

# O papel do alongamento no desempenho, lesão e dor na muscular tardia

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# Dúvidas da prática

Alongamento para:

- ✓ Alteração no desempenho subsequente;
- ✓ Redução ou prevenção do risco de lesão;
- ✓ Atenuação da dor muscular tardia;



**Alongamento reduz o desempenho da  
atividade subsequente?**

# Alongamento reduz o desempenho muscular?

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## Review

### Does pre-exercise static stretching inhibit maximal muscular performance? A meta-analytical review

L. Simic<sup>1</sup>, N. Sarabon<sup>2</sup>, G. Markovic<sup>1</sup>

- ✓ Alongamento estático (ativo ou passivo)
- ✓ Dinâmicos não foram incorporados nessa revisão
- ✓ Sem controle
- ✓ Sessões com mais de 30 min
- ✓ Força máxima (1RM)
- ✓ Potência muscular
- ✓ Taxa de desenvolvimento de força
- ✓ Salto
- ✓ Sprint
- ✓ Arremesso

# Características da revisão

- ▶ 104 artigos
- ▶ 962 indivíduos
- ▶ Diferença padronizada em %
- ▶ Tamanho de efeito

## Acute static stretching and performance

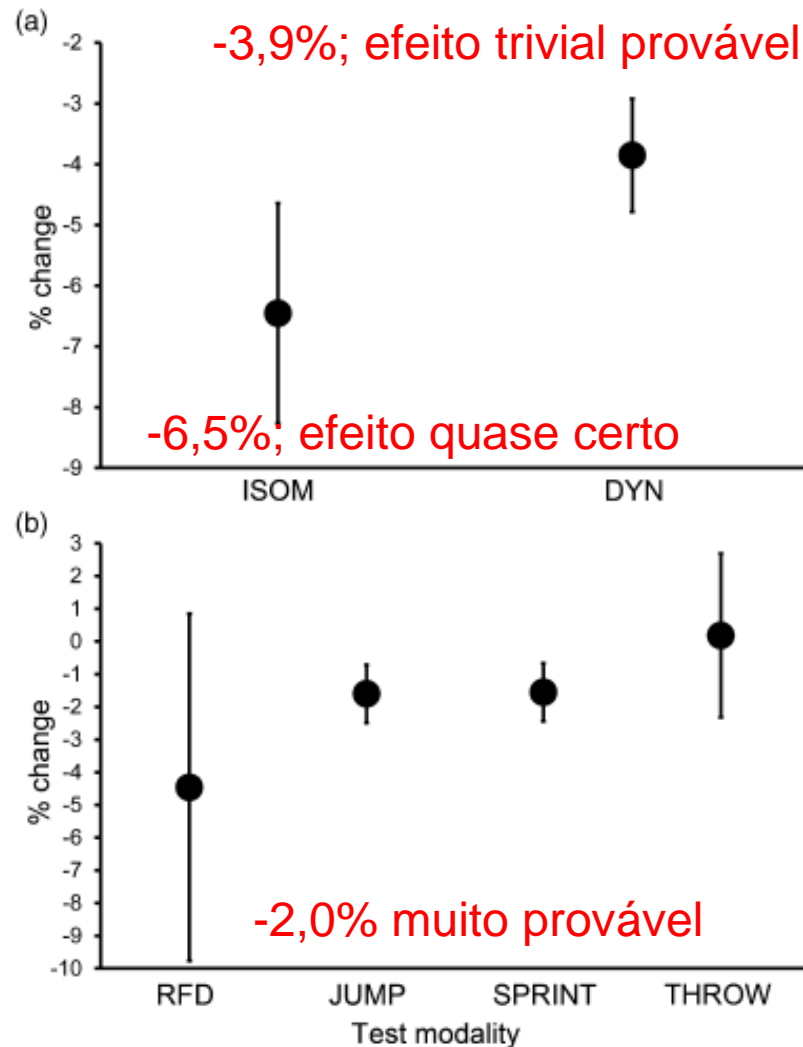


Fig. 1. Meta-analyzed acute effects of static stretching on maximal muscle strength tests (a) and explosive muscular performance tests (b). ISOM, isometric muscle strength; DYN, dynamic muscle strength; RFD, rate of force or torque development; JUMP, jumping performance; SPRINT, sprinting performance; THROW, throwing performance.

