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Original Article

Instrument for the control and evaluation of the tactical technical performance in the baseball pitchers

Instrumento para el control y evaluación del accionar técnico-táctico de los lanzadores de béisbol

Instrumento para o controle e avaliação do desempenho técnico-táctico dos lançadores de beisebol

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ABSTRACT

The control and evaluation of the tactical technical action in the training in game situations, is an aspect that is made difficult by the lack of definition of indicators to be taken into account in baseball, specifically in the pitching area. Therefore, the objective of this article focuses on proposing an instrument for the control and evaluation of the tactical technical performance of baseball pitchers, category 15-16, in game situations, during the training unit, as well as in sports competition. For this purpose, we worked with a primary sample of 15 pitchers of the 15-16 years old category of the Sports Initiation School, "Ormani Arenado Llonch" of Pinar del Río and nine coaches as a secondary sample. Scientific research methods and techniques were used, such as document analysis, observation, standardized and individual interviews. Shortcomings were found in the treatment of the control and evaluation of the tactical technical preparation, in terms of the baseball pitcher's tactical technical action in game situations based on the creation of an instrument that provided the coach with information about the state of the pitcher's tactical technical action, by promoting the treatment of weaknesses presented by the athletes in this game area.

Keywords: tactical technical action; baseball; control; evaluation; pitchers.



RESUMEN

El control y evaluación del accionar técnico-táctico en el entrenamiento, en situaciones de juego, es un aspecto que se dificulta por la no definición de indicadores a tener en cuenta en el béisbol, específicamente en el área de lanzadores. Por ello, el objetivo del presente artículo se centra en proponer un instrumento para el control y evaluación del accionar técnico-táctico de los lanzadores de béisbol, categoría 15-16 años, en situaciones de juego, durante la unidad de entrenamiento, así como en la competición deportiva. Para ello, se trabajó con una muestra primaria de 15 lanzadores de la categoría 15-16 años de la Escuela de Iniciación Deportiva "Ormani Arenado Llonch", de Pinar del Río y nueve entrenadores como muestra secundaria. Se emplearon métodos y técnicas de la investigación científica como el análisis de documentos, la observación, la entrevista estandarizada e individual. Fueron constatadas carencias en el tratamiento del control y evaluación de la preparación técnico-táctica en cuanto al accionar técnico-táctico del lanzador de béisbol en situaciones de juego, a partir de la creación de un instrumento que le aportó información al entrenador sobre el estado del accionar técnico-táctico del lanzador, al propiciar el tratamiento de debilidades que presentaron los atletas de esta área de juego.

Palabras clave: accionar técnico-táctico; béisbol; control; evaluación; lanzadores.

RESUMO

O controle e avaliação da ação técnica táctica no treinamento em situações de jogo, é um aspecto dificultado pela falta de definição de indicadores a serem levados em conta no beisebol, especificamente na área de lançamento. Portanto, o objetivo deste artigo é propor um instrumento para o controle e avaliação do desempenho técnico táctico dos arremessadores de beisebol, categoria 15-16, em situações de jogo, durante a unidade de treinamento, bem como em competições esportivas. Para isso, trabalhamos com uma amostra primária de 15 arremessadores da categoria de 15-16 anos da Escola de Iniciação ao Esporte, "Ormani Arenado Llonch" de Pinar del Río e nove treinadores como amostra secundária. Foram utilizados métodos e técnicas de pesquisa científica, tais como análise documental, observação, entrevistas padronizadas e individuais. Foram encontradas deficiências no tratamento do controle e avaliação da preparação técnica táctica em termos da ação técnica táctica do lançador de basebol em situações de jogo, com base na criação de um instrumento que forneceu ao treinador informações sobre o estado da ação técnica táctica do lançador, promovendo o tratamento das debilidades apresentadas pelos atletas nesta área de jogo.

Palavras-chave: ação técnica táctica; beisebol; controle; avaliação; arremessadores.

