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## Introduction

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# Do non-steroidal anti-inflammatory drugs improve sport performance ? A meta-analysis of randomized trials

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## Objective :

To perform a systematic review and meta-analysis of studies which evaluated the effect of NSAIDs on the athletic performances, i.e. maximum performance, time to exhaustion, and pain.

## Material and methods:

Databases were searched for randomized trials involving healthy males and females, untrained or athletes, from any setting.

The intervention included NSAIDs (including aspirin), against any control. The primary outcome was the maximal performance (as defined in each study). The secondary outcomes were the time until self-reported exhaustion and the self-reported pain.

## Results:

8 parallel group studies and 5 crossover studies were found, totaling 178 & 75 subjects respectively. 5 parallel group studies and 2 crossover studies tested an acute dosage, and 4 parallel group studies and 3 crossover studies tested a longer period of treatment. The dosages and drugs were very disparate. There was neither significant difference in the maximum performance between groups, nor in the time until exhaustion. Self-perceived pain was significantly lower in the NSAIDs group than in the control group.

**NSAIDs are not included in the World Anti-Doping Agency (WADA) Prohibited List, by lack of evidence that they improve sports performances. Since published studies are of poor quality and design, no conclusion can be drawn.**

## Introduction :

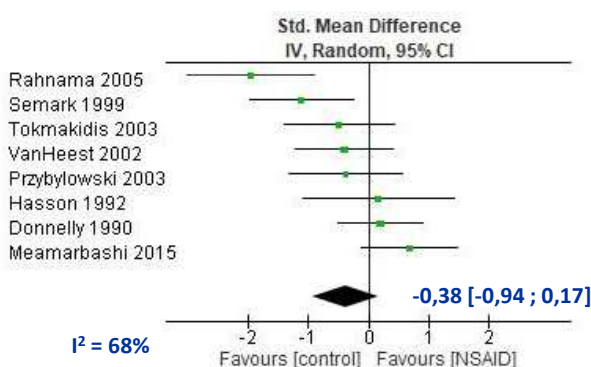
Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) are commonly used in sports medicine. NSAIDs are over-the-counter drugs and NSAIDs are frequently taken at high doses by athletes with unrestricted access. Severe adverse effects were reported such as acute renal failure, and gastro intestinal disorders.

NSAIDs are not considered as performance enhancing drugs and are not included in the World Anti-Doping Agency (WADA) Prohibited List

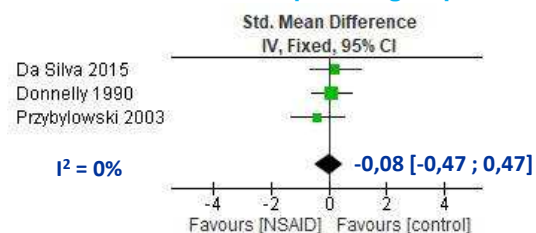
## Risk of bias of studies: poor quality studies

Study	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Da Silva 2015	?	?	?	?	?	?	?
Donnelly 1990	?	?	?	?	?	?	?
Hasson 1992	?	?	?	?	?	?	?
Meararbashi 2015	?	?	?	?	?	?	?
Przybylowski 2003	?	?	?	?	?	?	?
Rahnama 2005	?	?	?	?	?	?	?
Semark 1999	?	?	?	?	?	?	?
Tokmakidis 2003	?	?	?	?	?	?	?
VanHeest 2002	?	?	?	?	?	?	?

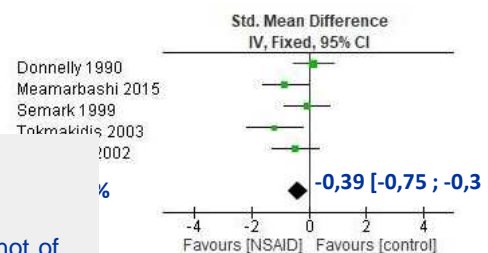
## Maximal performance: parallel group studies



## Time until exhaustion: parallel group studies



## Self-perceived pain



## Discussion / Conclusion:

Our meta-analysis does not allow concluding on the existence or not of an ergogenic effect of NSAIDs on sport performance, since the quality of the studies is low, the doses tested, and the exercises performed are very heterogeneous and far from those observed in real-life practices. However, the health risks for athletes is real and we recommend the conduct of new trials, adequately sized, methodologically sound, using adequate dosage in a real-life setting.

