



## ➤ Product Review ➤

August 2022 #361

### ***MORE CLINICALLY RELEVANT RESEARCH ON MARINE OIL SUPPLEMENTATION***

#### ***INTRODUCTION***

In the May 2022 product newsletter I featured a study that demonstrated krill oil supplementation could improve muscle size and function in older adults. This month I would like to feature two studies that focus on marine oil supplementation. The first, “Krill oil improved osteoarthritic knee pain in adults with mild to moderate knee arthritis: a 6-month multicenter, randomized, double-blind, placebo-controlled trial” by Stonehouse et al (Stonehouse W et al. *Am J Clin Nutr*, published online ahead of print July 26, 2022) consisted of krill oil supplementation again, this time in relation to moderate knee arthritis. The second, “Randomised controlled trial of fish oil supplementation on responsiveness to resistance exercise training in sarcopenic older women” by da Cruz Alves et al (da Cruz Alves NM et al. *Nutrients*, Vol. 14, 2022), similar to the study featured in the May 2022 product newsletter, considered the impact of a marine oil on sarcopenic older women. However, in the da Cruz Alves et al study, fish oil was the intervention being considered along with resistance exercise.

#### ***THE IMPACT OF KRILL OIL SUPPLEMENTATION ON OSTEOARTHRITIC KNEE PAIN***

In the above-mentioned study by Stonehouse et al, 234 adults aged 40 to 65 years were divided into two groups. 117 participants received 4 grams of krill oil supplements per day for six

months. The second group consisting also of 117 adults aged 40 to 65 years received placebo supplements. The daily composition of the krill oil was 600 mg EPA, 280 mg DHA, and 450 mg of astaxanthin.

Before, discussing the results of the study, though, I would like to feature a quote that emphasizes some of the advantages of krill oil supplementation that were featured in the May 2022 newsletter:

**“Krill are rich in the long-chain (LC)  $\omega$ -3 PUFAs EPA (20:5n-3) and DHA (22:6n-3) and the antioxidant astaxanthin, which have known anti-inflammatory effects. Structurally, krill oil differs from other dietary sources of LC  $\omega$ -3 PUFAs in that it contains a relatively high amount of LC  $\omega$ -3 PUFAs from phospholipids rather than triglycerides, which are the primary source of EPA and DHA found in fish oil. Some evidence suggests that the higher relative phospholipid content of krill oil may facilitate the incorporation of LC  $\omega$ -3 PUFAs into tissues more efficiently than fish oil.”**

What were the results? Stonehouse et al point out:

**“Knee pain score improved in both groups with greater improvements for krill oil than for placebo. Knee stiffness and physical function also had greater improvements with krill oil than with placebo.”**

Interestingly, as you will also see when I discuss the da Cruz Alves et al study, Stonehouse et al found no difference in inflammatory markers between the two treatment groups:

**“Although circulating inflammatory markers did not differ significantly between treatment groups, it does not preclude that krill oil may**

**have had localized anti-inflammatory effects within joints (not assessed). Furthermore, krill oil supplementation may have contributed to pain reduction through other non-anti-inflammatory mechanisms.”**

Given that it is almost universally accepted that the mechanism of action of marine oils, including krill, is via inflammation reduction, it is interesting that both papers suggest that the positive results seen with each study did not involve anti-inflammatory actions.

### ***THE IMPACT OF FISH OIL COMBINED WITH RESISTANCE EXERCISE IN SARCOPENIC OLDER WOMEN***

The next study I would like to discuss is “Randomized controlled trial of fish oil supplementation on responsiveness to resistance exercise training in sarcopenic older women” by da Cruz Alves et al (da Cruz Alves NM et al. *Nutrients* Vol. 14, published online July 11, 2022). The study protocol is as follows:

**“A randomized, double-blind, placebo-controlled trial is performed with thirty-four sarcopenic women (2010 European Consensus of Sarcopenia), aged ≥65 years. The participants are allocated into the following two groups: Exercise and Fish Oil (EFO) and Exercise and Placebo (EP). Both groups undertook a resistance exercise programme over 14 weeks. All participants are instructed to ingest 4 g/day of food supplements; the EP group received sunflower oil capsules, and the EFO group, fish oil capsules.”**

The fish oil capsules contained 440 mg EPA and 220 mg DHA. The EFO and EP groups were equally divided into 17 participants.

What were the results of the study? As you will see, while both groups demonstrated improvements in muscle strength, the fish oil group had a higher level of increase:

**“The main result of our study was that although participants from both groups showed an**

**increase in muscle strength and cross-sectional area (CSA) after physical training, the group supplemented with fish oil had a higher increment (23.6% higher in peak torque and 3.2% in CSA.”**

Another key finding was a higher improvement in muscle quality in the fish oil group, even though both groups improved:

**“In the present study, muscle quality improved significantly after the intervention in both groups, but the older women supplemented with fish oil showed a large increment in muscle quality (EFO group, 12.31% versus 4.22% in the EP group;  $p = 0.004$ ).”**

Why is this finding particularly important? Da Cruz Alves et al point out:

**“Muscle quality has been suggested to be a better muscle health biomarker than muscle mass because it represents an estimation of the neural and morphologic factors influencing strength.”**

What was the mechanism of the significant improvement? As with the Stonehouse et al study, contrary to what we might usually expect, reduction in inflammatory mediators was not a factor:

**“...in the present study, supplementation with omega-3 fatty acids was not associated with significant changes in the plasma concentration of inflammatory cytokines.”**

In contrast, the authors suggested that increases in the anabolic factor mTOR is the most probable explanation:

**“Evidence to date suggests that the activation of mTOR is the most probable explanation for the action of fish oil on muscle mass.”**

With the above in mind, da Cruz Alves et al conclude:

**“The use of fish oil supplementation concomitantly with strength training potentiates neuromuscular response to the anabolic stimulus from training, increasing muscle strength and physical performance in sarcopenic elderly women.”**

To learn more about our Moss Nutrition fish oil products - Krill Oil and EPA/DHA Select & EPA/DHA HP Select - see the enclosed technical sheets.