Effects of prior exercise on postprandial lipemia: a quantitative review
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CRD summary
This review assessed the effects of exercise before a meal on blood lipid levels after eating. The authors concluded that aerobic exercise caused a moderately large decrease in blood lipids in the predominantly healthy adults studied. The conclusions follow from the evidence presented, but methodological weaknesses in the review mean that the conclusions may not be reliable.

Authors’ objectives
To summarise quantitatively the effects of prior exercise on postprandial lipaemia, and to identify mediators (predictors) of the variation in effects between studies.

Searching
MEDLINE, PubMed and Dissertation Abstracts were searched for relevant studies; some of the keywords used were listed. The bibliographies of identified papers and review articles were also checked.

Study selection
Study designs of evaluations included in the review
Studies that failed to use a non-exercise control group were excluded. The included studies were described as repeat measure or cross-sectional (parallel and crossover designs).

Specific interventions included in the review
Studies assessing aerobic exercise, either as an acute bout of exercise or exercise training performed prior to a meal, were eligible for inclusion. The exercise regimes (intensity, duration and training) of the included studies were listed in the paper.

Participants included in the review
No inclusion criteria in relation to the participants were stated. The participants in the included studies were men and women aged over 18 years, and were predominantly healthy. Age was categorised as young (over 18 and less than 40 years), or middle aged and older (over 40 years or specified).

Outcomes assessed in the review
The outcome assessed was a measure of postprandial triglyceride response.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
How were the studies combined?
The results of the individual studies were standardised using Cohen's \( d \) (a standard deviation score). These were then combined using a random-effects meta-analysis to give a composite effect size. The scores were weighted by the sample size to adjust for small sample bias (reference given).

For studies that reported the energy expenditure of prior exercise, a Pearson's correlation coefficient \( r \) was calculated to describe the relationship between exercise energy expenditure and the magnitude of the postprandial response.

How were differences between studies investigated?
The homogeneity of the effect sizes was investigated using the \( Q \) statistic.

**Results of the review**
Twenty-nine studies, which evaluated 38 effects in 555 participants, were included. Ten studies (242 participants) used a between-subjects design and 18 studies (313 participants) used a repeated measure design. The authors stated that 29 studies were included, but only 28 were tabulated.

Exercise reduced the triglyceride levels by a moderate amount (Cohen's \( d \) 0.57, 95% confidence interval: -0.71, -0.43; test for homogeneity \( Q=41.70, P=0.56 \)).

The effect sizes did not differ by study design, gender, age, type of meal, exercise intensity, exercise timing, or duration. There remained significant variation within females and within each category of timing of exercise (greater than 24 hours versus less than 24 hours).

In the 13 studies that reported energy expenditure of the exercise prior to the test meal, there was a decreased postprandial lipaemic response in people who had a higher energy expenditure (Cohen's \( d \) -0.57; \( r \) -0.62, \( P=0.02 \)). As energy expenditure of the exercise increased, the \( d \) values decreased.

**Authors' conclusions**
Prior aerobic exercise caused a moderately large decrease in postprandial lipaemia in the predominantly healthy adults studied. Current evidence suggests that energy expenditure appears to be the major factor influencing postprandial lipaemia.

**CRD commentary**
This was a review of an important topic. However, there are concerns with the methodology, which may cast some doubt on the validity of the results.

The search strategy was not comprehensive and it is likely that studies were missed. No inclusion criteria for the participants was given and there were insufficient details on the participants included in each study, for example body mass index and health status, despite the authors identifying these factors as of possible importance. Similarly, no a priori inclusion criteria for study design were stated and no details were given on how the studies were selected for the review, whether any validity assessment was made, or how the data were extracted from the individual papers.

The number of studies included in the review was unclear: 28 studies were tabulated, but it was stated in the text that 29 were included. In addition, the authors reported heterogeneity between studies with a non significant \( P \)-value. The results of the test for homogeneity appear to have been misinterpreted, although this does not affect the interpretation of the main analysis.

The conclusions follow on from the presented results, as do the authors' recommendations which are research-related.

**Implications of the review for practice and research**
Practice: The authors did not state any implications for practice.

Research: The authors stated that more studies are needed to investigate the effect of low-intensity exercise, the timing
of exercise, the possible control mechanism of the effect, and the effects in obese patients and those with heart disease.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.