

UPMC Center for Integrative Medicine

Dedicated to increasing knowledge about safe and effective complementary and integrative medicine approaches.

Prolotherapy and Regenerative Injection Therapy

Ronald Glick, MD

Is pain an inevitable part of human existence? Why do injuries take a toll on our musculoskeletal system as we age? Some things we can't change. Hormones, such as testosterone, decline with age and this can cause our bodies to heal more slowly. Other factors that influence the body's healing response are amenable to change. Before we start talking about injections, what do we do to hurt ourselves?

Weight is a double insult. It puts more stress on our joints. It also fuels inflammation which may contribute to arthritis.

Our diet is pro-inflammatory. In other words, the carbohydrates and fats that we eat create a milieu in our bodies that hastens the decline that can occur with age.

We take non-steroidal anti-inflammatory medicines.

These are very helpful for severe inflammation, such as with rheumatoid arthritis. However, medicines like ibuprofen may limit the body's ability to heal following sprains and strains.

What is inflammation? I thought inflammation is bad? After a musculoskeletal injury, the body needs inflammation to heal. Strained tendons and ligaments release chemicals called phospholipids into the surrounding area. The body is smart and takes this as a sign that it needs to heal. It responds with chemicals called prostaglandins. These are the messengers of inflammation that drugs like ibuprofen block. The injury attracts white blood cells into the area. They clean up the mess and start the repair process. Next come the worker cells, fibroblasts. Fibroblasts lay down collagen, which is a protein that you can think of as building blocks. Collagen provides the structure and strength for all of our tendons and ligaments. So if you sprain an ankle, the ligament is disrupted, then you get chemical and white cell response, then the worker bees move in, then collagen is laid down. Over time the collagen tightens up and integrity is restored. Essentially, we need inflammation to help with healing, but too much or too little can cause problems.

What causes chronic pain? A number of factors and conditions can contribute to chronic musculoskeletal pain. Much of the pain we experience is myofascial or muscular. Treatment directed to the muscle problems include stretching, strengthening, and bodywork such as massage. Muscle pain often accompanies other pain issues. Three other factors are quite common and may be amenable to injection techniques:

Osteoarthritis involves degeneration of joints as well as low-grade chronic inflammation. Common areas include thumbs, shoulders, knees, and jaws.

Tendonitis involves chronic degeneration of tendons. Common problems include rotator cuff tendonitis, tennis elbow, and plantar fasciitis.

Ligament strains occur in a number of areas, including the pelvis or sacro-iliac joints, neck (as with whiplash), knees, and shoulders. Following an acute injury or chronic strain, the ligaments may loosen up and not provide the stability necessary to hold the body together. This may cause muscles to tighten up to compensate.

What is prolotherapy? If the problem is that tissues are degenerated or loose, wouldn't it be nice if we had a way to help things to reorganize and strengthen. That was the idea that led to the development of prolotherapy in the 1930's. A physician injects a small amount of an irritant into tendons, ligaments, and joints. The fluid stirs things up, creating a low level of localized inflammation. This has the same effect as a localized tissue injury, stimulating the body's healing responses. Dextrose, or sugar, is the most commonly used irritant. As this is part of normal IV fluids, it is very safe. In prolotherapy, we use a concentrated form to get the effect. The injections stimulate proliferation, hence the word prolotherapy. Essentially, we're getting the body to: stimulate growth factors, lay down new collagen, and strengthen tissues to help them regain their vitality. Prolotherapy is the 1st of 3 forms of regenerative injection therapy. It is the most commonly used and least expensive.

What are the other forms of regenerative injection therapy? Hines Ward has been a local and national figure for his in-your-face-play with the Pittsburgh Steelers and for his performance in Dancing With The Stars. An injury to his knee (medial-collateral ligament) almost sidelined him through the NFL playoffs in 2008. He underwent injections with platelet-rich plasma (PRP) and returned to the lineup to help the team get through the playoffs to earn a Superbowl Ring. PRP involves drawing blood, spinning it down in a lab, and injecting the part that floats on the top, which is rich in platelets and growth factors. This has a strong effect in stimulating growth and remodeling of damaged structures.

