

The Effects of Myofascial Release and Dynamic Warm-up on Exercise Performance

Department of Kinesiology, University of Wisconsin-Eau Claire, Eau Claire, Wisconsin

Chelsea Boesel, Brynn Caslavka, Rachel Ferestad, Hannah Gytri, Tiffany Melby

Faculty Advisors: Gary P. Van Guilder, PhD; Jeffrey Janot, PhD



ABSTRACT

PURPOSE: The purpose of this study is to compare the use of foam-rolling to dynamic warm-up on flexibility, power, speed, endurance, and balance in young recreationally active adults. This study is valuable for recreational athletes looking for the best warm-up to enhance flexibility, power, speed, endurance, and balance performance. **METHODS:** Sixteen young (age range: 18-26 years) healthy recreationally active adults (8 women, 8 men) participated in this study. Participants were recruited from the University of Wisconsin-Eau Claire student body. Each subject was randomized to complete three series of exercise performance tests separated by at least 48 hours following three different 15 minute warm-up trials (i.e., control 5 minute jogging warm-up, myofascial release using foam roll-out method, and select dynamic warm-up exercises targeting leg muscle fascia). The exercise performance tests included a triplicate assessment of trunk flexibility (sit and reach), maximum vertical jump height, laser-timed 40-yd running sprint, and standing balance test (Biodex balance). A maximal 1-mile timed run was used to assess aerobic endurance following each warm-up trial. **RESULTS:** Trunk flexibility was significantly improved following the dynamic warm-up trial (34.5±8.6 cm) compared with the foam roll-out method (32.4±9.8 cm) and control (32.4±9.6 cm); these changes were observed in the men rather than women subjects. Vertical jump performance was significantly reduced with foam roll-out (49.3±12.9 cm) compared to control (52.9±13.9 cm) and dynamic warm-up (52.2±15.9 cm). Interestingly, vertical jump performance was impaired in women but not men as indicated in separate gender analyses. There was no influence with warm-up technique on the 40-yard dash, one-leg standing balance, or mile run performance. **CONCLUSIONS:** Trunk flexibility as measured by the sit-and-reach test was significantly improved with dynamic warm-up compared to the control and foam roll-out groups. Furthermore, the improvement in sit-and-reach was driven by the men. Foam roll-out impairs vertical jump performance. There was no influence of warm-up technique on 40-yard dash, mile run, or balance.

Key Words: foam roll-out, fascia, explosive muscle power, stability

BACKGROUND

➤Fascia, a type of connective tissue that covers your muscles, provides support and structure for the body.

➤The fascia could tighten up and restrict movement, which may reduce exercise performance.

➤Release of the fascia, termed *myofascial release*, can be accomplished by using foam rollers or by performing a dynamic warm-up; these methods may enhance exercise performance.

➤If fascia is restricted injuries may result. An example of this is plantar fasciitis, which causes stiffness, pain in the toes and heel and a decrease in sport performance.

➤Understanding the impact and effects of different warm-up techniques is vital for recreational athletes to improve performance results and decrease the risk of injury.

➤Currently, there is limited research on the effects of various modes of myofascial release on exercise performance.

EXPERIMENTAL AIM AND HYPOTHESIS

To compare the effects of dynamic warm-up that targets leg muscle fascia to a standard myofascial release treatment using foam-rollers on maximum flexibility, power, speed, endurance, and balance in young adults.

We hypothesize that dynamic warm-up exercises targeting leg muscle fascia will improve flexibility, power, speed, endurance, and balance compared to a standard myofascial release treatment using foam roll-out and control.

METHODS

Subjects

- Sixteen adults between the ages of 18-26 years participated in three warm-up sessions followed by a series of exercise performance tests.
- Participants were recruited by flyers, word-of-mouth, and social networking from the University of Wisconsin-Eau Claire student body.
- All subjects provided written informed consent according to the guidelines of the University of Wisconsin-Eau Claire.

