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Original article


## Effectiveness in the strike zone of the pitchers from Pinar del Rio

Efectividad en la zona de strike de los lanzadores pinareños

Eficácia na zona de strike dos lançadores de Pinar del Rio

Angélica Arce Montero<sup>1\*</sup>  <https://orcid.org/0000-0001-5773-6594>

Rosa María Tabares Arévalo<sup>2</sup>  <https://orcid.org/0000-0003-2721-6402>

Yolainy Govea Díaz<sup>2</sup>  <https://orcid.org/0000-0003-1672-6597>

Luis Alberto Cuesta Martínez<sup>2</sup>  <https://orcid.org/0000-0003-4154-3872>

<sup>1</sup>Comité Central, medio de prensa-oficina de información, La Habana, Cuba.

<sup>2</sup>Universidad de Pinar del Río "Hermanos Saíz Montes de Oca", Pinar del Río, Cuba.

\*Corresponding author: angelicaarcemontero@gmail.com

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### ABSTRACT

Bearing in mind the importance of pitching and its weight for the success in the baseball game, the objective of the present work is focused on the analysis of the effectiveness in the strike zone of the pitchers of the Pinar del Río baseball team, first category, participants in the national series. For this purpose, it was worked with a population integrated by the 13 pitchers that constitute the pitching staff and the two coaches responsible for the preparation of these in such team, for which we used scientific methods and techniques such as the analysis of the statistics of each one of the games, as well as observation, survey and interview. The analysis of the results obtained reveals that 61,5 % of the pitchers of the team, mainly the youngest ones, present problems with the control of the throws in the strike zone, revealing a series of deficiencies related to the domain of the mechanics of pick-up, the scarce repertoire of throws, together with a low domain on the same ones, among other elements linked to the preparation. These results, together with the systematic control and analysis of the work of the throwers during the games, constitute important elements to trace more efficient strategies in the preparation of these athletes, tempered to their individual particularities and insufficiencies, in order to achieve a greater effectiveness of the same and therefore to overcome the competitive results of the team.

**Keywords:** baseball; pitcher; training; effectiveness; control; strike zone.



## RESUMEN

Teniendo presente la importancia del pitcheo y su peso para el éxito en el juego de béisbol, es que el objetivo de la investigación se centra en analizar la efectividad en la zona de strike de los lanzadores del equipo de béisbol de Pinar del Río, primera categoría, participantes en la Serie Nacional. Por ello, se trabajó con una población integrada por los 13 lanzadores que constituyen el staff de pitcheo y los dos entrenadores responsables de la preparación de estos en dicho equipo. Se emplearon métodos y técnicas científicas como el análisis de la estadística de cada uno de los juegos, así como la observación, la encuesta y la entrevista. El análisis de los resultados obtenidos revela que el 61,5 % de los lanzadores del equipo, fundamentalmente los más jóvenes, presentan problemas con el control de los lanzamientos en la zona de strike, aflorando una serie de insuficiencias relacionadas con el dominio de la mecánica de pitcheo, el escaso repertorio de lanzamientos, unido a un bajo dominio sobre los mismos, entre otros elementos vinculados a la preparación. Estos resultados, junto al control sistemático y análisis de la labor de los lanzadores durante los juegos, constituyen elementos importantes para trazar estrategias más eficientes en la preparación de estos atletas, atemperadas a sus particularidades individuales e insuficiencias, en aras de lograr una mayor efectividad de los mismos, y, por ende, superar los resultados competitivos del equipo.

