**Reference:**

Plasma Phospholipid Fatty Acids and Fish-Oil Consumption in Relation to Osteoporotic Fracture Risk in Older Adults: the Age, Gene/Environment Susceptibility Study


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**Summary:**

Osteoporosis is a weakening condition of the bone that is associated with thinning and often leading to an increased risk of breaking a bone (wrist, spine, shoulder, and hip). Osteoporotic fractures are a significant health problem in the aging population. The present study was designed to determine if the long-chain omega-3 fatty acid status of an aging population in Iceland (based on circulating levels of EPA/DHA/other omega-3 fatty acids) may be related to the risk of having osteoporotic fractures. Also, the association of the frequency of fish oil consumption (a supplemental source of EPA/DHA) with fracture risk was evaluated.

The circulating omega-3 fatty acid status (known to reflect dietary and supplemental EPA/DHA intakes) was measured in the blood plasma phospholipid (as the biomarker for intake and body status) in 1438 Icelanders (average age of 77 years) who were then followed for 5-9 years with respect to fracture occurrences. The inverse relationship between higher levels of the total omega-3 fatty acids and a lower risk of osteoporotic fractures was particularly evident in men. Those men who were in the top third with respect to EPA omega-3 levels had an overall 41-45 % lower risk for having fractures as compared to those men in the bottom third for EPA levels after normalizing for confounding factors. It was of further interest that those men who took a fish oil supplement daily later in life had an overall 36-38 % lower risk of fractures as compared to those who did not take such supplements. For women, a 25 % lower risk of fracture was found in those who supplemented daily during midlife as compared to those who never supplemented. In both the men and women as mentioned, occasional (less than daily) supplementation appeared to offer some intermediary/modest benefit against fractures.
Dr. Holub’s Comments:

As expected, the circulating levels of both EPA and DHA were considerably higher in those subjects who consumed fish oil daily as compared to those who did so less often or not at all. It is also noted that, even in those who did not take fish oil supplements, the circulating levels of EPA and DHA were much higher than found in people living in North America or central Europe which most likely reflects the higher intake of fish/seafood in Icelanders. Although the cellular mechanisms for the apparent beneficial effects of long-chain omega-3 fatty acids were not studied herein, their potential effects in enhancing bone mineral density and favorably modifying inflammatory processes will be likely targets for future investigations. The present study suggests that daily supplementation with EPA/DHA from fish oil may be of benefit in reducing subsequent bone fracture risk in the elderly.