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The Effect of Foam Rolling with Vibration on Vertical Jump Performance in Division III Football Players

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Abstract

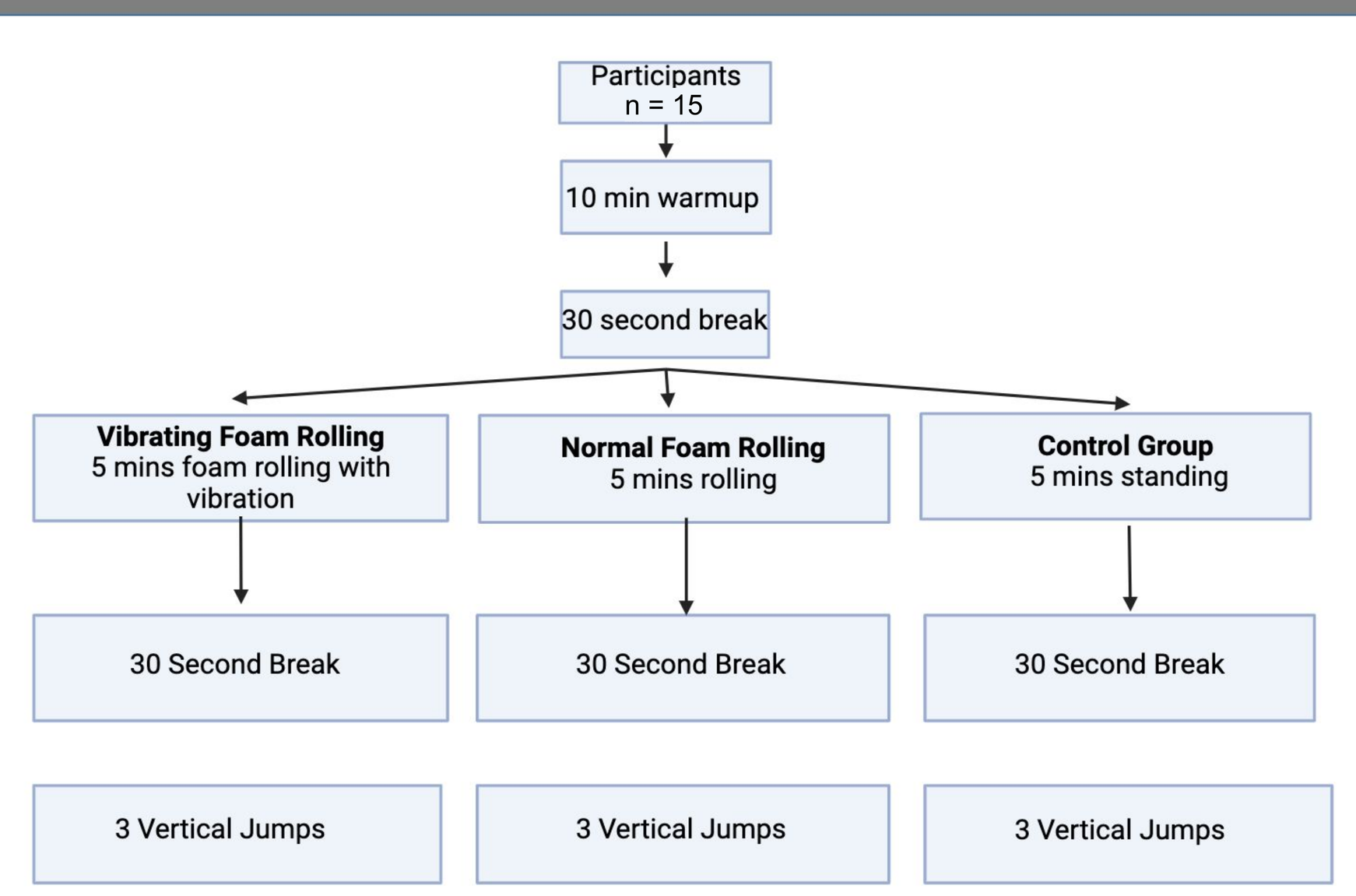
Vibrating foam rollers are a new percussive device that has become increasingly popular to perform myofascial release. Various studies have assessed these devices' effects on vertical jump performance in athletes. Prior research has reported that vibrating rollers (1) have no effect on performance, (2) improve performance to a similar degree as regular foam rollers, and (3) improve performance to a greater degree than regular foam rollers. The inconsistency of these results suggests that further investigation is warranted. Therefore, the purpose of this study was to examine the effects of vibrating and non-vibrating foam rolling on vertical jump performance in division III football players. 50 division III college football players were assessed on their vertical jump performance following no foam rolling, regular foam rolling, and foam rolling with vibration. Participants visited the lab on three separate occasions and completed each trial in a counterbalanced manner. Prior to each jump assessment, participants completed a 10 minute dynamic warm-up led by a researcher. After 30 seconds of rest, a 5-minute treatment was completed. In each foam-rolling trial, quadriceps, hamstrings, calf, and glute muscles in both legs were rolled out for 30 seconds each using a metronome to assure consistent rolling. In the non-foam rolling trial, participants rested for 5 minutes after the dynamic warm-up before jumping. The jumping protocol consisted of 3 countermovement jumps from a stationary position on the Just Jump mat. Thirty seconds separated each jump, and the highest jump was recorded for comparison between groups. It was hypothesized that the foam rolling with vibration would improve vertical jump performance to a greater degree than regular foam rolling and no foam rolling. This study is ongoing, and results will be available during the poster celebration.

