The Effects of Foam Rolling on Hamstring Flexibility

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INTRODUCTION

- Hamstring strains are one of the most common musculoskeletal injuries[1]
  - Reoccurrence rate of 34%[1]
- Hamstring strain injury risk increases with a lack of flexibility[2]
- Self-myofascial release helps to increase range of motion (ROM), which reflects improved flexibility[3]
- A 3-5º increase in the stand and reach test (improved flexibility) occurred following foam rolling[4]
- However, the Stand and Reach test incorporates low-back and hamstring flexibility, making it unreliable as an isolated hamstring flexibility measurement [4,5]
- Active knee extension test is considered the gold standard for measuring hamstring ROM; therefore, this test may be better for measuring isolated hamstring flexibility[6]

PURPOSE

- To investigate the acute effects of myofascial release, specifically foam rolling, on knee extension range of motion

HYPOTHESIS

- We hypothesized that hamstring flexibility would increase following foam rolling as compared to control

METHODS

- **Research Design:** Randomized Control Pretest Posttest
- **Independent Variables:** Group and Time
- **Dependent Variable:** Knee extension range of motion change from pre-test to post-test
- **Participants:** 3 (6 limbs) Daemen College students/faculty >18 years old free from upper and lower extremity injuries, no neurological conditions, no cardiovascular conditions, and no current experience with foam rolling of the hamstring

METHODS

Instrumentation

- **Active Knee Extension Test (AKET) (Figure 1)**
  - Intrarater reliability of .76-.97[7]
  - 3 times with 1 minute rest

Figure 1: AKET apparatus

- **Inclinometer (Figure 2)**

Figure 2: Acumar Single Digital Inclinometer
(Lafayette Instrument®, Lafayette Instrument company, INC. Lafayette, IN)

- **Foam Roller (Figure 3)**
  - A more rigid rolled exerts more pressure than a pliable one[8]
  - Foam rolling protocol: 5 - one minutes bouts to the hamstring muscle with 1 minute rest between each bout[9]

Figure 3: TriggerPoint GRID Foam Roller 1.0
(TriggerPoint, Implus LLC, Durham,NC)

Procedures (Figure 4)

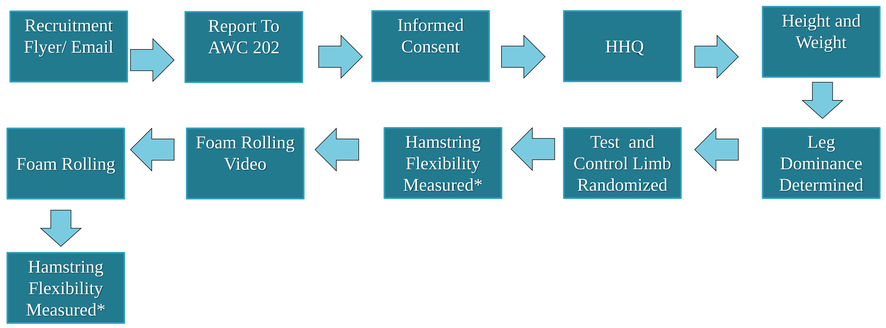

Figure 4: Procedures *Test limb measured first

RESULTS

Statistical Analysis

- Knee extension range of motion change score, means and standard deviations are presented for test and control limb (Table 1)
- An independent t-test will be utilized to compare differences between groups; SPSS v.23 was used for data analysis; $p < 0.05$

	Pre-Test (° ± SD)	Post-Test (° ± SD)	Δ Score (°)
Control	51 ± 11.5	56.2 ± 9.5	2.3
Experimental	53.9 ± 11	60.7 ± 8.4	6.8
p-value			0.38

Table 1: Mean±SD and Change Scores

CONCLUSIONS

- Greater clinically meaningful changes in ROM in the experimental group following foam rolling (Table 1)
- The changes in the control limb could be due to the cross-over effect
  - Although we waited the 10 minutes the effects of foam rolling on the contralateral limb were seen in the control limb post- foam rolling[10]
  - Control limb increases in ROM were higher then the standard error of measurement for the inclinometer[11]
- While these results may suggest a clinically meaningful change in ROM, the small sample size is a limitation to this study and may have contributed to the lack of statistical significance
- Further research needs to be done on foam rolling the hamstring and testing AKET to isolate any hamstring flexibility improvements
- Further needs to be done on the cross-over effect after foam rolling as the findings of this study may suggest a longer lasting effect

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