**Palabras clave:** béisbol; lanzador; entrenamiento; efectividad; control; zona de strike.

## RESUMO

Tendo em conta a importância do lançamento e o seu peso para o sucesso no jogo de basebol, o objectivo do presente trabalho está centrado na análise da efetividade na zona de strike dos lançadores da equipe de basebol de Pinar del Río, primeira categoria, participantes da Série Nacional. Para isso, trabalhamos com uma população composta pelos 13 lançadores que integram a equipe de pitcheo e os dois técnicos responsáveis pela preparação destes em tal equipe, para o qual foram utilizados métodos e técnicas científicas, como a análise das estatísticas de cada um dos jogos, assim como a observação, o inquérito e a entrevista. A análise dos resultados obtidos revela que 61,5% dos lançadores da equipe, principalmente os mais jovens, apresentam problemas com o controle dos lances na zona de strike, revelando uma série de deficiências relacionadas com o domínio da mecânica de lançamento, o escasso repertório de lançamentos, juntamente com um domínio baixo sobre os mesmos, entre outros elementos ligados à preparação. Estes resultados, juntamente com o controle e análise sistemática do trabalho dos lançadores durante os jogos, constituem elementos importantes para traçar estratégias mais eficientes na preparação destes atletas, temperados às suas particularidades e insuficiências individuais, a fim de alcançar uma maior efetividade dos mesmos e, portanto, para superar os resultados competitivos da equipe.

**Palavras-chave:** beisebol; lançador; treino; eficácia; controle; zona de strike.

## INTRODUCTION

In Cuba, baseball constitutes, in its own right, a national sport and pastime, given its roots and tradition throughout history, forming part of the identity, idiosyncrasy and sports culture of Cubans. In this decade, it has earned all the titles conferred by (World Baseball and Softball Confederation or WBSC) in the different categories, except for the World Baseball Classic.



At present, taking into account the international results of the last few years, this sporting discipline is not going through a good moment, which demands a deep work from the base and the application of scientific knowledge in order to go along with the development of this sport in the world and to maintain the achievements of previous times.

Baseball is a very demanding sport, which cannot be exempt from the scientific and technical advances that have been experimented in order to reach superior sporting achievements; its dynamism has a high level of development that is complemented by two very decisive aspects: offense and defense, being the area of pitchers where the most important weight of the victory falls (Labrador, Haces and Cuesta, 2016).

The pitcher is a very important and responsible part of the team, his effectiveness and control depends to a great extent on the victory. The pitcher work is very difficult, not only because of the physical effort and the mental activity, but also because of the diversity of the movements that compose it and that are used in each one of their throws, according to the situations in the course of the challenge.

In line with the above, several authors claim that this area is the most important in baseball, because from the direct actions of pitchers is the beginning of all the plays that can occur. Some specialists assign about 70 % in the possibilities of stopping the offense of the rival (Pérez, Martínez and Quintana, 2020).

On the other hand, Hernández and Cañizares (2016), state that,

" the throwing of the ball constitutes the main action in the performance of the pitcher and although there are several skills he must possess, the precision of them is vital in obtaining good results".

In this sense, scholars of the subject say that the main weapon of a pitcher is the control of his throws. In particular, Álvarez *et al.*, (2002), state that,

"the control of the strike zone is fundamental, being of vital importance for the pitcher, both as an opener and as a relief, to have good control. This has been, in recent years, a pending subject in the national series of Cuban baseball".

In turn, Garcia *et al.*, (2019), refer that the action of pitching is one of the most difficult technical elements within baseball, which requires training. For this reason, numerous studies are directed in this sense, because of the importance they represent for the results of the pitcher's sports training.

It is precisely one of the most difficult elements, because something very fundamental depends on the correct mechanics of throwing, as is the control. Most of the control problems are associated with technical errors.

According to Conill, Quintana and Rivera (2016), pitchers must demonstrate the use of the technique acquired in the mastery of pitching; it is feasible that they learn to throw to all sides of the strike zone: in, out, up, down, so that the batter cannot prepare for a certain place and so the pitcher can keep it off balance. Low-zone pitches are the most effective for several reasons; they are farther out of the batter's line of sight, so they are more deceptive, causing batters to go out and look for the bad ball, thrown below the knee or out of the home plate.



