ANALYSIS OF THROWING ON GOAL FROM POSITIONS 1 AND 2 IN YOUTH WATER POLO

Abstract

The analysis of the technical-tactical behavior of sports with high variability in the competition itself is carried out with the observational methodology, as this is a specific method for the analysis of competitive activity. The objective of this study was to analyze the behavior of shots on goal from positions 1 and 2 in the Villa Clara youth water polo team. Through the use of methods of the empirical level, such as measurement, workshops, scientific, statistical and mathematical observation, the shots on goal from zones 1 and 2 within the game system were observed and recorded, for this an instrument was developed that facilitated the collection of information and subsequent analysis of the results and, in this way, direct and consolidate the training actions during the preparation of this team. The information obtained constitutes reference values for the youth team of Villa Clara and the category in Cuba.

Keywords*: effectiveness; competitive activity; instrument, launch; goal*

Introduction

The analysis of the technical-tactical behavior of sports that develop their actions in a highly complex environment is carried out with exploratory studies under the observational methodology, this being a specific method for the analysis of competitive activity (Anguera and Hernández, 2017).

In a first stage, the most used observational analysis techniques were descriptive analyses, but currently the mastery of technical-tactical skills can vary according to the competitive level of the players, therefore, it is essential to establish an adequate follow-up. to the development of these skills (Sáez, Ruano and Gutiérrez, 2019).

On the other hand, it is also considered that high-level competition today is increasingly demanding, and requires a solid development of technical-tactical skills in players from their initial training stage (Palao, Manzanares and Ortega., 2015).

Currently, it is essential to progress in the knowledge of the actions of the players in the context of the game to increase the results during the competition (Papadopoulou, Giatsis, Billis, Giannakos, & Bakirtzoglou, 2020).

In this sense, Griego (2019) emphasizes that the study of competitive activity allows obtaining information and reference values for technical-tactical training depending on the competitive level, which is why increasingly effective evaluations are needed to improve knowledge. on the development of technical-tactical skills, experienced by players throughout the sports preparation process (Gamonales, Muñoz, León and Ibáñez, 2018); (Echeverría, Ortega, and Palao, 2020). Throwing in goal sports presupposes a finishing maneuver.

Despite the importance of the aforementioned works, the youth water polo team of Villa Clara presents insufficiencies in the effectiveness of the shot on goal from positions 1 and 2. That is why a study of the behavior of this finishing maneuver is carried out. on the equipment under study.

For all of the above, this research is considered timely and necessary, where the objective is: To analyze the behavior of shots on goal from positions 1 and 2 in the Villa Clara youth Water Polo team.

Methodology

Population and sample

a) The first population was composed of the Water Polo team of the male youth category participating in the National Youth Championship held in Camagüey 2019, with an average age of 16.0 years, a sports experience around 6, 8 years and a very good technical level.

b) The second population was made up of eight water polo coaches from the Comprehensive School of School Sports (EIDE) "Héctor Ruiz Pérez". These specialists participated in the investigative actions conceived to guarantee the construction and reliability of the observational record. They were trained through preparation workshops to consummate their role as observers within the investigation to be undertaken.

Methods and techniques used

The following scientific methods were used:

Structured scientific observation: It was used to know the number of launches that are made from the studied positions. The number of shots made from the pre-established positions and the goals scored from the areas delimited in the study were counted. An

observation instrument is elaborated that allowed the recording of the shots made and those scored from the assumed positions and playing areas.

The observations made for the validation of the elaborated instrument were made within the framework of the National Youth Championship. The 6 matches in which the Villa Clara team participated were observed, achieving, through the study of the behavior of the teams studied during the match, characterizing the behavior of the players in the variable reason for study: shots at goal from positions 1 and 2.

In this case it was a non-participant observation, since the observer does not intervene in the spontaneity of the observed, who does not even know that he is being observed. The position of the observer is as if he were not in the situation of direct observation, then the fundamentals observed are transferred to a record sheet (Conejero, Prado, Claver, Jara, & Moreno, 2018).

In the investigation that is developed, a recording made in the framework of the National Youth Championship held in Camagüey is used. The use of recording to make observations is considered by different authors as one of the auxiliary technical means for the systematic interpretation of the event in sport. All (6) Water Polo matches played by the Villa Clara youth team in the framework of the 2019 National Youth Championship were filmed.

