "omnipotent." This means it is capable of multiplying and differentiating into different cell types, such as skin, bone marrow, muscle, etc., until it creates an entire organism on its own. Now, "pluripotent" stem cells can also differentiate into most cell types of the body, but not the "extra-embryonic" tissues such as the placenta and cord. After birth, we really do not need to have cells capable of making the placenta. As such, getting pluripotent stem cells is perfect to repair any part of our body.

Offering Hope

In 2010, Dr. Shinya Yamanaka from Japan discovered a way to reprogram adult mouse cells back into pluripotent cells, winning the Nobel Prize in 2012. In 2014, Japanese scientists made iPSCs from the skin cells of a woman with macular degeneration and then differentiated them into adult retinal cells. Surgeons then transplanted the retinal cells into her eyes, making her the first patient to receive iPSCs.

With iPSCs, we no longer need to get someone else's stem cells. We no longer need to worry about a decrease in the number of our stem cells as we age,

and we now have access to the original building blocks to repair any part of our body that needs to be repaired.

Despite our excitement about iPSCs, significant technological, medical, and ethical challenges exist that need to be overcome before we will be able to safely offer this treatment modality.

Chapter Five

Healing With Sound and Magnet: How Do Shockwave and PEMF/EMTT Therapies Restore Function?

What Is Shockwave Therapy?

Acoustic Pressure Waves (Sound Waves) are referred to as Extracorporeal (from outside the body) Shockwave Therapy (ESWT) or simply Shockwave Therapy (SWT).

Shockwave therapies are advanced, non-invasive, and evidence-based treatments for acute and chronic musculoskeletal conditions. Before we get into the advancements in shockwave therapy and the conditions that can be treated, I want to give you an interesting story of how shockwaves were first discovered and how they were initially intended to be used.

Shockwave Therapy As a Weapon?

A Journey from Battlefield Innovation to Modern Healing:

WWII Origins

During World War II, German medical teams observed a puzzling phenomenon among soldiers exposed to Allied bomb blasts. Despite the absence of visible wounds, autopsies revealed that the intense shockwaves from the explosions had disrupted lung tissues, causing the tissues to rupture as if they had "exploded." Recognizing the destructive potential of these sound waves, the Germans explored the idea of using them as a weapon against enemy forces. Fortunately, this concept ultimately did not materialize as a weapon, but it laid the foundation for understanding the powerful biological effects of shockwaves.

Lithotripsy Breakthrough

The next major application of shockwave technology emerged in the field of urology. (Maybe you have even had this treatment if you have had a kidney stone or two.) Shockwave lithotripsy was developed to treat kidney stones, using powerful sound waves to break stones into smaller fragments for non-invasive removal.

- **Key Insights:**
  - High-intensity shockwaves could be precisely focused on kidney stones.
  - Observations during treatment noted that when the sound waves were applied at a lower intensity, they appeared to positively affect adjacent tissues.
  - Low-intensity shockwaves were found to promote tissue healing and increase bone marrow density.

Transition to Therapeutic Applications

Building on the insights gained from lithotripsy, scientists began experimenting with low-level shockwave therapy for broader medical applications, such as:

- **Pain Management and Tissue Healing:**
  - Low-intensity shockwaves are now used to stimulate the body's healing response in orthopedic pain management, including treatments in chiropractic offices.
- **Biological Mechanism:**
  - The shockwaves mimic a controlled injury, signaling the body to mobilize its natural

healing factors, including the migration of stem cells.

- This process leads to increased blood flow, nutrient delivery, and the stimulation of tissue repair.

Recent Advances and Integration with Regenerative Medicine

Over the past decade, refinements in frequency, intensity, and treatment protocols have transformed low-level shockwave therapy into a mainstream approach for managing musculoskeletal conditions.

- **Clinical Impact:**
  - When integrated with regenerative medicine treatments such as PRP or bone marrow stem cell injections, shockwave therapy enhances their effectiveness.
  - The therapy not only provides immediate pain relief but also supports long-term healing by activating the body's natural regenerative processes.

The history of shockwave therapy is an encouraging narrative of transformation—from battlefield injuries to a breakthrough in non-invasive treatment technologies. Today, this treatment represents a pivotal

advancement in both pain management and regenerative medicine, consistently showing improved outcomes when combined with other therapeutic interventions**.**

Two Types of Shockwave Therapy Are Available:

RSW (Radial) and FSW (Focused) Shockwave.

Radial is like a light bulb with waves going in all directions. Focal is like a laser pointer focusing its energy on a specific target area. Radial shockwaves have lower energy and more superficial effects. Focused has higher energy and deeper tissue penetration. Focused shockwave is the same type of therapy that is currently used to break down kidney stones without surgery, otherwise known as lithotripsy.

Some experts believe that radial shockwaves are not true shockwaves but rather "pressure waves." Thus, only focused shockwaves are "real" shockwaves. When used for musculoskeletal indications, a much lower dose is used compared to lithotripsy.

Three current focused shockwave systems include Piezoelectric, Electromagnetic, and Electrohydraulic. There are currently three big-name companies manufacturing and doing research on shockwave therapy. Wolf Piezo 2 uses piezoelectric technology.

Storz Medical uses electromagnetic sources. SoftWave Tissue Regeneration Technologies uses electrohydraulic technology to generate shockwaves.

Which Shockwave Therapy Is Better, Focused or Radial Shockwave Therapy?

In my experience, a combination of both radial and focused shockwave therapy gives patients better and faster results, but if you had to pick one, focused shockwave is far superior to radial. The benefits of shockwave therapy include no downtime, no scarring, and no need for anesthesia.

How Does Shockwave Therapy Work?

