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# From Degeneration to Regeneration: It's a New Generation

*By Dr. James Leiber, D.O.*

Did you ever wonder how your body heals itself from injury? Or why it doesn't heal and develops chronic pain? And why are we so complacent about getting replacements or surgery of our body parts? It certainly has become commonplace.

In the last decade, the number of total knee replacements performed annually in the United States has doubled, with disproportionate increases among younger adults. While total knee replacement is a highly effective treatment for end-stage knee osteoarthritis, total knee replacement recipients can experience persistent pain and severe complications. By the year 2030, knee replacements are expected to increase by 673% and revisions by 601%.

Despite being one of the most commonly performed procedures in this country, arthroscopic partial meniscectomy (for meniscus tears) lacks good evidence to support its use. Spinal fusion for arthritis in the low back is a similar story; evidence to support its use is limited at best and severe persistent pain after surgery or return of pain over time is not uncommon. Is this really the best that modern medicine can do?

Let's go back to how normal healing occurs. All of our body tissues are struggling with constant wear and tear versus growth and healing. Micro-damage occurs all of the time. The normal tissue healing response is to send over platelets from the blood and to stop bleeding if present. Platelets then initiate the three phases of healing: inflammation, proliferation, and remodeling. Many growth factors are released from the platelets and serve as signals to orchestrate and organize the resources needed to repair the damage and regenerate new tissue. Stem cells (immature cells that can ultimately turn into any type of tissue when signaled appropriately) are also called to the area. Sometimes this process is impaired and unable to overcome the forces of degeneration.

Two common forms of degenerative conditions that result in chronic pain are osteoarthritis (OA) and tendinopathy. OA develops when there is an imbalance between the normal synthesis and breakdown of cartilage leading to pain and joint stiffness. Common sites include: the neck, low back, hips, knees, big toe, and thumb. It affects 30% of people ages 45 to 64, and 68% of those over age 65. Tendinopathy is a form of chronic pain that affects tendons which are the connections of muscle to bone. It is common in recreational and professional athletes and with occupational repetitive motion. Common tendons affected include: achilles, patellar (Jumper's knee), hamstring, elbow (Golfer's elbow and Tennis elbow), rotator cuff of the shoulder, and abductor cuff of the hip.

Once conservative options have failed, what exists besides surgery for these chronic degenerative conditions? With its origin in the concepts of prolotherapy (injection of irritants into ligaments as a way to stimulate inflammation and reengage the healing cascade), Regenerative Medicine has continued to gain favor. As an expansion of this concept, concentrated platelets from the blood (platelet rich plasma therapy also known as PRP) or stem cells from one's bone marrow can be placed with strategic precision in these areas of tissue damage to stimulate healing and regeneration. In promising soon-to-be published research, patients with knee OA showed that 90 to 95 percent feel an average of 60 percent improvement up to three years later even with advanced arthritis when patients were treated with their own bone marrow derived stem cells. In tracking more than 1000 patients for up to 5 years, stem cells administered through image guided injections through the skin were shown to be extremely safe.

As for tendinopathies, physicians have traditionally tried using oral anti-inflammatory medications and injectable steroids. The rationale for these treatments has been recently questioned with evidence of detrimental effects on tendon healing and strength. PRP injections have been proposed as a promising alternative. One study investigating the use of ultrasound guided PRP injections for tendinopathies resulted in 82% of patients reporting moderate to complete improvement in symptoms.

So, if you suffer from OA or tendinopathy related chronic pain, the first step to improving your quality of life is to talk to an experienced physician who can discuss the full gamut of treatment options with you. I suggest exhausting your options and leaving surgery as a last resort. 📌