Various technological resources were used to carry out the measurement. A Sony DCR-SR85 HYBRID digital camera and a level tripod were used. The staff that developed the filming is specialized, fulfilling two essential requirements for the success of this investigative task, first, they dominate biomechanics, having experience in these tasks, and also one of these specialists is knowledgeable about the sport being studied, having practiced it for several years. years.

The actions carried out to carry out the filming are listed below:

• Placing the camera with a tripod on a surface that guarantees the stability of the whole.

• Focus of the filming area on the center of the field of play, ensuring that the limits of the field remain within the filming.

• Filming always in the same position, without changing the zoom from the start to the end of each game time.

Once the filming of each game was completed, the videos were stored on the hard drives of several computers, which guaranteed that they would not be lost or lost.

Measurement: It allowed the actual results to be expressed in numbers. The total number of shots made and the number of goals scored from the study zones and positions were recorded.

Mathematical-statistical: The empirical distribution of frequencies was used to calculate the effectiveness of the sports foundation studied. On the basis of the calculations carried out, the analysis of the behavior of the studied foundation is carried out.

Calculation formulas were used to provide quantitative indices that allowed reaching important results in the investigation.

To obtain the interobserver reliability values, the following formula was used: % Agreement = (Number of occurrences of agreement-Number of occurrences of disagreement) x 100 / Total number of occurrences

Chance coefficient of throws in attack phases. (the mathematical formula that determines a numerical value of the relationship between the shots made and the attack phases that took place in the matches studied).

Possibility coefficient of shots in the situational framework marked by numerical equality. (the mathematical formula that determines a numerical value of the relationship between the throws made and the times it is made from the situational framework studied).

Concretion coefficient of shots in the situational framework marked by numerical equality (the mathematical formula that determines a numerical value of the relationship between the shots scored and the shots made from the situational framework studied)

Concretion coefficient of shots from position 1 and 2 in the situational framework marked by numerical equality. The mathematical formula that determines a numerical value of the relationship between the shots scored and the shots made from those playing positions

Workshops: The workshop conceived was aimed at sports teachers with the aim of using it as a way to improve and access theory from practice. Based on the contents developed in the workshop, 3 training sessions were conceived aimed at developing observation and recording skills from a practical perspective.

Carrying out these training sessions allowed the preparation of the eight (8) selected specialists who intervene in the investigative actions conceived to guarantee the construction and reliability of the observational record. These specialists who participate in the workshop and then in the training sessions to undertake the observation, are the EIDE Héctor Ruiz Pérez water polo coaches from Villa Clara.

Specific elements that are used during the observational methodology and that point out, above all, aspects of how the study is carried out will be described below. The study is divided into three dimensions (Conditional/Context, Attitudinal/Game Action and Resolutive/Completion). The first to be defined are the criteria or variables. These criteria must be recorded on the basis that they allow groupings by affinity between the ranges of behaviors that are to be studied.

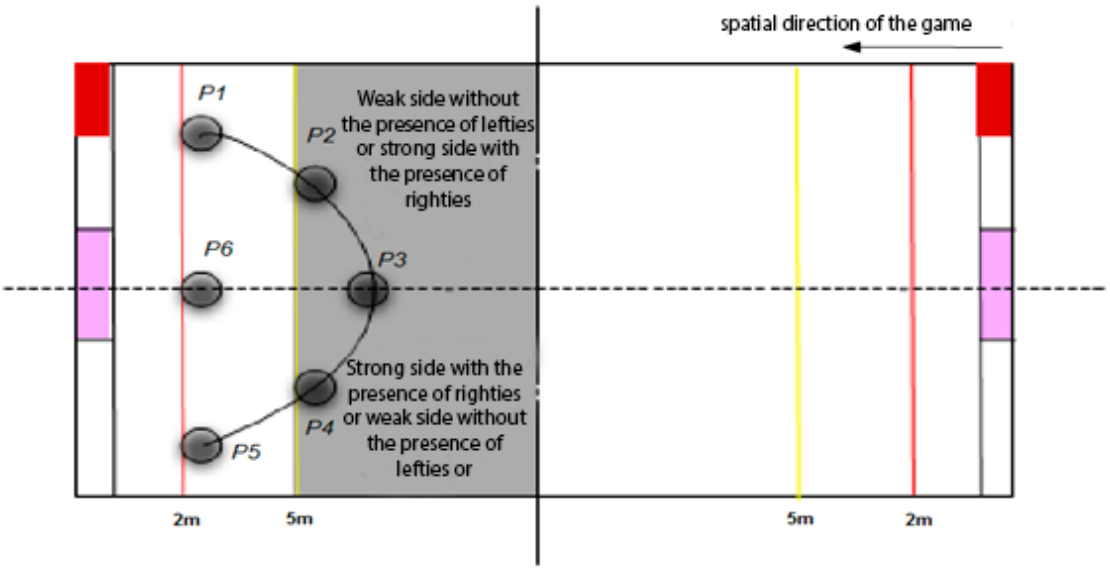
Following the determination of these criteria or variables, the categories that precisely describe the ranges of conduct that characterize the behavior of the criterion are defined. To carry out this process, the statement by Anguera and Hernández (2017) was taken into account that the extraordinary diversity of situations that can be systematically observed in the field of evaluation forces us to dispense with standard instruments and, on the contrary, dedicate the necessary time to prepare it Ad-hoc in each of the cases, to culminate the adjustment in the conditional/context dimension of the criteria, depending on the investigative interests and the information that was necessary to collect.

