Title: Hypertonic Dextrose Injection (Prolotherapy) to Multiple Tissues for Knee Osteoarthritis: Long Term Outcomes

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Abstract

BACKGROUND: Knee osteoarthritis (OA) is a common, debilitating chronic disease; pain generating tissue includes intra-articular structures such as cartilage, bone and synovium; and peri-articular supportive structures including ligaments and tendon attachments, and fascia. Prolotherapy is an injection therapy for chronic musculoskeletal pain. Injections are placed in the intra-articular knee space, and at the attachments of periarticular structures with extravasation to multiple fascial planes. Recent 52-week randomized controlled, and open label studies, have reported improvement of knee OA-specific outcomes compared to baseline status, and blinded control injections ($p<.05$). However, long term effects of this intervention are unknown. We therefore assessed long-term effects of prolotherapy on knee pain, function and stiffness among adults with knee OA.

METHODS: This post-randomized clinical trial, open-label follow-up study enrolled adults with mild-to-severe knee OA completing 52-week prolotherapy studies. Participants received 3-5 monthly dextrose prolotherapy injection interventions and were assessed using the validated Western Ontario McMaster University Osteoarthritis Index, (WOMAC, global knee score, 0-100 points) and the Knee Pain Scale (KPS, individual knee pain, 0-5 ordinal scale) at baseline, 12, 26, 52-weeks, and 2.5years.

RESULTS: 65 participants (58±7.4years old, 38 female) received 4.6±0.69 injection sessions. They reported improvement in WOMAC scores at all time points in excess of minimal clinical important improvement benchmarks during the initial 52-week study period, from 13.8±17.4 points at 12 weeks, to 20.9±2.8 points, ($p<.05$) at 2.5±0.6years in the current analysis. A post-hoc analysis revealed the majority of participants (53/65, 82%) reported improved composite WOMAC scores at 2.5±0.6years compared with baseline status; their mean composite WOMAC score increase was 28.3±17.5 points. KPS scores of injected knees were consistent. Additionally;

participants had less severe baseline KPS-specific knee pathology in un-injected knees but reported a substantial, statistically significant improvement in KPS scores for severity (63%, p=0.05) in un-injected knees at 2.5±0.6years, suggesting compensatory effects.

CONCLUSIONS: Prolotherapy injections to intra-articular and fascia- invested knee joint structures resulted in safe, significant, progressive improvement of knee pain, function and stiffness scores among most participants through a mean follow-up of 2.5years and may be an appropriate therapy for patients with knee OA refractory to other conservative care. Results suggest the need for future studies to assess the effect of prolotherapy on knee OA pain generators including fascial structures.

Abbreviations: RCT, randomized controlled trial; BMI, body mass index; WOMAC, Western Ontario McMaster University Osteoarthritis Index; KPS, knee pain scale; MCII, minimal clinical important improvement.

Disclosures:

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The University of Wisconsin Institutional Review Board approved the study protocol.

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