Pitching today demands a high degree of preparation, due to technological development and the possibilities it offers for training, the rise of psychology, sociology, metrology and measurement science, among others. The developed countries like the United States and Japan show surprising successes in pitching terms of the diversity of throws, control, tactical and strategic thinking, concentration, use of time in the box and the studies they make of the opposing teams.

Numerous are the authors who have conducted and published studies in baseball related to the pitching area. On the one hand, those who approach the preparation of pitchers from various aspects such as the preparation of the pitching arm and technical tactical elements, among them *Álvarez and Lopez (2005), Garcia et al., (2007), González and Padilla (2007), Echevarría, de Álvarez and Cepero (2010), Barreto, Jiménez and Gerardo (2011), Vale and Bello (2015), Arévalo and González (2016), Cárdenas et al., (2019), Morejón y Valdés (2020), Rodríguez, Mariño y Sabatés (2020).*

On the other hand, there are the studies that particularize in the effectiveness of the pitcher, control and precision of the pitches in the strike zone, such as *Álvarez et al., (2002), Villalobos and Unzué (2008), Conill, Quintana, and Rivera (2016), Hernández and Cañizares (2016).*

*Kawamura et al., (2017), Chapell et al., (2019) and García, et al., (2019 a and b).* According to the criteria of sports glories, baseball experts, as well as the results of controls carried out at training sessions, there is a tendency to decrease the rigor of pitchers' preparation in the country, a reality from which Pinar del Río province is not exempt. This province that decades ago became a powerhouse in the pitching area in the country, where more than 50 % of the pitchers in the national team were from this territory, nowadays does not behave like that anymore. Although there are still figures with talent and results, the depth of the staff is not the same of previous years, existing difficulties in the control and the variety of effective throws.

Based on the above, the objective of the present work is focused on the analysis of the effectiveness in the strike zone of the pitchers of the Pinar del Río baseball team, first category, participants in the national baseball series.

## **MATERIAL AND METHODS**

The research is carried out with the baseball team of Pinar del Río, first category, participant in the first phase of the National Series number 59. It was worked with the population made up of the 13 pitchers that made up that team, and also with the two coaches in charge of the preparation in the pitching area.

There were used methods from the theoretical level as the historical-logical, the system approach, the analysis of documents, the procedures of analysis-synthesis and of induction-deduction.

### **From the empirical level, the following were used**

Observation: this was carried out during the training sessions, both in the development stage of competitive performance and in the modeling stage of competitive performance, in which the control games and matches with other



provinces stand out. Out of a total of 30 sessions, 20 (66.6 %) were observed, focused on the pick-up area, to verify the difficulties existing in the pitchers.

Moreover, at the beginning of the championship, in the first stage of 45 games, 25 games (55.5 %) were controlled, which confirmed the problems investigated.

Interviews: two interviews were applied; one to the 13 pitchers who made up the population studied and the other to the two coaches who work with them, in order to ascertain their criteria on the different aspects related to their knowledge, preparation and mastery of the strike zone.

*Mathematical statistical methods:* from the descriptive statistics the percentage analysis on the frequency distribution tables was used.

## **RESULTS AND DISCUSSION**

### **Documents analysis results**

Reports made during baseball games were studied, to evaluate the performance of pitchers during the championships and to check if the training period has been effective. Also to have a notion of the effectiveness behavior in the preceding and subsequent games.

Likewise, the training plans of the team investigated during the last baseball campaigns were analyzed, as well as the Integral Program of Preparation of the Sportsman in its editions of 2009, 2011, 2013 and of the Olympic cycle 2016-2020. This review allowed to know the existing orientations for the teaching of the pitching action and if these plans have been effective, according to the tasks and objectives proposed, determined by the macro work cycle in search of its application in future seasons.

