

## **PROLOTHERAPY - - LIGAMENTOUS RECONSTRUCTION BY INJECTION**

Prolotherapy involves the injection of irritant solutions into weakened or stretched ligaments, which are a source of chronic pain. This induces an inflammatory response, which **mimics the normal repair sequence** of the body. All injections are done directly onto the ligament-bone junction. Thus ligaments are "peppered" with multiple injections. This is very different from trigger point injections or steroid injections in both technique and physiology.

The normal healing sequence involves the production of an anti-inflammatory exudate, peaking at 24 hours and subsiding. At three days, the proliferation of fibroblasts predominates. By seven days, new collagen is found and this is followed by dense fibrous tissue by eight weeks. The process continues on beyond this time up to three to twelve months.

Studies of proliferant treated ligaments from rabbits and rats have shown increases in ligament thickness, ligament mass, and mass to length ratios. Studies of human ligaments treated with prolotherapy have demonstrated fibroblastic hyperplasia and statistically significant increases in the diameter of collagen fibers on electron microscopy. Biomechanical measurements of ligament junction strength in proliferant treated rabbit medial collateral ligaments have shown increased bone to ligament junction strength over saline injection controls.

Hackett published a monograph in 1956 in which he cited a cure rate of 82% in 1,600 low back pain patients followed for two to twelve years. He reported no significant side effects or complications. During the 1960's, the use of potent chemical irritants and incorrect needle placement resulted in three cases of paralysis and two deaths. These tragedies are avoidable with correct needle placement and dextrose based solutions.

Ongley introduced a dextrose-glycerine-phenol based solution in the 1960's. He also emphasized the importance of movement in proper healing. This resulted in a randomized double blind clinical trial that was reported in Lancet. Patients with chronic refractory low back pain were randomized into treatment and placebo groups of forty and forty-one patients. The treatment group received forceful low back manipulation and a series of proliferant injections while the control group received manipulation and saline injections. Both groups were instructed in repetitive flexion exercises. Six months after injection, 87.5% of the prolotherapy group was improved 50% or more versus 39% in the placebo group. Fifteen of the treated group had zero disability scores at six months versus four in the placebo group. This is one of the few studies in the treatment of low back pain to show a dramatic difference between treatment and placebo groups.

Yelland reported a randomized trial in Spine 2004. One hundred ten participants with nonspecific low-back pain of average 14 years duration were randomized to have repeated prolotherapy (20% glucose/0.2% lidocaine) or normal saline injections into

tender lumbo-pelvic ligaments and randomized to perform either flexion/extension exercises or normal activity over 6 months. Ligament injections, with exercises and with normal activity, resulted in significant and sustained reductions in pain and disability throughout the trial. Significant and sustained reductions in chronic low-back pain and disability were observed with glucose/lidocaine injections for 2 years.

Prolotherapy offers a safe, effective means of treating ligamentous weakness, dysfunction, and pain in the chronic patient, which probably represents a significant portion of chronic musculoskeletal dysfunction and pain. It does require an in depth knowledge of anatomy and training in the use of proper solutions and needle placement. It can safely be used to relieve dysfunction in any articular ligaments depending on their accessibility. Thus it is ideal for chronic back, neck, shoulder, elbow, wrist, hip, knee, and ankle pain of ligamentous origin. It is also ideal for intraarticular temporomandibular joint, knee, shoulder, and ankle injections.

**Prolotherapy** (prolo-proliferation) involves the injection of irritants, commonly dextrose, into ligamentous structures in the neck, back, or extremities which cause those structures to be strengthened and thus improve support, improve function, and relieve pain. This procedure dates back to the late 1940's, although may have been in practice at the time of Hypocrites. It involves injecting dextrose (sugar water), lidocaine (numbing medicine), and sometimes sodium morrhuate (cod liver oil), phenol or pumice into structures that have been damaged, sprained, or are loose, causing chronic pain. This procedure does not involve the injection of steroids (such as cortisone). Experiments in animals and humans have shown that such structures are strengthened and thickened by this therapy. Studies have shown this to be an effective therapy in relieving chronic pain originating from damaged ligamentous structures.

**COMPLICATIONS:** There are potential complications from this procedure. Injections are always done directly onto bone. This is an additional safety factor to avoid nerves and blood vessels. However, since we are injecting around nerves and around the spinal cord at times, nerve damage can occur. This may cause increased pain, permanent numbness, infection, abscess, weakness, spinal headache, arachnoiditis (inflammation of the membrane covering the spinal cord), pneumothorax (collapse of the lung, which may require hospitalization and possibly a chest tube), allergic reactions, dizziness and nausea, and other disability. There is the possibility of complications due to the injection of anesthetic, drug reactions, or other factors, which may involve other parts of your body, including the possibility of brain damage, death, heart attack and stroke.

**PROCEDURE:** Prolotherapy involves injecting small amounts of a solution into ligamentous structures that are sprained and/or weak. Depending on the site and size of the area involved, this may necessitate many injections at one office visit. These injections are uncomfortable because they require multiple needle sticks. The skin will be numbed prior to the deeper injections. Many patients tolerate these injections well, but pain medication and Valium may be required for pain control prior to the procedure. You will need someone to drive you to your appointment if you use these medications prior to your appointment.

After the procedure, most patients feel fullness and numbness in the areas injected. Often times, their pain is relieved or changed at this point because of the local anesthetic. Subsequently, over the next 24 to 48 hours, the pain may return and may be initially more severe. It then gradually reduces in intensity over the next three to four days. Another group of patients finds that after injection they have little or no pain and that their pain stays relieved permanently. Another group of patients finds their pain is relieved initially but returns after two to three weeks necessitating further injections. Most patients show functional gains with each set of injections given.

The number of injections to obtain relief varies considerably from patient to patient and injury to injury. Some people are relieved totally with one injection; others require a series of injections. Generally, if there is no relief after three to four injections, we will not pursue this therapy any further. After the injections, pain medications will be prescribed and may be utilized in the first three days. Also a Lidoderm Patch can be applied twelve hours on and twelve hours off to the painful areas. Ice can also be utilized and supplemental Tylenol may also be used for discomfort. Remember **NOT TO USE** any anti-inflammatories or aspirin while receiving prolotherapy as they blunt the response to the therapy. Patients are encouraged to do regular stretching exercises after the third day but not to over stress the areas to allow proper healing. Increasing vitamin C intake and protein intake while receiving the prolotherapy promotes healing and is recommended. Smoking will delay your healing. It is important to remember that even if your pain is relieved and structures strengthened, it is possible to re-injure yourself at some time in the future. If you are having your neck injected or if you require pre-procedure anesthesia, you must have someone with you so that they can drive you home. Generally injections are done at intervals of four to six weeks. However, individual cases may require more frequent injections initially.

Web sites for more information:

[www.berenbeimosteopathic.com](http://www.berenbeimosteopathic.com)

[www.healthmark.org](http://www.healthmark.org)

[www.getprolo.com](http://www.getprolo.com)

[www.aaomed.org](http://www.aaomed.org)

[www.acopms.com](http://www.acopms.com)