INTRODUCTION

Baseball in Cuba is more than the national sport, it is part of our nationality, of our identity. It is something totally inexplicable for someone who is not Cuban. For this reason, many have seen it as a spontaneous process, which does not need science or anything other than pure baseball (Pilot, A. 2017).



"Collective, team, variable and contextualized sport among the ball sports group" is the definition that different researchers attribute to this sport discipline. (Martín, E & Deler, P., 2009; Arévalo, C. and González, Y., 2016).

Similarly, several researches that refer to the importance of the pitcher in the game of baseball, suggest that the influence of this in the victory of a team, ranging between 70 and 85 % of effectiveness, which commits coaches, specialists and researchers to the search for tools that allow the improvement, control and evaluation of the technical-tactical action of these athletes (Cordero, V. 2019; Orozco Cardenas, N. L., Arostica Villa, O., González Sánchez, E., & Gutiérrez Cruz, M. 2019).

In particular, this work focuses on control and evaluation as one of the fundamental pedagogical processes in sports training. This statement responds to the criteria of Harre, (1983), who considers that control is the recording of the performance of each athlete through measurement, counting, observation and evaluation of each sport or discipline with the aim of ascertaining the effect of each of the loads or the training status of each athlete.

Being this way, the control, in its pedagogic character, is materialized from the feedback in form of a return link, which allows the coach to obtain information, this makes possible to know how the process is going and in case it is necessary to rectify its direction. (Zatsiorski, V. 1989). In the same way, pedagogical control is associated with the theory of functionalism or feedback, this permanent feedback about the progress of the process, offers the possibility of introducing modifications in a systematic way in the state of preparation of the athlete (Copello, 2017).

As for the control of the state of the sportsman, Govea, Y. (2011), raises three varieties:

1. Staged testing, which aims to assess the status (level of preparedness) of the athlete in stages.
2. Current Monitoring, where the primary task is to determine the daily (current) fluctuations in the Athlete's condition.
3. Operational Testing, which is intended to provide an immediate assessment of the Athlete's condition at a given time.

Therefore, it is necessary to control and evaluate the process of teaching and learning the technical and tactical preparation of baseball pitchers, specifically in terms of their actions in game situations, with the aim of customizing the volume and intensity of this sports preparation and thus be able to know the state of assimilation of the training load received by pitchers.

Calero, S. (2014), also considers that evaluation tools should be promoted to provide a reflexive, interactive and motivating space on the possible actions to be developed within the game, integrating technique and tactics in correspondence with the demands of contemporary training, where training is increasingly similar to the form of competition; this causes a readjustment of the control and evaluation process in correspondence with the form of training and competition.

The consideration of the simplified situations of the game, inserted in the Integral Program of Preparation of the Athlete (Collective of authors, 2016-2020), as one of the pedagogical procedures, carried out in baseball and specifically in the area of pitchers, to model situations that the athletes can face in the game, implies that they



learn through active and exploratory confrontation with the real game environment, limiting themselves to receive the information and to reproduce performances leading to a repetitive and mechanistic learning **Cordero, V. (2019)**.

This limits the establishment of relationships with previous knowledge, causing new knowledge to be linked, in a superficial manner and without modifying previous knowledge, which is why pitchers learn to solve problems without the necessary understanding, all of which is conditioned by limitations in the use of instruments that allow the control and evaluation of simplified game situations used to perfect the tactical technical actions of baseball pitchers. Therefore, it is useful to create a mechanism that offers solutions to technical-tactical difficulties that athletes may present during training and competitions.

From observations made to training units and confrontation games, as well as interviews to coaches of the 15-16 years category, review of baseball normative documents it was possible to detect that there are deficiencies in the implementation of means and methods and indicators for the control and evaluation of the technical tactical preparation of baseball pitchers, specifically in terms of their action in game situations during training and competitions.

Consequently, the general objective of the present research was framed in elaborating an instrument for the control and evaluation of the tactical technical action of the baseball pitchers, category 15-16 years old in game situations.

