

The Effects of Submaximal Fatigue on the Y-Balance Test scores

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This project makes no effort to suggest generalizability. Instead, it was designed to demonstrate competency using lab equipment, capacity to integrate knowledge with application, and understand the scientific method.

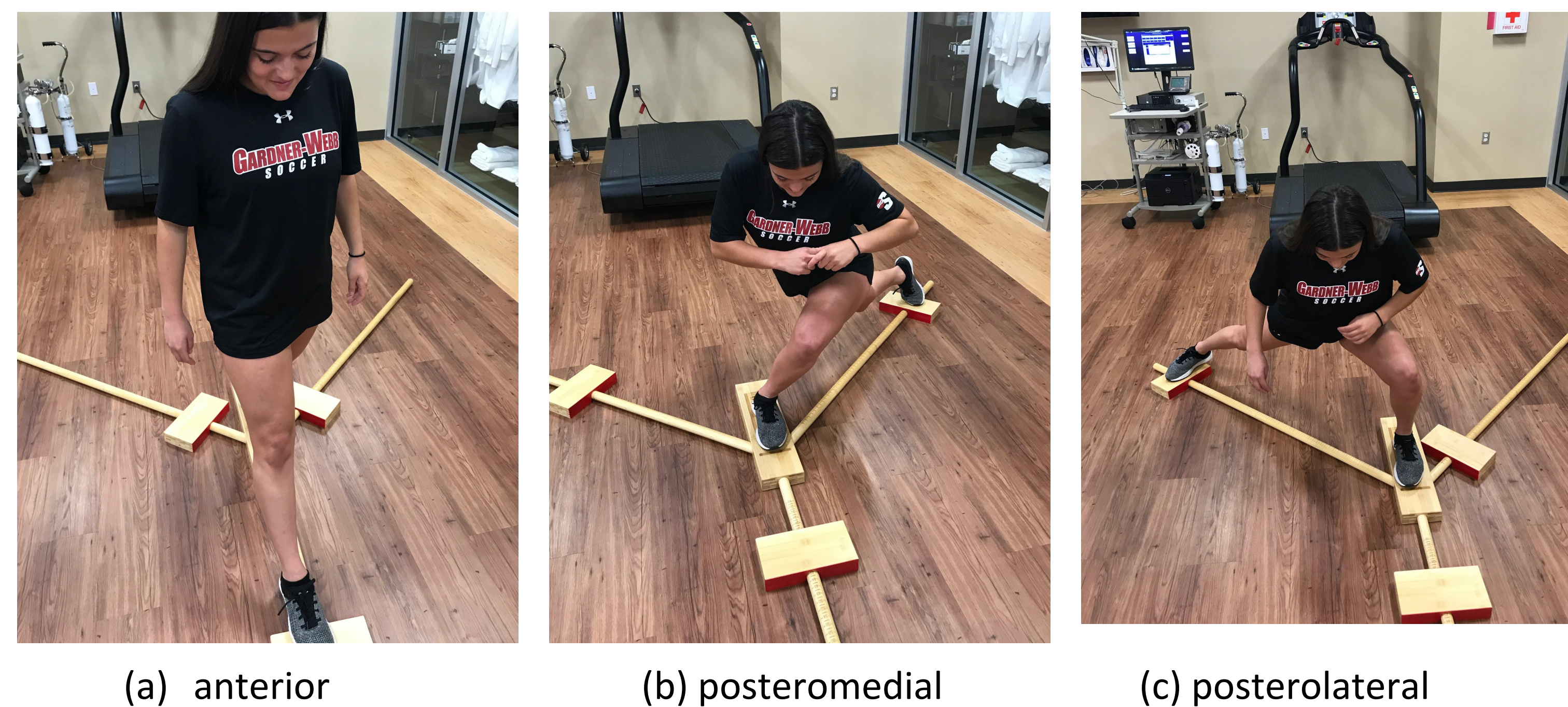
INTRODUCTION

- The purpose of this study was to assess how scores on the Y-balance test differed before and after submaximal fatigue. It was hypothesized that submaximal fatigue would cause Y-Balance Test scores to decrease in the anterior, posteromedial, and posterolateral directions. According to Johnston et al.'s research on the effects of maximal anaerobic fatigue on postural control using the Y-balance test, the anterior stretch took approximately 10 minutes to return to baseline after fatigue, the posteromedial stretch took approximately 20 minutes to return to baseline after fatigue, and the posterolateral stretch did not return to baseline after 20 minutes of rest after fatigue. According to Shaffer et al.'s research on the reliability of the Y-balance test, impaired balance is one of the several factors that have been associated with increased risk of lower extremity injuries.

METHODS

- 4 subjects, 3 male and 1 female
- Collected age, hip to ankle length (from ASIS to medial malleolus), and Y-Balance Test results
- Measured the subject's hip to ankle, and put a heart rate monitor on the subject.
- The subject stretched for 3 to 5 minutes before performing the Y-Balance Test.
- The subject then performed the Y-Balance Test before fatigue. Results were collected.
- Maximum heart rate was calculated by subtracting the subject's age from 220.
- The subject biked at 40% of their heart rate max for 5 minutes, then 60% for 10 minutes, and then 75% for 5 minutes.
- Once the subject completed the 20 minutes of biking, they performed the Y-Balance Test while fatigued and the results were recorded.