Introduction

- Vibrating foam rollers have become increasingly popular for myofascial release
- Tight muscular fascia can negatively impact: biomechanics, altered structural alignment, or decreased strength & endurance in muscle
- Prior research has reported varying results
- The study will differ previous research by examining athletes who have been immersed in foam rolling for football
- **Hypothesis**: Vibrating foam rolling will lead to a greater improvement in vertical jump height compared to a regular foam roller or no foam roller in division III football players

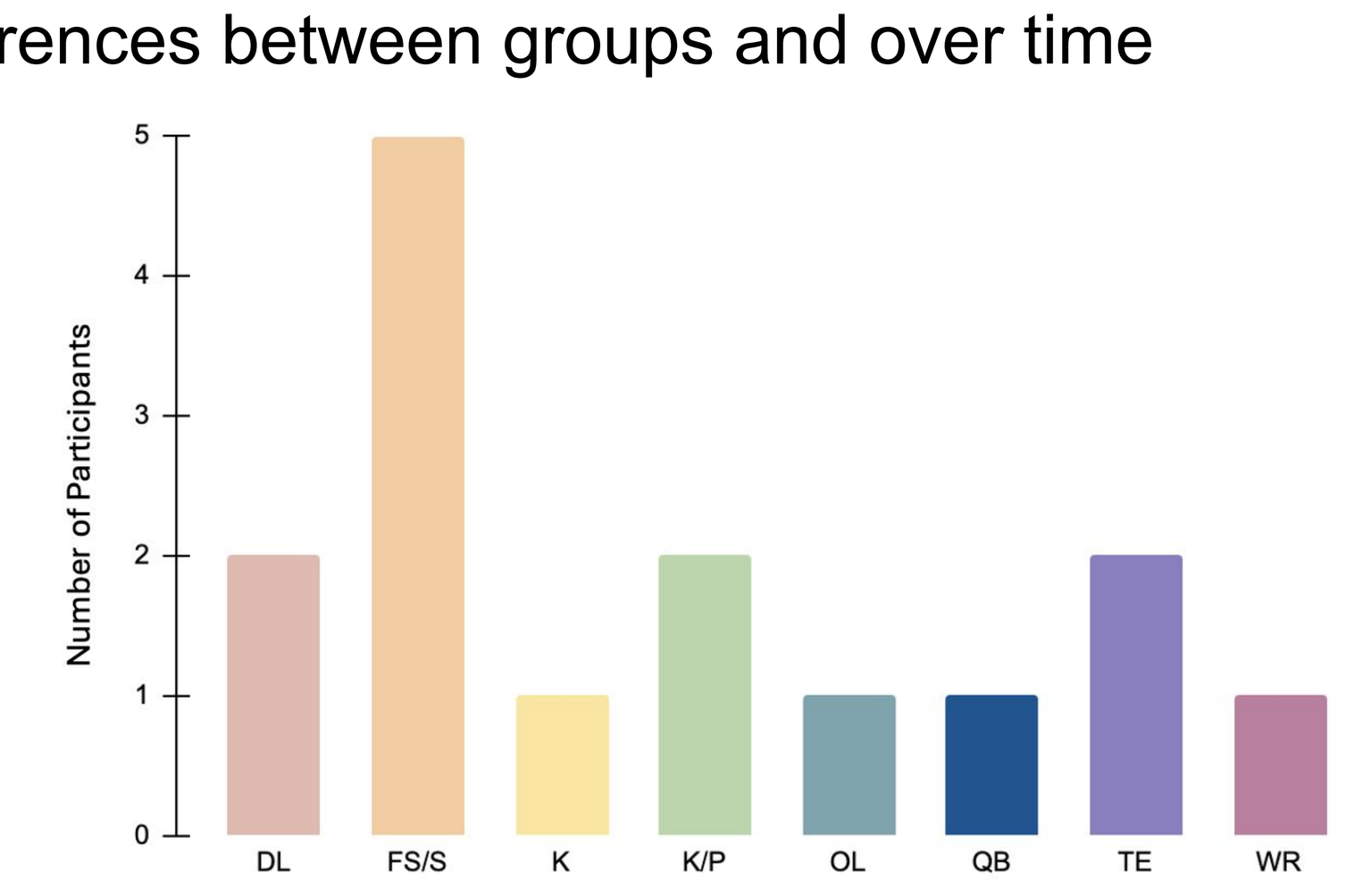
Methods

Data Collection:



Data Analysis: Repeated measures ANOVAs were used to compare differences between groups and over time

Division III Football Players
15 Males : Ages 18-22



Position Groups

Figure 1. Participant demographics and position groups

Methods

Figure 2. Participants demonstrating vertical jump on Just Jump Mat.

Figure 3. Subject participating in pre-jump warm up.