Randomized Order Experimental Design

Phase 1: Familiarization

- All of the sixteen subjects participated in a one-week orientation to familiarize them with the warm-up protocols and performance tests.
- Frequency: Occurred one time for each subject.
- Type: Familiarized to the vertical jump, 40-yard sprint, one-mile run, and balance test and performed the sit-and-reach (3 trials).

Phase 2: Randomized Warm-Up Sessions

- Each subject completed three separate warm-up trials in a randomized order (myofascial release, dynamic warm-up, and standard jog) for 15 min.
- Time: 15 minutes of either myofascial roll-out or dynamic exercises or a 5-minute warm-up jog.
- Myofascial roll-out exercises include: gluteus maximus, hamstrings, quadriceps, gastrocnemius, iliotibial band, and adductors.
- Exercises were performed twice, each set being 30 seconds on each leg with one minute rest between sets.
- Dynamic exercises included: overhead squat, spidermans, lunge with hip flexor stretch, inchworm, butt kicks, leg swings, frankenstein's, and leg lifts.
- Exercises were performed twice, each set being 30 seconds with 20 seconds rest and one minute rest between sets.

Phase 3: Performance Testing (3 separate days)

- Frequency: A series of five separate performance tests were completed immediately following each warm-up trial. A minimum 48 hours rest period was implemented between each warm-up performance testing session.
- Type: Performance tests included sit-and-reach (3 trials), vertical jump (3 trials), 40-yd sprint (3 trials), one-mile run (1 trial), and balance (3 trials).

STATISTICAL ANALYSIS

The primary dependent variables were exercise performance measures. The independent variables were warm-up (control, myofascial foam roll-out, dynamic warm-up). Subject characteristics were determined by descriptive analyses. Changes in performance tests following each warm-up trial were determined using a repeated measures analysis of variance adjusted for multiple comparisons using Bonferroni's test. Data are presented as mean±SD. Statistical significance was set at $P<0.05$. Statistical analyses were performed using SPSS software version 17.0 (SPSS Inc).

RESULTS

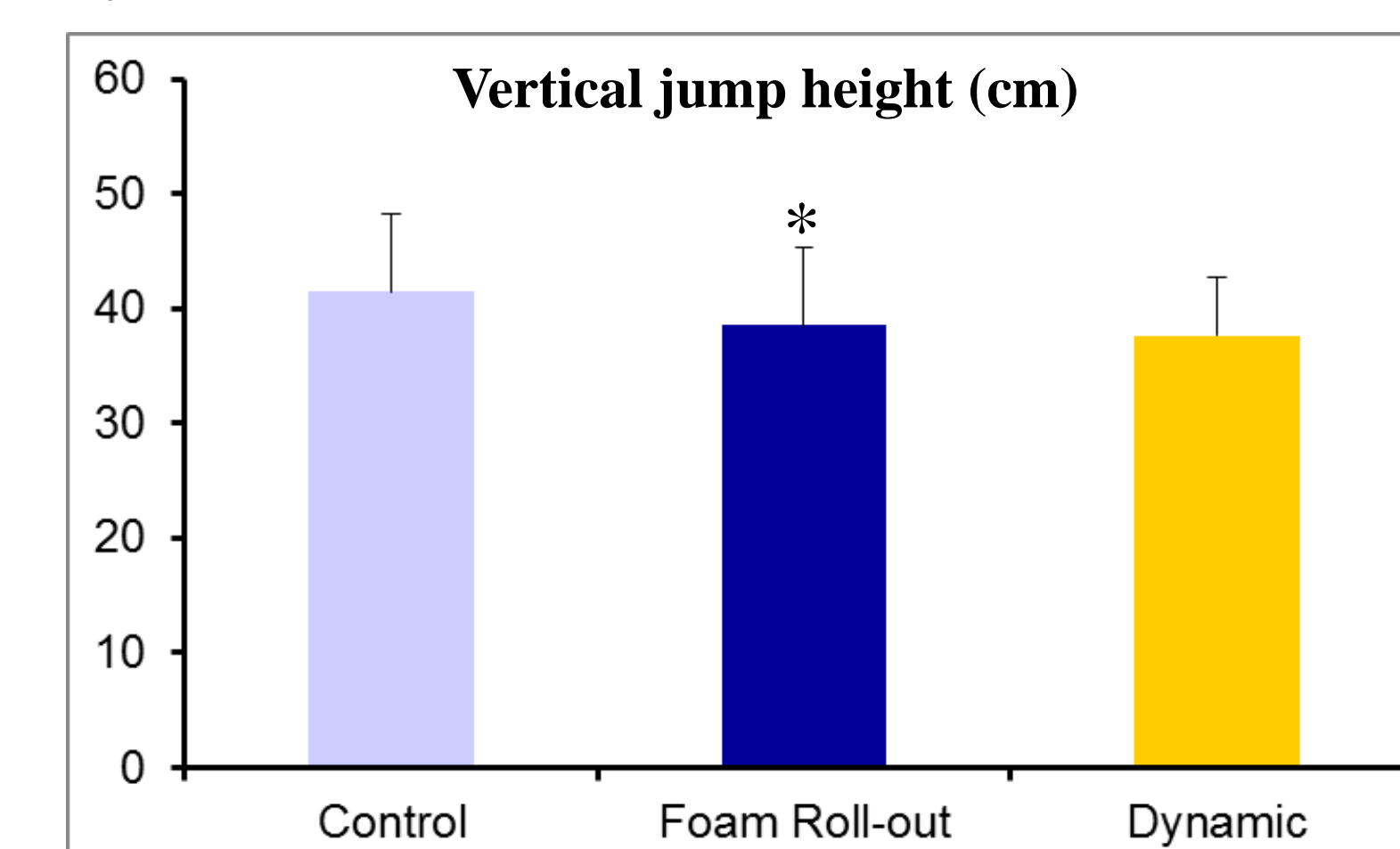
I. Subject characteristics for the entire study population

