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The Effects of Dynamic Versus Static Stretching on Lower Body Power

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Introduction

- Dynamic and static warmups have both been used to prepare for exercise and sport.
 - Previous researchers indicate that dynamic stretching is the best warmup before performing exercise because it involves moving joints through their full range of motion throughout the stretch.
- Dynamic stretching is presented as the optimal warmup in the results of this study (Smith et al., 2018).
- The overall purpose of a warmup is to increase blood flow and stimulate the muscles and tendons for physical movement to take place in a coordinated manner (McMillian et al., 2006).

Purpose

- The purpose of this study was to investigate the difference in dynamic stretching versus static stretching in an athlete's lower body explosiveness.
- Our hypothesis is that dynamic stretching will increase lower body power during vertical jump and standing broad jump in comparison to static stretching.

Materials and Methods

- A convenience sample of twelve physically active college students completed the study (age: 20.25 ± 0.75 years; height: 176.69 ± 8.09 cm; weight: 76.74 ± 17.92 kg; mean \pm SD).
- Three participants identified as female and nine were male.
- Each participant performed three randomly assigned treatments on different testing days, a dynamic stretching warmup, static stretching warmup, as well as a control treatment of no stretching (Figure 1).
- The two warmups were focused on the same muscle groups.
- Vertical jump and standing broad jump were performed after each stretching warmup and the best score of two trials was recorded.
- Testing sessions were separated by at least 24 hours.
- To analyze our results, we used a Repeated-Measures ANOVA Test since we had to compare means from three groups of data.
- We analyzed sphericity using the Mauchly's Test and examined Pairwise Comparisons

Results

- There was no significant difference in standing broad jump between the three ($F_{(2,22)} = 1.783$).
- The warmups had statistically significant differences on vertical jump between the three warmup conditions ($F = 3.515$, $p = .047$).
 - The dynamic warmup was significantly better than the static warmup in preparing the body for performing the vertical jump (mean difference = $.858$ cm, $p = .034$).
- There was no significance between the static warmup and control (mean difference = $.100$ cm, $p = .752$) nor between the dynamic warmup and control (mean difference = $.758$ cm, $p = .08$).

