

Effects of Self Myofascial Release & Static Stretching on Anaerobic Power Output

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The aim of this study was to determine the effects of static stretching (SS) and myofascial release (MFR) on anaerobic power output. Cycling (30-sec Wingate) tests were used to assess power output in 9 male and 14 female subjects. Peak power output (PPO) and percent power drop (PPD) were examined among subjects to determine the differences between interventions. In female subjects, PPO was significantly reduced following SS, in comparison to control (Control: 536.29 ± 69.11 W, SS: 508.295 ± 67.097 W). PPD was significantly decreased in the SS and MR treatments compared to the control (Control: 44.951 ± 5.29%, SS: 40.453 ± 6.69%, MR: 41.53 ± 5.97%). In male subjects, PPO was significantly increased following SS, in comparison to control (Control 850.624 ± 165.411 W SS: 881.1389 ± 169.3275 W). PPD was significantly increased in MR compared to the control group (Control: 44.69 ± 7.75, MR: 48.91 ± 8.27%). The effects of MFR on anaerobic power output remain inconclusive. Given that there is very little scientific inquiry with respect to the influence of SS and MFR on maximal anaerobic power performance, it can only be speculated on the possible mechanisms for gender disparity.

INTRODUCTION

◆ Static stretching has been the most popular warm-up prior to exercise; however, current research is exploring alternative techniques such as myofascial release.

◆ Fascia is a dense connective tissue surrounding muscle which contains mechanoreceptors, proprioceptors, and blood vessels. The stimulation of mechanoreceptors in the fascia elicits soft tissue and neural reflex modifications.

◆ The physiological effects of myofascial release are not presently known, although many theories exist.

◆ The manipulation of fascia triggers a myostatic stretch reflex. This reflex shortens the normal length-tension relationship that exists within the muscle proteins. Due to this decrease in length, mechanical changes occur in the fascial structure, which should increase anaerobic power.

◆ Myofascial release can also increase the range of motion within a joint, help to correct imbalances in the muscle while decreasing muscle soreness, and increase the extensibility of the musculotendinous junction.

◆ It is unknown if myofascial release prior to high power exercise benefits power output, therefore more research must be conducted to investigate the its effects.

◆ Multiple interventions should be examined and compared for their effectiveness on power performance as currently no studies exist comparing SS and MFR prior to exercise.

◆ There are inconclusive results on the effectiveness of MFR as a valuable warm-up technique.

Purpose

The current study aimed to determine the effects of pre-event SS and MFR on anaerobic power output in young adults using a Wingate protocol.

Hypothesis

Anaerobic power output will decrease following SS and increase with MFR compared to a control (no intervention) trial.

METHODS

Subjects

- ◆ 23 (14 female, 9 male) subjects participated with a mean age of 20.3 yrs ± 2.36 yrs
- ◆ Single blind study with subjects serving as own control

Participant requirements

- ◆ Participate in 3 Wingate trials
- ◆ Low or Moderate risk stratification according to ACSM guidelines
- ◆ Avoid alcohol, creatine, caffeine, or strenuous exercise 24 prior to testing
- ◆ Journal a 24 hour food log
- ◆ No orthopedic injuries within last 6 months

PROCEDURES

Control Trial:

- × Height and weight
- × 5-min self-paced warm-up on bike with 2% of body weight resistance
 - × sprints at 1:30, 3:00, and 4:30
- × 30-sec Wingate test with 8% of body weight resistance
- × 5-min self-paced cool down
- × 20-min orientation (10 min SS/10 min MFR) for stretching technique

Intervention Trials (MFR or SS):

- × randomized to MFR or SS protocol
 - × SS: hold to point of mild discomfort
 - × MFR: roll against foam roller down entire length of the muscle
- × 5-min self-paced warm-up with no resistance
- × MFR/SS Intervention: lasted approximately 20-21 minutes
 - × each stretch lasted 30 seconds and held 3 times
- × Intervention was completed in the following order: quadriceps, hamstrings, iliotibial band, adductors, gluteus, hip flexors, and calf muscles
- × 5-min self-paced warm-up on bike with 2% of body weight on fly-wheel
 - × sprints at 1:30, 3:00, and 4:30
- × 30-sec Wingate test with 8% of body weight as resistance
- × 5-min self-paced cool down on bike

STATISTICS

- ◆ Independent sample T-tests
- ◆ RMANOVA was used to compare groups on: PPD, absolute and relative, PPO, APO, & MPO.
- ◆ Alpha level was set at P < 0.05.
- ◆ Data was analyzed using SPSS version 16.0.

