**Omega-3 fatty acids and synovitis in osteoarthritic knees**

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**KEY POINTS FROM THIS ARTICLE:**

1) “Recently reported associations between synovitis, cartilage damage and plasma levels of omega-3 and omega-6 fatty acids in patients with osteoarthritis suggest that fish oil supplements might be beneficial additions to the therapeutic regime in this disease.”

2) Osteoarthritis (OA) is characterized by degeneration and loss of articular cartilage, and accompanying synovial inflammation (synovitis).

3) Synovitis can cause swelling, tenderness and restricted movement in OA patients.

4) In OA, inflammatory cytokines (IL-1B, TNF, IL-6) amplify the pathophysiological processes that result in joint damage.

5) In OA, low-grade inflammation influences the long-term outcomes in patients.

6) Treatments that safely reduce the inflammation underlying cartilage degeneration in OA are important.

7) Plasma levels of long chain omega-6 (n-6) and omega-3 (n-3) fatty acids correlate with MRI evidence of synovitis in the knees of patients with OA.

8) The inflammatory effects of omega-6 eicosanoids derived from arachidonic acid are greater than the anti-inflammatory effects derived from the omega-3 fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).

9) The “availability of arachidonic acid for production of inflammatory eicosanoids could be a predisposing factor for synovitis in early OA.” [Key Point]

10) The n-6 (AA) and n-3 (EPA) fatty acid ratios could be more important than the absolute amounts of these fatty acids.

11) “EPA and DHA reduced expression of degradative enzymes and inflammatory cytokines.”

13) Established benefits for omega-3-rich supplements in patients with rheumatoid arthritis include:

- Reduced symptom severity
- Increased remission
- Improvement in markers of cardiovascular risk
- Decreased use of NSAIDs

14) “The reduced use of NSAIDs is important as these drugs—whilst providing a prompt analgesic effect—have not been shown to improve long-term outcomes in RA, and their use can distract clinicians from prescribing more effective long-term disease-suppressing agents.”

15) “Moreover, NSAIDs are associated with an increased risk of potentially life-threatening gastrointestinal bleeding and serious thrombotic cardiovascular events, including myocardial infarction and stroke.” [Important]

16) “The NSAID-sparing effect and the direct collateral cardiovascular benefits are important potential advantages of fish oil use for long-term analgesia in a disease such as osteoarthritis.”

17) Treatment with omega-3 fatty acids “has the potential to play a key part in the management of patients with osteoarthritis.”

18) The omega-3 fats in dietary fish oil, EPA and DHA, inhibit the omega-6 fatty acid arachidonic acid cascade into the inflammatory prostaglandins and leukotrienes such as PGE2 and LTB4.

19) “Competitive inhibition of arachidonic acid metabolism by EPA and DHA could reduce inflammation, pain and synovitis.”

20) EPA and DHA suppress chondrocyte metalloproteinases production, and dietary fish oil has a protective effect on cartilage and subchondral bone in OA.
Omega-6 Arachidonic Acid (AA) Inhibited By Omega-3 EPA/DHA

Inflammatory Prostaglandins
PGE2
LTB4

Pain

Swelling
Neutrophil Activation

Inflammatory Cytokines Production
IL-1B
TNF
IL-6

Chondrocyte Metalloproteinases
Activation

Cartilage Degradation