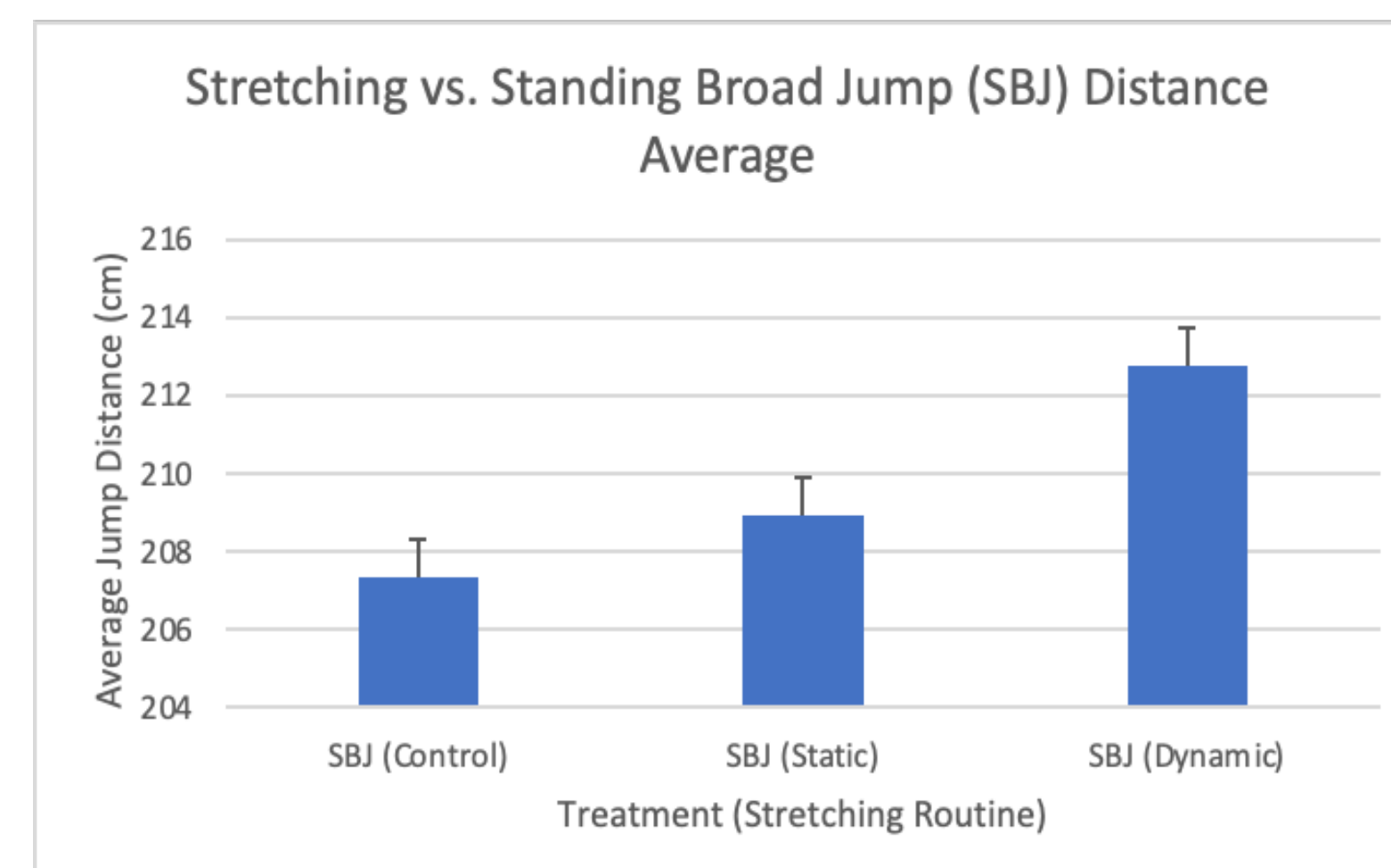


Figure 2. Average standing broad jump distance for each type of stretching routine with error bars.

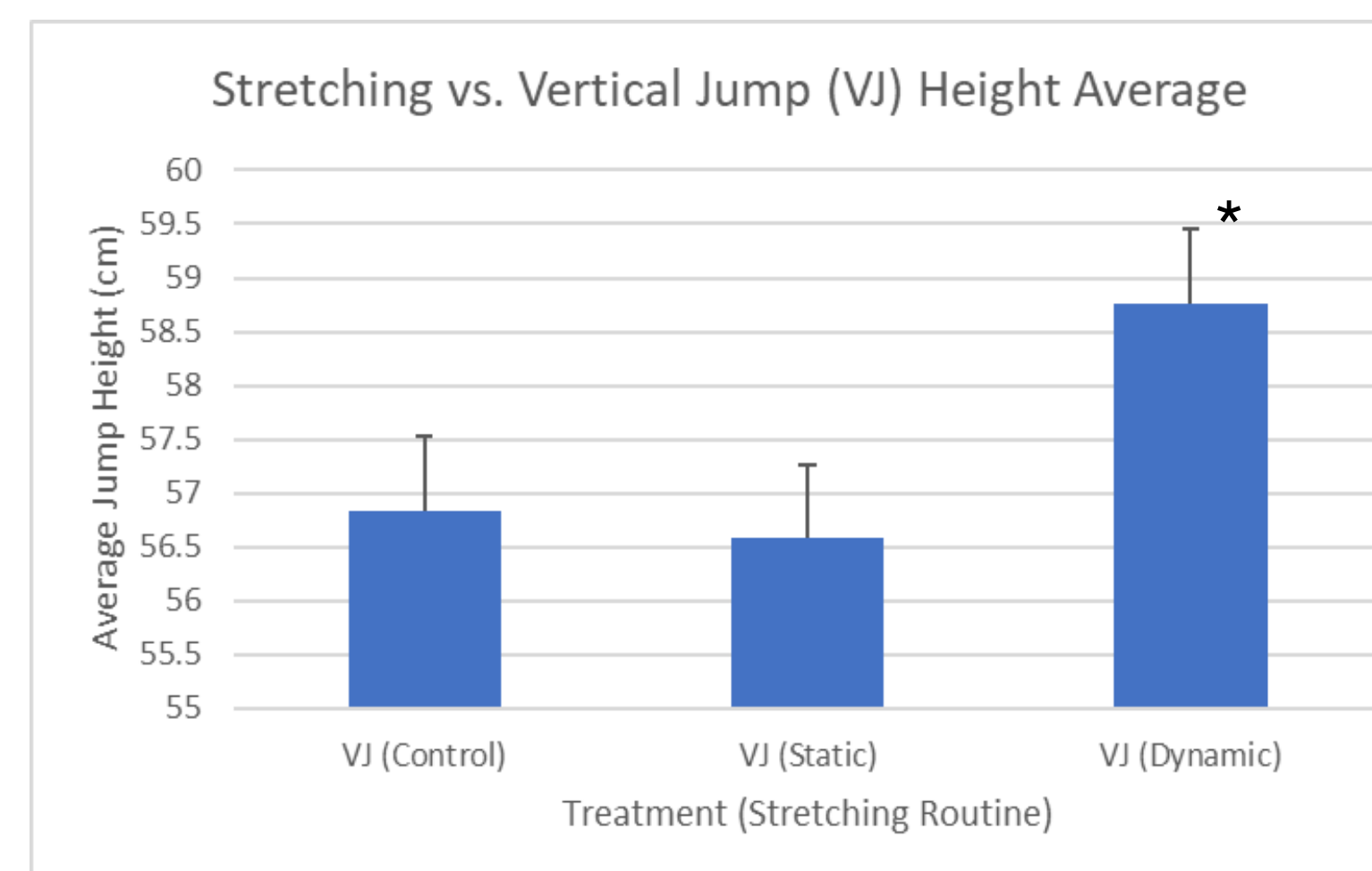


Figure 3. Average vertical jump height for each type of stretching routine with error bars. *Denotes significant differences from static warm up conditions.

