

EFFECTS OF VELOCITY, DISTANCE AND SHOULDER RANGE OF MOTION IN TWO THROWING PROGRAMS.

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Abstract

PURPOSE: Success in baseball pitching is determined by throwing velocity and accuracy. Strength conditioning, particularly of the shoulder and arm, as well as repetitive throwing programs are used to improve the pitch. Recently, a weighted ball program has been developed and is believed to increase ball velocity with less potential injury. However, there is limited research examining the impact of this program on performance. The purpose of this study was to compare a traditional long toss program with the MaxVelo weighted ball program. **METHODS:** Twenty male collegiate baseball players (age 18-22 years) were recruited. Baseline throwing velocity and distance as well as shoulder range of motion (ROM) were measured. Participants were then randomized to either a six week long toss throwing program or Maxvelo weighted ball program. Following training, throwing velocity, distance and shoulder ROM were measured again. **RESULTS:** Both training methods significantly improved throwing distance ($p<0.05$, weighted ball baseline 93.6 ± 10.2 vs. post training 94.29 ± 9.8 yards; long toss baseline 93.2 ± 6.3 vs. post training 97.3 ± 5.6 yards). However, throwing velocity did not change from pre-training measurements. All measurements of shoulder ROM (flexion, abduction and external rotation) significantly improved in both groups with abduction showing the greatest improvement in the long toss group (time by group interaction $p=0.024$, weighted ball baseline $164.1\pm5.9^\circ$ vs. post training $171.4\pm9.4^\circ$; long toss baseline $163.8\pm15.1^\circ$ vs. post training $182.8\pm12.5^\circ$). **CONCLUSION:** Our results suggest that both training programs are beneficial for baseball performance. It is interesting that ROM showed such large improvements. Cold weather at post testing may have influenced velocity and distance outcomes.