Variable	Total Group (N=16)			Women (n=8)			Men (n=8)		
	Control	MF	Dynamic	Control	MF	Dynamic	Control	MF	Dynamic
Sit-and-Reach (cm)	32.4±9.3	32.4±9.8	34.3±8.3*†	37.1±8.0	38.1±7.9	37.8±7.4	27.7±8.4	27.3±8.7	30.8±8.0*†
Vertical Jump (cm)	52.6±13.5	49.3±13.0*	52.0±15.4	42.4±6.7	38.6±6.8*	39.2±6.3	62.9±10.3	58.6±9.2	64.9±9.5
40-yd Dash (sec)	6.0±0.7	6.0±0.7	6.0±0.6	6.6±0.5	6.7±0.5	6.5±0.5	5.5±0.2	5.5±0.3	5.5±0.3
1 Mile Run (min)	7.9±1.0	7.8±0.9	7.9±1.0	8.6±1.0	8.5±0.9	8.6±1.0	7.2±0.6	7.2±0.5	7.2±0.6
Overall Balance	2.0±0.6	1.8±0.7	1.8±0.5	1.9±0.8	1.6±0.6	1.6±0.5	2.0±0.4	2.0±0.7	2.0±0.3
Balance-A/P	1.5±0.6	1.3±0.4	1.2±0.5	1.5±0.7	1.1±0.4	1.1±0.6	1.5±0.4	1.4±0.4	1.4±0.2
Balance-ML	1.1±0.4	1.2±0.6	1.1±0.4	1.0±0.6	1.1±0.7	1.0±0.4	1.2±0.2	1.3±0.5	1.2±0.3

