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A preliminary study of newly developed baseball technique in batting

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Abstract

The purpose of this study is to examine a new batting style embedded in racket sports and its effectiveness. This new batting style was named KAKUMA New Batting (KNB). Fifteen male university students participate in this experiment. Each subject tried to swing 30 fast balls thrown from pitching machine. Thirty trials were divided into 3 groups (right-handed, left-handed, KNB). As for the baseball players, the result of KNB is lower than the other groups and, as for beginner in baseball, it is almost equal to the other groups. It is concluded that the beginner in baseball using KNB might hit a ball like in the batter box as usual.

Introduction

Baseball batting is complex movement [Escamilla, 2001]. And many investigators research this complex movement. Previous research on baseball batting has focused on swing biomechanics [Zandt, 1992] [Kirkpatrik, 1963] [Welch, 1995] [Yuichi, 2010] [Takahito, 2010] and motor control [Brooke Casteneda, 2007], physics of the ball flight [Bahill A. T., 1993] and bat-ball contact [Nathan, 2000] [Greenwald, 2001] [Crisco, 2002] [Cross, 1998] [Fleisig, 2002] [M. Maeda, 2010]. Many of this research investigate something to swing faster [Yabe, 1982] and to hit a ball further [Bahill A. T., 1989] [Koenig, 2004] [Szymanski, 2010]. But, it is difficult for beginner in baseball to hit a ball regardless ball speed. And, it is limited that the research focused on "hit a ball" for beginner or layman in baseball [Yamamoto, 2010] [Wu, 2011] [Yi-Wen Chang, 2011]. This is a difficulty for extend baseball all over the world. So, a new batting was considered to hit a ball easier for beginner in baseball. And, the idea was gotten for the new batting from racket sports. Because almost all racket players don't swing away in games at all, as compared with baseball players do many time.

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Methods

1. Idea about new batting style

Badminton players focus on touch shuttlecock by racket when they receive smash because to touch shuttlecock is enough to let it fly to rival court. So, the most important thing about new batting style is to have strong consciousness about to touch ball, and to do batting style similar to badminton receiving in batter box.

a. Stance: Open stance; to face front to pitcher.
b. Batter box: Another side player always is; Right-handed badminton players have racket

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by right hand and receive smash at their left side. Right-handed players should be left batter box to do batting style similar to badminton receiving in batter box. So, batter box is defined another side players always are because right-handed players are in right batter box in general.

c. How to take hold bat: Grip end is taken hold by dominant hand, and grip top is taken hold by nondominant hand.

d. How to swing: Right hand is around bellybutton, and bat end is allowed to go up and down when players are waiting for ball coming. The power generated by torso twist and right hand are used when ball is impacted. (Fig 1-2)

New batting style was named KAKUMA New Batting (KNB).

Table 1 Anthropometric data for university students

group	n	age(year)	height(cm)	weight(kg)
Racket sports player	5	20.4±1.1	171.8±4.1	63.0±4.3
Baseball player	5	21.6±1.9	168.2±2.8	64.8±2.9
Football player	5	21.4±0.9	177.4±5.6	68.4±7.3
All subjects	15	21.1±1.4	172.5±5.4	65.4±5.1

2. To try new batting style ～Experiment～

a. Subject: Fifteen male university students that are consisted of 5 baseball players, 5 racket sports players and 5 football players. Table 1 presents university students means and SD of anthropometric data. All subjects are right-handed. And all subject signed informed consent forms.

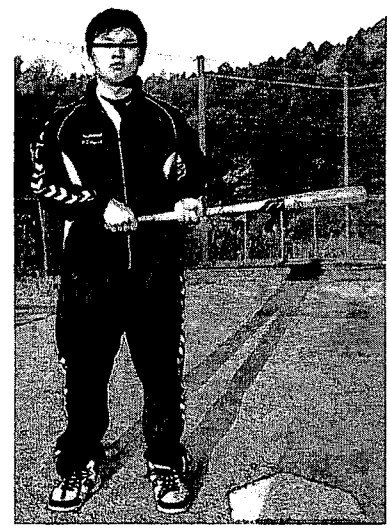

Figure 1 Stance of KNB

Figure 2 Stance of KNB from the side

b. Trial: Subjects tried to swing 30 fast balls thrown from pitching machine (Mizuno) by wooden bat (900g). The ball speed is set 100km/h(±10km/h), and ball course is set at center of strike zone. Thirty trials were divided into 3 groups. They are batter box players always are (right-handed), batter box players

always aren't (left-handed) and KNB. Each of them has 10 trials.

c. Data: data were divided into 3 groups shown below.

1) Hit: The number of ball that fly to except foul territory.

2) Foul: The number of ball that flies to foul territory despite touched by bat.

3) Meet: The number of ball that Hit and Foul are added.

Results & Discussion

Average of the number of Hit, Foul and Meet are shown Figure3-5 conducted by baseball, racket sports and football player.

The result of baseball players of right-handed is that the number of Hit is 5.6, Foul and Meet is 3.2 and 8.8 respectively. As for left-handed, the number of Hit, Foul and Meet is 5.8, 3.3 and 9.0 respectively. And, as for KNB, the number of Hit, Foul and Meet is 3.0, 3.6, and 6.6 respectively (Fig 3).

