The Effect of Static Stretching on Hamstring Muscle Length: A Systematic Review

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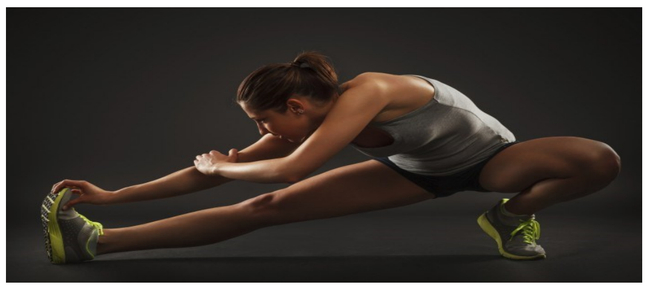
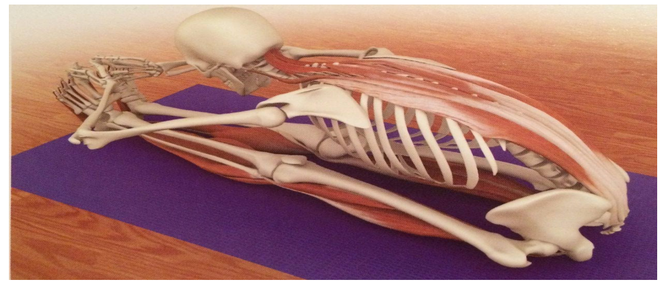
INTRODUCTION

Muscular flexibility is important to allow sufficient joint range of motion during basic movements.(4) Hamstring strains are among the most common injuries in sports that involve sprinting and jumping, but are also common in dancing and gymnastics.(4) The bi-articular anatomy of this muscle sometimes means it is stressed heavily over two joints during simultaneous hip flexion and knee extension. Insufficient hamstring muscle length has been thought to be a possible cause of hamstring strain. Static stretching has been shown to be the most effective at increasing hamstring muscle length and flexibility in the management of hamstring injuries.(1,2,3) Recent studies show that there are divided opinions about the effect of static stretching on muscles. More insight is needed to understand if this intervention does or does not increase hamstring muscle length.



AIM

Identifying the effect of Static Stretching on Hamstring Muscle Length



METHOD

Study Design:	Systematic review
Databases:	PubMed, PEDro and Medline, Cinahl and Sportdiscuss via EBSCOhost
Keywords:	Two elements of PICO --> *Intervention:* Stretching techniques, *Outcome:* effect, muscle, muscle length
Inclusion criteria:	English/German studies, intervention studies, hamstring muscle length, manual stretching techniques, outcome measurement includes ROM (hip and knee joint), measured in degrees
Exclusion criteria:	Subjects with an orthopaedic or neurologic issues that could influence the ability to gain ROM, immediate effect, stretching combined with another intervention, abstract and unpublished data
Data extraction:	*Intervention table:* demographics of subjects, study design, supervision, position, duration, protocol, and time elapsed between measurements. *Outcome measurement table:* results and authors conclusion
Quality Assessment:	Methodological quality with Physiotherapy Evidence Database (PEDro) scale
Level of Evidence:	Levels of recommendation and levels of evidence (EBRO method)
Data Synthesis:	A best-evidence synthesis (BES) was performed