MATERIALS AND METHODS

General characteristics of the sample

With the intention of verifying the current state of the control and evaluation of the tactical technical action of baseball pitchers, the instruments that are revealed to control the tactical technical action of pitchers in playing situations, as well as the indicators stipulated for working with pitchers in the 15-16 year-old category, it was determined to work with a primary sample of 15 pitchers and nine (9) coaches in the aforementioned category as a secondary sample. The same was selected by means of an intentional non-probability sampling, taking as an intentional criterion, in the case of the pitchers, to have more than three (3) years in the function of pitcher, and in the case of the coaches, to be a pitching coach, with more than five years of experience in this work. Of the nine (9) coaches sampled, six (6) are Bachelor of Science in Physical Culture; two (2) Master of Science in Sports Coaching and one (1) Postgraduate Specialist, in High Performance baseball.

Research methods and techniques

The methods and techniques of scientific research are based on the materialist-dialectical method as a fundamental theoretical-methodological basis for the interpretation of the objective reality of the training of technical-tactical preparation in baseball, specifically the technical-tactical action of pitchers.

The analysis of documents was used; the survey applied to the coaches and the observation, carried out this last one to 15 training sessions in the preparatory period and 10 games of confrontation in the competitive period, with the purpose of knowing the line of work, followed as far as the control and evaluation of the technical-tactical action, carried out by the coaches. Indicators were needed to know the technical-



tactical action and thus be able to develop a new instrument to achieve this end, such as: time taken by the pitcher to make the next delivery; travel for the assistances and their placement, and performance of quality throws and use of pitching commands.

RESULTS AND DISCUSSION

In order to fulfill the proposed objective and to be able to develop the instrument to control and evaluate the technical-tactical action of pitchers in game situations. An exploration of the state of the technical-tactical action of baseball pitchers, category 15-16 years old in the province of Pinar del Río, was carried out based on the methods and instruments foreseen, whose main results are described below:

Documentary analysis

When analyzing the normative document that governs the sport preparation of baseball players in Cuba, particularly in pitchers, in the Integral Program of Preparation of the Sportsman (Collective of authors, 2016-2020), it is appreciated that the indications related to the control of the technical-tactical preparation and its evaluation, specifically as far as the action of pitchers in game situations, lacks instruments that allow the coach to know how the action of the pitcher in game situations is manifested, at the moment that he makes a technical-tactical action. Only the use of pitching cards is evident, where their usefulness lies mainly in the control of pitchers' pitches, providing information in a restricted way to the coach, since it is only limited to the pitcher's performance before the batters. This shows little precision in the control of different individual and group technical-tactical actions, in which the pitcher's participation is fundamental.

The indicators assumed in the normative documents to control the technical-tactical action of baseball pitchers lack objectivity, since they are limited to the pitcher's action in front of batters and in the bullpen.

Likewise, the existing instruments show deficiencies in evaluation scales, which makes it difficult for the coach to know the state of the technical-tactical action and to reorient the preparation in order to solve the technical-tactical problems of the athletes.

Results of the interviews to the coaches

The overall analysis of the coaches' responses yielded the following:

- The 100 % of the interviewed persons consider imprecise and insufficient the methodological orientations offered by the Integral Program of Preparation of the Athlete (PIPD) on the control of the technical-tactical preparation of the throwers, specifically as for the action of these athletes, confirming that they are supported, basically, in the control of throws, through the pitching cards.
- The 100 % of the coaches show lack of knowledge of other instruments used to control the actions of the pitchers during training or competition, so that the technical-tactical training of the pitchers is limited in terms of control and evaluation of the actions of the athletes they prepare.
- The 100 % of the interviewed people agree that it would be very useful a methodological tool, structured with precise procedures and methodological



orientations, that allows the control and evaluation of the baseball pitchers of the category 15-16 years old in game situations.