- It reduces tendon, muscle, and joint pain & stiffness.
- Stimulates and accelerates the tissue engineering and cell proliferation healing process.
- Stimulates angiogenesis (formation of new, healthy blood vessels) and enhances blood circulation.
- Destroys damaged muscle fibers.
- Breaks down adhesions and scar tissue.

Anytime we have ongoing inflammation of a structure, be it repeated use or irritation of a muscle, tendon, or joint, we will form scar tissue.

Scar tissue is often missed as the source of the pain and can be easily missed on even advanced imaging, such as an MRI. The treatment of scar tissue is anything BUT surgical removal of the scar tissue. A surgeon might be able to surgically "clean" the area and remove the scar tissue, but the minute the surgical site has been closed and in the process of healing the wound, the body will end up creating an even bigger scar than before surgery. As I shared earlier, shockwave therapy was the only treatment that was able to get rid of my decade-old right shoulder pain from scar tissue.

Shockwave therapy could be the first line of treatment for athletes after an injury. Studies show that an accelerated return to sports could be achieved using this treatment.

As far as how many and how often, I always recommend at least weekly sessions of shockwave therapy. Twice a week seems to be reasonable as well, but I would not repeat shockwave therapy within 48 hours. A minimum of six sessions once a week is what I currently recommend. Keep in mind that, with shockwave therapy, similar to other regenerative

medicine therapies, the full clinical and radiological effects could take months.

SoftWave Therapy (Unfocused)

This is a variation of Shockwave therapy patented by a specific company. It uses electrohydraulic technology to generate its shockwaves. While the manufacturer advertises this machine as an "unfocused" therapy, it resembles focused more than radial shockwave therapy. The name SoftWave might sound less frightening than Shockwave. Therefore, it is probably an advertising attempt by the manufacturer. Regardless of the name and technology used, at the end of the day, the mechanism of action of SoftWave therapy remains identical to other shockwave therapy technologies.

PEMF/EMTT

Pulsed Electromagnetic Field Therapy and Extracorporeal-Magneto-Transduction Therapy are a technology that creates an electromagnetic field. In turn, this creates a local electric field. It interacts directly at the cellular level with the cell membrane, ions, and enzymes. This will decrease the inflammation and accelerate healing. To produce this, you need a very high frequency and a strong magnetic field. Simply putting a magnet at the area of injury

would not work. It took many years to study the effect of "Magnet Therapy" on the human body. Parameters such as oscillation frequency and field strength have been studied, but in the last 3 years, we finally have the knowledge and power to offer this exciting therapy to our patients. Making new blood vessels (Neovascularization), increasing growth factor, and increasing collagen production have been shown in studies of EMTT on mesenchymal stem cells in the lab. In short, magnet therapy can promote the body's natural healing process.

What Conditions Can Be Effectively Treated With PEMF/EMTT?

Any tissue in need of help to heal can be treated with magnet therapy. However, I rarely recommend this treatment modality on its own but, rather, as an adjunct to other therapies.

A word of caution when using PEMF/EMTT: These are some powerful magnets and should be used away from any metallic objects such as necklaces and bracelets. Patients with pacemakers should not even get close to these machines when they are turned on. Per manufacturer recommendations, these treatments are contraindicated during pregnancy. The use of these therapies is also discouraged for patients with an insulin pump.

In my practice, I try to combine shockwave therapy with EMTT. Based on multiple randomized clinical trials, adding EMTT to shockwave therapy results in improved outcomes. When added to regenerative medicine therapies, they act synergistically to accelerate healing and return to function.

Chapter Six

Beyond the Injection: Nutritional and Natural Supports for Regenerative Healing and Other Synergistic Treatment Modalities

Regenerative medicine works best in an ideal body environment. Metabolic syndrome—which consists of obesity, high blood pressure, high blood sugar, high triglycerides, and low HDL (good cholesterol)—increases your risk of heart attack and stroke. It also impairs your body's healing power and thus can decrease the effectiveness of regenerative medicine.

Before even thinking about taking any supplements, the first thing you need to do is get the scale and calculate your BMI. I do not want anyone here to have unrealistic expectations from supplement therapy. No supplement is nearly as important as being at a normal BMI with a good amount of muscle composition. Diet and exercise are crucial not only for your longevity but also for the effectiveness of regenerative medicine.

Case Study: Shoulder Injury Recovery of a 36-Year-Old Baseball Enthusiast

John, a 36-year-old baseball enthusiast, has experienced persistent shoulder pain over the past six months. Previously active on the baseball field, his injury began to affect not only his sports performance but also his ability to exercise and stay fit. Now, it was beginning to affect his family life. John, a devoted father, found that the pain prevented him from actively playing with his kids and participating in family outings, further impacting his overall quality of life, mood, and enjoyment of physical activities.

Injury and Initial Symptoms

- **Injury History:**
  - John's shoulder discomfort developed gradually, with increasing pain during baseball activities and daily tasks.
  - An MRI revealed a partial tear in the rotator cuff, a condition that was interfering with both his athletic performance and his ability to engage fully with his children.
- **Impact on Daily Life:**
  - At night, John struggled with pain when lying on his shoulder, leading to reduced

sleep quality. He also found it difficult to help get the kids ready for bed.

- At home, the injury limited his participation in family sports and playtime, making him feel sidelined both on the field and with his kids. (It did not make his wife very happy either.)

Treatment Protocol

Our Shoulder Protocol Involved a Multi-Modality Approach:

1. **Ultrasound-Guided Injections:**
    - **First Stage:** Administered a low-dose steroid injection into the subacromial bursa, aimed at reducing inflammation near the rotator cuff tissues.
    - **Second Stage:** Three weeks later, a PRP injection directly into the torn portions of the rotator cuff under ultrasound guidance.
2. **Follow-Up PRP Treatment:**
    - Six weeks after the initial PRP therapy, a repeated ultrasound-guided PRP injection was performed to further enhance tissue healing.

