

INPLASY PROTOCOL

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An umbrella review of systematic reviews and meta-analyses of omega-3 fatty acids supplementation: effects on lean mass and muscle function

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Rationale: Data have emerged suggesting that supplementation with n-3 fatty acids may benefit skeletal muscle. Work in younger and older adults has demonstrated that supplementing the diet with n-3 fatty acids for 8wk potentiated rates of mixed muscle protein synthesis in response to a hyperinsulinemic-hyperaminoacidemic clamp and increased bone and fat-free (lean) mass in free-living older men and women. There is also evidence that n-3 fatty acid supplementation enhances strength gains during resistance exercise training, an effect that appears more pronounced in women. With this review, we aim to arrive at a consensus, using an umbrella review of systematic reviews, on whether n-3 fatty acid supplementation affects skeletal muscle mass (or proxies such as lean mass and fat-free mass).

Condition being studied: n-3 lipid supplementation and effects on skeletal muscle and muscle function.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 03 June 2023 and was last updated on 03 June 2023 (registration number INPLASY202360012).

INTRODUCTION

Review question / Objective: Study Design

A. Only systematic reviews and meta-analyses are considered.

B. No narrative reviews or scoping reviews are considered.

Participants

Does the study involve adults aged ≥ 18 years?

Groups that may be covered:

A. Healthy older adults

B. Older adults within clinical populations

C. Clinical populations

Intervention

1. Does the study evaluate omega-3 fatty acids interventions?

2. Does the study evaluate the mechanisms of omega-3 fatty acids?

3. Are these interventions aimed at the prevention or treatment of sarcopenia?
4. Are the interventions aimed at treating people losing muscle mass due to disease?
6. Does the study report effects on sarcopenia-related outcomes?
7. Does the study report effects on ICU-related outcomes?

Omega-3 fatty acids supplementation includes:

1. Studies in which the effect of omega-3 fatty acids supplementation (as food or other form) is compared with no supplementation
2. Studies in which omega-3 fatty acids supplementation is added to an exercise program and compared with a control group of exercise without supplementation

Relevant outcomes include:

- A. Lean (muscle) mass
- B. Muscle strength
- C. Muscle endurance
- D. Flexibility
- E. Mobility
- F. Physical function
- G. Disability
- H. Function and participation

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METHODS

Participant or population: Adults >18 years.

Intervention: N-3 fatty acid supplementation.

Comparator: Placebo (nothing) or an oil that is not n-3.

Study designs to be included: Systematic reviews.

Eligibility criteria: Adults >18yr taking n-3 fatty acids.

Information sources: Electronic databases: MedLine, SCOPUS, CINAHL.

Main outcome(s): muscle mass, lean mass, fat-free mass, strength.

Additional outcome(s): function, sarcopenia-related outcomes.

Data management: All data are stored in secure databases using coded Excel files. References are de-duplicated using EndNote.

Quality assessment / Risk of bias analysis: Consensus Analysis strategy for Umbrella Review

1. All reviews will be scored using the AMSTAR (A Measurement Tool to Assess Systematic Reviews) tool (Shea et al. BMC Med Res Methodol.2007;7:10). This 11-item tool assesses the degree to which review methods avoided bias. The methodological quality is rated as high (score 8–11), moderate (score 4–7) or low (score 0–3).

2. To organize the evidence, authors will systematically synthesize the extracted data of each review. This results in standardized effectiveness statements (i.e., sufficient evidence, some evidence, insufficient evidence, insufficient evidence to determine) about the treatment effect of the interventions in the individual systematic reviews.

3. The quality of the evidence (QoE) supporting each bottom-line statement will be rated by using a method based on the Grading of Recommendations Assessment,

Development and Evaluation (GRADE) approach for primary evidence (1 - very low; 2 - low; 3 - moderate; 4 - high). This method considers study design (meta-analysis: yes or no) and AMSTAR rating of the included systematic reviews.

Strategy of data synthesis: Synthesis of reviews in terms of conclusions, quality of evidence, and standard effectiveness statements per our previous work (An umbrella review of systematic reviews of β -hydroxy- β -methyl butyrate supplementation in ageing and clinical practice: <https://onlinelibrary.wiley.com/doi/10.1002/jcsm.13030>).

Subgroup analysis: Supplementation with and without resistance training
Younger (18-50) vs. Older (>50)
Males vs. Females.

Sensitivity analysis: None planned.

Language restriction: English.

Country(ies) involved: Canada.

Keywords: N-3 fatty acid, Omega-3 fatty acid, Sarcopenia, Muscle.

Dissemination plans: Publication in a scientific journal.

Contributions of each author:

Author 1 - Everson Nunes - Conceived ideas for review, conducted searches, screened articles, conducted analysis, and drafted the paper.

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Conflicts of interest: SP reports grants or research contracts from the US National Dairy Council, Canadian Institutes for Health Research, Dairy Farmers of Canada, Roquette Freres, Ontario Centre of Innovation, Nestle Health Sciences, Myos, National Science and Engineering Research Council, Friesland Campina, the US NIH during the conduct of the study; personal fees from Nestle Health Sciences, non-financial support from Enhanced Recovery, outside the submitted work. SP has patents licensed to Exerkine but reports no financial gains from patents or related work.