



Part 2 of 2:

Omega-3 Fatty Acids: is the hype justified?

Recently, a great deal of attention has been placed on the supplementation of omega-3 fatty acids. Good evidence supports the use of omega-3 fatty acids for the prevention of cardiovascular (CV) disease.¹ However, recently the proposed health benefits provided from omega-3 fatty acids extend far beyond CV health. Recent claims include the use of omega-3 fatty acids for depression, rheumatoid arthritis, diabetes, improved memory and brain efficiency, improved immune system function, improved recovery after injury, healthy skin, weight loss, use during pregnancy to improve cognitive function in babies, and many others.^{2,3} So, the question remains: what are the benefits of omega-3 fatty acids and who should be supplementing with them?

Strong Evidence

Hypertriglyceridemia: Fish oil from supplements or dietary sources can decrease triglyceride levels. Benefits appear to be dose-dependent, with effects at doses as low as 2 grams of omega-3 fatty acids per day. Higher doses have greater effects, and 4 grams per day can lower triglyceride levels by 25-40%. However, fish oil supplements in doses of 4 grams/day do not seem to be as effective as gemfibrozil 1200 mg/day. Fish oil supplements also appear to cause small improvements in high-density lipoprotein (HDL) by 1-3%, but they have also increased low-density lipoprotein levels (LDL) by 5-10%. Thus, benefits likely will not be seen if an individual presents with elevated blood levels of total cholesterol or LDL and other options should be suggested.^{5,6,7}

The 2006 Canadian Cardiovascular Society's Recommendations for the Management of Dyslipidemia recommend salmon oil 1 to 2 grams three times a day in combination with a statin for mild to moderate hypertriglyceridemia. To lower triglycerides in individuals with severe hypertriglyceridemia (>10mmol/L) therapy may include a fibrate, niacin, and salmon oil.⁷ The American Heart Association recommends 2 to 4 grams of EPA+DHA per day provided as capsules under a physician's care.⁸

Prevention of CV Disease: Consumption of fish oils from dietary sources (two servings of fish per week) is recommended for primary prevention of CV disease.⁶ In people with existing heart disease, several well-conducted randomized controlled trials report that regular consumption of oily fish or fish oil/omega-3 supplements reduces the risk of non-fatal heart attack, fatal heart attack, sudden death, and all-cause mortality. Consuming 1 gram/day of fish oils from fish or fish oil supplements seems to decrease the risk of myocardial infarction, stroke, and progression of atherosclerosis. One analysis indicates a 23% reduction in overall mortality and a 32% reduction in death from CV causes in people with or without CV disease while another study indicates a 16% reduction in overall mortality and a 24% reduction in death due to myocardial infarction in people with existing heart disease.⁵ The American Heart Association recommends consuming two servings of fish each week in addition to consuming oils and foods containing ALA for primary prevention and 1g of EPA + DHA per day preferably from fatty fish.⁸

Good Evidence

Hypertension: Human trials report small reductions in blood pressure with intake of omega-3 fatty acids. Reductions of 2 to 5 mmHg have been observed, and benefits may be greater in those with higher blood pressures. Doses greater than 3g per day are likely needed which increases bleeding risk so a physician should be consulted. More effective methods are available to decrease blood pressure, thus limited information exists regarding the role of omega-3 in controlling blood pressure.⁵

Rheumatoid Arthritis: Multiple randomized controlled trials report improvements in morning stiffness and joint tenderness with the regular intake of fish oil supplements for up to three months. Evidence is accumulating to support clinical improvement in "number of tender joints," "morning stiffness," and "reduced antirheumatic medication dose" in rheumatoid arthritis patients receiving 3 to 6 g per day of omega-3 fatty acids. The effects after three months have not been evaluated.⁴

Weak / Insufficient Evidence

The use of omega-3 fatty acids is possibly effective in many other conditions some of which include asthma, atherosclerosis, ADHD, bipolar disorder, depression, diabetic nephropathy, dry eyes, endometrial, breast, prostate and colon cancer, obesity, psoriasis, eczema, osteoporosis, stroke, menstrual pain, irritable bowel disease, cognitive function in the elderly, schizophrenia, arrhythmias, and cystic fibrosis.^{4,5,6} Additional evidence is required to support the use of omega-3 fatty acids in these conditions.

