

**SYNOVIAL FLUID GLYCOSAMINOGLYCAN AND CHONDROITIN SULFATE EPITOPES 3B3 AND 7D4 IN HUMAN OSTEOARTHRITIS AFTER EXERCISE**

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**Objective:** Walking exercise alleviates some symptoms, such as pain, in patients with mild to moderate knee osteoarthritis (OA). However, a major concern is that weight-bearing exercise on osteoarthritic joints may exacerbate articular cartilage degradation. Loading of articular cartilage depleted articular cartilage *in vitro* increased expression of chondroitin sulfate epitope 3B3, suggesting that loading may influence the metabolism of osteoarthritic cartilage. The purpose of our study was to determine the effects of walking exercise on articular cartilage metabolism in patients with knee OA, as reflected by changes in concentrations of synovial fluid markers.

**Methods:** Thirty elderly patients with knee OA (Kellgren-Lawrence grade II to IV) were randomized into control (n = 15) and twelve-week walking exercise groups (n = 15). Synovial fluid obtained at time zero and after twelve weeks was analyzed for the chondroitin sulfate epitopes 3B3, 7D4 and total glycosaminoglycan (GAG) concentrations. The 3B3/GAG and 7D4/GAG ratios were calculated.

**Results:** There were no significant changes in concentrations of 3B3, 7D4, GAG, 3B3/GAG or 7D4/GAG between time zero and twelve weeks in either group. However, at twelve weeks, GAG concentration in the exercise group ( $32.84 \pm 4.9$  ug/ml) was significantly less than in the control group ( $48.97 \pm 7.5$  ug/ml) ( $P = 0.009$ ). Also found was a significant decline in 3B3 ( $P = 0.0027$ ) and 3B3/GAG ( $P = 0.0077$ ) with walking, that was unrelated to treatment, radiographic grade, sex or body mass index.

**Conclusion:** Twelve weeks of walking exercise had no demonstrable effects on articular cartilage metabolism, as reflected by the concentrations of synovial fluid GAG or chondroitin sulfate epitope 3B3.

**MATRIX METALLOPROTEINASE 3 CONCENTRATIONS IN SYNOVIAL LAVAGE AND SERUM FROM PATIENTS WITH ANTERIOR CRUCIATE LIGAMENT R KNEE INJURY**

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**Objective:** To investigate the concentrations of pro-matrix metalloproteinase 3 (pro-MMP 3) in knee synovial lavage and serum in patients with injury to the anterior cruciate ligament and/or meniscus.

**Methods:** Synovial lavage and serum samples were collected from 256 patients with trauma and tear of the cruciate ligament, alone or in combination with meniscus tear. Diagnosis was confirmed by arthroscopy and cartilage damage was assessed according to an osteoarthritis (OA) Score: Scoring was from 0 to 4 based on the findings at arthroscopy, as follows: 0 = normal cartilage, 1 = chondromalacia, 2 = superficial fibrillation, 3 = deep cartilage clefts, 4 = bony erosions. Concentrations of pro-MMP 3 were determined by sandwich enzyme immunoassay, using polyclonal antibodies.

The median concentrations of pro-MMP 3 in synovial lavage was 0.6 ug/ml (range 0.6 to 42273.0). Concentrations of pro-MMP 3 in the

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**A META-ANALYSIS OF CHONDROITIN SULFATE TREATMENT OF OSTEOARTHRITIS**

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**Objective:** To examine the efficacy of chondroitin sulfate treatment of osteoarthritis (OA) on the basis of a meta-analysis of published controlled clinical trials.

**Methods:** After personal and Medline searches, a meta-analysis of the available publications was performed. Types of joint involvement studied, study designs, number of patients enrolled and variables analyzed. The Lequesne index and VAS of pain were considered the main variables. Of 16 publications found, seven trials including 3,000 patients could be enrolled into the meta-analysis. Although not all claimed to be of randomized, double blind design, the results should be noted, that CS was given along with analgesics, thus yielding required dosage of co-medication a concern.  
**Results:** CS was shown to be significantly superior to placebo with respect to the Lequesne index and the VAS of pain. The meta-analysis confirmed these results and showed at least 50% reduction in study variables in the CS group compared to placebo. In the CS treated patients co-medication with NSAIDs and analgesics was significantly reduced in comparison to placebo. Side effects were well tolerated, interestingly the frequencies of adverse effects were consistently higher in the placebo groups compared to CS treated patients.

**Conclusions:** The results of this meta-analysis suggest that CS is useful in OA, but further investigations in larger controlled trials over longer time periods are needed to prove the usefulness of chondroitinsulfate as a symptom modifying drug in OA.

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**PULSED SIGNAL THERAPY FOR THE TREATMENT OF OSTEOARTHRITIS: A DOUBLE BLIND AND PROSPECTIVE STUDY RECRUITING OVER 35,000 PATIENTS**

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Double-blind clinical trials and other open label protocols have been conducted over a ten year period in the USA, Canada, Germany, to determine the effectiveness of the pulsed magnetic field treatment termed Pulsed Signal Therapy for the treatment of osteoarthritis of the knee, hip, lower back and neck.

Controlled double-blind and prospective open label trials have been conducted by Dr. David H. Trock and Alfred J. Bollet at Danbury Hospital (Teaching Affiliate of Yale University School of Medicine), University of Vancouver, Canada; Prof. Menkes, Coker University, Prof. Radaelli, Ospedale Niguarda - Ca Granda, Milan, Italy; Prof. von Gumpfenberg, TU University School of Medicine, Munich, Germany. Over 35,000 patients have been studied to date.

Initially, 18 half-hour treatments and later 9 one-hour treatments were given in a placebo in the double-blind and active in the prospective study. The study was conducted in thirty-five thousand patients over the USA, Canada and Europe. Pain was evaluated using the WOMAC and OMERACT III validated instruments of outcome measurement. Pain was measured using WOMAC and modified Ritchie scale. Improvements were evaluated by the patient and examined by the physician.

Matched pair tests and other statistical analysis