The contents of the declared dimensions are extracted from the study by Sabio (2015) when he investigates the finishes in positions 1 and 2 of Water Polo in the Barcelona Swimming World Championships in 2013. This author defines the following as contents: in the Conditional/Context dimension three variables are distinguished: team (EQ), player (J) and final result (RF).

In the Attitudinal/Action dimension of the game, it assumes five variables: side from which the pass is received (LRP), position from which the throw is made (PL), reception, side of origin of the pass (LPP) and laterality of the player. (LJ). In the Resolutive/Completion dimension there is only one variable: Completion Efficiency (EF).

In the study carried out by Sabio (2015), the zones and positions of each athlete within the game are also clarified from a tactical-strategic space perspective and it characterizes each of these zones and identifies their motor behavior.

Graph 1. Delimitation of the tactical-strategic motor space based on the possible motor actions Offensive arc (Sabio, 2015).



On the basis of the previous graph, the elaborated instrument that works as a guideline and allows to develop the study is presented. The instrument simulates a Water Polo pitch to scale. It is 28 cm² and the field of play for the men's is 600m² since its official measurements are thirty meters long by twenty meters wide. (Figure 1)

Figure 1. Observation instrument for recording the finishing maneuvers under study (throwing at goal)

A			B		
	6			6	
5		1	5		1
4		2	4		2

	3			3	
C					

Description of the observation instrument for recording the finishing maneuvers under study (shot on goal)

It is divided into three zones. To delimit the areas, the current official land markings were used, as well as a mark that has ceased to be used in official games, since it does not influence the development of the game, but to delimit the land in this investigation it is of great help and the authors they refer to it as the imaginary line of seven meters. The zones have been named A, B and C. Generically, these zones that have been delimited show the transitions that occur in the matches. For example:

- Zone A will be the portion of the field where the goal that the team with white caps must defend is located and where the players with blue caps will carry out the attacking maneuvers.
- So zone B identifies the zone where the blue hats will defend and the players with white hats will attack.
- Managing within this convention assumed in the registration instrument zone C as transition from offensive to defensive and vice versa.
- These areas are taken only as a reference for researchers.

The marks used to delimit the zones were:

ZONE A – From the line where the goal that delimits the bottom of the field is located, to the imaginary line as the imaginary line (old) of seven meters. As this is a zone of attack and defense, since when one team meets the attack the other must necessarily meet the defense, zone A is equal to zone B in terms of dimensions. This area measures seven meters long by twenty meters wide, with an area of one hundred and forty square meters. In turn, this area is divided into six quadrants, which will only be used to know the specific place in the area where the actions are carried out, so the numbering only makes sense for

the orientation of the observer. The measurements of the quadrants logically depend on the measurements of the area.

Zone B will not be described because, as previously stated, it is the same as zone A.

ZONE C – It is delimited from the imaginary line of seven meters of zone A, up to the imaginary line of seven meters of zone B with twenty meters wide and sixteen long in the case of male players, with an area of three hundred and twenty square meters, is where the transition from defensive to offensive and vice versa is usually made.