### Sub grupo para duração do alongamento por grupo muscular

- < 45s: -3,2% (quase provável)
- 45-90s: -5,6% (provável)
- 90s: -6,1% (quase certo)

Heterogeneidade baixa

### Sub grupo para duração do alongamento por grupo muscular

- < 45s: -0,8% (possível)
- 45-90s: -2,5% (quase certo)
- 90s: -4,1% (quase certo)

Heterogeneidade baixa

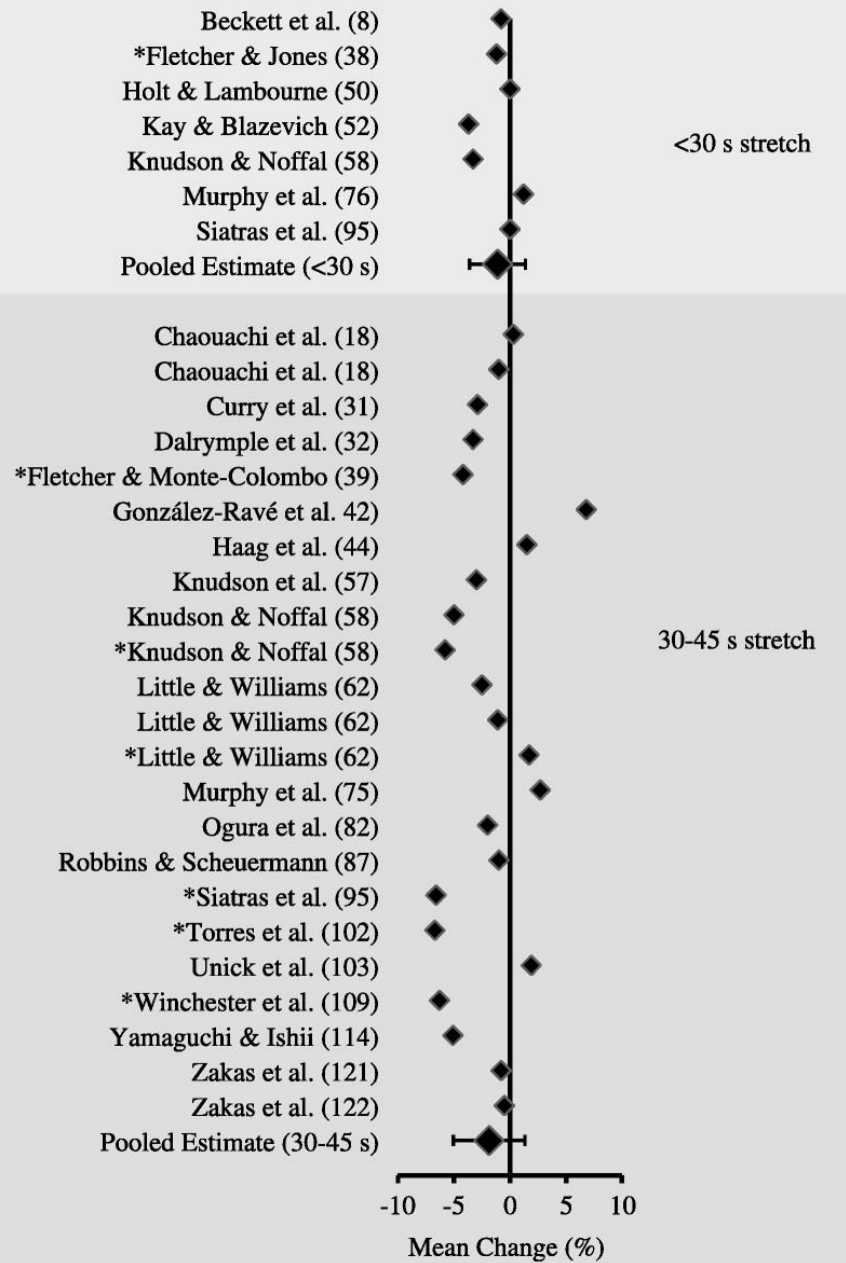
✓ Independente do sexo, idade e estado de treinamento

# Alongamento reduz o desempenho muscular?

## Effect of Acute Static Stretch on Maximal Muscle Performance: A Systematic Review

ANTHONY D. KAY<sup>1,2</sup> and ANTHONY J. BLAZEVICH<sup>2</sup>

*<sup>1</sup>Sport Exercise & Life Sciences, The University of Northampton, Northampton, UNITED KINGDOM; and <sup>2</sup>School of Exercise, Biomedical & Health Sciences, Edith Cowan University, Joondalup, Western Australia, AUSTRALIA*



Avaliaram 149 achados em 106 artigos

Conclusão: Alongamento estático realizado por curta duração não reduz a força.