3. **Adjunctive Therapies:**
    - **Peptide Therapy:** Combined BPC-157 and TB-500 were administered to aid in overall tissue repair.
    - **Shockwave Therapy and Class IV Laser Therapy:** These modalities were added to stimulate healing, improve blood circulation, and relieve pain.

Outcomes and Recovery

- **Short-Term Results:**
    - Within three months after the completion of the treatment series, John reported complete relief of shoulder pain.
- **Long-Term Impact:**
    - John was able to resume playing baseball recreationally without discomfort.
    - He experienced a significant improvement in sleep quality, no longer bothered by shoulder pain at night. He was also able to shed extra weight and become more active in helping care for his children. (This made his wife very happy.)

Impact on Baseball and Family Life

John's recovery brought notable improvements in both his athletic and family life:

- **Athletic Performance:**
  - His return to baseball sparked renewed passion and energy on the field.
  - No longer hindered by the pain, John could enjoy his favorite sport and regain his competitive spirit.
- **Family Engagement:**
  - With his shoulder pain managed, John could actively participate in games and outings with his wife and children.
  - His renewed ability to play safely with his kids strengthened family bonds, allowing him to be a more involved and present father.

John's treatment success is a prime example of a comprehensive, multi-modal approach to addressing complex shoulder injuries. The combination of ultrasound-guided injections, adjunctive therapies, and regenerative techniques not only alleviated his pain but also restored his quality of life both on the baseball field and at home with his family.

Losing Weight and Getting Healthy

Although John was relatively healthy when he first came to see me, his health continued to improve after treatment. What if he were not healthy? What could he have done to start losing weight, especially since he was in pain?

I hate to say it because it is very simple but often not very easy. You have to look at what you are putting in your mouth. It all starts with your diet. This is not a one-diet-fits-all solution. There are a variety of conditions that resolve with different diets that you may want to look into.

Diets Are Not So Bad if You Feel Better… Right?

Some diets have been shown to decrease systemic inflammation and potentially accelerate the healing process.

The Vegan Diet has been shown to have an anti-inflammatory effect. My personal opinion is that, while a short-term vegan diet might be beneficial to decrease inflammatory markers, improve gut health, and accelerate healing after an injury or a regenerative medicine procedure, I believe the risks of long-term vegan diets outweigh their benefits.

Intermittent Fasting, or **IF,** consists of drinking only water, fasting from food for a period of time, and eating during a short window of time. A popular way of IF is 16/8, which is 16 hours of fasting and an 8-hour window during which you can eat. Benefits of IF could include reduction of pro-inflammatory cytokines, reduction of oxidative stress, improvement of insulin sensitivity, as well as improved brain function and focus, decreased brain fog, and increased human growth hormone (HGH).

3–5 day Fasting is a rather extreme diet (by traditional measures), during which one only drinks water and electrolytes for 3–5 days. Benefits of this diet, other than weight loss and increased metabolic health, could include enhanced cognitive function and protection against neurodegenerative disease. The most interesting and important benefit of a long fast is cellular repair via a process called autophagy. Autophagy is a natural process where cells break down and recycle old or damaged parts to maintain cell health and function.

Too many junk components in a cell can take up space and can slow or prevent a cell from functioning properly.

Autophagy is our body's cellular recycling system that gets rid of nonfunctional cell parts. It would definitely

help with tissue regeneration as well when combined with other regenerative medicine therapies. Autophagy has also been considered to be beneficial for longevity.

A word of caution about any diet: You simply cannot heal from any injury using any treatment modality if you are not providing your body with the building materials needed to heal. Restrictive diets, especially prolonged ones, can result in malnutrition, muscle breakdown, and entering catabolic state. Some studies suggest fasting could reduce the availability of nutrients needed for cell repair and collagen production, which is crucial for wound closure. This could lead to slower healing times and potentially increased risk of infection.

To counter this, I highly recommend supplementation, which is our next topic. This is especially true if you continue to be active and exercise during your fast.

Supplements:

Let's discuss why supplementation is important, especially when the body is in regenerative mode. Much medical research shows that targeted nutritional protocols can accelerate tissue regeneration by 25% post-treatment by enhancing cellular repair mechanisms essential for effective recovery.

Here is the list of my favorite supplements in conjunction with regenerative medicine to help boost the body's natural healing process:

- **Glucosamine** is a very common supplement and is a cartilage-building block. Research has shown that supplementation with Glucosamine can help cartilage by reducing cartilage loss and breakdown, as well as increasing function.
- **Chondroitin** is the cousin of Glucosamine and another common cartilage-building block supplement with similar effects.
- **Resveratrol** is a powerful antioxidant and activator of the SIRT1 gene, which has been associated with longevity. One mechanism of action of Resveratrol is to stimulate autophagy. It has also been shown to help protect the joints.
- **Curcumin** is an extract from the Indian spice turmeric. It has anti-inflammatory properties and may help preserve cartilage. Although a beneficial supplement at the acute and chronic phases of musculoskeletal disease, *this supplement must be stopped* at least a week prior to and two weeks after injection of any type of orthobiologic.
- **Leucine-Enriched Essential Amino Acid Complex** stimulates muscle growth and repair.

- **L-glutamine** supports faster recovery, wound healing, muscle growth and decreases oxidative stress.
- **L-arginine** promotes blood flow, protein synthesis, fibroblast activation, bone healing, and collagen repair. Supplementation with L-Arginine has been shown to improve the efficacy of photobiomodulation based on some recent studies.
- **Creatine Monohydrate** improves performance via mitochondrial biogenesis, increases cellular ATP production, and enhances lean muscle mass.
- **L-citrulline** increases nitric oxide production and promotes circulatory health.
- **HMB** is suggested to prevent muscle loss and facilitate tissue rebuilding.
- **CoQ10** is a naturally occurring antioxidant in our body that helps convert food to energy within mitochondria and promotes tissue regeneration. CoQ10 production decreases with age, and as such, supplementation is key to optimizing the body's healing power.
- **Micronutrients** such as Boron and Zinc improve wound healing.