This zone will not be the object of analysis, since only the data whose completion comes from the actions of the players in the gaming systems will be observed and quantified, which implicitly implies the agreed positions for zones A and B of the instrument.

The record of the shots consisted of marking, in the area corresponding to each zone, the shots that were made, the laterality of the players, the zone from which the pass that is received and thrown is made, as well as its final result (if they ended up being scored or failed).

To this end, several preparation actions were carried out, which are summarized in a workshop with the potential observers. The workshop was aimed at preparing the observers and developing their skills for collecting information with the use of the created instrument; The initial approach on the number of sessions belonging to the training conceived in relation to the model described by Medina and Delgado (1999) is shown, and the criteria of Valero, Hernández, Pérez and Gutiérrez (2018) are evaluated.

The relevance of the role of the observers in the investigation was explained to them, doubts were clarified and the desired skill was deepened. 3 training sessions are conceived for the specialists with the aim of collegiating among them similar behaviors in the moments of observing, codifying and recording the incidents.

The preparation actions conceived are carried out by the researcher and Water Polo coaches from the Provincial EIDE “Héctor Ruiz Pérez de Villa Clara” are selected as potential observers. The fact of selecting specialists of the chosen sport as potential observers implies a reduction of the sessions destined to their preparation to develop the task assigned to them within the logic used in the investigation.

During these work sessions, the consensual concordance is first calculated, that is, an agreement was reached between the observers before recording, which made it possible to discuss to which category or field format code each action was assigned. This made the registration instrument stronger and better defined.

Regarding the strategy that was followed to find the concordance, it should be noted that a reference observer was used. The data obtained by each observer were compared at all times with those of the reference observer. This reference observer was a Water Polo coach trained in observational methodology and prepared through prior training, which led to the reliability of his data being assumed.

In addition, the interobserver reliability was also calculated by comparing the pooled data from the group of observers with the data from the reference observer. In this way, it was possible to verify at the same time, the individual and group differences in the record of behaviors between the participants in the training and the reference observer.

Analysis and discussion of results

The realization of the workshop with the specialists and the materialization of the training sessions, allowed the training of the observers when manipulating, through the implicit tasks, the created observation instrument. The values obtained in the consensual concordance (see table 1) reaffirm that the instrument is reliable to consummate the objective for which it is intended.

It is an investigative resource that allows criteria to be combined with respect to the instrument to be used before the registry is developed, while at the same time consolidating its reliability and objectivity, demonstrating that, using this instrument conceived from the intentions to be achieved by the researcher and of its exhaustive conditions, it is possible to gather the required information from the record made.

Consensus agreement (by nature qualitative) is a variant used as a measure indicating the degree to which two or more observers agree with each other. The values obtained allow inferring the existence of a reliable instrument when used by specialists trained for this purpose.

At the end of the training sessions, it was necessary to apply intra-observer reliability to keep observers who were really trained to fulfill their purpose with quality. This analysis is interesting because it allows access to very useful interpretations in practice, since the individual and group differences in the behavior record between the participants in the training and the reference observer are investigated in two directions.

TABLE 1. RESULTS OBTAINED IN INTEROBSERVER RELIABILITY

Specialist	value obtained in the calculation of the consultated concordance/inter-observer reliability	default value
1	83%	equal to or greater than 80
2	88%	equal to or greater than 80
3	81%	equal to or greater than 80
4	92%	equal to or greater than 80
5	97%	equal to or greater than 80
6	89%	equal to or greater than 80
7	91%	equal to or greater than 80
group interobserver reliability	**86.42%**	equal to or greater than 80

In this sense, the criterion that was chosen to ensure the subsequent reliability of the data corresponded to 86.42% agreement with respect to the reference observer, that is, those

observers who, at the end of the training process, passed to the final observation of the matches, achieved 80% or greater agreement with respect to the reference observer when comparing the pooled data from the group of observers with the data from the reference observer. The values obtained allowed the inclusion of seven (7) trained specialists in the study.

Once the observation and registration of each of the matches observed in the National Youth Championship was carried out, a wealth of information was collected, which was necessary to organize and process to carry out an accurate analysis.

The table below shows the pairings, the final scores, the goal difference during the matchup, as well as the number of periods or partials.