**Entre 30 e 45 segundos pode reduzir força.**



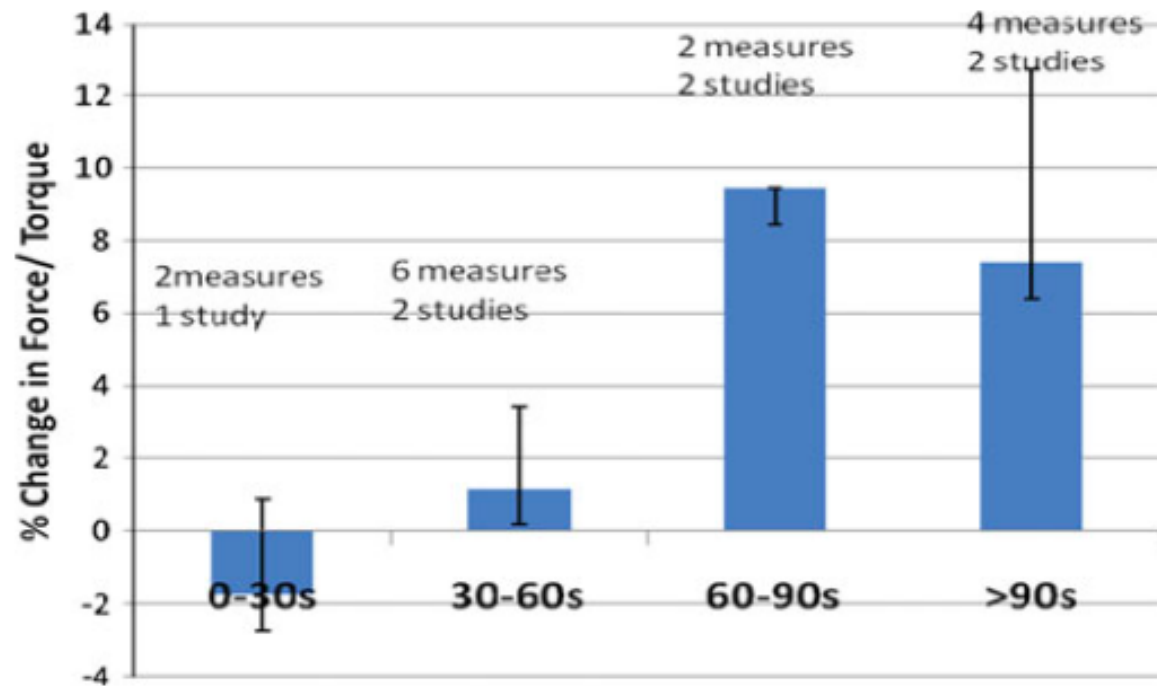
Eur J Appl Physiol (2011) 111:2633–2651

DOI 10.1007/s00421-011-1879-2

REVIEW ARTICLE

# **A review of the acute effects of static and dynamic stretching on performance**

**David G. Behm · Anis Chaouachi**



**Fig. 7** The effect of dynamic stretching duration on force/torque and power production from 241 participants. Measures of force and power in these studies included isometric force and torque, isokinetic power, and one repetition maximum lifts such as squats and bench press. *Columns* represent mean percentage changes with standard deviation bars. Mean values may include multiple measures from a single study (e.g. 4 force or torque measures from two studies)

Falta de controle

**Alongamento reduz o risco de lesão ?**

*Scand J Med Sci Sports* 2010; 20: 169–181  
doi: 10.1111/j.1600-0838.2009.01058.x

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Review

## To stretch or not to stretch: the role of stretching in injury prevention and performance

M. P. McHugh, C. H. Cosgrave

# The Impact of Stretching on Sports Injury Risk: A Systematic Review of the Literature

STEPHEN B. THACKER<sup>1</sup>, JULIE GILCHRIST<sup>2</sup>, DONNA F. STROUP<sup>3</sup>, and C. DEXTER KIMSEY, JR.<sup>3</sup>

<sup>1</sup>Epidemiology Program Office, <sup>2</sup>National Center for Injury Prevention and Control, and <sup>3</sup>National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, GA