- **Vitamins** A, B6, C, and D3 are crucial for the body's full regenerative ability. Many of my patients taking daily multivitamins have low Vitamin D levels in their blood work.

As far as the timing of the supplementation, the most critical time is to start two weeks prior to and six weeks after any regenerative medicine treatment.

Time permitting, my hope is that we will soon be able to make a simplified "*Regeneration Support*" mix of all essential supplements for our patients to simplify this process.

Peptides: Peptides are short chains of amino acids (typically consisting of 2 to 50 amino acids) that play key roles in various biological processes, including tissue repair, inflammation control, and pain management. Several peptides have shown promise in regenerative medicine and pain relief due to their ability to accelerate recovery, modulate immune responses, and support tissue regeneration.

There are many out there, but here are my five favorite ones to be used in tandem with regenerative medicine therapies:

BPC-157 (Body Protection Compound-157) promotes the healing of tendons, ligaments, muscles, and the gut lining and has anti-inflammatory properties. It

increases blood vessel formation (angiogenesis), enhances collagen production, and regulates growth factors like VEGF.

TB-500 (Thymosin Beta-4) promotes tissue regeneration and reduces inflammation. It enhances cell migration, encourages stem cell differentiation, upregulates actin for tissue repair, and increases collagen production.

Thymosin Alpha-1 (Tα1) modulates the immune system and has anti-inflammatory effects. It enhances T-cell function, reduces oxidative stress, and promotes immune homeostasis.

CJC-1295 + Ipamorelin are growth hormone-releasing peptides that promote tissue repair and regeneration. They stimulate the release of growth hormone (GH) and insulin-like growth factor 1 (IGF-1). Ipamorelin helps break down fat for the use of energy, as well as preventing the breakdown of muscle.

NAD (Nicotinamide adenine dinucleotide) is a peptide that helps the mitochondria within cells produce energy, repair DNA, boost metabolism, and support the immune system. NAD levels naturally decline as we age, leading to cancers, metabolic diseases, and neurodegeneration. Restoring those NAD levels with peptide therapy may help slow down aging and extend lifespan.

As far as the timing of peptide therapy, I recommend they be started at least two weeks before and continued at least six weeks after any regenerative medicine therapy.

A Word of Caution Regarding Peptide Therapy

There is a lot of "hype" regarding peptide therapy right now. Some people have started to think of it as a "cure-all" miracle. Because of this, there is a bunch of misinformation being spread around, and some opportunistic folks are using this to pad their pockets. Given the current position of the FDA at the time of the publication of this book, acquiring a high-quality and reliable source of peptides remains a challenge.

Here Are My Recommendations If You Are Interested in Peptide Therapy:

1. Only use peptide therapy as an adjunct and not a replacement for a healthy lifestyle and Regenerative Medicine.

2. Do NOT purchase peptides from any online source, such as those advertised on social media.

3. Do NOT purchase any "oral" peptides. As mentioned earlier, peptides are short chains of amino acids, and they will be degraded by the digestive

enzymes when taken orally. Furthermore, they have difficulty crossing the intestinal barrier, resulting in low availability. Most peptides need to be injected subcutaneously for proper absorption.

Photobiomodulation (PBM)/Low-level Laser Therapy: Laser therapy uses specific wavelengths of light energy to favor and accelerate the body's natural healing processes. Potential benefits of laser therapy include anti-inflammatory properties, analgesia, accelerated tissue repair and growth, improved vascular activity, increased metabolic activity, reduced fibrous tissue formation, immunoregulation, and faster wound healing.

One mechanism of action is via stimulating the mitochondria and cell membrane photoreceptors' synthesis of ATP. The combination of specific wavelengths is key to achieving these results. Low-level laser therapy (LLLT) is also called "cold laser" because it does not create heat during treatment. It involves the application of red light (670-700 nm) and near-infrared light (700-100 nm) over a specific area of the body or the whole body. Unlike sunlight, which contains harmful UV rays, red light therapy only uses beneficial waves. PMB therapy is usually a "whole body" treatment and commonly uses LED lights in lieu of actual laser lights.

Personally, I never use low-level laser therapy as the sole treatment modality for musculoskeletal problems. Rather, I combine full-body laser therapy with regenerative medicine and shockwave therapy, focalized high-power class 4 laser therapy, as well as optimal nutrition supplementation.

Focalized Class 4 Laser Therapy uses high-power (above 0.5W) lasers to target specific areas of the body for pain relief and promotion of healing. Class 4 lasers are the highest classification, meaning they have the potential to cause the most damage if not used properly, but also offer the highest power output for therapeutic effects.

A high-intensity concentrated laser penetrates deeper into the tissue, making it a better choice for muscle and joint problems. Protective eyewear needs to be worn during treatment to prevent eye damage. Mechanism of action is similar to that of low-level laser therapy and includes reduction of inflammation, increased circulation of blood, pain relief, and enhanced tissue healing.

Early data from recent studies suggest that the combination of laser therapy with biologics enhances healing by approximately 20% compared to biologic treatments alone.

