

Biomechanics of Pitching

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Purpose and Hypothesis

The purpose of my experiment is to find out if the accuracy stays the same if I take away some Biomechanics of pitching.

If I change the biomechanics of pitching will I be more accurate with all of them combined or separate? I think I will get more accurate with all of them combined because all of the biomechanics include the leg kick, cock, stride, land, and throw, and they all lead up to the throw which shows accuracy and speed of the baseball. If I take away some of the biomechanics of pitching I will not get the same accuracy.

Background Research

The history of baseball is very sketchy but baseball actually comes from a mix of a lot of other sports. Some of those sports include cricket and rounders which both use balls and a bat. There are many people who believe that Abner Doubleday invented baseball during the time of the Civil War. The game was founded in 1839 and the MLB was founded in 1869. Tommy Bond, Larry Corcoran, and John Ward were some of the best pitches of that time period. The biomechanics that they used were different from what pitchers use today.

<https://www.history.com/news>

Baseball has changed a lot over the years, the rules have changed and so have the ways the players play the game. There were a number of changes like the number of balls to have a batter walk and the pitching mound was moved further back. There have also been many changes to the different styles of pitching a baseball. It is like the way cars have changed a lot since the 1900s. There are also a variety of biomechanics in pitching.

<https://www.history.com/news>

The different mechanics include the stride, the leg kick, the throw, and then the land. When the pitchers go up to pitch they have to stand on the rubber or else it will be called a balk. A balk is when the ball is dead because the pitcher has moved his shoulders so the runners get to advance to the next base. The pitcher has to stand on the rubber mound and they have to go through the biomechanics before they pitch. If they do them correctly they will throw a strike.

The pitcher can improve the speed that the ball travels by changing the arm angles that he throws the ball. The pitcher can also change the grip that they have on the ball so that the ball

will spin in a different direction. There are many different grips that pitchers use and all of the MLB pitchers today use them. Some examples of them would be the curve ball, slider, sinker, fastball, and changeup. Those are only some of the many different pitches that the pitcher can throw. The grip of the ball is important in throwing because if the pitcher grips the ball in a different way then the ball will spin in a different direction causing one of two things. The first thing is, the ball moves as it travels to the strike zone and it throws off the batter and the second is, the speed can be affected by the way your grip is. When the ball spins in a side and top rotation the ball will curve and drop when it hits the strike zone, that is called a curveball. That will throw off the batter and cause them to swing and not hit the ball because where the ball is originally when the pitcher throws it is not the same height as when the ball crosses the strike zone. If the pitcher uses the pitches effectively then the batter will not be able to hit that ball. That is an example of the different ways pitchers throw the ball and change the mechanics so that the ball will spin in a different direction and move as it crosses the strike zone.

https://www.physio-pedia.com/Throwing_Biomechanics

The leg kick is an example of a biomechanic that is very important. The leg kick is the part of pitching where the pitcher lifts his leg and brings it forward. That might not seem important but it is the step that puts all of the pitcher's weight in front of the ball so that it will travel at a higher speed. To do this the player will need good balance. The pitcher will not throw the ball accurately and fast if the leg kick is not there. The next biomechanic is the stride. The pitcher will go into the stride after the leg kick motion is finished. The stride is a reach with the pitcher's front foot. That foot will go forward towards the batter and towards the plate. It will show the direction of which the ball will travel and it also generates power towards the ground so

that the ball can go faster. The stride does not have to be a specific length but it has to be big enough that the pitcher can feel comfortable and able to throw the ball. Next is the throw, the throw is the last biomechic that all of the other biomechanics lead up to. This is the mechanic where you actually release the ball. All of the other mechanics will determine how hard you will throw the ball in the end. The pitcher has to have his arm aimed towards the plate so that the ball will accurately go over the plate for the batter to swing to hit or so that the pitcher can strike the batter out. Then The last one is the land. The land is the last biomechanic, and it is the mechanic that is the easiest. All the pitcher does is bring the back foot forward in a ready position so that the pitcher is in a position to field the ball. These are all the biomechanics and the part they play.

