

## A New Treatment Option in Osteoarthritis: Prolotherapy Injections

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### Abstract

Osteoarthritis is the most common degenerative disorder, and one of the major causes of physical disability in adults. Unfortunately many people experience arthroplasty or other major surgeries, in spite of improvements of the conservative options. There is a need for efficient treatment methods in this group of patients. Prolotherapy is one of the simple and safe injection-based complementary method and its efficiency was proved in the musculoskeletal problems. The aim of this article is to present current perspectives of prolotherapy in osteoarthritis.

**Keywords:** Osteoarthritis; Prolotherapy injections; Knee joints; Chondromalacia Patella; Carpometacarpal joints; Metatarsal joints

### Introduction

Prolotherapy is an injection-based complementary method, has successfully used musculoskeletal problems including tendinopathies and ligament-tendon injuries [1-3]. Because of the successful results of the previous studies, indication range was extended and prolotherapy injections have started to use for joint problems including degenerated intra and extra-articular ligaments, chondral lesions, early and late stages of osteoarthritis [4,5].

The injection solutions are prepared in combination of distinct concentrations of hypertonic dextrose, erythropoietin (10-25%) and local anesthetic solutions (lidocaine, sensorcaine, xylocaine, etc.) [6-10]. The optimal concentration and combination remains uncertain [6,7]. Dextrose solutions below the concentration of 10%, stimulate proliferation of cells and tissue but do not effect on histological inflammatory reaction; the concentrations greater than 10%, provide osmotic rupture of growth factors and inflammatory cells that initiates the wound-healing cascade [11,12]. No animal or clinical study in the literature that compared the effectiveness of distinct concentrations or combinations of prolotherapy solutions [11,13].

Mechanism of action is considered to osmotic rupture of local cells and increase of growth factors in the extracellular matrix. This lead to deposition of new collagen and subsequent healing [8,14,15].

### Knee osteoarthritis

Knee is the most effected joint by osteoarthritis. Various treatment methods are described for the treatment of knee osteoarthritis including shoe modification, non-steroidal anti-inflammatory medicines, physical rehabilitation, platelet-rich plasma and stem cell therapy. The symptoms are completely recovered with foregoing treatment modalities in some of the patients, but in majority of the

patients symptoms are persisted or exacerbated and ultimately surgical procedures inevitably for this group. There is a still need for more efficient treatment methods for patients with osteoarthritis. Prolotherapy injections were recently used in the treatment of knee osteoarthritis. Most of the studies reported beneficial outcomes about prolotherapy injections; especially in the decreasing of pain scores and improvement of knee functions [16-19].

Injection procedures vary according to studies; some authors preferred single intra-articular injection. Others preferred combined intra-articular and extra-articular injections for bony attachments of LCL or other ligaments. Because of the ligament injuries that commonly accompanied to osteoarthritis in the younger ages, and extra-articular degenerated ligaments in the elderly patients, mechanic instability is commonly accompanied to osteoarthritis. The studies, which preferred combined injections, declared beneficial outcomes in terms of reduction in pain scales, healing of knee ligaments and improving of mechanic stability of knee joint in the osteoarthritic patients with traumatic knee instability. In the studies favorable results of prolotherapy have also shown in terms of improvements of cartilage defects and healing of extra-articular injured ligaments [5,10,20], investigated long-term efficacy of prolotherapy injections in the patients with mild-to-severe knee OA and observed significant improvements in the knee functions, pain intensity, and stiffness. A randomized controlled study compared the effectiveness of prolotherapy with saline injections, and declared significantly better outcomes with prolotherapy injections [16,21] compared the efficacy of erythropoietin prolotherapy, dextrose prolotherapy and pulsed radiofrequency in the treatment of osteoarthritis, and stated that erythropoietin prolotherapy provided better outcomes than dextrose prolotherapy and pulsed radiofrequency.

### Patellafemoral syndrome (Chondromalacia patella)

Chondromalacia patella is common disease of knee, accompanied by chronic pain and dysfunction. The cartilage of the patella is

degenerated and thinned in the advanced stages of the disease, and if it is not properly treated, it could induce disruption of knee cartilage and other structures, and eventually resultant osteoarthritis [22,23] researched the efficiency of prolotherapy in the treatment of chondromalacia patella in a retrospective study. They proclaimed successful outcomes with prolotherapy injections in terms of enhancing the knee functions and pain relief. There is a need for prospective and comparative studies in this area.

### Osteoarthritis of carpometacarpal joints

Osteoarthritis commonly affects minor extremities in elderly and there is no efficient treatment strategy exists for this condition [24]. Corticosteroid injections are the commonly preferred method and clinical benefits were declared in the short time period, however effectiveness of this method was temporary and most of the symptoms recurred in the long-term [25] compared prolotherapy and corticosteroid injections in the treatment of osteoarthritis of the first carpometacarpal joint. They obtained better outcomes with corticosteroid injections than prolotherapy in the short time (1 month). However some symptoms turned back in the long-term in the corticosteroid group. In the 6 months of first injection, prolotherapy group had significantly better clinical results than corticosteroid group, especially in phalanx functions and pain.

### Conclusion

As a simple, efficient and safe option; prolotherapy injections can be considered as a first-line conservative method for osteoarthritis. In spite of successful results of the aforementioned studies, there were few clinical and animal studies investigated prolotherapy injections for osteoarthritis and most of them have limited participants, short-term follow-up or poor quality studies. The optimal injection procedure remains obscure; studies used different combinations and concentrations. There is still need for more high-quality studies researched ideal strategies of the prolotherapy injections in treatment of osteoarthritis.

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