## Estudos de síntese não demonstram associação prática do alongamento e diminuição do risco de lesões

Limitação de condução do estudo

Table 2. Studies examining effects of stretching on injury risk

References	Study design	Subjects	Sample size	Intervention	Effect on all injuries	% muscle strains	Effect on muscle strains
van Mechelen et al. (1993)	Randomized trial	Recreational runners	167 control 159 intervention	10-min stretching+warm-up vs. neither	No effect	Low (not specified)	Not specified
Pope et al. (1998)	Randomized trial	Military recruits	544 control 549 intervention	Warm-up+Stretching (4 × 20 s gastroc and soleus) vs. Warm-up+Upper extremity stretching	No effect	Low (not specified)	Not specified
Pope et al. (2000)	Randomized trial	Military recruits	803 control 735 intervention	Warm-up+Stretching (1 × 20-s stretch six different muscle groups) vs. Warm-up only	No effect	7.5% of	Not specified*
Ekstrand et al. (1983)	Randomized trial	Soccer Players	Six teams control Six teams intervention	Multi-component intervention (including 10-min stretching) vs. no intervention	Control: 93 injuries Intervention: 23 injuries $P < 0.001$	25%	Control: 23 injuries Intervention: six injuries $P < 0.001$
Bixler and Jones (1992)	Randomized trial	American Football	Two teams control Three teams intervention	3-min stretching+warm-up vs. no intervention	No effect	Sprains and strains 38%	Control: 13 injuries <sup>†</sup> Intervention: one injury <sup>†</sup> $P < 0.05$
Amako et al. (2003)	Randomized trial	Military Recruits	383 control 518 intervention	20-min supervised stretching (18 × 30-s stretches) vs. 10-min unsupervised stretching	No effect	20% <sup>‡</sup>	Control: 16 injuries <sup>‡</sup> Intervention: seven injury <sup>‡</sup> $P < 0.05$
Hadala and Barrios (2009)	Longitudinal study	Yachting Crew	28 per season	30-min stretching (12 stretches 1 or 2 × 20–30 s stretches) vs. no intervention	Control: 33 injuries <sup>§</sup> Intervention: 14 injuries <sup>§</sup> $P < 0.05$	67%	Control: 22 injuries <sup>§</sup> Intervention: four injury <sup>§</sup> $P < 0.01$

# Alongamento reduz ou previne a dor pós exercício?



**Cochrane  
Library**

Cochrane Database of Systematic Reviews

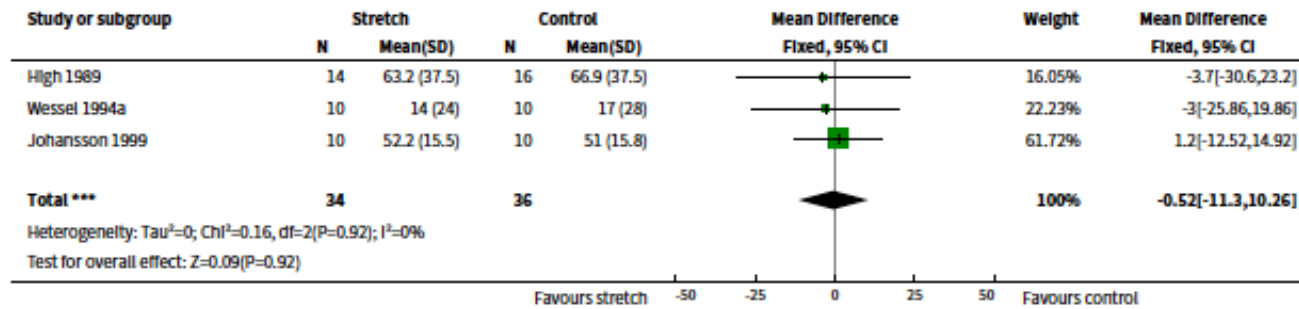
**Stretching to prevent or reduce muscle soreness after exercise  
(Review)**