Results

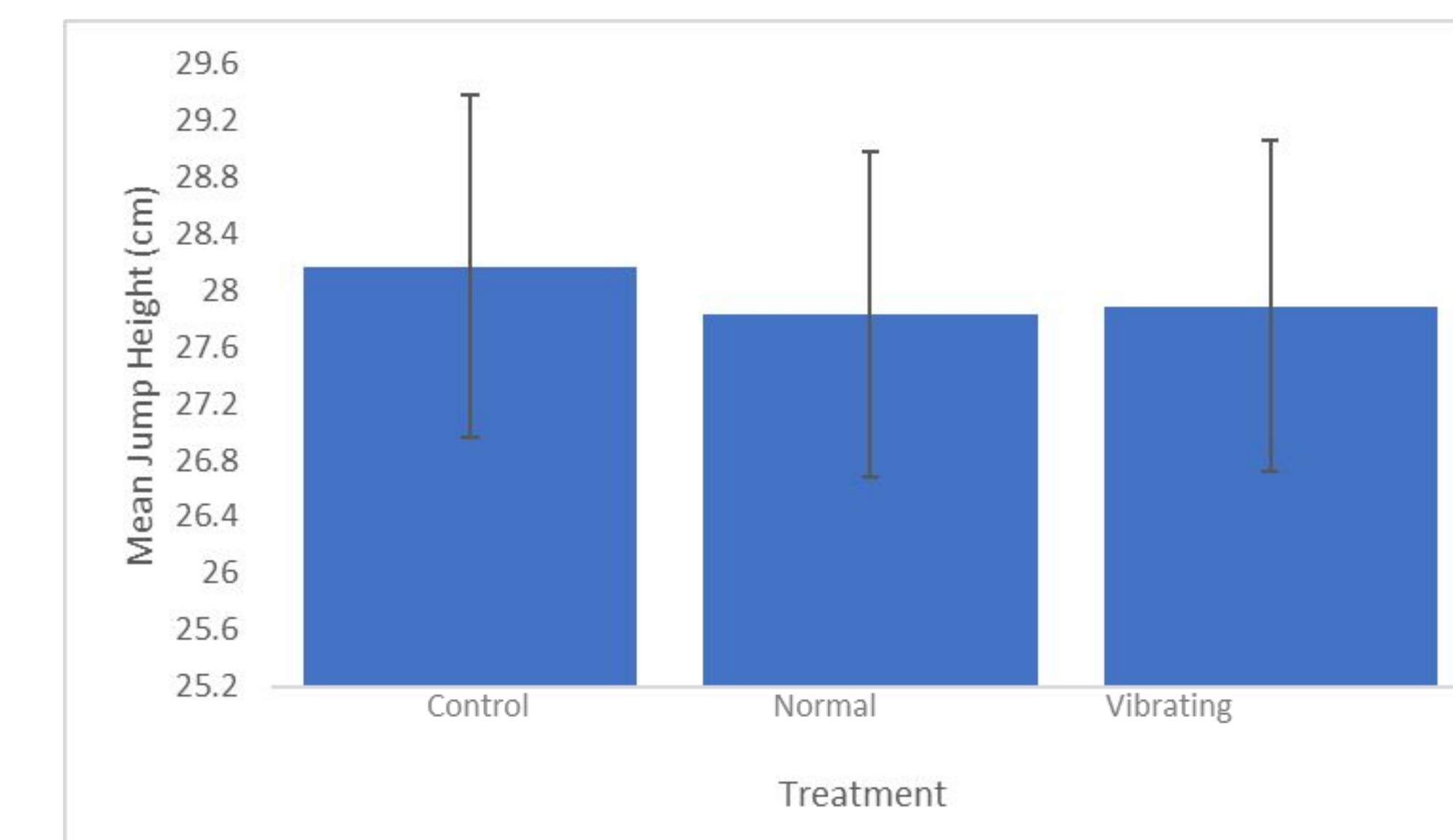


Figure 5. Vertical jump height by treatment. There was no difference between groups (p = 0.522).

