

# Fatty acid supplements did not improve motor function but improved literacy levels in developmental coordination disorder

Richardson AJ, Montgomery Paul. The Oxford-Durham study: a randomized, controlled trial of dietary supplementation with fatty acids in children with developmental coordination disorder. *Pediatrics* 2005;**115**:1360–6.

Clinical impact ratings Paediatrics ★★★★★☆ Psychiatry ★★★★★☆

**Q** In children with developmental coordination disorder (DCD), do fatty acid supplements improve motor function, reading and spelling levels, and symptoms of attention deficit/hyperactivity disorder (ADHD)?

## METHODS

-  **Design:** randomised placebo controlled trial (Oxford-Durham Study).
-  **Allocation:** concealed.\*
-  **Blinding:** blinded (patients, clinicians, and outcome assessors).\*
-  **Follow up period:** 3 months.
-  **Setting:** 12 elementary schools in County Durham, UK.
-  **Patients:** 117 patients (mean age 8.8 y, 67% boys) who met DSM-IV criteria for DCD and were not receiving any treatment. Exclusion criteria: any major physical or mental health condition (eg, epilepsy, diabetes mellitus, depression, or chronic fatigue syndrome).
-  **Intervention:** fatty acid supplements (2 capsules 3 times per d) (n = 60) or matching placebo (n = 57). The supplements consisted of 80% fish oil (sardine and pilchard) and 20% evening primrose oil to contain omega 3 fatty acids (eicosapentaenoic acid, 558 mg/d, and docosahexaenoic acid, 174 mg/d); omega 6 fatty acids (γ linoleic acid, 60 mg/d); and vitamin E (natural form, α tocopherol, 9.6 mg/d).
-  **Outcomes:** motor function (Movement Assessment Battery for Children), reading and spelling achievement (Wechsler Objective Reading Dimensions), and teacher rated ADHD related symptoms (Conners' Teacher Rating Scales, Long Version [CTRS-L]).
-  **Patient follow up:** 94% for motor and literacy outcomes (intention to treat analysis).

\*See glossary.

## Commentary

In post-war Britain, with the advent of the National Health Service and welfare state, cod liver oil was given to all children, together with milk and orange juice. After acceptance of the effectiveness of methylphenidate in the treatment of ADHD, dietary studies, particularly of addition free diets, dwindled along with universal benefits.

With a revival of interest in the general health benefits of omega 3 and omega 6 fatty acids, recent research explores the effects of highly unsaturated fatty acids (HUFA) on brain development and behaviour. Cod liver oil in pregnancy and the addition of docosahexaenoic acid and arachidonic acid to infant formula<sup>1</sup> were both found to augment children's IQ at 3–4 years, and fish oil might reduce aggression and impulsivity in girls. Children with ADHD or specific learning disabilities had lower levels of HUFA. Although HUFA supplements improved dyslexia, the outcome of randomised controlled trials (RCT) in ADHD was equivocal.<sup>2</sup>

A significant proportion of children with ADHD also have dyslexia, behavioural problems, and DCD. In this study by Richardson *et al*, children showed significant improvements in reading and spelling during 3 months active treatment with either omega 6 or omega 3 supplements, doubling the expected rate of progress. The teacher rated ADHD symptom scores (CTRS-L) improved but coordination did not. An earlier study<sup>3</sup> showed an improvement in cognitive problems and ADHD symptoms in children with dyslexia treated with HUFA. It is unclear how HUFA improves cognitive function, boosting literacy in children whose literacy difficulties may be associated with dyslexia, ADHD, or both. Evaluation of longer periods of supplementation is required and may confirm whether any long term benefit exists for DCD. Trials are likely to be complicated by the growing use of HUFA by parents for children with or without developmental difficulties.

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- 1 Auestad N, Scott DT, Janowsky JS, *et al*. *Pediatrics* 2003;**112**:e177–83.
- 2 Schachter HM, Kourad K, Merali Z, *et al*. *Evid Rep Technol Assess (Summ)* 2005;**116**:1–11.
- 3 Richardson AJ, Puri BK. *Prog Neuropsychopharmacol Biol Psychiatry* 2002;**26**:233–9.

## MAIN RESULTS

Fatty acid supplements improved reading and spelling levels (table) and symptoms of ADHD, but not motor function (table). All 7 global scales and 4 of 6 subscales of CTRS-L were significantly greater in the treatment group than the placebo group. 102 of 117 children were included in the CTRS-L score analysis, but 13 children had their last outcome carried forward.

## CONCLUSIONS

In children with development coordination disorder, omega 3 fatty acids and omega 6 fatty acids did not improve motor function, but did improve reading and spelling age and symptoms of attention-deficit/hyperactivity disorder at 3 months.

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### Omega 3 fatty acids and omega 6 fatty acids (FA) v placebo for coordination disorder

Outcomes at 3 months	Mean change from baseline		Absolute difference in mean change from baseline (Mann-Whitney p value)
	FA	Placebo	
Total impairment*	-2.5	-3.1	0.6 (0.7)
Reading age (month)	9.6	3.4	6.2 (<0.004)
Spelling age (month)	6.6	1.2	5.4 (<0.001)

\*Total impairment scores were the sum of manual dexterity, ball skills, and static and dynamic balance subtests (maximum score = 40 [the highest impairment]).