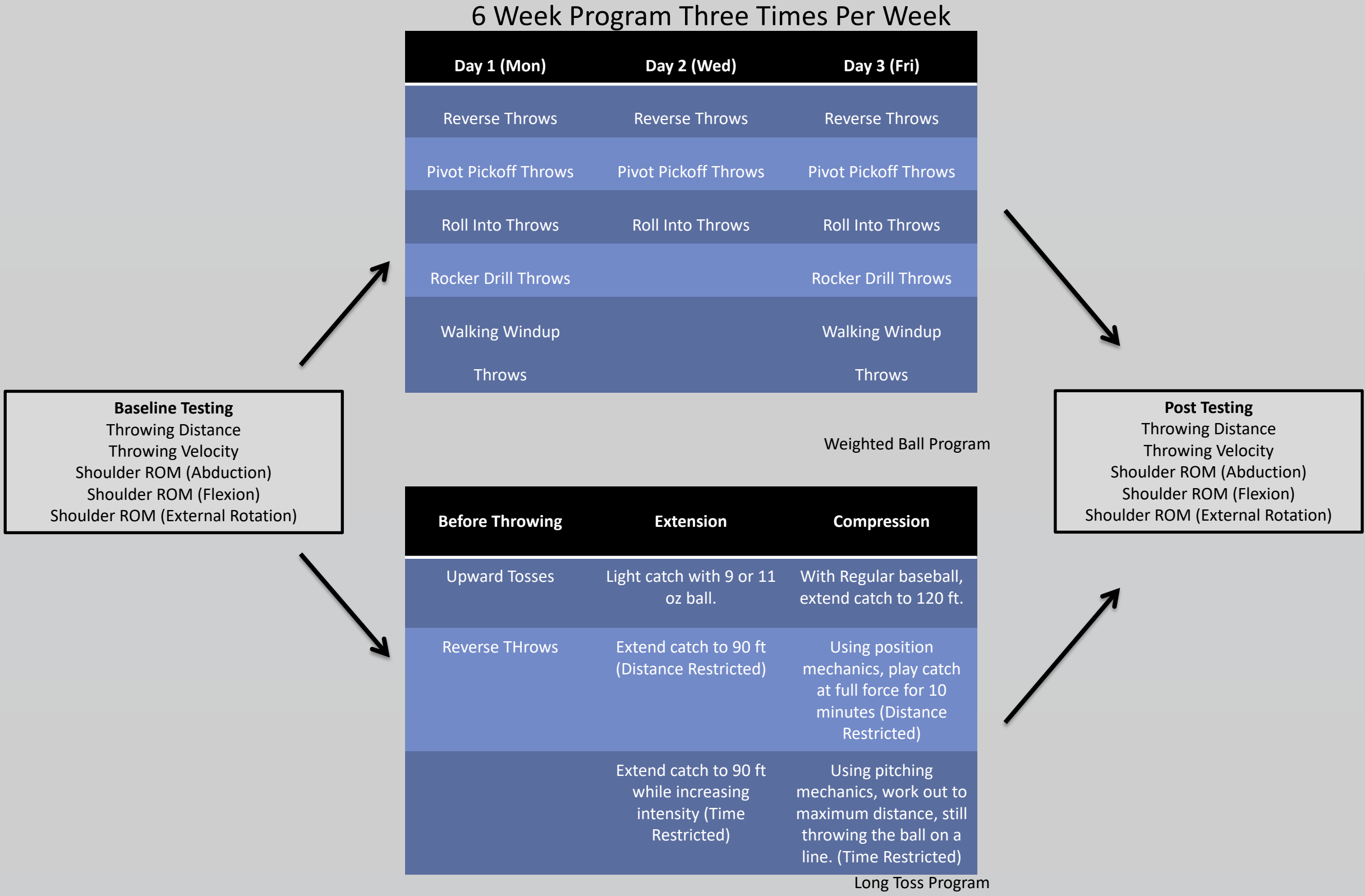
Purpose

Although previous research has examined a long toss throwing program to be the gold standard for increasing throwing velocity and throwing distance, new research is contradicting that theory. Thus, the purpose of this study was to examine the difference in ROM, throwing velocity and throwing distance in a long toss throwing program compared to a MaxVelo weighted ball throwing program.

Introduction

Throwing athletes do all they can in order to improve their performance on the playing field. Muscular strength as well as range of motion of the shoulder joint are determinants of increased velocity, accuracy around the zone, and overall stamina. Various programs such as the long toss program have been used to improve strength. Cal Ripkin, a major league hall of fame baseball athlete supports the long toss program as the best way to develop and maintain arm strength, by focusing on lengthening out the arm, without overthrowing. Overthrowing may put unnecessary strain on the arm and may lead to damage (Ripkin). There has been some recent controversy over whether or not long toss increases velocity or damages shoulder tissue. A new program, Driveline, utilizes a weighted ball program to build muscle in the shoulder and arm. This program is meant to build muscle in the shoulder and elbow and increase the velocity in pitches for a pitcher (Cressey 2009). There has been limited research done on the weighted ball program. It is not clear weather a weighted ball program shows greater improvements compared to the long toss program