Hyperbaric Oxygen Therapy (HBOT) is a treatment in which patients breathe close to 100% oxygen in a pressurized chamber to enhance the delivery of oxygen to the body. The elevated pressure forces more oxygen to dissolve in the plasma, boosting the amount of oxygen delivered to the body's tissues. When combined with regenerative medicine, HBOT can further improve blood flow, enhance angiogenesis (formation of new blood vessels), decrease oxidative stress, stimulate the release of stem cells, promote cell proliferation and differentiation, and stimulate collagen production. When available and possible, I always encourage this rather cost-prohibitive treatment modality to be combined with any regenerative medicine therapy.

Physical Therapy/Rehabilitation: Do Not Shake the Trees

After any treatment of the joints and/or tendons, I highly recommend manual therapy/chiropractic care, physical therapy, and stretching to restore optimal function of the joint and/or the muscle group. When to start these therapies after a regenerative medicine injection varies by the pathology. Overall, I would say somewhere between two and four weeks after the injection of PRP or stem cells is a good time to start manual therapy and/or physical therapy. Two weeks is

the minimum amount of time I would like the injected structure to be "left alone." For example, after a knee injection, I recommend walking on the knee only, but no running, jumping, or leg days for at least two weeks. Do not "Shake the trees" for two weeks. Let the PRP do its work, get the healing process going, and get it to a good point before starting to put a load on the joint again. After two weeks, I recommend starting with isometric exercises for another two weeks before starting full physical therapy. For athletes doing extreme exercises, I recommend against max-level training for up to six weeks following the treatment.

As a rule of thumb, anyone who has subacute or chronic pain is deconditioned. When you have pain in a part of your body, you will not move the muscles in that area. If you do not use a muscle, it will get "disuse atrophy." Even if regenerative medicine can completely address the structural problem and fully restore function, the muscles around the joint or spine still need to be strengthened.

A gradual increase in the activities and "going easy" when starting back at the gym is a great option. A better option would be to restart the rehabilitation first with a professional to avoid reinjuring and to concentrate on the most beneficial exercises prior to going to the gym. When possible, I always recommend four to six weeks of physical therapy once or twice a

week, starting about four to six weeks after my treatments. More important than PT itself is the continuation of those exercises. Remember, muscle is key to wellness and longevity. Be gentle with yourself and be encouraged to know you are heading in the direction of health. It is okay to take a little time before jumping back into your life with both feet.

Chapter Seven

Tailored Relief: Proven Regenerative Protocols for Every Major Joint and Spinal Region

Over my decades of practice, I have seen many of the same injuries coming into my office. Whether you are young, old, or in between, there is most likely a therapy to help you avoid invasive surgeries. You will be surprised at the results we get on “lost cause” and “last resort” patients who thought they had no choice but to go under the knife.

It is my deepest held belief that many, many injuries can now be treated without surgery. As we go into the future, I can imagine that many surgeons will be operating on patients less and less because regenerative medicine will be more readily available. It will become the obvious, less painful, and faster healing solution.

On the following pages, I have listed my recommended combination of treatments for the most common conditions I see. If your injury is not listed, do not be discouraged. It is not that we may not have a treatment for it. It is that the length of this book would never end if we put all the things that can go wrong in this wonderful human body of ours!

Knee Protocols

Knee Meniscus Tear Protocol

- Aspiration of fluids and low-dose steroid injection in the joint. Technique: Fluoroscopy or ultrasound-guided. Purpose: Decrease inflammation. Optimize biochemical milieu.

  2–3 weeks later →

- PRP injection. Technique: Ultrasound-guided. Ultrasound is needed to ensure the placement of PRP in the meniscus tear and the joint. Purpose: Main regenerative medicine therapy.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #1. Technique: Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #2. Technique: Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #3. Technique:

Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

- 6 sessions of weekly radial and focal shockwave therapy.
- 6 sessions of weekly EMTT.
- 6 sessions of weekly focal class 4 laser therapy.
- 8 weeks of daily “Regeneration Support” supplementation, two weeks prior to and six weeks after PRP.

Knee Arthritis Protocol

- Aspiration of fluids and low-dose steroid injection in the joint. Technique: Fluoroscopy or ultrasound-guided. Purpose: Decrease inflammation. Optimize the treatment area biochemical milieu.

  2–3 weeks later →

- PRP injection in the joint. Technique: Fluoroscopy or ultrasound-guided. Purpose: Main regenerative medicine therapy.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #1. Technique: Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #2 Technique: Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #3 Technique:

Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

- 6 sessions of weekly radial and focal shockwave therapy.
- 6 sessions of weekly EMTT.
- 6 sessions of weekly focal class 4 laser therapy.
- 8 weeks of daily "Regeneration Support" supplementation, two weeks prior to and six weeks after PRP.
- *Extra Treatments*: If suboptimal response to standard protocol or in case of severe bone-on-bone arthritis, consider BMAC (bone marrow stem cells) intra-articular (in the joint) and/or BMAC Intraosseous (in the bone) above and below the joint.

Shoulder Protocols

Shoulder Rotator Cuff Tear Protocol

- Low-dose steroid injection in the subacromial bursa. Technique: Fluoroscopy or ultrasound-guided. Purpose: Decrease inflammation. Optimize the treatment area biochemical milieu.

  2–3 weeks later →

- PRP injection in the subacromial bursa as well as pathological rotator cuff structures #1. Technique: Ultrasound-guided. Ultrasound is needed to ensure the placement of PRP in the target torn muscles and ligaments. Purpose: Main regenerative medicine therapy.

  2–4 weeks later →

- PRP injection in the subacromial bursa as well as pathological rotator cuff structures #2. Technique: Ultrasound-guided. Ultrasound is needed to ensure the placement of PRP in the target torn muscles and ligaments. Purpose: Main regenerative medicine therapy.
- 6 sessions of weekly radial and focal shockwave therapy.
- 6 sessions of weekly EMTT.
- 6 sessions of weekly focal class 4 laser therapy.

