



# Active Muscle Therapy: Hamstring Flexibility and Strength

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## INTRODUCTION

### Purpose

- ❖ The purpose of this research was to compare the effects of deep stripping massage strokes in combination with eccentric resistance with deep stripping massage strokes on hamstring flexibility and strength.
- ❖ Many studies have been conducted to determine various interventions on hamstring length, but little research has considered the effects of combining deep stripping strokes with eccentric resistance on muscle length and strength.

### Definitions

- ❖ The criteria for tight hamstrings was a passive terminal knee extension reading of 75° or less measured supine with the pelvis securely strapped to the table, the hip flexed to 90° and the ankle relaxed.
- ❖ For the strength measurement, participants pressed their posterior calcaneus into a microFET3 digital muscle tester for approximately 5 seconds while seated on the edge of a desk with the knee of the leg being measured flexed to approximately 90°.

### Hypothesis

- ❖ The combination of deep stripping massage strokes with eccentric resistance is more effective on hamstring flexibility than deep stripping alone.
- ❖ The combination of deep stripping massage strokes with eccentric resistance is more effective on hamstring strength than deep stripping alone.

## METHOD

### Participants

- ❖ 89 participants between the ages 18-62 years were recruited through advertisements in the school newspaper, by informing all coaches of the sports teams, and by convenience
- ❖ 64 participants qualified in the category of tight hamstrings with either one or both hamstrings to match the criteria and with no history of knee, thigh, hip or lower back problems for 1 year before the study.
- ❖ 29.7 % women and 70.3% men
- ❖ Age: 31.4±12.1 (mean±standard deviation)
- ❖ 85.9% right side dominant, 14.1% left side dominant

### Research Design

The research design employed was:

- ❖ A one visit, two variable experimental design where each participant experienced both treatments during the same visit.

## METHOD

### Research Design cont'd

Pre treatment:

- ❖ Hamstring flexibility was measured having the participant supine with the pelvis securely strapped to the table, the hip flexed to 90° and the ankle relaxed. A research member would then move the knee to terminal extension and a measurement using a microFET3 digital inclinometer was taken to record the participant's pre intervention hamstring lengths. After the length of each hamstring was recorded, the microFET3 was set to muscle testing on the high threshold setting to measure and record the strength of each hamstring. For the strength measurement, participants were seated on the edge of a desk with the knee of the leg being measured flexed to approximately 90°. Their arms were folded across their chests and their shoulders and opposite side knee were stabilized as they pressed their posterior calcaneus into the gauge for approximately 5 seconds

Treatment:

- ❖ On their tighter side participants were administered a series of fifteen ten-second bouts of eccentric resistance that were combined with deep longitudinal stripping massage strokes. The eccentric resistance consisted of an extremity strap and elastic resistance band securely strapped to the table and the participants ankle. Then, the knee was moved passively into flexion a little beyond 90° by a research assistant and the participants were asked to engage their hamstring muscle in order to resist the pull from the band. On their other hamstring participants were administered a series of fifteen ten second deep longitudinal stripping massage strokes while lying passive. All massage strokes were performed at a depth of 7 out of 10 on a verbal pressure scale index. The entire breadth of the muscle from insertion to origin was covered by the stripping strokes.

Post intervention:

- ❖ The same hamstring flexibility and strength measurements used in the pretest were administered in the same manner.

## RESULTS

- ❖ Hamstring flexibility
  - There was a 9.3% improvement (p<0.01) in flexibility following the combination of stripping strokes and eccentric resistance.
  - There was a 6.4% improvement (p<0.01) in flexibility with stripping strokes alone.
  - The improvement in flexibility observed following the combination of stripping strokes and eccentric resistance was greater (p<0.05) than following stripping strokes alone.
- ❖ Hamstring strength
  - There was a non-significant 1.1% increase (p>0.05) in strength following the combination of stripping strokes and eccentric resistance.
  - There was a non-significant 1.8% decrease (p>0.05) in strength with massage only.

## RESULTS

Table 1. Means & Standard Deviations for Flexibility Measures (degrees)

	N	Mean	Std.Deviation	Range	Minimum	Maximum
Pre Flexibility: Stripping + Eccentric	64	64.4	8.2	33	42	75
Post Flexibility: Stripping + Eccentric * ^	64	71.3	9.3	40	48	88
Pre Flexibility: Stripping alone	64	69.5	8.6	44	45	89
Post Flexibility: Stripping alone *	64	73.9	9.0	38	49	87

Table 2. Means and Standard Deviations for Strength Measures (kg)

	N	Mean	Std. Deviation	Range	Minimum	Maximum
Pre Strength: Stripping + Eccentric	64	6.5	3.3	15.1	1.6	16.7
Post Strength - Stripping + Eccentric	64	6.6	3.8	14.8	2.1	16.8
Pre Strength - Stripping alone	64	6.7	3.4	13.2	1.4	14.6
Post Strength - Stripping alone	64	6.6	3.9	15.9	1.6	17.5

\* denotes greater from baseline (p<0.01); ^ denotes greater than stripping alone (p<0.05)

## CONCLUSIONS

- ❖ Given that both treatments resulted in improvements in flexibility, it can be concluded that deep stripping massage strokes, with or without eccentric resistance, have a positive effect on flexibility.
- ❖ Furthermore, deep stripping massage strokes combined with eccentric resistance are more effective than deep stripping alone in terms of improving flexibility.
- ❖ Neither deep stripping massage strokes combined with eccentric resistance nor deep stripping alone have any effect on strength.

## DISCUSSION

### Implications

- ❖ Given the significance of the results from this study, it would be beneficial and more effective for e.g., athletic trainers, massage therapists and physical therapists to utilize deep stripping with eccentric resistance to improve flexibility.

### Future Research

- ❖ The effect of this new technique of combining deep stripping massage strokes with eccentric resistance needs to be researched further in order to fully determine its benefits.
- ❖ Further study is needed to determine how long flexibility is enhanced following deep stripping massage combined with eccentric resistance.
- ❖ In addition, training studies utilizing these techniques are warranted to determine the effects that repeating these measures have on flexibility and strength over time.