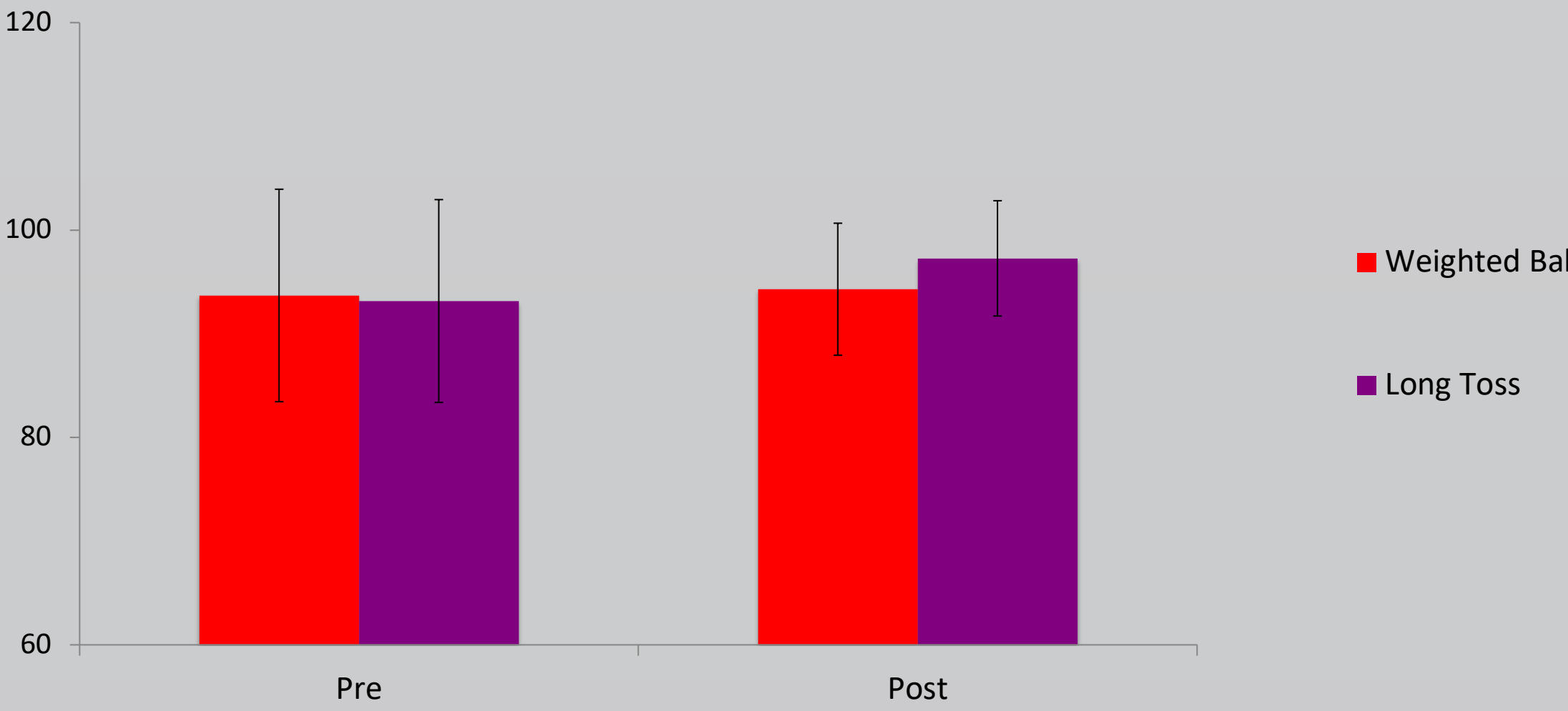
Materials and Methods



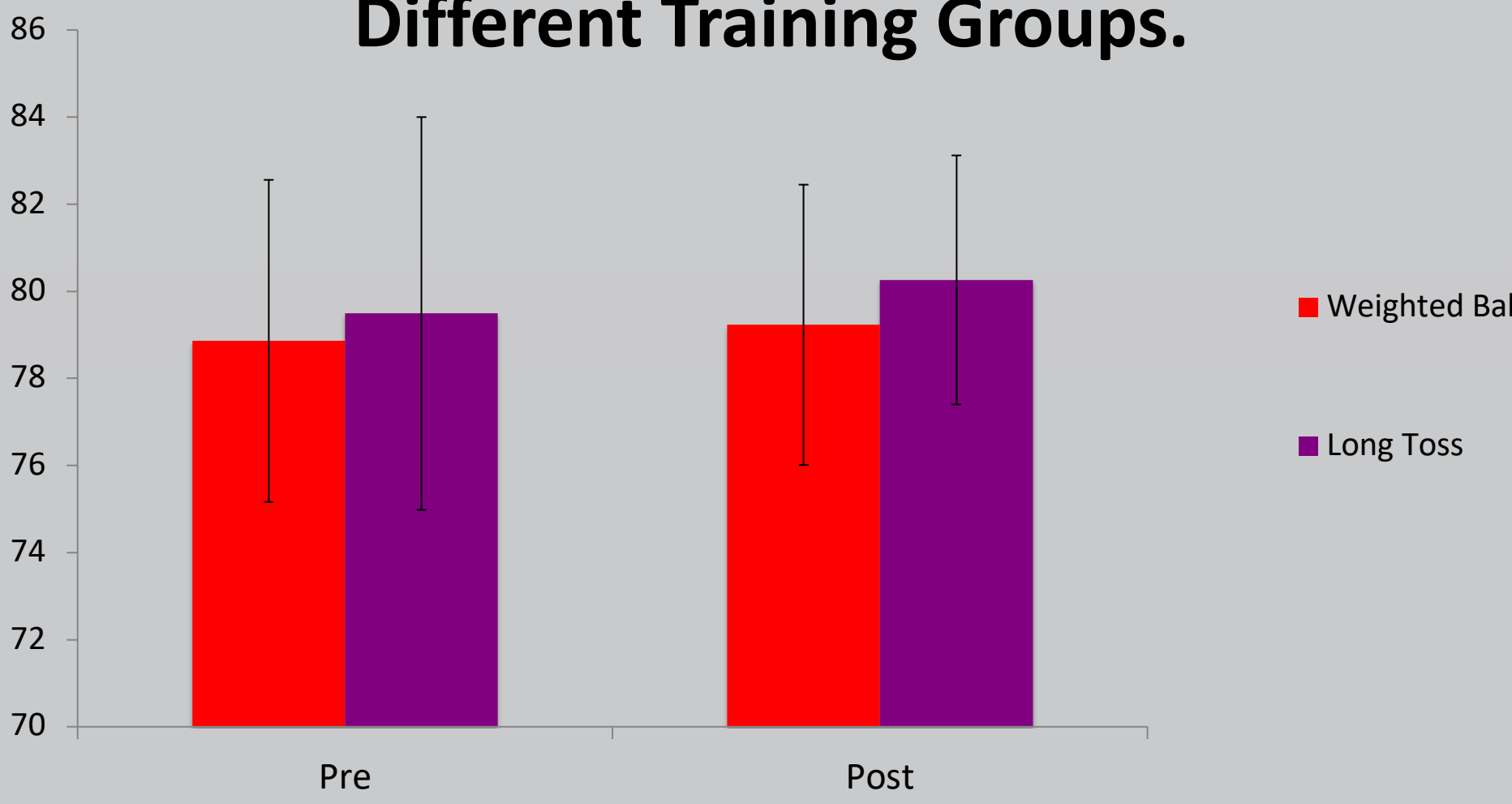
After recruitment of baseball players to partake in this study, baseline testing was done. Following the baseline results, the participants were randomized into two groups. Each group had a specific throwing program that was to be followed. Group one (weighted ball training) used plyometric balls to strengthen rotator cuff muscles, whereas group two (Long toss training) used more of a distance technique to strengthen the rotator cuff muscles. The training protocols are listed above. A more in depth training protocol was given to each participant that specified technique with sets and repetitions. Each group met three days a week for six weeks. Following completion of the six week training protocol, post testing was done.