RESULTS

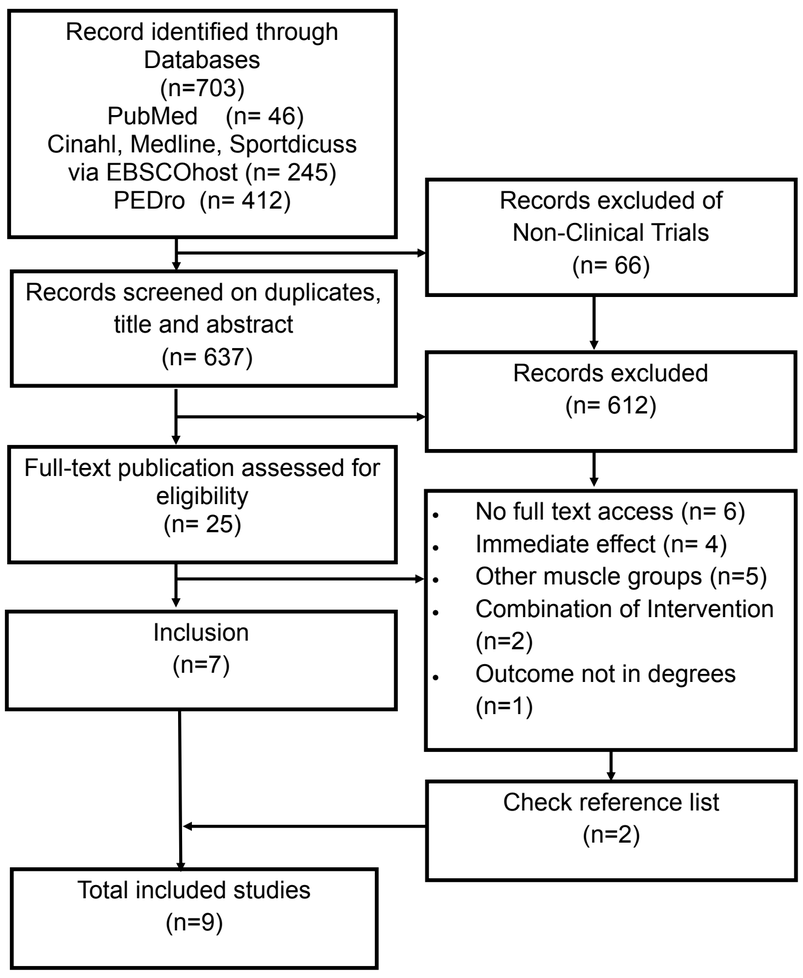


Figure 1: Collection and Selection of eligible studies

Regular static stretch DOES NOT increase Hamstring Muscle Length	VERSUS	Regular static stretch DOES increase Hamstring Muscle Length
3 Randomized Control Trial	**Number of included articles**	3 Randomized Control Trial 3 Clinical Control Trial
Strong	**PEDro Score**	4 Moderate; 2 Strong
Digital Inclinometer	**Measurement Tool**	Universal Goniometer
Passive Straight Leg Raise	**Testing position in supine**	Passive Straight Leg Raise/Active Knee Extension Test
Objective measured by special devise	**End range determination during testing**	Subjective measured by the patients feeling of discomfort
First test at least one day prior Final test at least 24 hours after the last stretch	**Pre/Post Measurement**	5 out of 6 studies ->: No specific information 1 out of 6 studies ->: First test one week prior Final test 1-2 days after
1 x 1-30 minutes 5-7 x a week for 3-6 weeks	**Intervention Protocol**	2-6 x 20-30 seconds 3-7 x a week for 4-12 weeks
No	**Easy to apply in practise**	Yes
CI of 95% or higher	**Statistical Values**	p<0,05

LIMITATIONS

- Systematic review is written by one author
- Lack of blinding during the data collection of included studies
- Inclusion and exclusion criteria narrowed down
- No direct procedure to measure the length of the muscle
- Only one muscle group and one stretching technique

Recommendation for clinical practice:

- Static stretching is NOT recommended as an intervention to increase hamstring muscle length

Recommendation for future studies:

- Insufficient consistency in terminology
- Subjects with limited hamstring muscle length

REFERENCES

1. Ben M, Harvey LA. Regular stretch does not increase muscle extensibility: A randomized controlled trial. Scand J Med Sci Sport. 2010;20(1):136–44.
2. Folpp H, Deall S, Harvey L a, Gwinn T. Can apparent increases in muscle extensibility with regular stretch be explained by changes in tolerance to stretch? Aust J Physiother [Internet]. 2006;52(1):45–50.

CONCLUSION

Regular static stretching does NOT increase Hamstring Muscle Length

REFERENCES

3. Law RYW, Harvey L a, Nicholas MK, Tonkin L, De Sousa M, Finniss DG. Stretch exercises increase tolerance to stretch in patients with chronic musculoskeletal pain: a randomized controlled trial. Phys Ther. 2009;89(10):1016–26
4. Borman NP, Trudelle-Jackson E, Smith SS. Effect of stretch positions on hamstring muscle length, lumbar flexion range of motion, and lumbar curvature in healthy adults. Physiother Theory Pract. 2011;27(2):146–54.