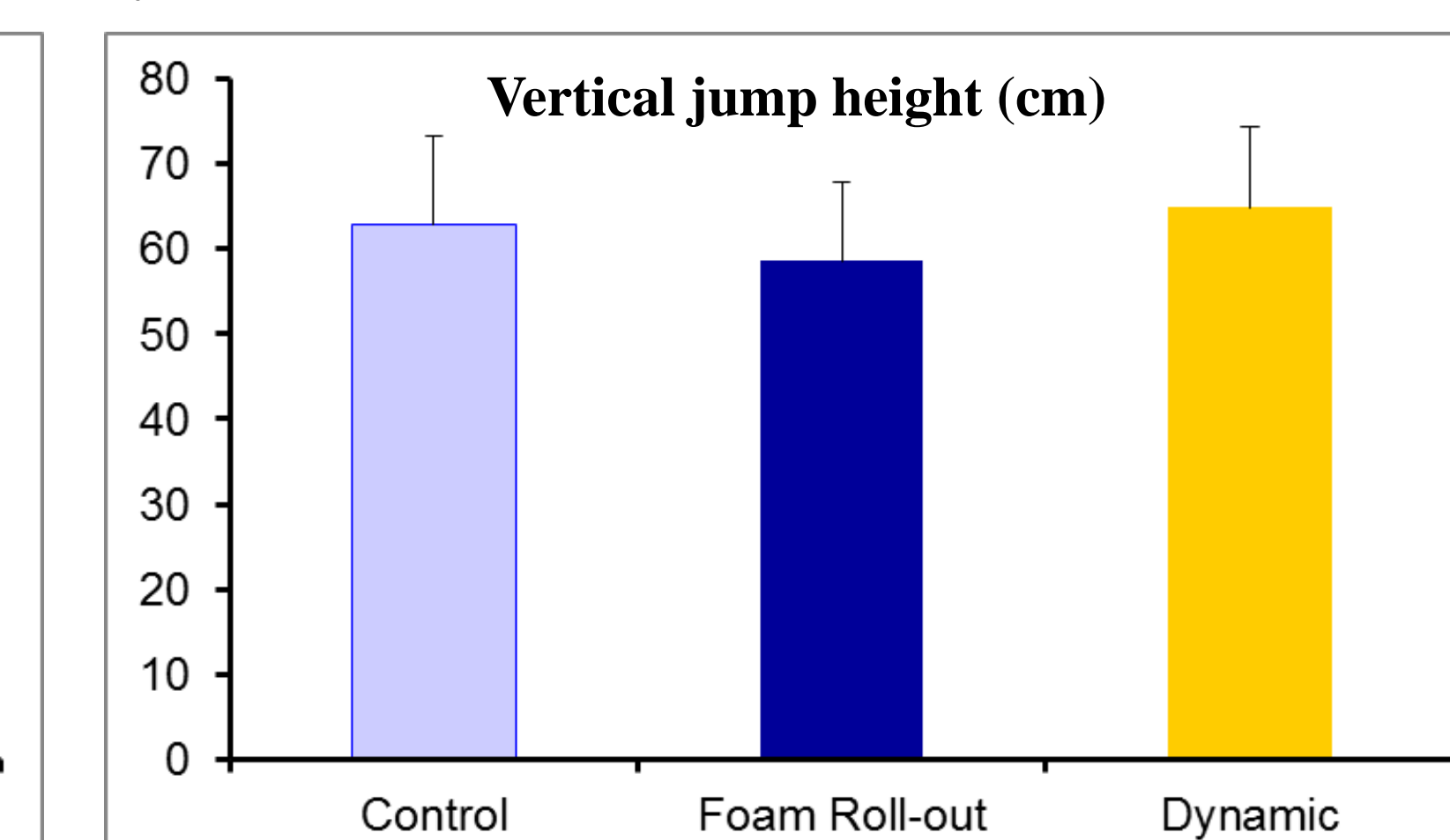
MF: myofascial foam roll-out; A/P: anterior/posterior; ML: medial-lateral. * $P<0.05$ versus control; † $P<0.05$ versus MF