Herbert RD, de Noronha M, Kamper SJ

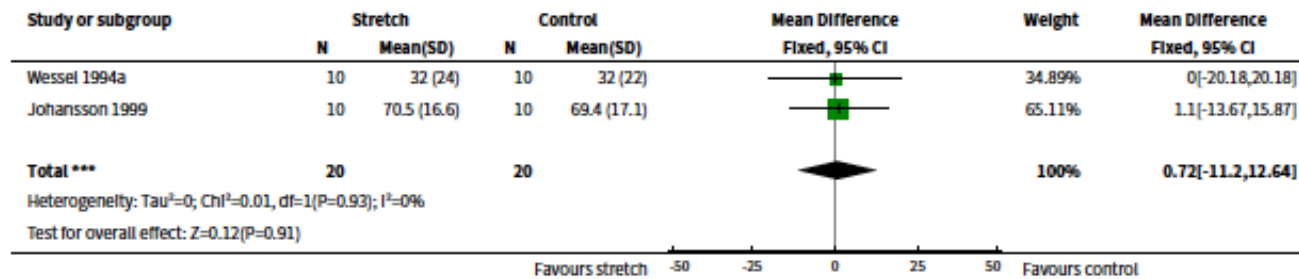
Pré-exercício

1, 2 e três dias

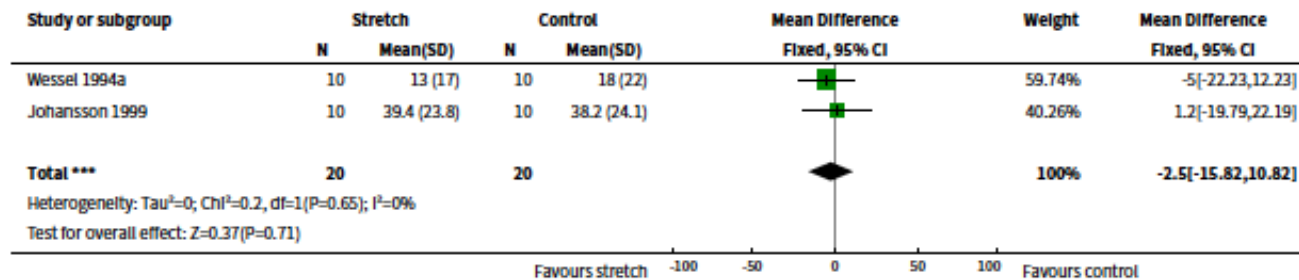
### Analysis 1.1. Comparison 1 Pre-exercise stretching, Outcome 1 Soreness on day 1 (assessed 18-30 hours post-exercise).



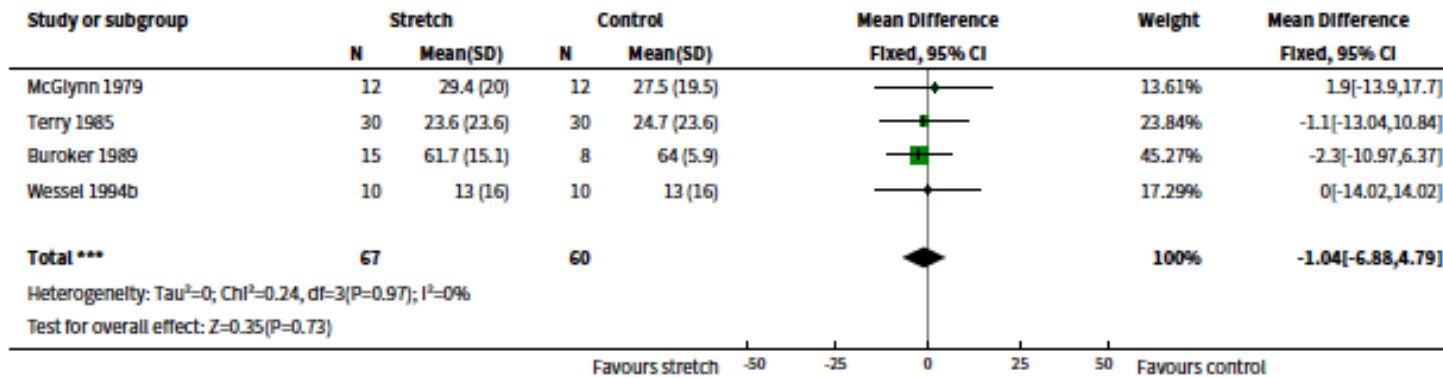
### Analysis 1.2. Comparison 1 Pre-exercise stretching, Outcome 2 Soreness on day 2 (assessed 42-54 hours post-exercise).