<https://whyfiles.org/2012/baseball-biomechanics/index.html>

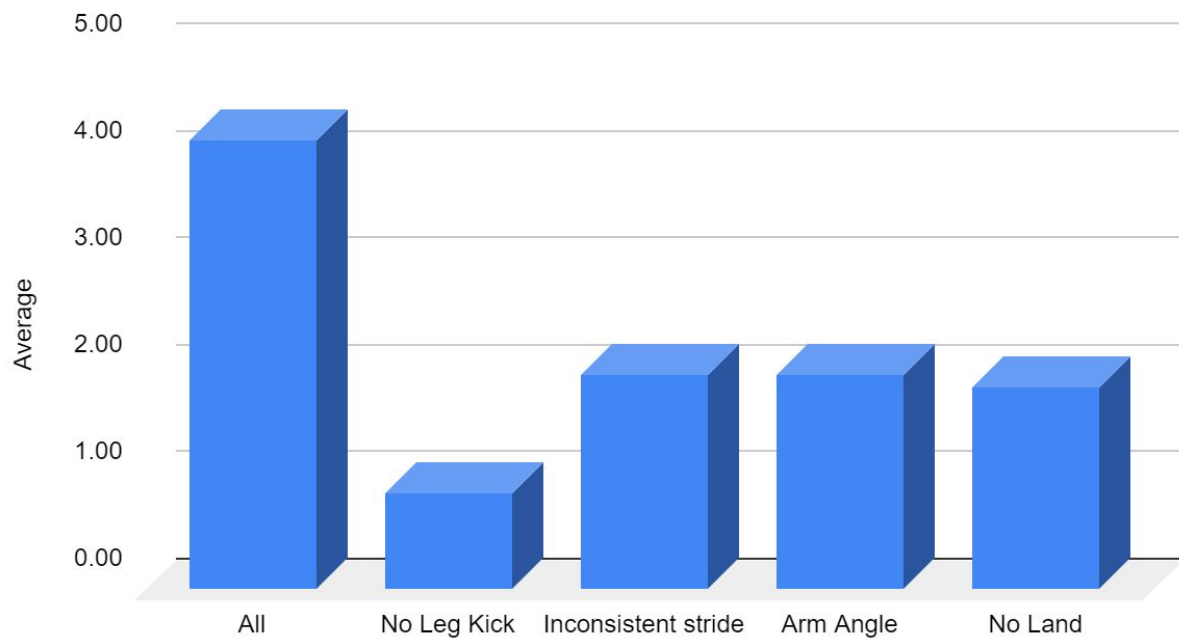
Materials

The Materials you need are a pencil, a big board that you can draw on, a baseball, a mit string, and a protractor or something pointy, and a marker.

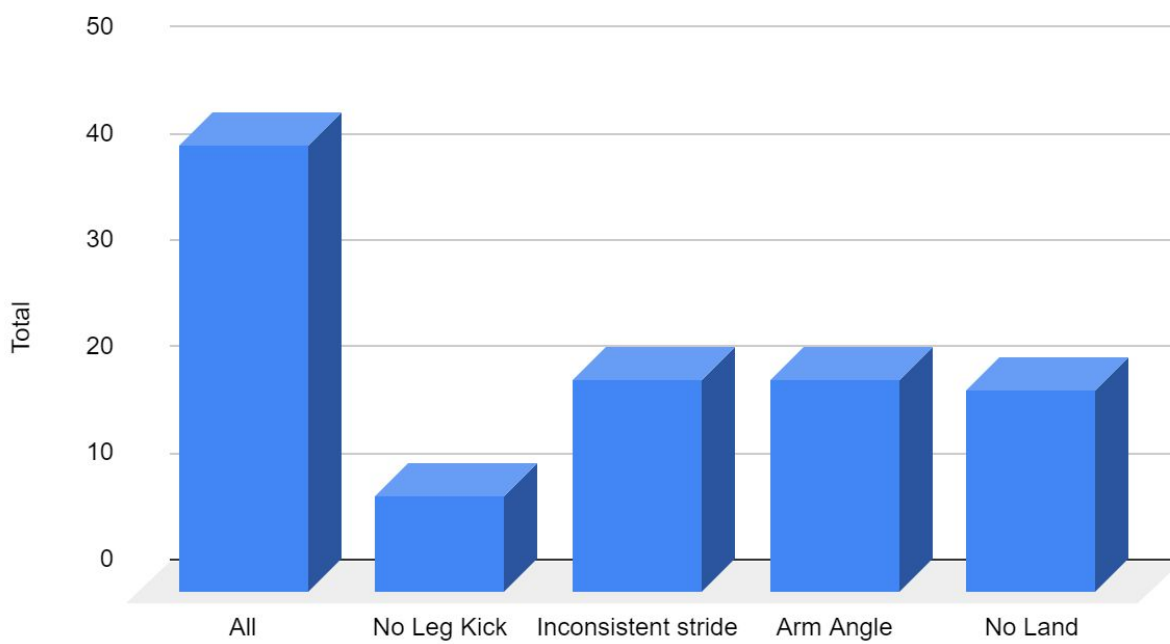
Procedure

First you will need to measure from your knees all the way up to your chest. Then once you have the measurements that is how high your furthest circle will be. Then you take a piece of string and connect it to a protractor. Then have a pencil and connect it to the other end of the string. Place the protractor in the middle of the board and take the pencil and go all the way around the protractor to create a circle. You will need to do this three times in total. Then do the same process but make the string three inches smaller each time you do it. Now you should have three circles and trace them with a marker so you can see them better. Now take the board and put it up against the wall. Grab your ball and your mit. Finally you will pitch the ball to the target with all of the biomechanics combined and separated.

Average Accuracy Scores



Total Accuracy Scores



Devitt, T. (Ed.). (2012, May 17). *Pitching the Biomechanics*. whyfiles.org.
Retrieved December 16,
2020, from <https://whyfiles.org/2012/baseball-biomechanics/index.html>

History, S. (2013, March 27). *Who Invented Baseball?* History.com.

Retrieved March 28, 2019, from

[https://www.history.com/news/](https://www.history.com/news/who-invented-baseball#:~:text=You%20may%20have%20heard%20that,during%20the%20summer%20of%201839.&text=Its%20most%20direct%20ancestors%20appear,the%20earliest%20colonists)%20and%20cricket.)

[who-invented-baseball#:~:text=You%20may%20have%20heard%20that,during%20the%20summer%20of%201839.&text](https://www.history.com/news/who-invented-baseball#:~:text=You%20may%20have%20heard%20that,during%20the%20summer%20of%201839.&text)

[=Its%20most%20direct%20ancestors%20appear,the%20earliest%20colonists\)%20and%20cricket.](https://www.history.com/news/who-invented-baseball#:~:text=You%20may%20have%20heard%20that,during%20the%20summer%20of%201839.&text=Its%20most%20direct%20ancestors%20appear,the%20earliest%20colonists)%20and%20cricket.)

Throwing Biomechanics. (2020). <https://www.physio-pedia.com/>.

Retrieved December 3, 2020, from

https://www.physio-pedia.com/Throwing_Biomechanics