

Prolotherapy 101: What is a Sugar Water Injection?

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What is this “sugar water” injection that everyone is talking about, and how can they help with healing and pain?

Prolotherapy has been around since the 1930s when Dr. Earl Gedney, an osteopathic physician, developed a technique to heal his own injured ligaments when he hyperextended his thumb on closing surgical doors.¹ However, in the 1950s Dr. George Hackett named the technique prolotherapy after observing a growth of new tissue at the junction of ligament and bone following an injection of a proliferant solution to the area.²

The theory behind prolotherapy is that when ligaments and tendons are loose or injured, they no longer provide stability to the joints they surround. The body then compensates by using the muscles around the injured region to provide the stabilization, resulting in muscle spasm.

Ligaments and tendons have relatively poor blood supply; however, they are richly innervated with pain fibers.² When ligaments and tendons get injured, they never completely heal to their pre-injured state, and the recovery is usually prolonged. Chronic pain can ensue when there is lack of healing of these tendons and ligaments.

Understanding Sugar Water Injections

Prolotherapy involves injecting an irritant solution, usually a combination of dextrose (sugar), saline (salt), and a local anesthetic such as lidocaine. However, there are other solutions that can be used such as concentrated 23.4% saline and platelet-rich-plasma (PRP), to name a couple.

This irritant solution is injected into ligaments and tendons where they attach to bone (also known as entheses) to restimulate the body's natural injury-healing process. This occurs over a period of 6-8 weeks. The new connective tissue that is laid down will then mature and become stronger over the next 12-24 months,³ which should provide more stability and decrease pain stemming from these structures.

When Do We Recommend a Sugar Water Injection

Prolotherapy can be a better option for pain and recovery than the usually accepted treatments such as corticosteroids (e.g., cortisone injections) and non-steroidal anti-inflammatory (NSAIDs) medications. This is important to note because studies have shown that corticosteroid injections are harmful to tendons, ligaments, and joint cartilage.¹⁶

In addition, NSAIDs have been shown to impair healing at the entheses¹⁷ and damaged cartilage.^{18,19} Also, NSAIDs appear to significantly elevate cardiovascular risk. In contrast, prolotherapy has been demonstrated to be a safe alternative therapy for a variety of painful conditions.^{7,F}



What Are They Used to Treat?

There have been animal studies^{4,5,6} that have shown an increase in ligament and tendon thickness after prolotherapy injections compared to controls. Studies have also shown prolotherapy may be effective in treating chronic pain by modulating Substance P, a pain-producing molecule found in sensory nerve fibers, thereby reducing the transmission of pain signals.^{A,B} This may explain the rapid pain reduction some patients experience following prolotherapy injection.^C

There are multiple publications on prolotherapy, demonstrating its benefit in treating chronic musculoskeletal and sports injuries associated with unhealed ligament and tendon damage, which if left untreated can lead to the sequelae of unstable joints, osteoarthritis, and eventually pain.^{7,8,9}

Chronic tendinopathy due to repetitive/overuse injury can be treated with prolotherapy with studies showing benefits in pain and function in individuals with tennis elbow.^{10,11} A review published in February 2019 looked at corticosteroids, prolotherapy, and PRP for treatment of rotator cuff tendinopathy, and concluded that prolotherapy and PRP provided significant pain reduction and improvement in shoulder function in the long term (more than 24 weeks), compared to corticosteroid injections, which only provided short-term relief of pain and improved function.¹²

However, prolotherapy has also been proven to provide equally good short-term (3-12 weeks) pain reduction and functional improvement when compared to corticosteroid injection for rotator cuff-related shoulder pain.^D Prolotherapy has also been shown to be superior to exercise alone for improvements in pain and function related to knee osteoarthritis.¹³

A recent meta-analysis, including over 300 patients with knee osteoarthritis, found prolotherapy significantly improved knee pain and function when compared to placebo injection or exercise alone.^E In addition to these studies, prolotherapy has also been shown to significantly improve pain long-term at 15 months when compared to corticosteroid injections in patients with sacroiliac joint pain¹⁴ and neck pain studied 1 to 39 months post-treatment.¹⁵

How Many Injections Do You Need?

Typically, one treatment session of prolotherapy will not provide a complete resolution of pain. The number of sessions needed for treatment depends on the injury's extent and the individual's overall health. If you have musculoskeletal pain that does not seem to heal and are uninterested in surgery, prolotherapy may be a good treatment option for you. To learn more about these injections and see if you are a good candidate, please call our office and make an appointment.

Please note that there are different providers (DO, MD, and NMD) that perform prolotherapy in Arizona, and we recommend that you do your research on the credentials and training of these providers (such as their educational backgrounds, what conferences they have attended to learn prolotherapy techniques, and how they perform their prolotherapy).



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Here at Desert Spine and Sports Physicians, we perform these injections under ultrasound guidance, fluoroscopic guidance, and palpation guidance. Our providers attend yearly conferences on prolotherapy and regenerative medicine to keep up and improve their skills as prolotherapists.

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