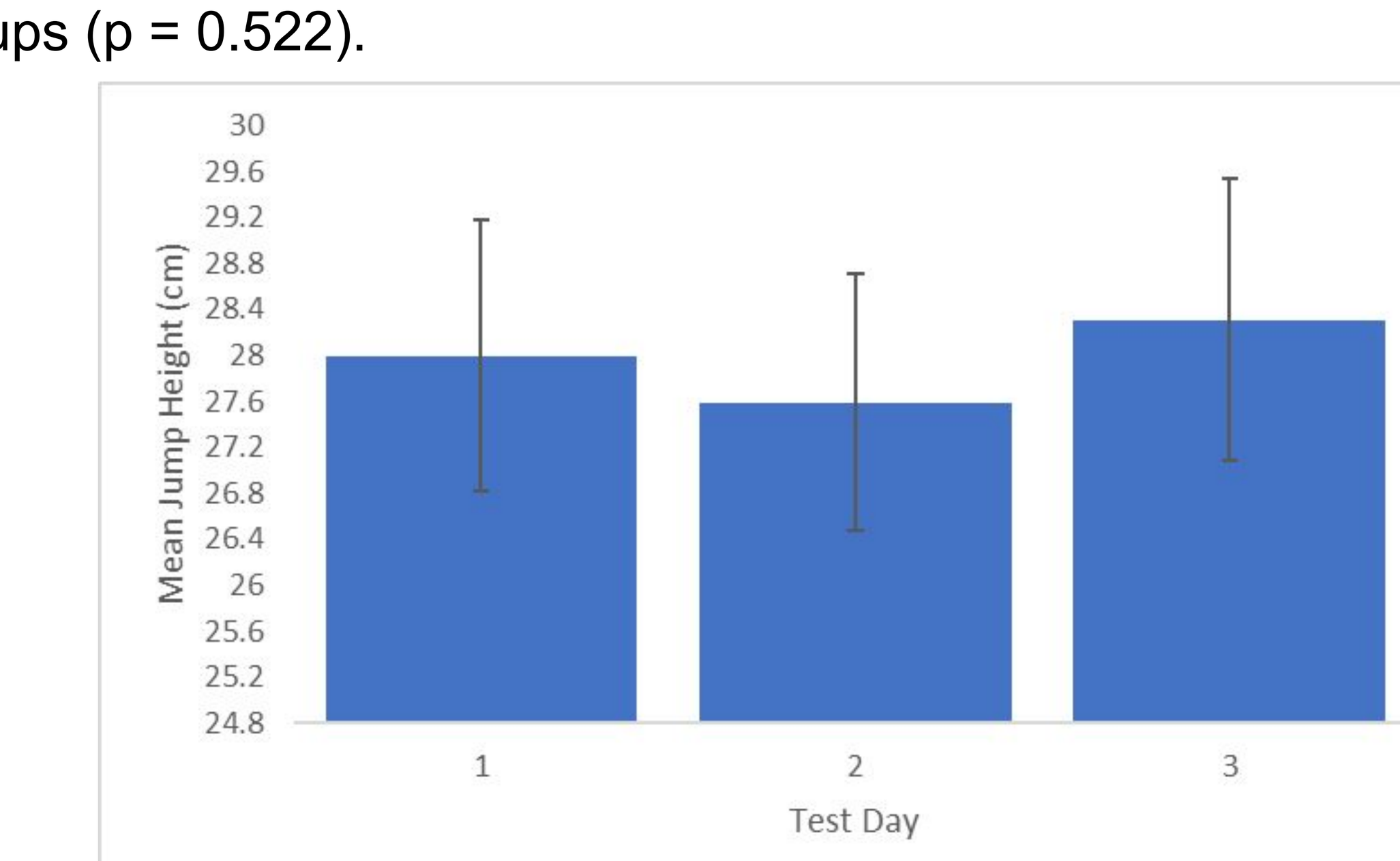


Figure 6. Vertical jump height by test day. There was no difference over time (p= 0.057), but there was a trend for a difference between day 2 and day 3.

