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. Hamstring strains are among the most common injuries in sports that involve sprinting and jumping, but are also common in dancing and gymnastics. 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. 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could influence the ability to gain ROM, immediate effect, stretching combined with another intervention, abstract and unpublished data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

<table>
<thead>
<tr>
<th>Regular static stretch</th>
<th>VERSUS</th>
<th>Regular static stretch</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOES NOT increase</td>
<td></td>
<td>DOES increase</td>
</tr>
<tr>
<td>Hamstring Muscle Length</td>
<td></td>
<td>Hamstring Muscle Length</td>
</tr>
<tr>
<td>3 Randomized Control Trial</td>
<td>Number of included articles</td>
<td>3 Randomized Control Trial</td>
</tr>
<tr>
<td>Strong PEDro Score</td>
<td>4 Moderate; 2 Strong</td>
<td></td>
</tr>
<tr>
<td>Digital Inclinometer</td>
<td>Universal Goniometer</td>
<td></td>
</tr>
<tr>
<td>Passive Straight Leg Raise</td>
<td>Testing position in supine</td>
<td></td>
</tr>
<tr>
<td>Objective measured by special devise</td>
<td>End range determination during testing</td>
<td></td>
</tr>
<tr>
<td>First test at least one day prior</td>
<td>Pre/Post Measurement</td>
<td></td>
</tr>
<tr>
<td>Final test at least 24 hours after the last stretch</td>
<td>5 out of 6 studies -&gt;</td>
<td></td>
</tr>
<tr>
<td>1 x 1-30 minutes 5-7 x a week for 3-6 weeks</td>
<td>No specific information 1 out of 6 studies -&gt;</td>
<td></td>
</tr>
<tr>
<td>Intervention Protocol 2-6 x 20-30 seconds 3-7 x a week for 4-12 weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No CI of 95% or higher</td>
<td>Easy to apply in practise</td>
<td></td>
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</tbody>
</table>

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