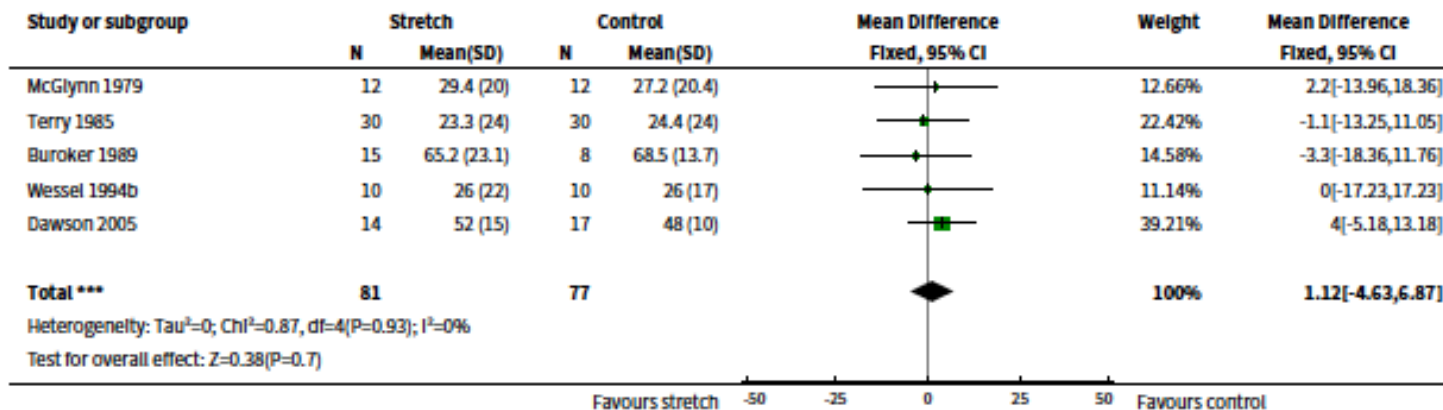
### Analysis 1.3. Comparison 1 Pre-exercise stretching, Outcome 3 Soreness on day 3 (assessed 66-78 hours post-exercise).



**Analysis 2.1. Comparison 2 Post-exercise stretching, Outcome 1 Soreness on day 1 (assessed 18-30 hours post-exercise).**



**Analysis 2.2. Comparison 2 Post-exercise stretching, Outcome 2 Soreness on day 2 (assessed 42-54 hours post-exercise).**

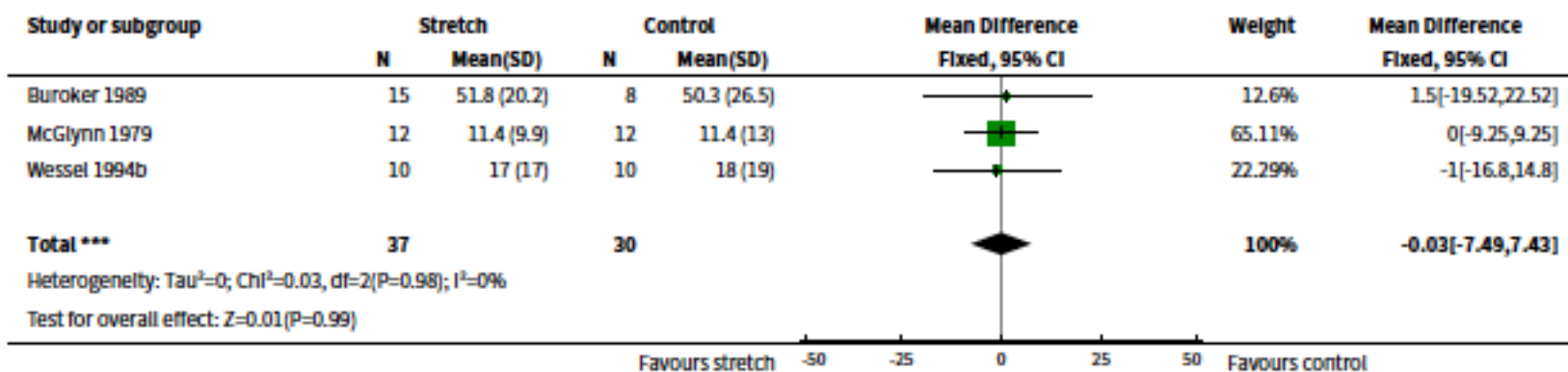


Pré-exercício

1, 2 e três dias



### Analysis 2.3. Comparison 2 Post-exercise stretching, Outcome 3 Soreness on day 3 (assessed 66-78 hours post-exercise).



# Porque?

- ▶ Atingir amplitude de movimento que será desempenhada na tarefa principal
- ▶ Treinamento para evitar lesões quando movimentos com grande amplitude de movimento são executados



# Concluindo

- ▶ Alongamento estático pode prejudicar o desempenho de exercícios de força e potência com maior efeito na força (5%);
- ▶ A duração do alongamento é um fator importante considerando que menos que 45 segundos atenua o efeito no desempenho;
- ▶ Poucas evidências em relação do dinâmico com muita variedade de desfechos;
- ▶ Ausência de relação com lesão;
- ▶ Ausência de efeito na dor muscular tardia;



# Obrigada!

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