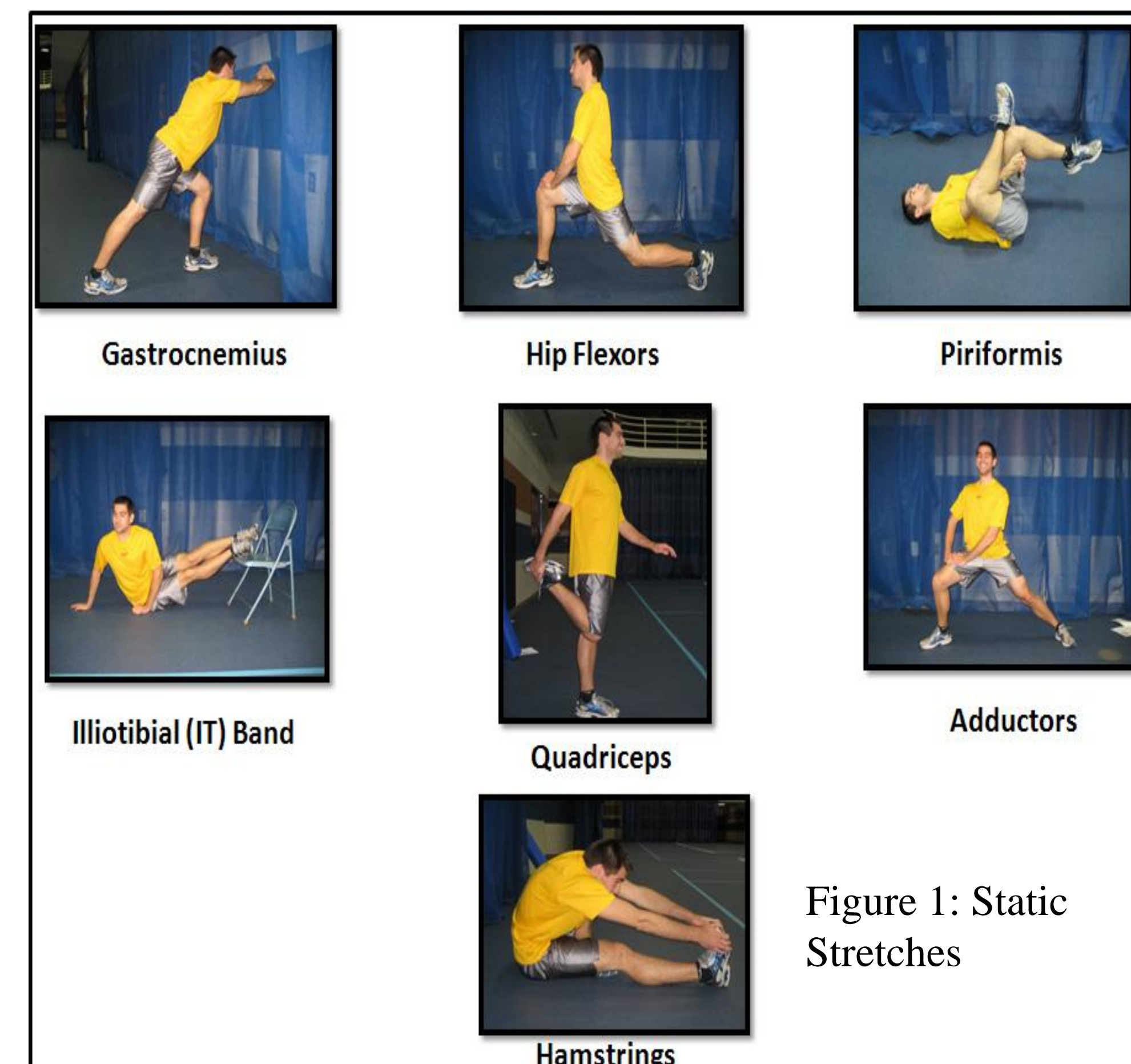


Figure 1: Static Stretches

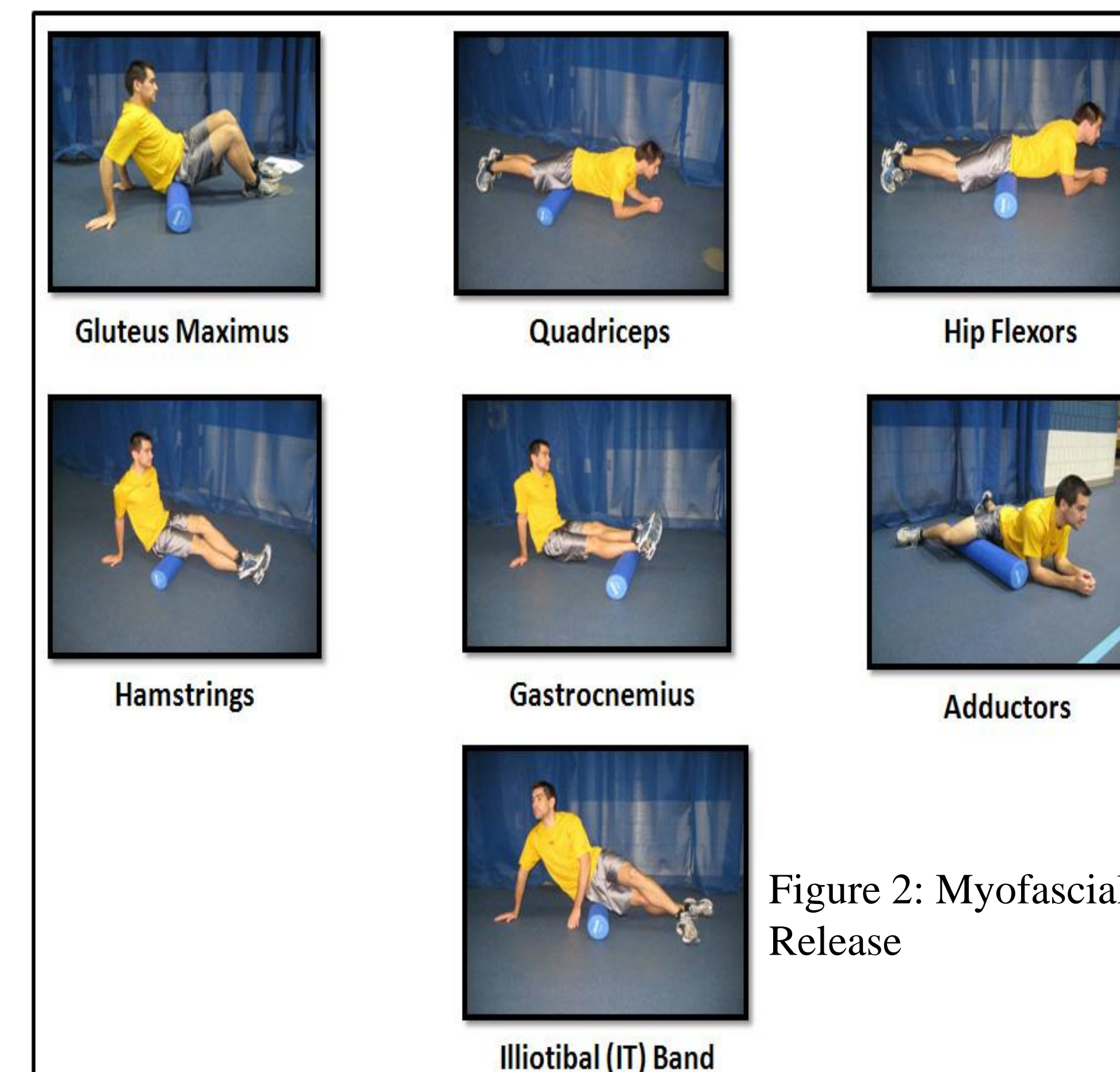


Figure 2: Myofascial Release

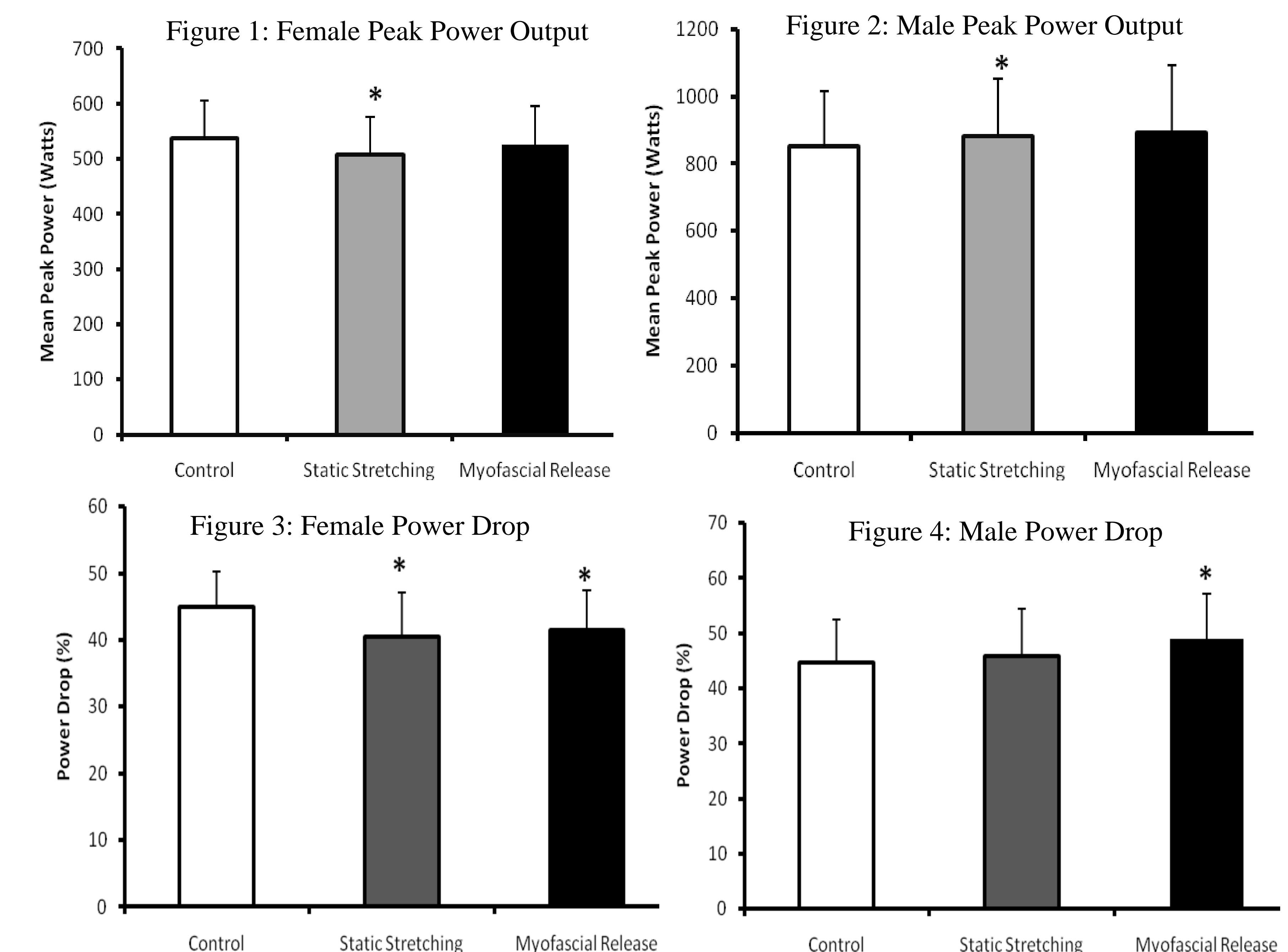
RESULTS

◆ As a group:

- × No significant differences between control, SS, or MFR trials

◆ Between genders:

- × In females: PPO significantly reduced following SS compared to control
 - × Control: 536.29 ± 69.11 W, SS: 508.295 ± 67.097 W
- × In females: PPD significantly decreased in SS and MFR compared to control
 - × Control: 44.951 ± 5.29%, SS: 40.453 ± 6.69%, MFR: 41.53 ± 5.97%
- × In males: PPO significantly increased following SS compared to control
 - × Control 850.624 ± 165.411 W SS: 881.1389 ± 169.3275 W
- × In males: PPD significantly increased in MFR compared to control
 - × Control: 44.69 ± 7.75, MFR: 48.91 ± 8.27%



DISCUSSION, LIMITATIONS, and FUTURE RESEARCH

Discussion

- ◆ No differences between the effects of SS or MFR on PPO or PPD
- ◆ Differences on the effect of treatment between male and female subjects suggests gender disparity with respect to SS and MFR

- ◆ Muscle mass of the lower extremities
- ◆ Physiological differences in muscle tissue
- ◆ Stretch reflex complex

Limitations

- ◆ Insufficient experience among the subjects with MFR
- ◆ Control of maximal exertion during the Wingate tests
- ◆ Variability among interventions
- ◆ Brake weight resistance may not have been sufficient for some subjects

Future Research

- ◆ Dose-response of MFR
- ◆ Different anaerobic performance tests and aerobic capacities with MFR
- ◆ Post-exercise MFR and future performance
- ◆ Time delay between MFR and performance
- ◆ Another study using task specific exercises in young adults