The Effects of $n$-3 Polyunsaturated Fatty Acids on Cartilage Metabolism in Patients with Osteoarthritis: the Results of a Pilot Clinical Trial


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Introduction: Previous work in our laboratory has shown that exposure of pathological osteoarthritic cartilage to $n$-3 polyunsaturated fatty acids (PUFAs) caused abrogation of enzymes that degrade cartilage in arthritis and inflammatory mediators and factors that propagate pain and inflammation in degenerative joint diseases. The aim of the current pilot clinical trial was to extend these in vitro observations to studies in vivo to see if a benefit to patients could be shown.

Methods: For this clinical (blind) trial, 31 patients were recruited 10-12 weeks prior to their scheduled elective surgery for total knee replacement. Half were provided with cod liver oil capsules (2g/day) and the other half were provided with capsules that contained an edible oil mixture (as U.K. diet) with the same calorific content as the cod liver oil. At surgery, cartilage, synovial fluid and synovium were harvested as human surgical waste and analysed. In addition, pre-operative and post-operative blood samples were taken to evaluate PUFA content. All procedures had Local Ethical Committee approval.

Results: During the study 6 patients dropped out, thus the data was from 25 patients (9 males, 16 females; ages 43-83 years). 86% of patients that had received the cod liver oil (CLO) supplement had a reduction or abrogation of their endogenous aggrecanase (enzyme that breaks down cartilage) activity compared to 26% of the patients receiving placebo oil. A similar reduction was seen in endogenous collagenase activity (73% in CLO treated patients versus 18% in the placebo group). Gene expression for aggrecanases was reduced in 93% of those patients receiving CLO and there was also a reduced level of expression of the inflammatory mediators IL-1 and TNF.

Discussion: In summary, the trial has shown that patients with osteoarthritis can benefit from taking cod liver oil prior to their joint replacement surgery.