### **Results of the interview with the pitchers**

Among the main results of the interview applied to the 13 pitchers of the Pinar del Río team, related to their preparation and the mastery of the strike zone, the following stand out:

- The 77 % point out as an important element in the mastery of the strike zone, the systematic preparation and throwing daily.
- The 69 % declare as another important element the concentration in the box.
- The 62 % refer to the study and observation of opposing batters.
- The 62 % recognize the importance of working with their legs, arguing that correct mechanics depend on them to have good control and stay as long as possible with good physical preparation during the game.
- In lesser percentage, other aspects are mentioned such as the mastery of the mechanics of pitching and of varied pitches, physical preparation.



## Results of the interview with the coaches

The above results can be seen in the interview applied to the two coaches who lead the preparation of these athletes, among whose results the following stand out:

- They highlight the importance of deepening the work with pitchers, depending on their role in the game, in relation to the good command of the strike zone as an important element in their effectiveness and therefore in the result of the match.
- They emphasize that in order to have a good command of the strike zone the pitcher must master the basic elements of the pick-up dynamics, the mastery of different types of pitches, as well as the concentration in the box and accumulate a good volume of pitches in his preparation.
- The importance of physical preparation to face the effort made in the game is underlined, mainly in the opening pitchers and long relays.
- In the preparation, the study and knowledge of the opposing batters is considered, as well as placing the pitches in the area that hurts the batter the most in turn, and placing himself above the count.
- They claim to structure the preparation taking into account the shortcomings of the previous season, taking into account individualized work, combining the other elements of technical-tactical, theoretical, physical and psychological preparation. It is recognized that sometimes this is not achieved 100 %, for different reasons.
- In the work with the control of the throws, they are carried out, in addition, games of preparation with tasks and specific situations, similar to those that can be presented in the competition.
- In addition, other elements are worked on, such as concentration, confidence and security in pitching and the development of technical and tactical thinking.
- They declare that the check and control of the effectiveness of the throws, during the trainings, is carried out mainly through the pitching cards, instruments that register each throw and the result that was obtained. In addition, the application provides relevant information on the status of the pitcher, which serves to plan training and work during the game.
- About the insufficiencies and aspects to improve they referred to the use of different implements, the overcoming, a greater application of the science, as well as the necessity of a deeper work with the youngest from the previous categories and that they arrive at the elite tournament with more throws.

## Training observation results

The observations made at the 20 training sessions yielded the following overall results:

- The 61.5 % of the throwers have mastered the basic elements of the art of throwing, while 38.5 % (coinciding with the youngest), present problems in the mechanics, both in the posture when throwing, and in the form, mainly affecting the use of the throwing board and the maintenance of balance in the execution of the throws. This causes loss of control and speed in the box.
- The Insufficiencies are observed in the warm up, related to its schematic form, irregular execution and the time of duration.
- The 69 % of the throwers throw straight and slider. Shifts and curves are effectively mastered by only 31 %, with little variety of throws, as there is little control over them.



In table 1, you can see the average number of throws made by the team's pitchers in the controlled training sessions, differentiating those made in the strike zone and those that fell outside it.

It can be seen that the total percentage of pitches in the strike zone (55.7 %), is slightly higher than those that fall outside the strike zone (44.3 %), which is not positive, taking into account that, according to the specialists, in order to evaluate the indicator properly, from a session of 120 pitches, the pitchers would have to throw at least 70, in the strike zone.

In turn, this 55.7 % is mainly marked by the work of experienced pitchers, who represent more than 50 % of the team.

**Table 1.** - Quality of throws made by pitchers during training sessions

Pitchers	Throws in the strike zone	Throws out of the strike zone
1	93	27
2	85	35
3	70	50
4	79	41
5	72	48
6	70	50
7	74	46
8	55	55
9	60	60
10	48	72
11	52	78
12	54	66
13	57	63
Totals/%	869/55,7%	691/44,3%
Mean	66, 8	53, 1

It would be convenient, in order to make comparisons with other studies, to use other methods in the evaluation of pitching accuracy, such as the one used by [Hernández Gacitá y Cañizares \(2016\)](#), consisting of a dynamic test of pitching accuracy applied, in this case, to pitchers of the baseball team, first category of the Mayabeque province, which showed little development of proprioceptive control in the population studied, which affects the accuracy of pitches towards the desired area in the home plate.

