

The "4th Hamstring": Effects of Adductor Magnus Treatment on Hamstring Length During Knee Extension

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Introduction

The adductor magnus is often called "the 4th hamstring." This study was designed to observe the effects of treating the adductor magnus on hamstring length measured by knee extension.

Background:

The adductor magnus is a muscle of the medial thigh originating at the ischial tuberosity and ischiopubic ramus and inserting at the linea aspera and adductor tubercle of the femur. The obturator and sciatic innervate the adductor magnus. The actions of the adductor magnus are two-fold: adduction and extension of the hip. The adductor magnus is specifically recruited when the hip must move from flexion to extension quickly (i.e. exploding from the blocks in a sprint race).

Trigger points in the adductor magnus can refer pain to the groin or ischial tuberosity. Often times strain to the adductor magnus will feel like a high hamstring strain. The adductor magnus is a very important muscle for track athletes and power lifters.

Objective

The purpose of this study was to determine what effects, if any, treatment to the adductor magnus had on hamstring length. Multiple clinical observations demonstrated that treatment to the adductor magnus could increase knee extension range of motion. This was puzzling due to the adductor magnus's lack of action at the knee joint. This study hoped to determine if these observations were a coincidence, or if treatment to the adductor magnus may be a viable option for increasing hamstring length.

Taking a translational philosophy in our study we were mostly concerned with the possible clinical inferences we could make from our results. Our goal is to create studies that deepen our understanding and, most importantly, have direct impact on the health of the clients we serve.

Method

Study Design

An interventional study design was implemented to determine the effects of the adductor magnus on hamstring length. A total of 80 subjects (m=32, f=48) were recruited at 5 different locations. Of those, 64 were placed in a treatment group (m=27, f=37) and 16 were placed in a control group (m=5, f=11). Five therapists were instructed how to measure hamstring length and treat the adductor magnus with neuromuscular techniques. A 12 inch goniometer was used to measure knee extension. A supervising therapist oversaw the instruction to ensure consistency.

Procedure

- Measure hamstring length during knee extension bilaterally with hip and knee at 90 degrees flexion (see figure)
- If hamstring length was restricted (<150 degrees) treat adductor magnus with cross fiber friction and digital compressions focusing on tender points for 10 minutes.
- Subjects in the control group were asked to lay down and relax for 10 minutes.
- Remeasure hamstring length.

Treatment

Therapists worked with the subjects for 10 minutes treating only the adductor magnus in a side lying position with neuromuscular techniques.



Results

Treatment Group

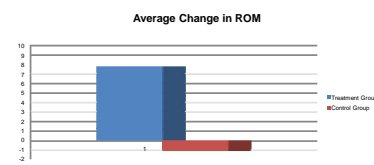
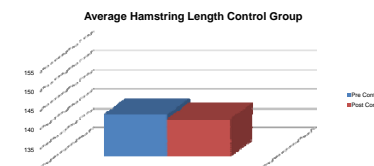
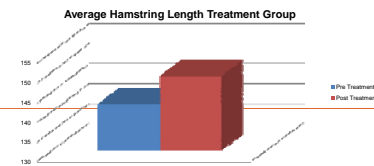
Post-treatment measures were on average 7.71 +/- 0.61 degrees increase after adductor magnus treatment for the treatment group. Increase was seen in 92% of post-treatment measurements. 44% returned to "normal range" (≥ 150 degrees). 31% of treatment subjects increased hamstring length by 10 degrees.

The treatment group had a maximum increase of 34 degrees, a median increase of 7 degrees, a mode of 8 degrees, and a minimum of a decrease of 3 degrees.

Control Group

Measures for the control group were on average -1.09 +/- 1.83 degrees. Only 13% of the control group returned to normal range and only 10% increased by 10 degrees.

The control group had a maximum increase of 14 degrees, a median decrease of 2 degrees, a mode of decreasing 6 degrees, and a minimum of a decrease of 17 degrees.



The above graphs illustrates change in hamstring length for both treatment and control groups. Figure 1 illustrates the average change in hamstring length after treatment to the adductor magnus. Figure 2 illustrates the average change in hamstring length after laying down for 10 minutes. Figure 3 illustrates the difference between treatment and control groups.

Conclusions

As the above data shows, treatment to the adductor magnus seems to be able to increase hamstring length during knee extension. The treatment group received significant benefits in range of motion increases which could be important in any clinical treatment session. An inability to fully extend the knee could affect gait patterns, athletic ability, and/or provide for trigger point development and muscular discomfort.

Coming from a translational perspective this study provides insight for the clinician when treating range of motion problems at the knee. If a client presents with limited knee extension this study shows it may be wise to address issues in the adductor magnus to deal with those issues. Similarly if hamstring treatment is not producing desired results, perhaps it is important to look into the 4th hamstring.

Looking Ahead

This project had shortcomings that should be addressed in future research. The number of practitioners performing the treatments may have added inconsistency to the procedure.

Furthermore, a larger control group should be used in future studies. The authors believe that it would be prudent to add comparison groups, such as a stretching group, to a study to help determine best practice for clinicians.

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