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Omega-3 polyunsaturated fatty acids for the management of exercise-induced bronchoconstriction: insights from a meta-analysis

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Background: Omega-3 polyunsaturated fatty acids (PUFAs) are often cited as a non-pharmacological approach to the management of exercise-induced bronchoconstriction (EIB), however prior studies evaluating treatment efficacy have included modest sample sizes and yielded inconsistent results. **Aim:** To conduct a systematic appraisal of studies investigating omega-3 PUFA in adults with EIB. **Method:** Electronic databases were searched for original research up to May 2024. Inclusion criteria: adults ≥18 years with EIB comparing omega-3 PUFA (≥3 weeks EPA + DHA) vs. placebo. End-points: (1) pre-post fall in FEV_1 post indirect bronchial provocation (ΔFEV_1); (2) baseline fractional exhaled nitric oxide (FeNO). A random-effects model was used to determine the overall effect size using pre-to-post-intervention values to calculate the standard mean difference (SMD) and 95% confidence intervals (CIs). **Results:** Eight studies (n = 141) met the inclusion criteria. Five reported an improvement in ΔFEV_1 ($P<0.05$). Six studies (n = 106) were included in the meta-analysis (with three studies including FeNO (n = 60). Omega-3 PUFA attenuated ΔFEV_1 in response bronchial provocation (SMD = -0.96, [95% CI: -1.84 to -0.08], P=0.03), however substantial heterogeneity was observed between studies (I^2=87%). No significant difference in FeNO was observed (SMD = -0.62, [95% CI -2.45 to 1.22], (P=0.52). **Conclusion:** While the mechanism of action is biologically plausible, further large-scale prospective trials, with

consideration for disease severity and sub-type (i.e., T2-high vs. T2-low endotypes) are required to fully determine the effectiveness of omega-3 PUFA for the management of EIB.