Likewise, [Kawamura et al., \(2017\)](#), evaluated the accuracy of baseball pitching using a variety of parameters to quantify errors, applied to two small samples of pitchers, professional and non-professional.

The accuracy of ball throwing into the strike zone is educated in the sports training process through daily practice, with high volume of such throws or deliveries ([Hernández and Cañizares, 2016](#)).

### Results of the observation to the competition

As a result of the 25 games controlled during the competition, a large part of the deficiencies mentioned above were ratified, those that are concentrated fundamentally in the youngest pitchers and in those that fulfill the function of relays,



this last area of more negative incidence in the competitive results of the team. In a general way, the following elements prevail:

- Deficiencies in pitching mechanics.
- Deficiencies in the repertoire of pitchers and the mastery of various types of pitches.
- Limited use of the pitching table that conditions difficulties in the location of the pitch in the strike zone and according to the weaknesses of the opponent.
- Deficiencies of the pitchers when marking the first strike are evident.
- There are deficiencies in the independence and decision making of the pitchers during their performance in the game.
- In 58 % of the cases, the relief pitchers did not fulfill the task of dominating the batter they faced at the beginning of their performance.
- In 45 % of the occasions when pitchers were counting favorably against opposing batters, they received positive connections.

Most of these insufficiencies coincide with those detected by **Cordero, Martínez and Tabares (2019)** in the pitchers of the team of the category 17-18 years of the province, which confirms the previously raised related to deficiencies in the technical tactical preparation that is dragged from the previous categories.

According to **Martín, Trejo and Martínez (2020)**, to throw successfully, the pitcher has to master the mechanics of the movements and the correct rotation on the ball when releasing it at each throw. The improvement of movements and grips needs to be taught and motor skills developed, which comes with the repeated tasks of familiarization with the technique, its use and a higher level of demand. In the structure of the movements in the throwing, it is essential to comply with the following requirements: Positioning on the throwing rubber. Head movements and use of sight. The work of the feet and the posture of the body. Possession and placement of the ball.

At the same time, **Álvarez et al., (2002)**, point out that the pitcher is in charge of controlling the offense and must be prepared from every point of view; pitching is an art of dominating the batter and to do so, he must know the pitches that connect the rival batters and, therefore, those that hurt them. He must also know where to put the ball on each pitch; this is one of the keys to his success. You must also concentrate hard and forget what's going on off the field.

In a study conducted on pitching quality in Major League Baseball (MLB) in the United States (**Swartz et al., 2017**), it was found that the optimal pitching quality period, for headlines, is approximately between the 20th and the 70th pitch. In turn, the study itself suggests that the outer low zone, within the strike zone, generally constitutes the best performance, from the point of view of pitcher effectiveness.

Summarizing what has been discussed and based on the above mentioned insufficiencies, in order to improve control, achieve adequate control of the strike zone and therefore effective work by the pitcher, in addition to a refined technique, it is necessary to continue developing tactical thinking, especially of the youngest, who still do not have enough experience in the sport, and resources such as memory still do not put them in full function of the pitching command.

It is urgent to record the pitching of each batter, which is achieved by studying the opposing batters of all the teams. It also requires greater concentration and cunning





in the game to try to get the first strikeout out of the inning as a way to get in quickly on favorable count and not to get plays like batting and running, stealing bases, hitting from behind the runner or bunting.

Overpowering the opposing team could respond to zigzag pitching, working the corners, changing speed, breaking and relying on the experience of your receiver, knowing how to throw close, appealing to the dominant throw in complex situations, with men on bases, more than any other timely indication of the bank.

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#### **Conflict of interests:**

The authors declare not to have any interest conflicts.

#### **Authors' contribution:**

The authors have participated in the writing of the work and analysis of the documents.



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