Results of training observations in the preparatory period

When evaluating the results from the 15 observations made to the training sessions, in the preparatory period of the baseball pitchers, of the 15-16 years category of the Ormani Arenado EIDE, from Pinar del Río, the following insufficiencies were found:

- Marked difficulties in the use of commands at pitches, according to the weaknesses of the opposing batter.
- Vulnerability in the action of throwing, since in 90 % of the shipments they were seated far from the batter, conditioned by difficulties in the location on the table of throwing.
- Technical deficiencies that prevent the realization of quality pitches, since in 60.5 % of the pitches made in the bullpen, were located in the most vulnerable and of greater contact zone of the strike zone (of the superior part of the mask to the shoulders of the receiver).
- Lack of means and instruments that contribute to the control and evaluation of the technical-tactical component of the athlete's preparation.

Results of observations of confrontation games

- On the other hand, the control made to 10 games of confrontation, carried out, included in the special and pre-competitive mesocycles (modeling of the sport performance and adjustment of the sport performance), gave the following results:
- There are deficiencies in the use of tools or instruments that allow the pitcher, with the help of the coach, to make adjustments in his actions, with the aim of achieving a higher performance.
- Limited use of the throwing table that conditions difficulties in the location and commands of the throwings according to the weaknesses of the opponent.
- Technical difficulties that limit the performance of quality pitches to counteract the offense of the opposing batters.

In general, the results of the observations of the preparatory and competitive periods, the interview with coaches and the documentary analysis of the Integral Program of Preparation of the Sportsman (PIPD), reflect that the orientations of the normative documents that govern baseball in the country have gone through a process of irregularities, so that the control and evaluation of the technical-tactical preparation, specifically the technical-tactical action of the pitchers, in situations of game, have been treated in an irregular and inadequate way. This situation has influenced the prevalence of deficiencies in the technical-tactical action of pitchers that move them away from the performance standards in force in modern baseball.



Instrument to control and evaluate the technical-tactical action of baseball pitchers

Once the results of the methods and techniques applied were processed and analyzed, the instrument for the control and evaluation of the technical-tactical action of baseball pitchers in the 15-16 year-old category in playing situations was developed, based on the use of the systemic-structural-functional method, which made it possible to establish the structure and operation.

To undertake the development of the proposed instrument, several authors were consulted, such as [Zatsiorski, \(1989\)](#); [Muñiz, \(1998\)](#); [Haag and Dassel, \(2005\)](#); [Iglesias, \(2013\)](#), among others.

Indistinctly, these authors propose different steps to follow for the structuring of the instruments or tests. Depending on the characteristics of the instrument or test to be proposed, the following steps are established:

1. Definition of the aspect to be measured: the technical-tactical action of baseball pitchers, in game situations.
2. Necessary instruments: Stopwatch, calculator, paper and pencil.
3. Selection of the variables, dimensions and indicators to control and evaluate.
4. Establishing the structure of the instrument.
5. Establishing the rating scale.

The internal logic of a sport is the system of the relevant features of this ludomotive situation and the accompaniment of practical consequences that this system entails ([Nieves, R., and Martínez, L., 2012](#)). Starting from this affirmation, it is considered to the determination of structural and functional constants dimensions and indicators; these condition the action of game in each sport and it looks for to know the structural characteristics that could be used in the situations of education and their correspondence with the internal structure of each sport; it always takes into account the present tendencies of the sport training, which is directed to the accomplishment of the sport practice, in conditions increasingly near the reality of the game.

Accordingly, the teaching of a sport or specialty must be organized, based on knowledge of its internal logic. Thus, indicators, according to [Campistrous & Rizo, \(2005\)](#), are a variable that allows to indicate the values of another variable. Thus, by indicating the values of offensive and defensive variables, the indicator facilitates the process of control and evaluation of technical-tactical action.

In determining the influence of indicators for the control and evaluation of technical-tactical action, the method of prospective and structural analysis of variables was used.