The test consisted of the following three movements:



RESULTS

- The study revealed that:
 - Participant's scores actually increased after performing the submaximal bike test
 - Subject's muscles were warmed up after biking for 20 minutes which allowed them to score higher
- 75% of the participants maintained or increased their right leg score after biking
- 58% of the participants maintained or increased their left leg score after biking
- Subject 4 with the shortest limb length (59 cm.) had by far the greatest composite score for the left and right limbs
- Subject 1 had the longest limb length (97 cm.) but the worst composite score for both limbs
- Subject 2 had 80 cm. for limb length and finished third for average composite scores
- Subject 3 had 90 cm. for limb length and was second for average composite scores

Table 1

Y-Balance Test Scores on the Right Leg Before and After Fatigue

| Limb length | Anterior | Posteromedial | Posterolateral |
|-------------|----------|---------------|----------------|
| 97 | 87 | 78 | 119 |
| 80 | 119 | 128 | 110 |
| 90 | 127 | 144 | 132 |
| 59 | 134 | 134 | 128 |

Note. Scores on the left are before fatigue. Scores on the right are after exercise.

Table 2

Y-Balance Test Scores on the Left Leg Before and After Fatigue

| Limb length | Anterior | Posteromedial | Posterolateral |
|-------------|----------|---------------|----------------|
| 97 | 82 | 85 | 129 |
| 80 | 122 | 119 | 116 |
| 90 | 137 | 144 | 141 |
| 59 | 138 | 133 | 134 |

Note. Scores on the left are before fatigue. Scores on the right are after exercise.



Figure 1. Right Leg pre and post submaximal Y-balance scores

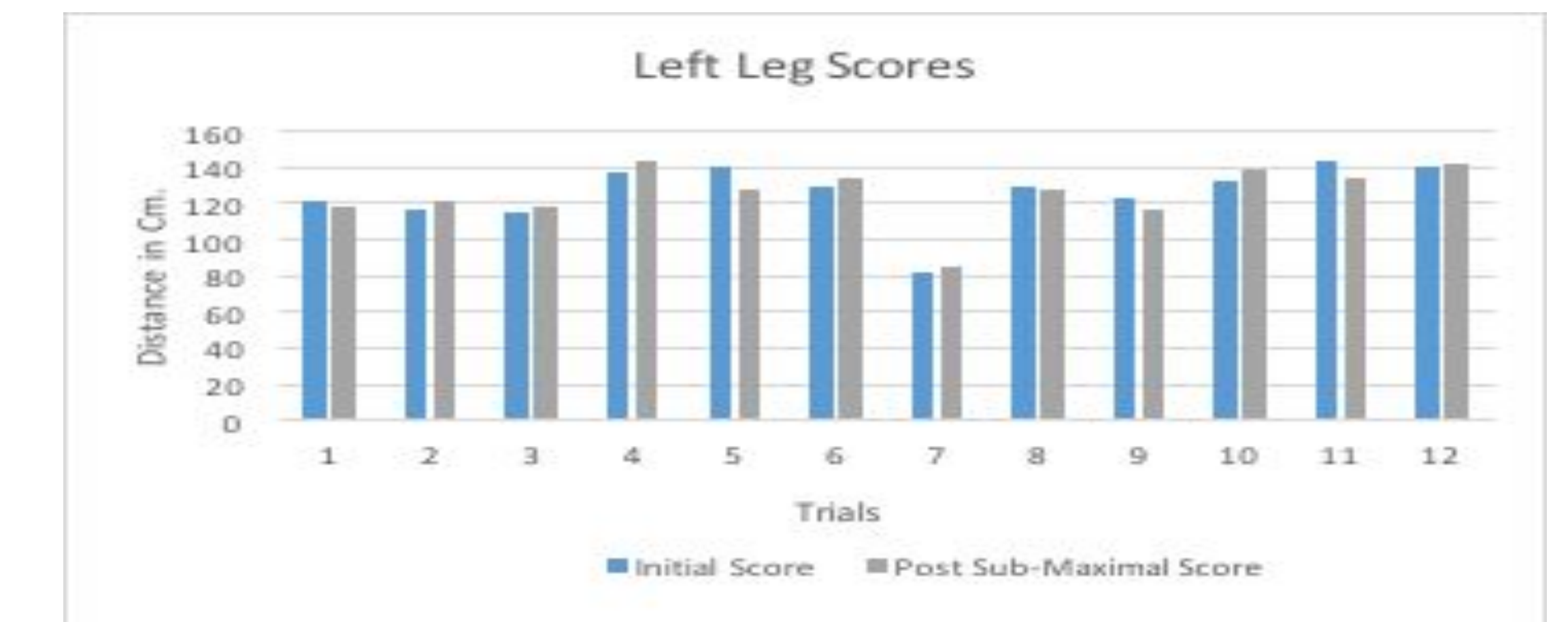


Figure 2. Left Leg Scores pre and post submaximal Y-balance scores

DISCUSSION

- The norm for the dependent variable that was found was an increase in y-balance scores, after submaximal exercise. The norm for exercise was for participants to be fatigued, but not exhausted, then re-test on the y-balance board. The research found during this lab was different from the literature because this study found that submaximal exercise, for 20 minutes, increased y-balance scores. The literature found before this lab, said that maximal exercise decreases y-balance scores. The researchers implied that submaximal and maximal exercise would have similar effects; however, it did not, it had the opposite effects. Applications used for this lab in real life, would be that submaximal exercise could improve athletic and also exercise performance. Submaximal exercise could also improve flexibility and overall quality of exercise and life. Submaximal exercise requires fatigue, but not for a long period of time. Submaximal exercise for as little as 5 to 10 minutes can improve flexibility, while not requiring a ton of effort and energy. Y-balance scores indicate how good an individual's balance can be. The better someone's balance is, the better quality of life someone has, especially with older people.

CONCLUSION

- In this lab, there were new discoveries that had not been found in the literature that was read before this lab.
- This lab found new information that could be applied to everyday life and exercise.
- Submaximal exercise was found as an efficient warm-up to increase balance and flexibility within these participants.

REFERENCES

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