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3-2021

### **Fish oil and concussions: Summary**

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**Specific Care Question**

In adolescent and teenagers with concussion does fish oil supplement versus no fish oil supplement improve concussion recovery speed, improve brain healing, decrease inflammation, or decrease severity of concussion?

**Recommendations Based on Current Literature (Best Evidence) Only**

*No recommendation can be made for or against the use of fish oil supplement, based on expert review of current literature by the Department of EBP. No human studies were found that answered the specific care question. When there is a lack of scientific evidence, standard work should be developed, implemented, and monitored.*

**Literature Summary**

**Background.** The Centers for Disease Control and Prevention (CDC) (2020) defines concussions or a mild traumatic brain injury (mTBI) as “a complex pathophysiologic process affecting the brain, induced by traumatic biomechanical forces secondary to direct or indirect forces to the head.” Concussions are a significant public health concern affecting 1.6 to 3.8 million youth annually (Gay, 2016). However, the true concussion incidence may be higher due to underreporting (McGeown et al., 2020).

An area of interest for concussion treatment and recovery is nutrition therapy and omega-3 fatty acids (McGeown et al., 2020). Omega-3 polyunsaturated fatty acids (n-3FA) are part of the cell membrane, and particularly docosahexaenoic acid (DHA) (Lewis, 2016). It is generally believed that the supplementation of n-3FA may be beneficial in the treatment and recovery of concussions. Most of the evidence in this area is based on animal studies (McGeown et al., 2020) and a few case studies (Lewis et al., 2013; Trojjan & Jackson, 2011). The pre-clinical evidence of the animal studies has shown promise (McGeowen et al., 2020), but the use of n-3FAs has not been demonstrated in rigorous human studies. To date, there are no head-to-head intervention studies on the use of n-3FAs to treat concussions or mTBI in humans; however, there are four trials underway (National Library of Medicine [NLM], NCT01814527; NLM, NCT01903525; NLM, NCT03582267; NLM, NCT03345550). The CDC guidelines for the management of mild brain injury among children makes no mention of n-3FAs or fish oil supplementation in their guideline (Lumba-Brown et al., 2018).

On the topic of usage in patients, in a survey response of 257 active physician members of the American Medical Association of Sports Medicine, 25% reported prescribing n-3FA to athletes that had suffered concussions (Kent et al., 2020). Of the 25% that reported prescribing n-3FAs, 40% believed their use was effective in improving recovery, while 57% were unsure.

Due to the lack of human studies, the EBP Department is unable to review the current literature on this topic.

**Study characteristics.** The search for suitable studies was completed on November 30, 2020. L. Edwards MEd, RD, LD, CSSD reviewed the 95 titles and/or abstracts found in the search and identified<sup>a</sup> 24 single studies believed to answer the question. After an in-depth review, no human studies were found that answered the question.

**Identification of Studies**

**Search Strategy and Results** (see Figure 1)

("fatty acids" OR "Fatty Acids, Omega-3"[Mesh] OR Omega-3 OR "Omega 3" OR "Docosahexaenoic Acids"[Mesh] OR DHA[tiab] OR "Fish Oils"[Mesh] OR "fish oil\*") AND ("Brain Concussion"[Mesh] OR "Post-Concussion Syndrome"[Mesh] OR concussion\*)

("fatty acids" OR "Fatty Acids, Omega-3"[Mesh] OR Omega-3 OR "Omega 3" OR "Docosahexaenoic Acids"[Mesh] OR DHA[tiab] OR "Fish Oils"[Mesh] OR "fish oil\*") AND ("Brain Concussion"[Mesh] OR "Post-Concussion Syndrome"[Mesh] OR concussion\*) AND (youth OR adolescent OR adolescence OR "adolescent and young adult\*" OR AYA[tiab] OR pediatr\* OR paediatr\* OR child OR children)

Records identified through database searching *N* = 95

Studies Included in this Review

Citation	Study Type
No studies found	

*Studies Not Included in this Review with Exclusion Rationale*

Citation	Reason for exclusion
Ashbaugh and McGrew (2016)	Animal study
Bailes and Patel (2014)	Review article
Barrett et al. (2014)	Review article
Domenichiello et al. (2020)	Did not measure fatty acid intake
Figueiredo et al. (2018)	Animal study
Gay (2016)	Review article
Gupta et al. (2019)	Review article
Kent et al. (2020)	Survey
Lei et al. (2016)	Review article
Lewis et al. (2013)	Case report
Lewis (2016)	Review article
Lucke-Wold et al. (2018)	Review article
Lust et al. (2020)	Review article
Maroon and Bost (2011)	Review article
McGeown et al. (2020)	Review article
Oliver et al. (2016)	Letter
Oliver et al. (2018)	Blood levels only
Pender et al. (2020)	Review article
Philpott et al. (2019)	Review article
Rawson et al. (2018)	Review article
Sun et al. (2018)	Review article
Trojian and Jackson (2011)	Care report
Trojian et al. (2017)	Review article
Vonder Haar et al. (2016)	Review article

**Methods Used for Appraisal and Synthesis**

<sup>a</sup>The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram depicts the process in which literature is searched, screened, and eligibility criteria is applied (Moher, Liberati, Tetzlaff, & Altman, 2009).