Ineffective

Omega-3 fatty acids have been found to have no effect on fasting blood glucose levels or in hemoglobin A1c in people with type 2 diabetes. There is also evidence indicating omega-3 is not effective in hypercholesterolemia, in preventing organ transplant rejection, or in preventing weight loss in cancer patients.^{5,6}

Use in Pregnancy

The use of omega-3 fatty acids in pregnancy is controversial. Attention has recently been placed on the use of omega-3 fatty acids to improve cognitive development in infants. A recent randomized placebo-controlled trial assessed the cognitive function of 2 & 1/2 year old infants after maternal supplementation of fish oils in pregnancy from 20 weeks gestation until delivery. Results indicated an improvement in hand and eye coordination in the fish oil group. No differences were found in overall growth, locomotor skills, social skills, speech and hearing, performance or practical reasoning. The authors of this trial also concluded that maternal fish oil supplementation during pregnancy is safe for the fetus and infant.¹⁴ Additional population research suggests that increased maternal consumption of seafood is associated improved measures of child development such as verbal intelligence quotient, communication, and social development. Researchers speculate this is likely due to increased fish oil intake but further research is needed.¹¹ Currently insufficient reliable evidence exists to rate the effectiveness of fish oils during pregnancy.

Infant Growth and Development

New parents now have the option to buy infant formula containing long chain omega-3 fatty acids (long chain polyunsaturated fatty acids (LCPUFA's)). Standard infant formulas contain only the precursor essential fatty acids, ALA (ALA, the omega-3 precursor) and linoleic acid (LA, the omega-6 precursor) from which formula-fed infants must synthesize their own DHA and AA, respectively. DHA is an important component of structural lipids of cell membranes and its perinatal availability has been related to visual acuity development, neurological development, behavior, and brain growth.⁴ Evidence indicates that formula fed infants have less DHA than infants being breastfed leading to the suggestion of DHA supplemented formula.⁴ Currently conflicting evidence exists regarding the effectiveness of PUFA supplementation in infant formula. The Cochrane Library recently reviewed 14

randomized trials to assess whether supplementation with LCPUFA's such as DHA and AA is safe and of benefit to term infants. Results indicated that there is not enough evidence from these clinical trials to demonstrate a clear and consistent benefit of supplementing with LCPUFA's with respect to visual acuity, neurodevelopment outcomes, and physical growth in term infants. In regards to safety, no harmful effects were found. The final conclusion was that data did not support the need for routine supplementation of formula for term infants with LCPUFA to improve visual acuity, neurodevelopment or physical growth.¹⁰ Further research is necessary to discover if the beneficial effects from LCPUFA's can be replicated in different settings. It is also recommended that follow up of study infants is necessary to see if there are any differences at early school age regarding visual, cognitive and physical development.

However, some evidence exists that supplementation with omega-3 LCPUFA's in preterm infants increases the early rate of visual maturation. Evidence also indicates that omega-3 supplementation benefits malnourished infants who have poor fat absorption as they tend to absorb fish oil supplement well.⁴ Additional research is necessary regarding omega-3 supplementation for infant growth and development.

Health Canada's Recommendations¹¹

Health Canada supports the use of omega-3 fatty acids for the following indications:

- To maintain good health: 100-3000 mg EPA + DHA
- To help support cognitive health and/or brain function: 100-3000 mg EPA + DHA including at least 100 mg DHA, per day
- To help support the development of the brain, eyes and nerves in children and adolescents: 150-2500 mg EPA + DHA including at least 150 mg DHA, per day
- To help maintain/support CV health: 500-3000 mg EPA + DHA, per day with a ratio of EPA:DHA between 0.5:1 and 2:1
- To help to reduce serum triglycerides/triacylglycerols: 1000-3000 mg EPA + DHA, per day with a ratio of EPA:DHA between 0.5:1 and 2:1
- To help reduce the pain of rheumatoid arthritis in adults: 2800-3000 mg EPA + DHA, per day with a ratio of EPA:DHA between 0.5:1 and 2:1

Dosing information:

| | EPA+DHA (mg/day) | | |
|---|------------------|-----|-------|
| | Min | Max | |
| Children | 1-8 y | 100 | 1,500 |
| Adolescents | 9-13 y | 100 | 2,000 |
| | 14-18 y | 100 | 2,500 |
| Adults (includes pregnant and breast feeding women) | ≥ 19 y | 100 | 3,000 |

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