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The effect of LCn-3 PUFA supplementation on body weight, body composition, and muscle function during alternate-day fasting (ADF)

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During weight loss the loss of body mass is associated not only with body fat reduction but also with a decrease in fat-free mass (FFM), related to the reduction in muscle mass and function(1). Supplementation with long-chain n-3 fatty acids (LCn-3 PUFA), in the absence of caloric restriction, results in a significant decrease in fat mass and an increase in FFM(2) along with improvements in muscle mass and strength(3). However, the impact of supplementation with LCn-3 PUFA during weight loss) remains unknown. Therefore, the aim of this study was to explore the effects of LCn-3 PUFA supplementation, in the form of Krill oil (KO), during alternate day fasting (ADF) on body weight, fat mass loss, FFM and muscle function changes in healthy overweight and obese adults.

A total of 41 men and women (age: 39.35 ± 10.4 years, BMI: 31.05 ± 4.2 kg/m^2) completed the study (NCT06001632), in which they were randomised into either a KO or Placebo (PL) groups. Both groups carried out 8-weeks of ADF combined with intake of 4 g/day of the corresponding supplements. ADF involved consuming no more than 500 calories on the 'fast day' and consuming food ad libitum on each 'feed day'. Data on body weight and body composition (TBF-300, Tanita, Manchester, UK), handgrip strength (Handheld Hydraulic Dynamometer, Vernier Jamar; England, UK), and time to conduct 5 repetition of chair rising test were obtained pre-and post-intervention. Changes from baseline within groups were assessed using paired samples t-test. Mixed analysis of variance (Mixed-ANOVA) was used to measure 2-way interactions between time and group to identify the differences between groups. All statistical analysis were conducted using IBM Statistical Package for the Social Sciences SPSS 28.0.

In both groups, body mass decreased significantly (KO:-4.7 ± 0.4kg, p<0.001; PL:-4.5 ± 0.4kg, p<0.001), along with a significant reduction in fat mass (KO:-2.4 ± 0.5kg p<0.001; PL:-2.3 ± 0.5kg p<0.001), and FFM (KO:-0.6 ± 0.2kg p<0.001; PL:-0.7 ± 0.2kg, p<0.001), with no differences between groups. In the PL group, there was a reduction in handgrip strength (-0.9 ± 0.7 kg, p<0.001), while there was no change in KO group (-0.2 ± 0.5 kg, p=0.1), with a significant difference between groups (p<0.001). In the KO group there was a significant reduction in time to conduct chair rising test (-1.8 ± 0.9s, p<0.05), with no change in the PL group (-0.3 ± 1.3s, p=0.2), with a significant difference between groups (p<0.001).

Supplementation with LCn-3 PUFA (4 g/day) during 8 weeks of ADF, applied to individuals living with overweigh and obesity, does not facilitate body or fat mass loss and does not diminish the reduction in FFM. However, it attenuated the reduction in muscle function in healthy overweight and obese adults.

References

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