<sup>a</sup>Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement*. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097 **For more information, visit [www.prisma-statement.org](http://www.prisma-statement.org).**

**Question Originator**

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**Medical Librarian Responsible for the Search Strategy**

K. Swaggart, MLIS, AHIP

**EBP Team Member Responsible for Reviewing, Synthesizing, and Developing this Document**

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*Acronyms Used in this Document*

Acronym	Explanation
CAT	Critically Appraised Topic
CDC	<i>Centers for Disease Control and Prevention</i>
EBP	Evidence Based Practice
n-3FA	<i>Omega-3 polyunsaturated fatty acids</i>
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
mTBI	<i>mild traumatic brain injury</i>

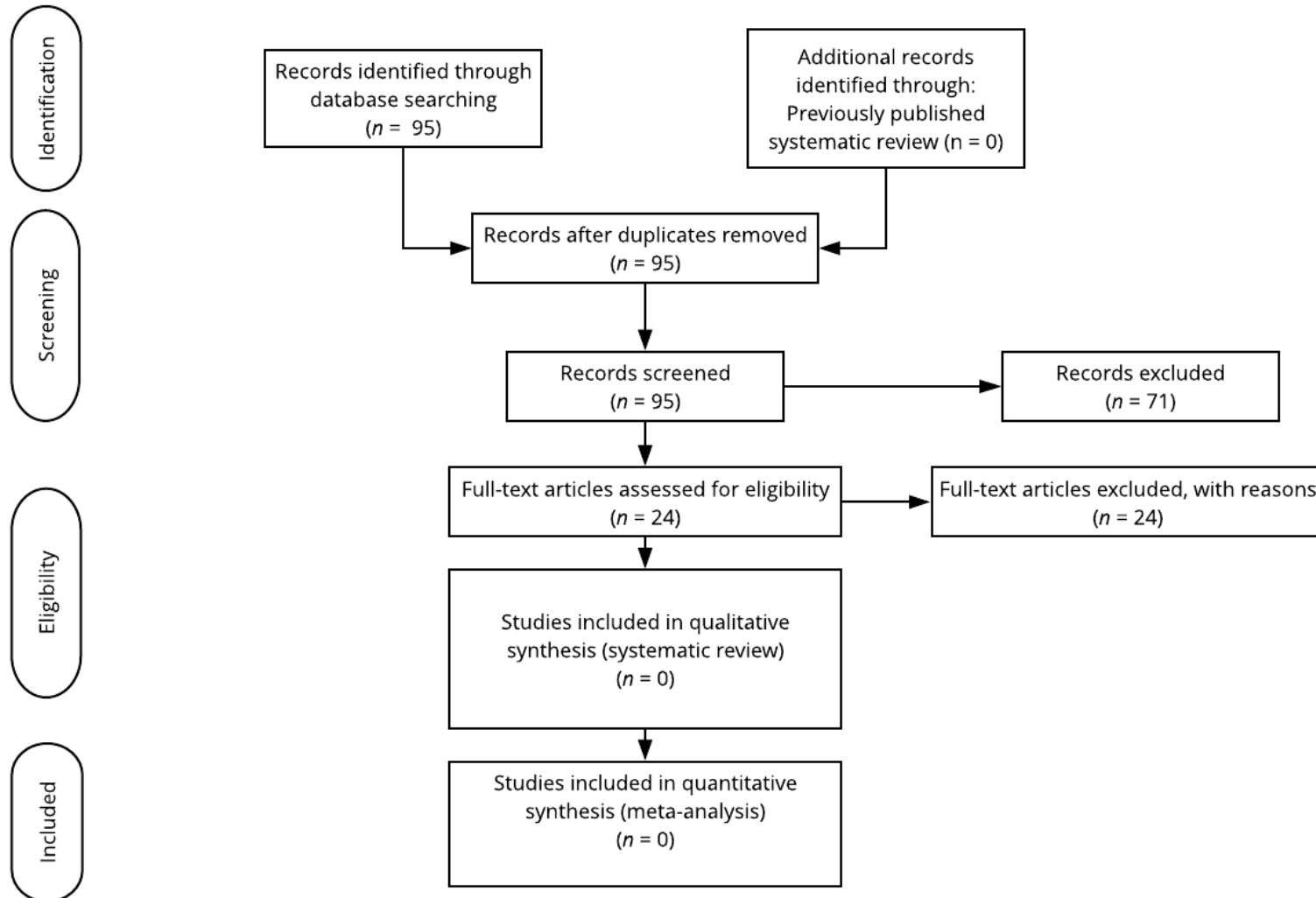


Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)<sup>a</sup>

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