Polyphenols and Performance: A Systematic Review and Meta-analysis

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Introduction

Sporting supplements are becoming more widespread as athletes verge on the edge of what is physically attainable. One important plant-derived substance that has shown great promise of late is polyphenols. Polyphenols are antioxidants that have been reported to hinder training adaptations, yet conversely they stimulate stress-related cell signalling pathways that trigger mitochondrial biogenesis and influence vascular function. Currently there is no conclusive statement on whether polyphenols improve athletic performance.

Objective

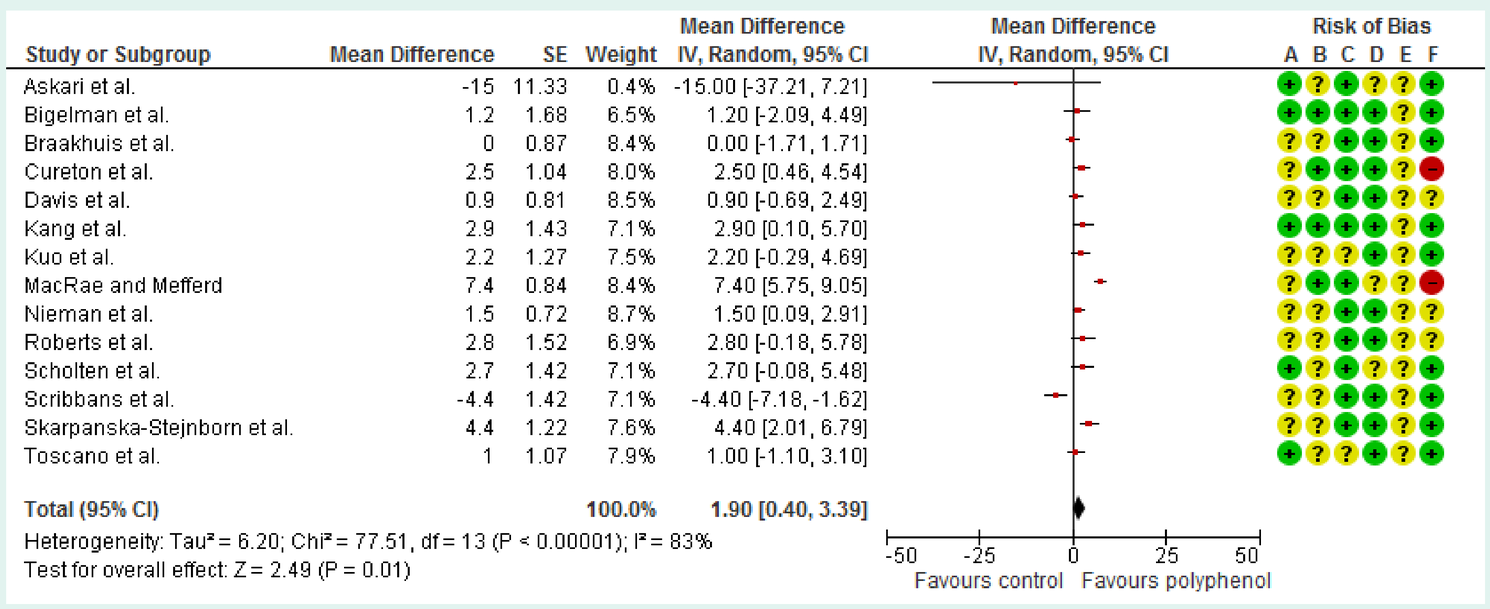
Determine the overall effect of polyphenols on athletic performance.

Methods

A search strategy was completed and searched in 2016. From this 4794 papers were initially screened and reviewed against a predetermined criteria; (1) be primary intervention studies designed as randomised controlled trials; (2) be either single or double blind; (3) include healthy participants (trained or untrained) aged between 18 and 70; (4) and contain a polyphenol intervention (either dietary or individual) ≥ 7 days. As a result 14 studies were include in the review. For meta-analysis, all performance data were converted to a common metric, representing the percent effect on mean power in an equivalent time trial.

Results

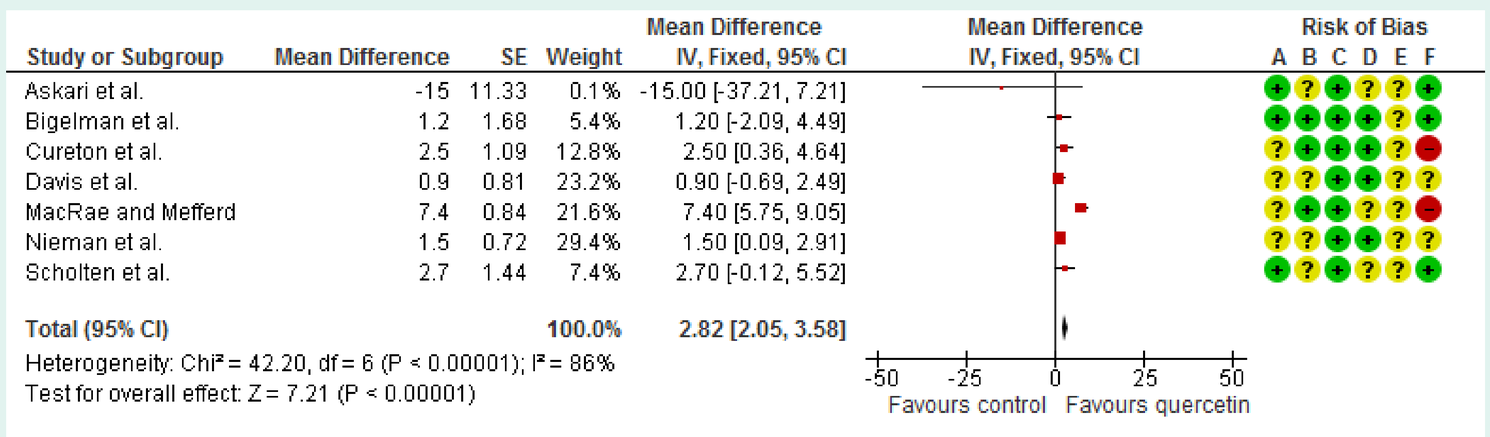
Overall Meta-analysis



A. Random sequence generation (selection bias); B. Allocation concealment bias (selection bias); C. Blinding of participants and personnel (performance bias); D. Incomplete outcome data (attrition bias); E. Selective reporting (reporting bias); F. Other bias.

The studies included 348 participants of whom 300 and 282 were male and trained respectively. Ten of the studies were parallel design RCTs and in total the studies averaged 688 ± 478 mg.d^{-1} polyphenol for an intervention period of 31 days.

Quercetin Sub-group Analysis



Discussion

There are a few points to highlight. Firstly, the average daily intake was 688 ± 478 mg.d^{-1} which although high, is achievable without supplementation. Secondly, of the three studies that used women, they all reported a mean percentage effect less than the overall result (1.9%). Lastly, although quercetin had an increased performance improvement, six of the seven studies had a daily intake > 688 mg.d^{-1} so we are unable to confirm if it is a dose or quercetin effect

Key Points

- Polyphenol supplementation for at least seven days has a clear moderate benefit on performance in healthy individuals
- The performance benefits of quercetin are superior to other polyphenol supplements
- Further research on dose and types of polyphenols is needed

Publication

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