The result of racket sports players of right-handed is that the number of Hit is 6.4, Foul is 1.8, and Meet is 8.2. As for left-handed, the number of Hit, Foul and Meet is 3.0, 1.6 and 4.6 respectively. And, As for KNB, the number of Hit, Foul and Meet is 4.6, 3.2, and 7.8 respectively (Fig 4).

The result of football players of right-handed is that the number of Hit is 3.8, Foul is 2.6, and Meet is 6.4. As for left-handed, the number of Hit, Foul and Meet is 4.0, 3.0 and 7.0 respectively. And, As for KNB, the number of Hit, Foul and Meet is 3.4, 3.2, and 7.8 respectively (Fig 5).

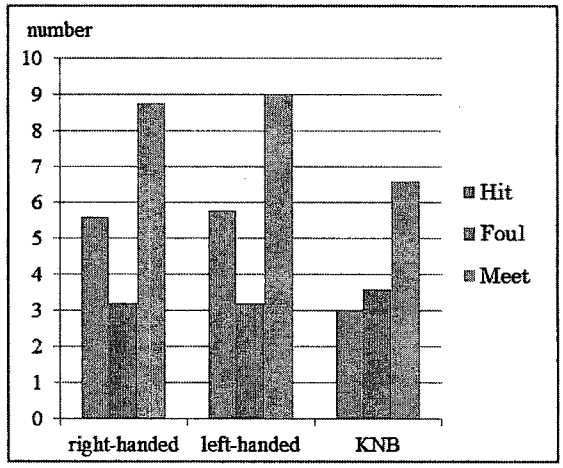

Figure 3 Baseball player's result

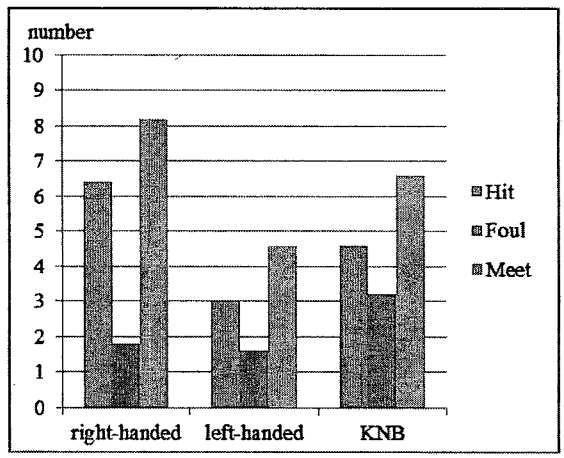

Figure 4 Racket player's result

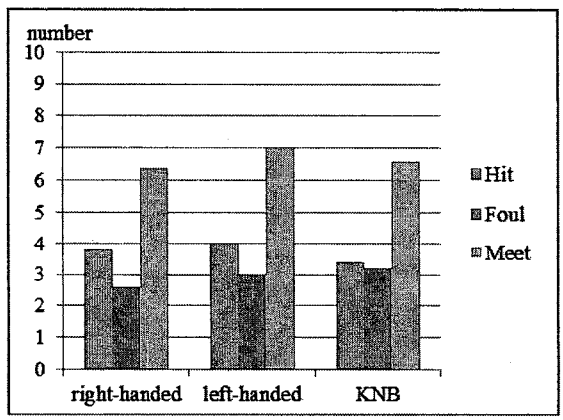

Figure 5 Football player's result

In this experiment, baseball player's the number of Meet is between 8 to 10 regardless of right-handed or left-handed. The reason of this result is that pitched ball is too slow for the baseball players. The baseball players experienced baseball over 10 years and plays collegiate baseball league belong division 1. And they usually hit baseball pitched about 140km/h in the practice and game. So, the ball set about 100km/h in this experiment is too slow for baseball players. In short, it is too easy for baseball players that hit the ball pitched from pitching machine.

And, the results of racket player's Meet is higher than football player's. And the result of racket player's Meet is almost equal to baseball player's Meet. The motion of racket player's swinging racket is similar to the motion of baseball player's swinging bat. Furthermore, racket player hit a ball in game and practice like baseball players do. But, football players usually don't hit a ball or swing something. So, the reason football players are inferior to baseball and racket players are not used to hit a ball or swing something.

The result of KNB is lower than right-handed and left-handed in baseball player's number of Meet. KNB is suggested by badminton receiving. In this batting style, batter faced pitcher's direction and impact in the side of batter's body. But, in ordinary baseball batting, baseball batter hit a ball in front of batter's body. So, this result of KNB is caused that baseball batter is not used to impact in the side of batter's body. And, left-handed and KNB are in the same batter box (left batter box). The batter box is the other side of subject always in. But, the result of KNB in football players is almost equal to right-handed and left-handed. Furthermore, the result of KNB in racket players is almost equal to right-handed and higher than left-handed. This result shows one of a merit that a batter use KNB. Generally speaking, it is hard that a batter in the other side of batter box he always in hits a ball. But, racket player using KNB hit a ball like right-handed as look at the result of this experiment.

Conclusion

It is concluded that the beginner in baseball using KNB might hit a ball like in the batter box as usual and that the newly developed baseball technique would be useful for the baseball batting.

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