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ReachMD

www.reachmd.com
info@reachmd.com
(866) 423-7849

Dry Eye Disease: Effect of Re-esterified Omega-3 Supplementation

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Dry eye disease is a progressive condition often leading to visual loss, ocular surface damage, and overall reduction in quality of life. The most common cause of evaporative dry eye, called Meibomian gland dysfunction or MGD, results in a deficient production of the lipid layer of the tear film. Because of this altered lipid composition associated with MGD, dietary supplementation with omega-3 fatty acids has been recommended as primary therapy in both the International Dry Eye Workshop and International Workshop on Meibomian Gland Dysfunction.

I'm Dr. Alice Epitropoulos, ophthalmologist and lead author of a study published in the September 2016 issue of the journal, *Cornea*, which investigated the clinical value of omega-3 fatty acid supplementation in the management of dry eye disease. My coauthors and I selected a patented re-esterified omega-3 fatty acid supplement, called *PRN Dry Eye Omega Benefits* softgels, which as a natural triglyceride form of omega-3 fatty acids, is better tolerated and better absorbed than omega-3 fatty acids in the more common ethyl ester form.

In this multicenter, prospective, interventional, placebo-controlled, double-masked study, subjects were randomized to one of two groups: an omega-3 group receiving 4 daily softgels containing a total of 1680 mg of eicosapentaenoic acid, or EPA, and 560 mg of docosahexaenoic acid, or DHA, at a 3:1 ratio; and a control group receiving 3136 mg of linoleic acid daily for 12 weeks. Participants were measured at baseline, week 6, and week 12 for tear osmolarity, which was the primary endpoint; secondary endpoints were tear break-up time, Ocular Surface Disease Index, or OSDI, fluorescein corneal staining, and Schirmer test with anesthesia. Secondary endpoint measures of matrix metalloproteinase-9, or MMP-9, and omega-3 index, were assessed at baseline and at 12 weeks.

A total of 122 subjects were eligible for the study; 54 were randomized to omega-3 and 51 were control. Seven in the omega-3 group and 10 in the control group dropped out over the 12 weeks. The mean age of 105 subjects who completed the study was 56.8 years. Nearly 72% of subjects were female; the remaining baseline characteristics were similar among groups.

A statistically significant reduction in the primary endpoint, tear osmolarity, was observed in the omega-3 group versus the control group at week 6 and at week 12. Week 6 revealed a decrease in tear osmolarity of -16.8 mOsm/L in the omega-3 group vs. a decrease of -9.0 mOsm/L, in the control group with a P value of 0.042; and at week 12, an even greater decrease -19.4 vs. -8.3 mOsm/L was observed, with a P value of 0.004. At 12 weeks, a statistically significant increase in tear break-up time was also observed, at 3.5 seconds for the omega-3 group vs. 1.2 seconds for control, a P value of 0.002. There was also a greater than 70% increase in omega-3 index levels favoring the omega-3 group, with a P value <0.001. A 67.9% reduction in MMP-9 positivity was observed in the omega-3 group compared with a 35% reduction in the control. This was also statistically significant with a P value of 0.024. Lastly, OSDI symptom scores also decreased, by -17.0 versus -5.0, with a P value of 0.002 favoring the omega-3 group.

The authors concluded that daily oral ingestion of a re-esterified omega-3 supplement for 12 weeks compared with a linoleic control significantly improved dry eye signs and symptoms, with many of the signs improved as early as 6 weeks. This rapid response to nutritional therapy clearly supports the recommendation that dietary supplementation with re-esterified omega-3 fatty acids be included as primary therapy for dry eye disease.

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