Correlation of Throwing Velocity to Front Crawl Swimming Speed

David Freed, Esteban Abbey, and Seth Paradis, PhD.

Department of Human Kinetics and Applied Health Sciences
The Biokinetics Program

Abstract

Purpose: The purpose of this study was to examine if there is a relation between front crawl swim speed and overhead throwing velocity. The overhead movements found in swimming engage similar musculature such as subscapularis, supraspinatus, and latissimus dorsi to the overhead throwing movement of a baseball throw (Escamilla et. al., 2009). Realizing that both motions show a similar movement pattern, it would be of great interest to professionals training competitive baseball players if swimming is a proper training protocol for their overhead throwing athlete.

Design: Throwing velocity and swim speed were tested in 20 Division III male baseball players (20±2 years old). Following their fall season, each participant was given 5 throws, velocity being measured by using a radar gun (Jugs Pitching Machine Company, USA). Each participant's highest and lowest scores were eliminated and the remaining scores averaged (80.8+6.1 mph). Within two weeks of the throwing test, a separate test recorded their swim speed in the 25yd front crawl without a leg kick. The average of two maximal swim sprints was collected with a standardized 2 minute rest in between trials.

Results: Pearson Product Correlation demonstrated a moderate correlation (r=.453, p=.022) between throwing velocity and swim speed.

Conclusion: The data demonstrates that multiple therapies and training techniques need to be used to target and strengthen the muscles used to throw a baseball. Swimming may be used in the baseball population including post-surgery therapy to strengthen muscles such as the subscapularis, supraspinatus, and latissimus dorsi. Swimming may also be used to maintain shoulder strength during the baseball offseason when the volume of throwing decreases. Further research will implement a swim training program to find the program's effect on throwing velocity.

Introduction

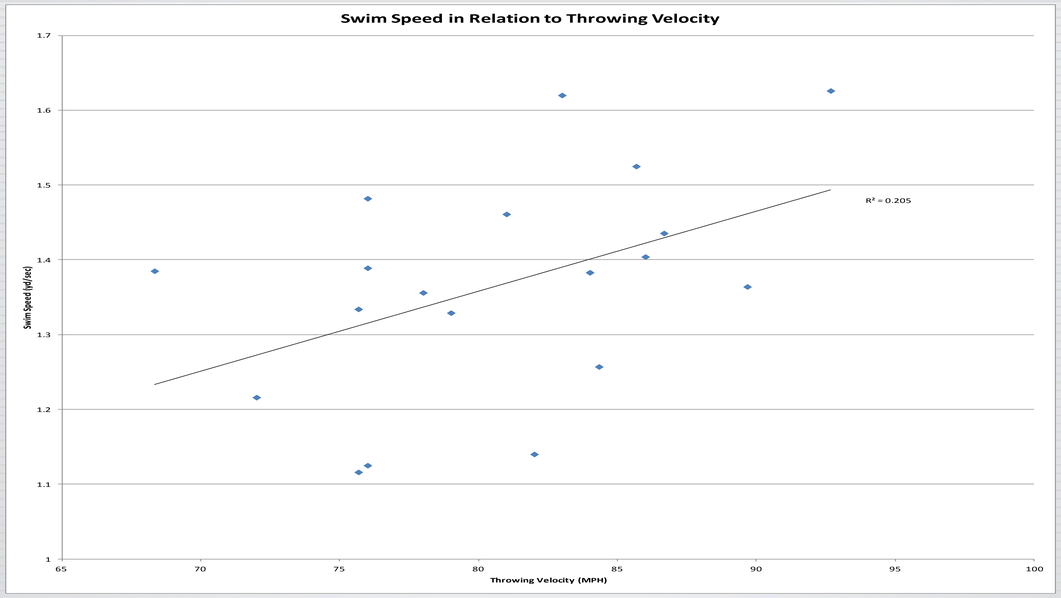
Sports requiring overhead arm motion require that an athlete have the ability to express strength and strength-endurance qualities within the shoulder complex musculature. The ability to produce great amounts of force repeatedly in competitive sports requiring overhead motion will help increase the success of the athlete. Examples of sport movements demanding the expression of these qualities would be swimming and throwing a baseball. The quicker one fatigues in these sports, the less likely a favorable outcome will be expected.

The overhead movements found in swimming the front crawl stroke engage similar musculature to the overhead throwing movement of a baseball throw, such as the subscapularis, supraspinatus, and latissimus dorsi (Escamilla et. al., 2009). Realizing that both motions show a similar movement pattern it would be of great interest to those training competitive baseball players if swimming could be a proper training protocol for their overhead throwing athlete.

Methods

Twenty collegiate athletes completed both of our tests. The radar gun throwing test consisted of 5 maximal throws. Subjects came in at four different times in small groups of 5-8. Each group was led through an identical dynamic warm-up, and then a protocol throwing program to ready their arm for maximal throws. Each subject threw 5 balls maximally into a net from 60 feet away. The radar gun was directly behind the net for each throw. The subjects took 10 to 15 seconds rest between each maximal throw. The high and low velocity numbers were thrown out, and the middle three scores were averaged.

The swimming test consisted of two 25 yard front crawl swim sprints. Two subjects jumped into lane 1 to warm up. They warmed up their shoulders by treading water, practicing their front crawl form, and finally they swam maximally using the pull buoy before they were ready to move to lane 2 for the swim trial. Before the start, the swimmer put the Styrofoam pull buoy between their legs, put both feet on the wall, and one arm held the edge of the pool. They were given a verbal start signal, and the stopwatches were started on the swimmer's first movement. The swimmers were instructed to not push off, but to just start swimming. They were also instructed not to kick their feet at all. The two stopwatches were started at the exact same time by one researcher, and then one of the stopwatches was given to the other researcher. The two researchers stopped their stopwatch when they viewed the swimmer's hand touch the opposite wall where the test ended (25 yd. swim). The two stopwatch times were compared, and any trial with greater than a .20 second difference in the two times was thrown out. The two times taken for each trial were averaged. After their first trial, the swimmer was given 3 minutes rest and was asked to swim the trial again. There were no more than 6 subjects in the pool at one time.



Graph 1

Results

Pearson Product Correlation demonstrated a moderate positive correlation (r^2=.453, p=.022) between throwing velocity and swim speed (Graph 1).

Conclusion

The data demonstrates that multiple therapies and training techniques need to be used to target and strengthen the muscles used to throw a baseball. Swimming may be used in the baseball population including post-surgery therapy to strengthen muscles such as the subscapularis, supraspinatus, and latissimus dorsi. The use of swim therapy for sports rehabilitation is useful in restoring ROM, decreasing compensatory patterns and providing a therapeutic environment for rehabilitation. Although swimming may be further down on the progression/regression spectrum in shoulder rehabilitation, it can be used as a pre-requisite to land-based exercise. Additionally, swimming can also be implemented to an offseason strength and conditioning program. Depending on the length of the season and volume of throwing, swimming may be used early in the periodized program before increases in volume and intensity occur within the program. Further research will implement a swim training program to find the program's effect on throwing velocity.

References

Escamilla, R. F., & Andrews, J. R. (2009). Shoulder muscle recruitment patterns and related biomechanics during upper extremity sports. Sports Medicine, 39(7), 569-590.

Acknowledgements

We would like to say a special thank you to both the Bethel University Baseball team for their participation and cooperation in our study and the Northwest Family YMCA in Shoreview, MN.

David Freed: d-freed@bethel.edu ▪ Esteban Abbey: e-abbey@bethel.edu ▪ Seth Paradis: s-paradis@bethel.edu