This method allows the appearance of the main influential and dependent variables and, therefore, the essential variables for the future evolution of the system of variables, object of study, which in this research constitutes the one that intervenes in the process of technical-tactical preparation, specifically in the technical-tactical action of the launchers, in the constant search of its improvement, control and evaluation.



Table 1. - Variables, dimensions and indicators for the control and evaluation of the technical-tactical action in baseball pitchers

Variable 1	Dimensions	Indicators
Time that elapses since the stimulus arrives at the athlete, reacts to it and performs the action	Motor	Time the pitcher use to make the next throw
Variable 2		Indicators
Number of errors made during game action		Quality throws made by the pitcher.
		Use of pitching commands.

Establishing the structure of the instrument

The structure of the instrument is determined by the control of the variables declared for this research, which, from the mathematical calculation (multiplication) between the results of their measurements respectively, give as a result a qualitative evaluation of the technical-tactical action of the pitcher in game situations. The result is the following equation:

$$att = t (e-r-a) \times (ce c)$$

Where:

att= technical tactical action

t (e-r-a)= time that elapses since the stimulus arrives at the athlete, reacts to it and performs the action.

(ce c) = number of errors committed

Establishing the rating scale

Therefore, according to the equation, the technical-tactical action of each thrower will be more appropriate, when the values reached are in the range between four (4) and minus four (-4). They are declared as inadequate when the values reached are not in the range mentioned above. In this case, the following scale of values is established (Figure 1).

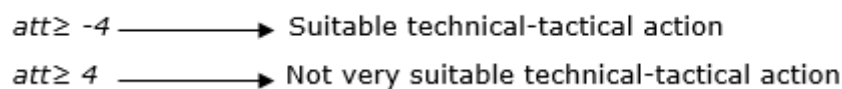


Fig. 1. - Scale for evaluating the technical-tactical actions of baseball pitchers



Methodological guidelines for the use of the instrument to monitor and evaluate the technical-tactical action of 15-16 year-old baseball pitchers

- The instrument will be applied in training, at the time planned for the development of tactical direction and in competition, at the time or situation determined by the coach.
- In the training session, the coach will model situations similar to those the pitcher might face during his competitive activity and will demand the maximum effort from the athletes to avoid false measurements and assessments.
- The control can be done daily and, at the end of the micro training cycle, the behavior of the technical-tactical action of each athlete will be evaluated.
- During the recovery between repetitions, the thrower will receive indications or corrections from the coach about the technical-tactical action, controlled to achieve better performance in the activity.
- The coach should specify the content of the action or actions to be performed by the thrower so that the general and special warm-ups will provide the athlete with the optimal levels of predisposition (level of concentration of attention, levels of motivation to complete the task, pulse levels), for execution in accordance with the required levels of performance.
- It should also be taken into account: the recovery time between repetitions, depending on the physical-technical characteristics of the thrower and the objective of the training.

Advantages of the proposed instrument use

- It facilitates the evaluation of the current state that the pitcher has, with respect to the technical-tactical action in game situations.
- They produce a greater level of exigency in the activity that is made, product to the objectivity that confers him to the evaluation, since those indicators will be evaluated that influence directly in the result of the preparation.
- It facilitates a better planning, control and evaluation of the technical-tactical preparation, in correspondence with the stages of the preparation.
- They allow athletes to work with a design of the technical-tactical preparation in terms of action, in game situations, much more personalized and perfected.
- It facilitates the identification of strengths and weaknesses of technical-tactical throwers in game actions.

The indicators determined for the control and evaluation of the technical-tactical action in baseball pitchers, in game situations, allow us to know the influence they have on the performance of the pitcher to obtain good results, conditioned by the demands of contemporary baseball. The proposed instrument constitutes a useful tool for the control and evaluation of the technical-tactical action of pitchers in playing situations; it is accessible to coaches and allows for systematic control during training, making it possible to correct training planning in time.



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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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