- 8 weeks of daily “Regeneration Support” supplementation, two weeks prior to and six weeks after PRP.
- *Extra Treatments*: If suboptimal response to the first round, repeat in 2 months.

Shoulder Labral Tear and Arthritis Protocol

- Aspiration of fluids and low-dose steroid injection in the joint. Technique: Fluoroscopy or ultrasound-guided. Purpose: Decrease inflammation. Optimize treatment biochemical milieu.

  2–3 weeks later →

- PRP injection. Technique: Fluoroscopy or ultrasound-guided. Purpose: Main regenerative medicine therapy.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #1. Technique: Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #2 Technique: Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #3 Technique:

Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

- 6 sessions of weekly radial and focal shockwave therapy.
- 6 sessions of weekly EMTT.
- 6 sessions of weekly focal class 4 laser therapy.
- 8 weeks of daily "Regeneration Support" supplementation, two weeks prior to and six weeks after PRP.
- *Extra Treatments*: If suboptimal response to standard protocol or in case of severe bone-on-bone arthritis, consider BMAC (bone marrow stem cells) intra-articular (in the joint) and/or BMAC Intraosseous (in the bone).

Hip Protocols

Hip Labral Tear and Arthritis Protocol

- Aspiration of fluids and low-dose steroid injection in the joint. Technique: Fluoroscopy or ultrasound-guided. Purpose: Decrease inflammation. Optimize the treatment area biochemical milieu.

  2–3 Weeks later →

- PRP injection. Technique: Fluoroscopy or ultrasound-guided. Purpose: Main regenerative medicine therapy.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #1. Technique: Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #2 Technique: Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #3 Technique:

Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.

- 6 sessions of weekly radial and focal shockwave therapy.
- 6 sessions of weekly EMTT.
- 6 sessions of weekly focal class 4 laser therapy.
- 8 weeks of daily "Regeneration Support" supplementation, two weeks prior to and six weeks after PRP.
- *Extra Treatments*: If suboptimal response to standard protocol or in case of severe bone-on-bone arthritis, consider BMAC (bone marrow stem cells) intra-articular (in the joint) and/or BMAC Intraosseous (in the bone).

Elbow Protocols

Tennis Elbow (Lateral Epicondylitis) Protocol

- Low-dose steroid injection in lateral epicondyle. Technique: Ultrasound-guided. Purpose: Decrease inflammation. Optimize the treatment area biochemical milieu.

  2–3 weeks later →

- PRP injection in the lateral epicondyle #1. Technique: Ultrasound-guided. Purpose: Main regenerative medicine therapy.

  2–4 weeks later →

- PRP injection in the lateral epicondyle #2. Technique: Ultrasound-guided. Purpose: Main regenerative medicine therapy.
- 6 sessions of weekly radial and focal shockwave therapy.
- 6 sessions of weekly EMTT.
- 6 sessions of weekly focal class 4 laser therapy.
- 8 weeks of daily "Regeneration Support" supplementation, two weeks prior to and six weeks after PRP.
- *Extra Treatments*: If suboptimal response to the first round, repeat in 2 months.

Golfer's Elbow (Medial Epicondylitis) Protocol

- Low-dose steroid injection in medial epicondyle. Technique: Ultrasound-guided. Purpose: Decrease inflammation. Optimize the treatment biochemical milieu.

  2–3 weeks later →

- PRP injection in the medial epicondyle #1. Technique: Ultrasound-guided. Purpose: Main regenerative medicine therapy.

  2–4 weeks later →

- PRP injection in the medial epicondyle #2. Technique: Ultrasound-guided. Purpose: Main regenerative medicine therapy.
- 6 sessions of weekly radial and focal shockwave therapy.
- 6 sessions of weekly EMTT.
- 6 sessions of weekly focal class 4 laser therapy.
- 8 weeks of daily "Regeneration Support" supplementation, two weeks prior to and six weeks after PRP.
- *Extra Treatments*: If suboptimal response to the first round, repeat in 2 months.

Elbow Arthritis Protocol

- Aspiration of fluids and low-dose steroid injection in the joint. Technique: Fluoroscopy or ultrasound-guided. Purpose: Decrease inflammation. Optimize the treatment biochemical milieu.

  2–3 weeks later →

- PRP injection. Technique: Fluoroscopy or ultrasound-guided. Purpose: Main regenerative medicine therapy.

  2 weeks later →

- Viscosupplementation with Hyaluronic Acid (Hyalgan, Orthovisc, etc.) #1. Technique: Fluoroscopy or ultrasound-guided. Purpose: Scaffolding, support, and synergistic therapy to PRP.
- 6 sessions of weekly radial and focal shockwave therapy.
- 6 sessions of weekly EMTT.
- 6 sessions of weekly focal class 4 laser therapy.
- 8 weeks of daily "Regeneration Support" supplementation, two weeks prior to and six weeks after PRP.

Low Back (Lumbar Spine)

Lumbar Disc Herniation and Sciatica Protocol

- Injection of full dose steroids in the lumbar epidural space at the level(s) of pathology #1. Technique: Fluoroscopy-guided with injection of contrast. Purpose: Decrease inflammation. Optimize treatment biochemical milieu. Shrink the size of the disc herniation/annular tear.

  4 weeks later →

- Injection of full dose steroids in the lumbar epidural space at the level(s) of pathology #2. Technique: Fluoroscopy-guided with injection of contrast. Purpose: Decrease inflammation. Optimize treatment biochemical milieu. Shrink the size of the disc herniation/annular tear.

  4 weeks later →

- Injection of full dose steroids in the lumbar epidural space at the level(s) of pathology #3. Technique: Fluoroscopy-guided with injection of contrast. Purpose: Decrease inflammation. Optimize treatment biochemical milieu. Shrink the size of the disc herniation/annular tear.