II. Vertical jump performance following each warm-up trial in women (A) and men (B). * $P<0.05$ versus control.

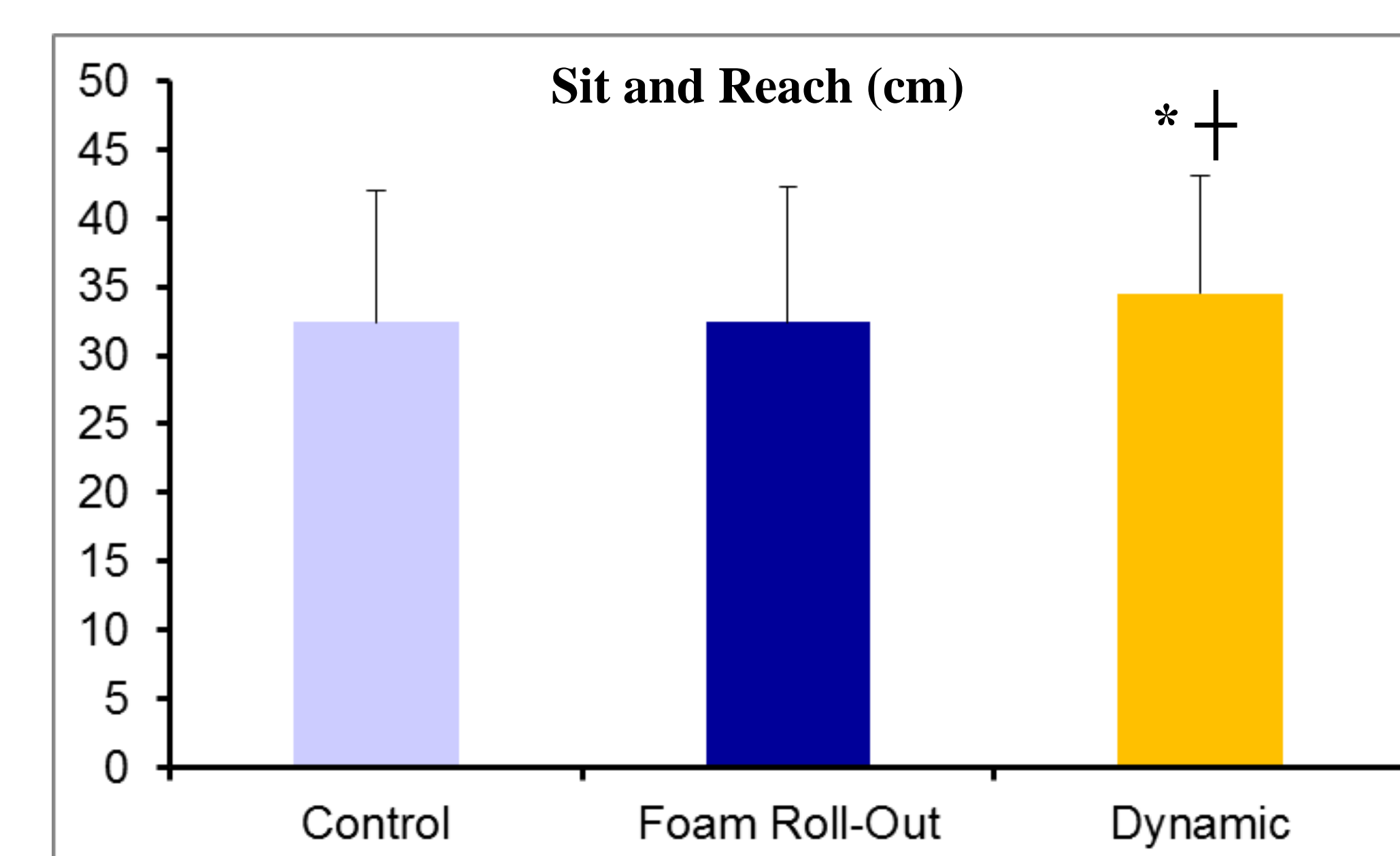
A.



B.



III. Trunk flexibility via the Sit-and Reach test showed statistically significant increases after dynamic warm-up compared to control and foam roll-out conditions ($P<0.05$ versus control; † $P<0.05$ versus foam roll-out).



SUMMARY AND CONCLUSIONS

➤Our data indicated that foam roll-out had negative effects on vertical jump for women. In contrast, sit-and-reach was improved following dynamic warm-up: this improvement was primarily driven by the men.

➤Warm-up technique showed no significant effects on balance, 40-yard dash, and one-mile run.

➤This study is valuable for recreational athletes looking for the best warm-up to enhance power and flexibility.

➤Limitations include small sample size and similarity of subject characteristics.

➤Future research may include increasing study length with subjects assigned to one warm-up to determine long-term effects of warm-up on performance.

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