Results

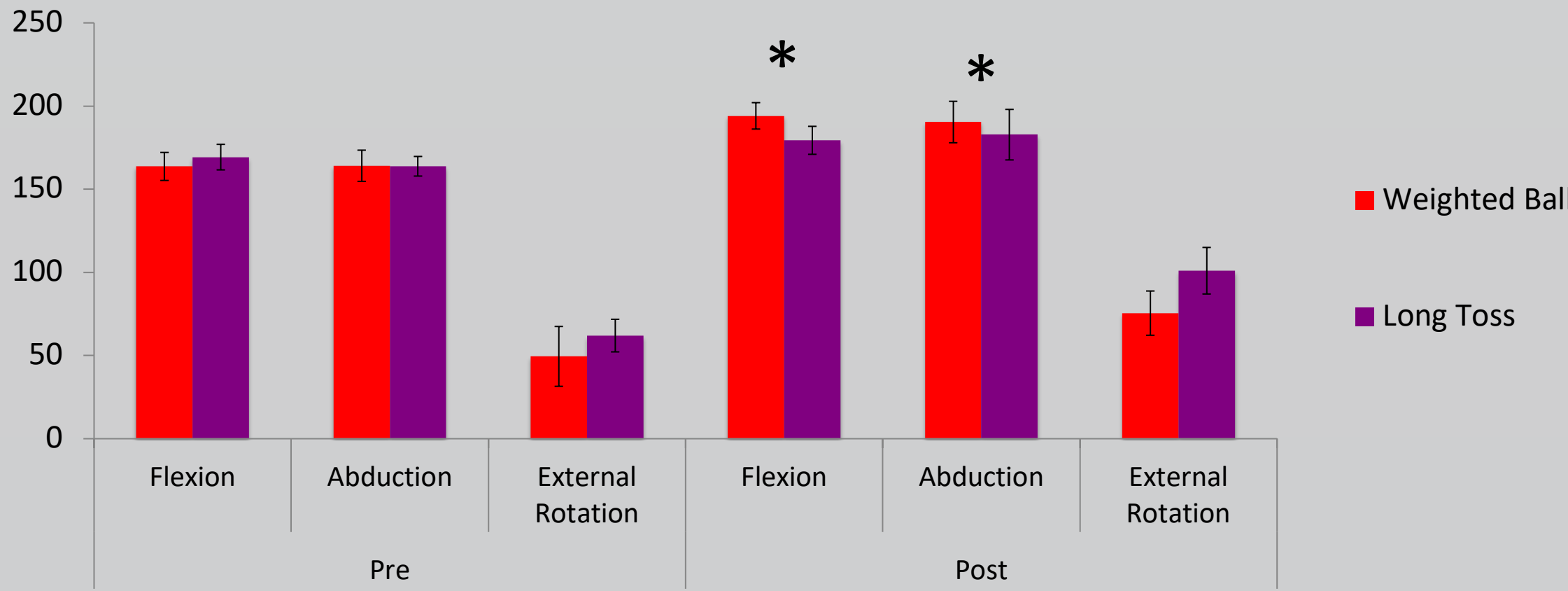
Distance Thrown Increased in both Groups



Velocity was not Impacted by the Different Training Groups.



Flexibility of the Shoulder Improved in both Training Groups



Summary and Conclusion

This study demonstrated that both long toss and a weighted ball program can improve distance and ROM in the shoulder joint. However, no significant difference was seen through velocity. The long toss program showed the greatest increase in both categories of distance and ROM compared to the weighed ball program. However, more research needs to be done in order to be confident that a long toss program is better than a weighted ball program.

There were several limitations to the study. The sample size of each group could have been larger, which would have provided more validity and statistical power to the study. The time period in which we measured the participants drastically varied in weather mainly with wind. Different researchers measured pre and post ROM that can cause a slight chance of error even using the same methods.

References

- Escamilla R.F., Ionno, M., DeMahy, M.S., Fleisig, G.S., Wilk, K.E., Yamashiro, K., Mikla, T., Paulos, L., & Andrews, J.R. (2012). Comparison of three baseball – specific 6 – week training programs on throwing velocity in high school baseball players. *Journal of Strength and Conditioning Research*, 26, 1767–1781.
- Fleisig, G.S., Bolt, B., Fortenbaugh, D., Wilk, K.E., & Andrews, K.R. (2011). Biomechanical comparison of baseball pitching and long - toss: implications for training and rehabilitation. *Journal of Orthopedic & Sports Physical Therapy*, 41, 296–303.
- Teyhen, D.S. (2011). Baseball Pitching: Understanding mechanics of throwing a baseball may help protect the shoulder and elbow. *Journal of Orthopedic Sports Physical Therapy*, 41(5), 304.
- Yang, W.W., Liu, Y.C., Lu, L.C., Chang, H.Y., Chou, P.P., & Liu, C. (2013). Performance enhancement among adolescent players after 10 weeks of pitching training with appropriate baseball weights. *Journal of Strength and Conditioning Research*, 27, 3245–3251.

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