  4 weeks later →

- Injection of PRP in the lumbar epidural space at the level(s) of pathology. Technique: Fluoroscopy-guided with injection of contrast. Purpose: Main regenerative medicine therapy.

Seal off the disc and prevent re-herniation/heal the annular tear.

- 12 sessions of weekly lumbar decompression.
- 8 weeks of daily “Regeneration Support” supplementation, two weeks prior and six weeks after PRP.

Low Back Arthritis Protocol

- Injection of low-dose steroid injection in the target lumbar (facet) joints. Technique: Fluoroscopy-guided. Purpose: Decrease inflammation. Optimize treatment biochemical milieu. Diagnostic and therapeutic.

  2–3 weeks later →

- PRP injection in the target lumbar (facet) joints. Technique: Fluoroscopy guided. Purpose: Main regenerative medicine therapy.

  2 weeks later →

- Radiofrequency Ablation of the joint pain wires (RFA or Rhizotomy). Technique: Fluoroscopy-guided. Purpose: Decrease the pain signals traveling from the arthritic joints, reduce muscle spasms and ongoing pressure on the joints, support and synergistic therapy to PRP.
- 6 sessions of weekly focal calls and four laser therapy.
- 8 weeks of daily "Regeneration Support" supplementation, two weeks prior to and six weeks after PRP.

Neck (Cervical Spine)

Neck Disc Herniation and "Pinched Nerve" Protocol

- Injection of full dose steroids in the cervical epidural space at the level(s) of pathology #1. Technique: Fluoroscopy-guided with injection of contrast. Purpose: Decrease inflammation. Optimize treatment biochemical milieu. Shrink the size of the disc herniation/annular tear.

  4 weeks later →

- Injection of full dose steroids in the cervical epidural space at the level(s) of pathology #2. Technique: Fluoroscopy-guided with injection of contrast. Purpose: Decrease inflammation. Optimize treatment biochemical milieu. Shrink the size of the disc herniation/annular tear.

  4 weeks later →

- Injection of full dose steroids in the cervical epidural space at the level(s) of pathology #3. Technique: Fluoroscopy-guided with injection of contrast. Purpose: Decrease inflammation. Optimize treatment biochemical milieu. Shrink the size of the disc herniation/annular tear.

  4 weeks later →

- Injection of PRP in the cervical epidural space at the level(s) of pathology. Technique: Fluoroscopy-guided with injection of contrast.

Purpose: Main regenerative medicine therapy. Seal off the disc and prevent re-herniation/heal the annular tear.

- 12 sessions of weekly cervical decompression.
- 8 weeks of daily “Regeneration Support” supplementation, two weeks prior and six weeks after PRP.

Whiplash and Neck Arthritis Protocol

- Injection of low-dose steroid injection in the target lumbar (facet) joints. Technique: Fluoroscopy-guided. Purpose: Decrease inflammation. Optimize treatment biochemical milieu. Diagnostic and therapeutic.

  2–3 weeks later →

- PRP injection in the target lumbar (facet) joints. Technique: Fluoroscopy-guided. Purpose: Main regenerative medicine therapy.

  (Optional) 4–8 weeks later and only if still symptomatic →

- Radiofrequency Ablation of the joint pain wires (RFA or Rhizotomy). Technique: Fluoroscopy-guided. Purpose: Decrease the pain signals traveling from the arthritic joints, reduce muscle spasms and ongoing pressure on the joints, support and synergistic therapy to PRP.
- 6 sessions of weekly focal calls and four laser therapy.
- 8 weeks of daily "Regeneration Support" supplementation, two weeks prior to and six weeks after PRP.

Chapter Eight:

Who Is a Regenerative Medicine Doctor and When Do You Need to See One?

Let me start by saying there is no formal medical specialty called "Regenerative Medicine". Physicians performing these interventions are either Pain Management specialists such as myself, Physical Medicine and Rehabilitation (PM&R) specialists, or Orthopedic Surgeons who are open to learning and offering non-surgical regenerative treatments. I truly hope we will soon have a dedicated specialty in the field.

Let me also say that I highly disagree with the name of my specialty being "Pain Management." I did my residency in the field of Anesthesiology, and I am a board-certified anesthesiologist. However, I have never worked a day in my life as an anesthesiologist. As soon as I finished my residency, I started my fellowship at Massachusetts General Hospital, Harvard Medical School. Despite my specialty's name of "Pain Management", the vast majority of what I learned during my fellowship was how to examine patients' musculoskeletal systems with emphasis on spine

conditions and how to treat them with image-guided, non-surgical interventions.

A Proper Name for My Specialty Is "Non-Surgical Spine & Joint"

The consequences of naming my specialty "Pain Management" have been catastrophic for patients and my colleagues alike. The traditional and "textbook" pattern of referral from Primary Care Providers (PCP), family doctors, and Nurse Practitioners/Physician Assistants, has been the following: If you have a spine condition (such as back pain) you will be referred to a Spine Surgeon. If you have any joint problem (such as knee arthritis), you will be referred to an Orthopedic Surgeon. And unfortunately, only if someone asks for narcotics is when they will be referred to Pain Management.

By no means am I criticizing my esteemed colleague surgeons, but their way of thinking and training is about how to fix a spine or joint problem surgically. On the other hand, Pain Management and PM&R physicians' training focuses on how to treat those exact same conditions non-surgically. Yes, there are about two to five percent of patients that need referrals to surgeons right off the bat. This is typically when we find "Red Flags" either on the physical exam or radiological studies. For example, if we have full

numbness in part of the foot, or significant weakness upon examination of a patient suffering from sciatica, immediate surgical attention is needed. If we find severe spinal stenosis on the MRI of the neck, prompt referral to a spine surgeon is indicated. Another example would be when we have evidence of full rotator cuff tear on the shoulder MRI.