Results

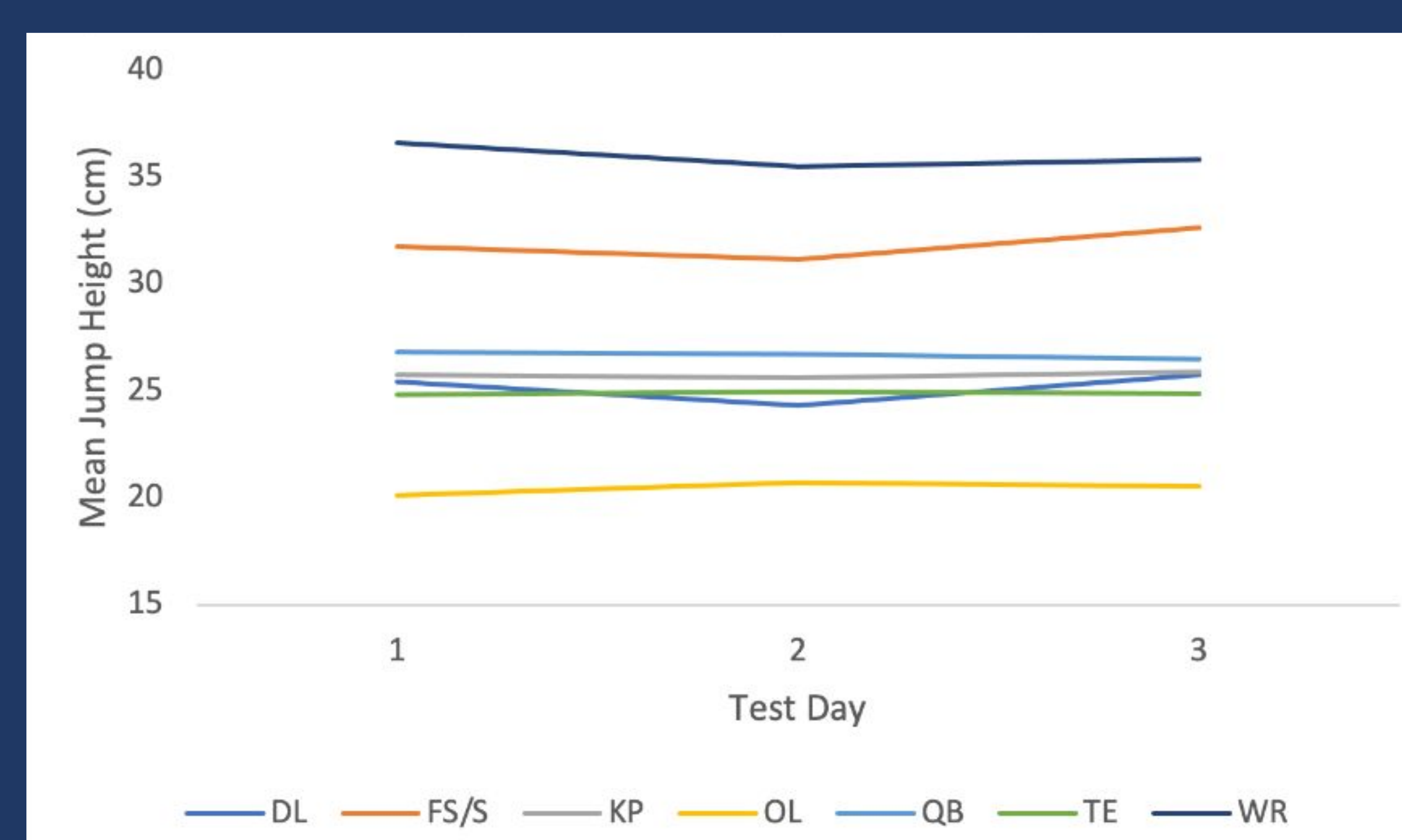


Figure 4. Mean jump height in cm over the three trials compared across participant position groups.

Discussion

Conclusions:

- Foam rolling did not affect vertical jump height (p=0.522)
- Jump height difference between testing days approached significance (p= 0.057)

Limitations:

- Participants' familiarity with the testing procedure may have influenced results
- Small sample size, varied individual muscle strength/power, and inconsistent weekly testing times due to participants' varying schedules.
- All the participants were taken from a population of only one football team at one college.

Future research:

- Different foam rolling techniques
- Compare power by position groups

Acknowledgements

Hope College 2023 Football Team

Bibliography

1. Alonso-Calvete A, Lorenzo-Martínez M, Padrón-Cabo A, Pérez-Ferreirós A, Kalén A, Abelairas-Gómez C, Rey E. Does vibration foam roller influence performance and recovery? A systematic review and meta-analysis. Sports Med. 2022 Mar 4;8(1):32.
2. Ammar A, Riemann B, Abdelkarim O, Driss T, Hökelmann A. Effect of 2- vs. 3-minute inter-repetition rest period on maximal clean technique and performance. Journal of Strength and Conditioning Research. 2020;34(9):2548–2556.
3. Bishop D. Warm up I: potential mechanisms and the effects of passive warm up on exercise performance. Sports Med. 2003;33(6):439–54.
4. Hilburger J, Sivanathan V, Fritz A, Chatziagoratou K, Knicker AJ. Effects of vibration and non-vibration foam rolling on the jumping performance. J Sports Sci Med. 2020 Apr;1-7.
