

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Lipids and Related Supplements for Mild Traumatic Brain Injury: Clinical Effectiveness

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Research Questions

1. What is the clinical effectiveness of nutritional supplementation as a prophylactic treatment for mild traumatic brain injury?
2. What is the clinical effectiveness of nutritional supplementation as treatment for mild traumatic brain injury?

Key Findings

One randomized controlled trial was identified regarding the clinical effectiveness of nutritional supplementations as a treatment for mild traumatic brain injury. Additionally, no studies were identified regarding the clinical effectiveness of nutritional supplementation as a prophylactic treatment for mild traumatic brain injury.

Methods

A limited literature search was conducted by an information specialist on key resources including Medline and Embase via OVID, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were mild traumatic brain injury and nutritional supplementation with curcumin, omega-3 fatty acids, and resveratrol. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2005 and February 24, 2020. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Q1: People of all ages, at risk for mild traumatic brain injury Q2: People of all ages, with suspected or diagnosed mild traumatic brain injury
Intervention	The following nutritional supplements, either as single ingredients or in combination preparations: <ul style="list-style-type: none"> • Docosahexaenoic acid • Resveratrol • Curcumin
Comparator	Q1,2: Placebo or usual diet
Outcomes	Q1,2: Clinical effectiveness (e.g., severity of signs and symptoms [e.g., nausea, headache, dizziness], duration of hospitalization, mental status [e.g., level of consciousness, memory], structural brain lesions, neurologic disability, performance measures) and harms (e.g., morbidity, mortality, adverse drug reactions, side effects)
Study Designs	Health technology assessment, systematic review, and randomized controlled trials

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports and systematic reviews are presented first, followed by randomized controlled trials.

One randomized controlled trial¹ was identified regarding the clinical effectiveness of nutritional supplementations as a treatment for mild traumatic brain injury. No health technology assessments or systematic reviews were identified. Additionally, no studies were found regarding the clinical effectiveness of nutritional supplementation as a prophylactic treatment for mild traumatic brain injury.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

One randomized controlled trial¹ was identified and assessed whether omega-3 polyunsaturated fatty acid treatment (DHA+EPA) provided neuroprotective effects for patients with acute mild traumatic brain injury (mTBI) compared to a placebo. The authors of the study reported on mTBI symptom resolution. The most frequently reported symptoms included headache, feelings of dizziness, taking longer to think, nausea, fatigue, and photobia.¹ The authors found that the median time to resolution was 12.5 days and majority of subjects reported complete resolution within 30 days and none of the patients in the study reported any significant side effects.¹ The authors of the study concluded that this pilot study will be used to develop blood biomarkers to identify patients who are less likely to recover from their symptoms quickly.¹

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

1. Falk H, Korley F. A pilot study of omega-3 polyunsaturated fatty acid treatment in mild acute TBI (OPTIMA-TBI pilot). *J Neurotrauma*. 2018;35 (16):A144.

Appendix — Further Information

Systematic Reviews

Mild Traumatic Brain Injury Not Specified

- Goslin B. Traumatic brain injury and concussion: time for brain food. *J Neurotrauma*. 2017;34 (13):A107.

Randomized Controlled Trials

Sport Related Concussions – Mild Traumatic Brain Injury Not Specified

- Miller SM, Zynda AJ, Sabatino MJ, Ellis HB, Dimeff RJ. Docosahexaenoic acid (DHA) is safe and feasible for the treatment of pediatric sport-related concussion. *Clin J Sport Med*. 2019;29 (2):165.
- Bica D, Armen J, Kulas AS. High dose omega-3 fatty acids in the treatment of sport related concussion. *Clin J Sport Med*. 2018;28 (2):243.
- Gatson J, Warren V, Barillas J, et al. Resveratrol improves cognitive performance in concussed athletes. *Shock*. 2012;1):24-25.

Alternative Outcome

- Oliver JM, Jones MT, Kirk KM, et al. Effect of docosahexaenoic acid on a biomarker of head trauma in American football. *Med Sci Sports Exerc*. 2016;48(6):974-982.
[PubMed: PM26765633](#)

Non-randomized Studies

Mild Traumatic Brain Injury Not Specified

- Dai W, Wang H, Fang J, et al. Curcumin provides neuroprotection in model of traumatic brain injury via the Nrf2-ARE signaling pathway. *Brain Res Bull*. 2018;140:65-71.
[PubMed: PM29626606](#)

Review Articles

- Ashbaugh A, McGrew C. The role of nutritional supplements in sports concussion treatment. *Curr Sports Med Rep*. 2016;15(1):16-19.
[PubMed: PM26745164](#)
- Bailes JE, Patel V. The potential for DHA to mitigate mild traumatic brain injury. *Mil Med*. 2014;179(11 Suppl):112-116.
[PubMed: PM25373094](#)
- Barrett EC, McBurney MI, Ciappio ED. Omega-3 fatty acid supplementation as a potential therapeutic aid for the recovery from mild traumatic brain injury/concussion. *Adv Nutr*. 2014;5(3):268-277.
[PubMed: PM24829473](#)

11. Farkhondeh T, Samarghandian S, Roshanravan B, Peivasteh-Roudsari L. Impact of curcumin on traumatic brain injury and involved molecular signaling pathways. *Recent Pat Food Nutr Agric*. 2019;17:17. [epub ahead of print]
[PubMed: PM31288732](#)
12. Sun GY, Simonyi A, Fritsche KL, et al. Docosahexaenoic acid (DHA): an essential nutrient and a nutraceutical for brain health and diseases. *Prostaglandins Leukot Essent Fatty Acids*. 2018;136:3-13.
[PubMed: PM28314621](#)
13. Subash S, Essa MM, Al-Adawi S, et al. Pharmacological benefits of active components of natural products against traumatic brain injury - a review. *Curr Pharmacogenomics Person Med*. 2015;13(2):99-116.