Another form of regenerative therapy involves the use of stem cells. Mesenchymal stem cells can turn into any kind of cell in the body. Typically, bone marrow is extracted from the hip, treated in a lab, and as with PRP, injected into the involved areas. For both PRP and stem cell treatments, the physician will commonly use ultrasound to guide the injection to make sure that the fluid goes to the exact right spot.

What does the research show? As with other complementary approaches, research is mixed. Case series reports show consistent benefits for individuals with a variety of musculoskeletal pain problems. As the research methods have improved, we're seeing more consistent results with controlled trials, such as a study by Rabago using prolotherapy for treating knee osteoarthritis. PRP and stem cell treatments are being embraced by orthopaedic surgeons and have the potential to treat conditions otherwise deemed surgical. For example, research shows the potential for these treatments to help regenerate damaged tissues for patients with rotator cuff tendonitis or osteoarthritis of the knee.

What else do I need to know? No injection is fun to receive, especially when it involves an area that is already painful and tender. Part of the skill of the physician is to use local anesthetics and gentle techniques to help patients tolerate the procedures. Unfortunately, most insurance plans do not cover these injections.

Where can I get more information: Prolotherapy is available through the Center for Integrative Medicine as well as the Department of Physical Medicine and Rehabilitation (PM&R) at UPMC. PRP and stem cell treatments and ultrasound guided injections are available through the PM&R Department.

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Early Lessons in Leading a Holistic Life

Gillian Kruszka

As I took the shuttle from the airport to Old Mission San Luis Rey in Oceanside, CA, I could already tell the trip would be unforgettable. It was my first time in California, and the vegetation we passed along the way made me think I had been dropped into a Dr. Seuss book. My excitement and anticipation heightened as we pulled up to a property covered in beautiful gardens and buildings with Southwestern character. Over the next five days here, I would be immersed into all types of integrative medical practices, inspiring stories, and incredible experiences.

My name is Gillian Kruszka, and I am a second-year medical student at the University of Pittsburgh School of Medicine. I am honored to be sharing my experience at the Leadership and Education Program for Students in Integrative Medicine (LEAPS into IM) with you all. The purpose of LEAPS is to expose health profession students early in their training to the practice of integrating conventional and traditional medical techniques to achieve optimum health. The program also focuses on developing the participants' leadership skills so that we may be agents of both change and sustainability in our communities.

I could use this space to summarize the amazing week I experienced, filled from morning to night with self-care practices such as tai chi and meditation, endless educational experiences on different integrative therapies, and invaluable leadership exercises, but instead I want to share with you the top messages I took from the week that have been permeating my life since my return.

- Our nation is in desperate need of more holistic care. From nutrition to mind-body practices to addressing the root of a problem rather than just covering up symptoms, the health of our society could be greatly improved if we shifted what is valued in our health care system.
- Take care of yourself. In attending to your own body and spirit, you ensure compassionate, productive work and interactions with others.
- Lead to serve. We were taught the difference between 'power leadership' and 'servant leadership', which boils down to one's motivation. By setting the intention to devote our work to the wellbeing of others, we create a more pleasant and meaningful environment for everyone involved.
- Always follow your heart. On the second night, the LEAPS mentors, health care professionals from across the country, shared their personal journeys into IM with us. I was surprised to hear such diversity among their stories. Some knew from medical school that they wanted to practice IM. Some struggled with illnesses that introduced them to this path. Others had several different careers before discovering what "made his/her heart sing." The commonality between all of their stories was that when they finally stopped pushing themselves to do what they thought they should and instead followed the underlying feeling they knew to be true, their whole world opened.
- Wonder. Without contemplating the unknown or the misunderstood, we will not progress as far or as quickly.
- Live as if you can. We have all heard the saying "If you think you can, you can. If you think you can't, you can't." After my experience at LEAPS, I have vowed to apply this to every aspect of my life. I hope that you will too.

A very special thank you to the Stine Foundation for their incredible generosity and Dr. Ronald Glick for supporting my application. This transformational experience would not have been possible without you!

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