However, as mentioned before, based on my personal experience, about 95% of patients suffering from subacute and chronic spine and joint pathologies are not in need of surgery, and their condition would significantly improve, especially when we combine traditional non-surgical treatments with regenerative medicine treatments.

My humble suggestion to my primary care provider colleagues is not to refer to us as “Pain Management” but rather “Non-Surgical Specialist” until we can, hopefully, change the name of our specialty. When a patient is told they are being referred to “Pain Management” for their shoulder arthritis, their thinking process is, “The pain is not that bad,” or, “I do not want to be prescribed narcotics”. That is a very logical reaction. Once they realize our specialty and interventions are not designed to just “Manage the Pain” but “Fix the Problem” via non-surgical options, then we get a whole different response.

When Should We Start Regenerative Medicine Treatments?

The sooner, the better! *It is easier to treat inflammation than degeneration*. When we have a structure that is unable to repair itself, we will have a better outcome if we start treating it earlier. Equally important is that, as soon as a structure that is not healing well, it will negatively affect other adjacent structures. Research has shown that when we have a tendon problem (tendinosis), it will create a muscular trigger point cascade. It will first affect the muscular dysfunction of the primary muscle the tendon is attached to. As the problem goes on, there is excess strain on the other adjacent muscles, causing "reflex inhibition," which will then result in the recruitment of additional muscles, and not in a healthy way. The same goes for a joint problem. This problem is often referred to as "Kinetic Chain" dysfunction.

Lots of people have accepted their fate like I did: "Oh well, I'm old, and I'm supposed to have pain. Arthritis is normal. My pain is not bad. I have a 'normal' amount of pain," etc. These are all statements mainly because patients are unwilling to go under the knife, and they are simply unaware of their options.

In my practice, I often ask these two questions of anyone with ongoing spine or joint problems:

- What are the three things you cannot do as a result of your Injury?
- What would it mean to you if you could restart doing those three activities?

I want people to start thinking about the possibility of a life free of any ongoing injury or pain. Many times, after many months or years of being slowed down or being incapacitated, achieving this goal seems unrealistic. Asking those questions is all about changing that mentality.

My Hope for You

After reading all or some of this book, I hope you will begin thinking about regenerative medicine as a safe and effective option. It is a rather new specialty. There are many misconceptions, and unfortunately, there is some false information and bad players out there. However, for many spine and joint problems, the results of these treatments could be life-changing.

I also want to re-emphasize the fact that, in my practice, I have been able to provide significant and lasting relief to the vast majority of my patients with spine and joint problems, and fewer than five percent

required referrals to an orthopedic or spine surgeon. Given the high success rate of regenerative medicine, I would absolutely recommend everyone with any spine or joint pathology (with few exceptions) consider regenerative medicine prior to any invasive surgery.

Regenerate Your Body… Reclaim Your Life

Chronic pain takes a heavy toll on your life. I have spent over 17 years as an interventional spine and joint physician dedicated to helping patients explore non-invasive, regenerative solutions.

In this book, you will find honest explanations of the science behind regenerative medicine, practical guidance on choosing treatments, and real-life examples of how patients have reclaimed their lives without invasive surgery.

I am not here to offer miracles. I am here to help you understand your options so that you can make informed decisions about your care.

To learn more about the ideas discussed in this book or to find a regenerative non-surgical specialist in your area, contact us.

Dr. Ghalambor is the founder and chief medical officer of the NorTex Spine & Joint Institute, as well as the NorTex Tissue Regeneration. He is a fellowship-trained, triple board-certified Interventional pain management specialist from Harvard Medical School.

He holds medical licenses on three different continents and did Family Practice, Internal Medicine, and Anesthesiology residencies prior to his fellowship. Dr. Ghalambor's unique background has provided him with the ability to have a different approach to healthcare.

Snapchat: nortxspinejoint

X: norTXSpineJoint

Linkedin: Nortex Spine & Joint Institute

Instagram: @nortexspineandjoint

Facebook: Nortex Spine and Joint Institute

Website: www.nortexspineandjoint.com

Website: www.nortextissueregeneration.com

Contact: Regenerate@nortexpain.com

Regenerate Your Body... Reclaim Your Life

Chronic pain takes a heavy toll on your life. I've spent over 17 years practicing as an interventional spine and joint physician dedicated to helping patients explore non-invasive, traditional, and regenerative medicine therapies. I have witnessed firsthand the exciting, revolutionary advances in my field during this rather short period of time.

In this book, you'll find honest explanations of the science behind regenerative medicine, practical guidance on choosing treatments, and inspiring real-life examples of how patients have reclaimed their lives without invasive surgery.

I'm not here to offer miracles... But to help you understand your various new non-surgical options so that you can make informed decisions about your care. Unfortunately, many patients and colleague physicians alike are uninformed or misinformed about regenerative medicine, resulting in many preventable invasive surgeries. I hope that by writing this book, I could make a small change by raising awareness.

Dr. Ghalambor is the founder and chief medical officer of the NorTex Spine & Joint Institute and NorTex Tissue Regeneration. He is a fellowship-trained, triple board-certified Interventional pain management specialist from Harvard Medical School. He holds a medical license in three different continents and has done Family Practice, Internal Medicine, and Anesthesiology residencies prior to his fellowship. Dr. Ghalambor's unique background has allowed him the ability to have a different approach to healthcare.

nortxspinejoint

norTXSpineJoint

Nortex Spine & Joint Institute

@nortexspineandjoint

Nortex Spine and Joint Institute

@NortexSpineandJoint

Websites: www.nortexspineandjoint.com/ www.nortextissueregeneration.com

Contact: Regenerate@nortexpain.com

2 370002 048422 09000