5. Lim JH, Park CB. The immediate effects of foam roller with vibration on hamstring flexibility and jump performance in healthy adults. J Exerc Rehab. 2019 Feb;15(1):50-54.
6. McCrary J, Ackermann B, Halaki M. A systematic review of the effects of upper body warm-up on performance and injury. Br J Sports Med. 2016;49:935–42.
7. McGowan C, Pyne D, Thompson K, Rattray B. Warm-up strategies for sport and exercise: mechanisms and applications. Sports Med. 2015;45(11):1523–46.
8. Neiva H, Marques M, Barbosa T, Izquierdo M, Viana J, Marinho D. Effects of 10 min vs. 20 min passive rest after warm-up on 100 m freestyle time-trial performance: A randomized crossover study. JSAMS. 2017;20(1):81-86.
9. Opplert J, Babault N. Acute effects of dynamic stretching on mechanical properties result from both muscle-tendon stretching and muscle warm-up. J. Sports Sci. Med. 2019;18(2):351–358.
10. Senna G, Dantas E, Scudese E, Brandão P, Lira V, Baffi M, Ribeiro L, Simão R, Thomas E, Bianco A. higher muscle damage triggered by shorter inter-set rest periods in volume-equated resistance exercise. Frontiers in Physiology. 2022;13.
11. Silva L, Neiva H, Marques M, Izquierdo M, Marinho D. Short post-warm-up transition times are required for optimized explosive performance in team sports. Journal of strength and conditioning research. 2022;36(4):1134–1140.
12. Wang F, Zhang Z, Li C, Zhu D, Hu Y, Fu H, Zhai H, Wang Y. Acute effects of vibration foam rolling and local vibration during warm-up on athletic performance in tennis players. PloF. 2022; 17(5).
13. Zochowski T, Johnson E, Sleivert G. Effects of varying post-warm-up recovery time on 200m time trial swim performance: MSSE. 2006;38:S231.