

Purpose

The purpose of this study was to determine if either maximal rotational force of the trunk (as measured by a pneumatic Keiser machine) or maximal vertical leg power (determined by a vertical jump test) have an effect on the maximum throwing velocity of high school baseball athletes.

Experimental Design

High school baseball athletes (n=21) were recruited for the study. Prior to testing, all subjects completed a warm-up protocol that consisted of stretching and throwing movements (playing catch) until the subject's throwing arm felt capable of throwing at maximum velocity. Subjects then performed 10 maximal-effort throws of a baseball while a radar gun was used to determine maximum throwing velocity. The single highest observed velocity was recorded for each subject as their maximum throwing velocity value. After the throwing test, maximal rotational force of the non-throwing arm was determined by measuring the peak force achieved during 6 distinct rotational twist movements on a Keiser machine set at constant load of 50 pounds per square inch (PSI). Following the rotational force test, a maximum vertical jump test was performed to measure maximal leg power. Linear regression models were used to determine 1) the relationship between rotational force and throwing velocity and 2) the relationship between maximal leg power and throwing velocity.

Analysis

Rotational Power

The linear regression model revealed the relationship between rotational trunk force and throwing velocity to be significant ($p < .001$). For every 100 unit increase in rotational trunk force, maximum throwing velocity was observed to increase by 1 mph (adjusted R squared = .43).

See figure 1

Vertical Jump

While a general trend did appear to exist, the linear regression model determined that no statistically significant relationship existed between maximal vertical leg power and maximal throwing velocity ($p > .05$).

See figure 2

Conclusion

The data collected for this study indicate that increases in maximal rotational trunk force correlate with an athlete's ability to throw a baseball at a higher velocity. Whereas an increase in vertical jump does not have a significant effect on maximal throwing velocity. This can further suggest that coaching an athlete to focus their training on increasing rotational trunk force presents the potential to see increased gains in throwing velocity.

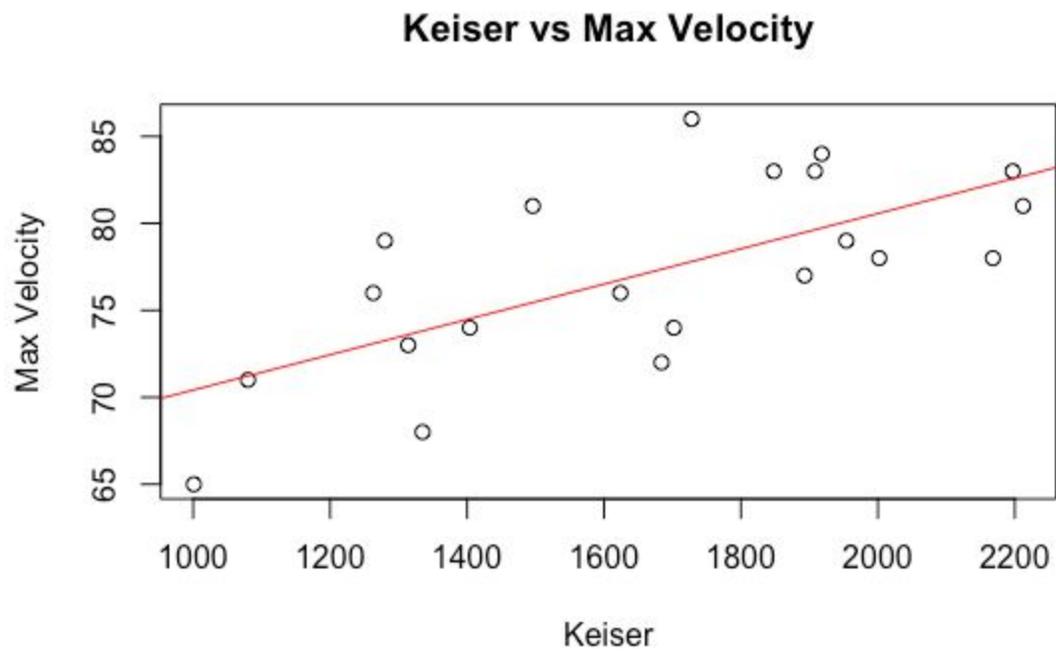


Figure 1

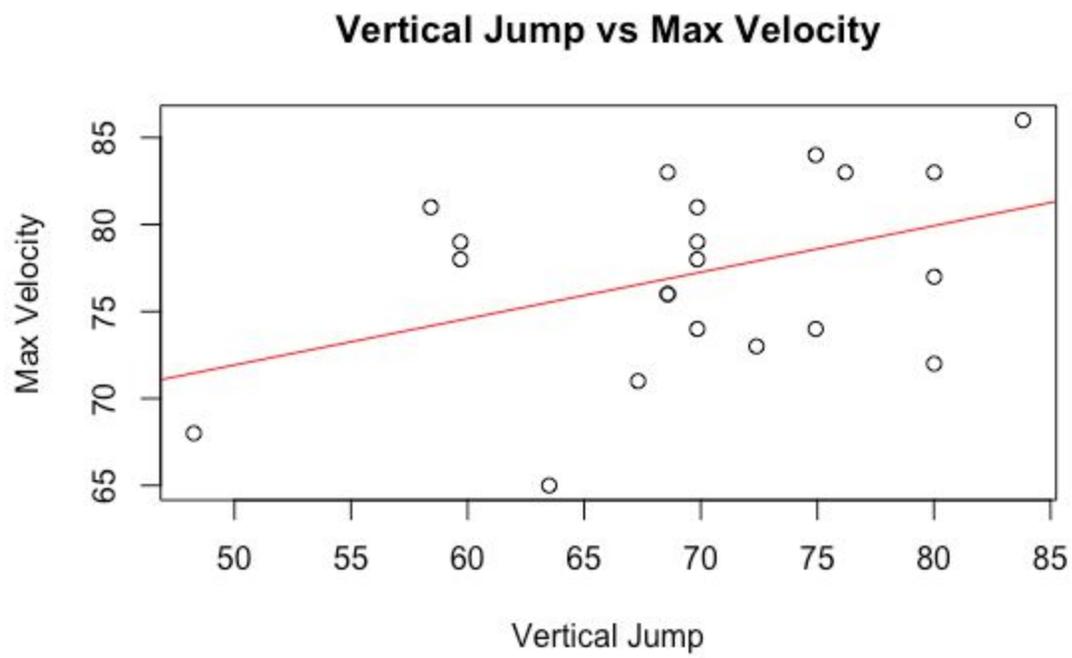


Figure 2