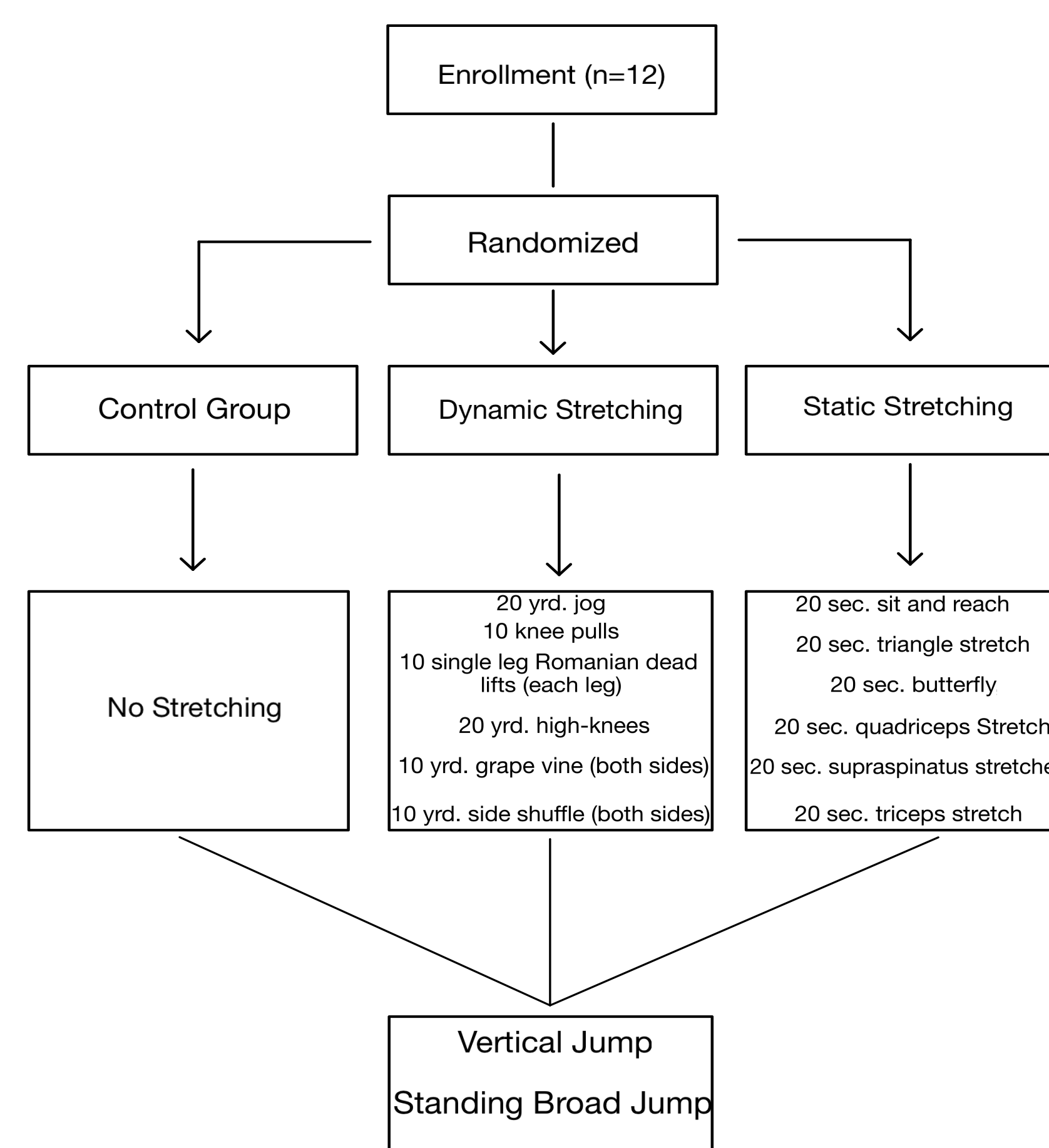


Figure 1. Methods Diagram

Discussion

- Dynamic warmup was significantly better than the static warmup for vertical jump height.
- Standing broad jump was not affected by warm up type.
- Dynamic stretching teaches the body how to effectively prepare one's body for physical activity while simultaneously improving strength, power, speed, agility, and endurance (Kovacs et. al, 2010).
- Static stretching lengthens the muscles for flexibility and was found to hinder vertical jump height. (Sherwood, L., 2015.)
- Muscles that are not properly prepared for a contraction will not be able to perform the maximal possible vertical jump. (Shoukat et al., 2017)
- Vertical jump works in the sagittal plane (Hickox et al., 2016). Standing broad jump however works in a two-dimensional manner in the sagittal plane.
- Hip extension torque and velocity are better measured in standing broad jump (Eagles et al., 2016).
- If this study was performed over a longer period more participants could have been gathered which would have strengthened the results of the study. Measuring joint ROM (hip, knee, ankle) might also give more information about how warmups changes joint flexibility which them might explain changes in jumps.

Conclusion (s)

The dynamic warmup resulted in a greater vertical jump than a static warm up. Warm up type did not affect standing broad jump.

- These findings suggest that dynamic stretching may be desirable for greatest lower body explosiveness, especially vertical lower body power production.

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