

## **General Information Related To Prolotherapy**

by K. Dean Reeves, MD

**1. Definition Of Prolotherapy:** Prolotherapy is injection to create growth of normal cells, tissue, or organs. Prolotherapy is most commonly performed by injecting a solution that stimulates growth factor production in order to produce new tendon/ligament/cartilage tissue for the purpose of tightening and strengthening loose or weak tendons or ligaments or repairing cartilage in a joint. Growth factors are complex proteins that cause cell growth and repair.

**2. How Dextrose Injection Causes Growth:** Dextrose is a simple sugar that is the main fuel for our body cells. If given by mouth it is digested, but if injected, it has three main effects that cause growth of cells:

Direct dextrose growth effect: Research in diabetics has shown that a number of different types of cells grow when exposed to even a slight increase in dextrose concentration in the fluid outside of the cell.

Osmotic growth effect: Cells surrounded by concentrated solution shrink by losing fluid (osmosis) which causes an increase in growth factors.

Inflammatory growth effect: If the dextrose concentration is more than 10%, it also causes temporary inflammation which causes an elevation in growth factors. Dextrose causes growth of normal tissue, not scar tissue.

**3. How Chronic Non-Joint Pain is Helped by Prolotherapy:** Chronic pain is very often from strain (tendon damage) or sprain (ligament damage) which can occur for injuries or just overuse. This is because many nerve endings are present in tendons and ligaments and when stretched due to weakness in the structure, they will cause pain. The patient feels tight as muscles try to protect the area but the problem is loose or weak connective tissue. Normal repair takes 6-8 weeks and is often incomplete. Normal repair attempts to thicken and tighten the weak and loose tendon/ligament and requires growth factor elevation. If the tendon or ligament does not get tight or strong enough, the muscles stay chronically tight causing stiffness and the nerves continue to be stimulated causing pain with movement or at rest. Growth factor elevation is only increased for several weeks after injury. Injection to raise growth factor levels causes the repair cycle to be repeated, allowing the tendon or ligament to get stronger and then decrease or eliminate symptoms. Indications of damage to tendons/ligaments can include referred symptoms such as pain, numbness, or coldness, symptoms of looseness such as clicking, popping, or feeling out of place or loose and secondary changes in muscle such as weakness, tightness, or twitches seen in muscle with stimulation of the weak/irritable area in the tendon/ligament. (Twitch contractions).

**4. How Myofascial Pain is Helped by Prolotherapy:** Myofascial pain is pain from a trigger point. A trigger point is an irritable area in tendon/ligament, or muscle. Trigger points imitate a patient's pain when pressed upon, and twitch contractions are twitches in muscle that occur when an irritable area is touched with a needle or strummed across with the fingers. Many have considered myofascial pain to be primarily from muscle, forgetting that trigger points in muscle are likely secondary to the underlying problem in the nearby ligament or tendon. Myofascial pain is almost always from sprain/strain either via injury or overuse, and the damage is actually in ligament or tendon. (Muscles heal much better than tendons and ligaments. The twitch contractions are actually just reflex changes in the muscle that occur when it is nearby an irritable tendon or ligament. Prolotherapy repairs the tendon or ligament, stopping the reflex reactions of muscle.

**5. How Nerve Root Problems are Helped by Prolotherapy:** Pain or numbness going down an arm and leg is not often due to nerve root problems. Much more common is referred numbness or pain from a weak tendon or ligament. This can come directly from nerves in the tendon or ligament or from secondary reactions and referred pain from muscle. By injecting to strengthen the ligament or tendon, the radiating pain stops. It is also helpful to recognize that the spine is supported by ligaments. If the ligaments are weak, the spine support is inadequate and the disks take too much pressure. This can cause herniation of disks and degenerative changes. By stabilizing the ligaments about the spine, less tendency for pressure on nerve roots occurs.

**6. How Arthritis Pain is Helped by Prolotherapy:** Arthritis Pain: Arthritis pain does not come from the cartilage padding in the joint, which has no nerve endings. Instead it comes from the bone surface itself, which has a thin layer of cartilage covering it, or from tendons or ligaments within or around the joint or the capsule (fluid containing membrane) of the joint. Most arthritis pain is NOT inflammatory, and this is why arthritis medications have limited effectiveness. In addition to other treatments for arthritis, and general pain treatment described in the treatment brochure, growth factor injection into and about the joint is utilized in this clinic in order to:

- 1) Repair the cartilage layer on top of bone surfaces. The type of fibroblast that grows after injection appears limited in its ability to fill in cracks or grow new cartilage on top of bone that has lost all its cartilage surface. The thick cartilage within a joint has no nerve endings, but the bone surface, which is lined with cartilage also, has many nerve endings. Prolotherapy appears to primarily affect the cartilage layer directly on top of the bone surface. This may be why patients who have no cartilage showing on X-Ray often react well to treatment. (As long as the cartilage surface directly on the bone is healthy pain can be minimal or absent).
- 2) Reduce joint looseness. Substantial scientific literature supports a close relationship between joint looseness and arthritic spur formation.
- 3) Eliminate pain sources from ligaments and tendons both inside and around the joint.

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