Table. 2 Summary of the fixed criteria used in the study

match,	marker	goal difference		game periods
VC-PR	9 a 1	8	10	2
	3 a 1	2		
VC-HAB	5 a 1	4	10	3
	8 a 4	4		
	3 a 1	2		
VC-CMG	3 a 2	1	8	4
	3 a 1	2		
	5 a 2	3		
	3 a 1	2		
VC-MTZ	4 a 3	1	4	4
	4 a 3	1		
	3 a 1	2		
	2 a 2	0		
VC-GRM	2 a 4	2	3	4
	4 a 1	3		
	2 a 1	1		
	3 a 2	1		
	1 a 1	0		

VC= Villa Clara. PR = Pinar del Rio. HAB= La Habana. CMG= Camagüey. MTZ=

Matanzas. GRM= Granma. CF= Cienfuegos

About shots scored

290 attack phases were developed in the studied matches. That is to say, that during the six games the teams in a sports duel had possession of the ball and therefore the possibility of attacking the opposing goal on 290 occasions. Of the 290 times that the teams had possession of the ball and were attacking the opposite goal, they were able to culminate and complete the completion with a shot 259 times. 259 shots were taken on goal. The percentage of shots made with respect to possession of the ball is 90%, while the effectiveness achieved through the coefficient of possibility of shots in attack phases was 0.90.

It might seem like a high percentage if these completion values are compared with the frequency of attack phases, however this aspect is given by the characteristics of the confrontations studied and the classification of the duels carried out. Of those 259 shots made on goal, only 106 culminated in goals. The percentage reached was 40.9%.

Of the 106 shots that culminated in goals, 67 were scored in the chosen situational setting. The rest were scored from other situational frameworks such as: transitional, numerical inequality (which causes situations of superiority and inferiority in the game pool) and penalty. 63.2% of the goals scored in the matches come from this situational framework. The Coefficient of 1 and 2 which yields 29.9%.

These data obtained coincide with the studies carried out by Sabio (2015) when he referred that these positions formed the areas from which more goals were scored, taking into account that most of the actions allow these players with a right-handed laterality, to receive the assisted ball. from its strong sides.

This author also described that the positions with the least chance of scoring are precisely positions 1 and 2 for the opposite reason to that stated, that is, the players occupying that zone when they are right-handed must always receive from their weak side, which causes contingencies. in their technical gestures limiting them to consummate their tactical projects.

It should be noted that of the 21 players who occupied these positions, only 5 were left-handed. The Coefficient of completion of shots from position 1 and 2 in the situational framework marked by numerical equality was only 0.29.

Of the 20 goals scored from positions 1 and 2, 15 of them were scored by left-handed players located in this area. The percentage of goals scored by left-handed players from

this area reaches 75%. The idea is ratified that when players whose right hand is left are located in this zone, then these players are located in a zone for them called strong, since, like right-handed players in positions 4 and 5, the trajectory of the ball on the pass they receive comes from their strong side.

About failed launches

Of the 153 shots that were missed, 91 were made in the chosen situational setting. The rest were ruled from other situational frameworks, the percentage reached was 59.4%. This behavior is logical since more shots are missed in a situation of numerical equality such as the one studied, where the skills of the players prevail in the role of attackers in search of possibilities to make the shot, than in situations of inequality where always there is a team with numerical superiority (offensive team) and another with numerical inferiority (defensive team) where the situation is almost always resolved through a tactical attack formation where the offensive team tries to assert its numerical superiority through the axiom defeat the goalkeeper with the system not with the arm.

There is another situational framework that favors the player to shoot, which is the penalty situation where the attacker shoots from four meters at a signal from the referee in context, where only the player to shoot and the goalkeeper intervene.

Positions 1 and 2 shot on goal 101 times, missing 66 shots. Of those 66 missed shots, 50 were from righties located in those positions and in that area of the field. In this area the right-handers fail more than the left-handers because the ball comes from their weak side.

It missed 66% of the time it was thrown from this area. However, lefties positioned in this zone averaged just 24.2% misses. Despite being an area with a high percentage of failures, the lefties who played in this area were effective.

Positions 3, 4, 5 and 6 launched 158 balls towards the goal. Of this number of shots, 71 were nested and 87 were missed. Although they miss more than those who score, the effectiveness shown was much higher than that shown by positions 1 and 2. (34.3% by 55%). It should be remembered that most of the goals scored from the area where positions 1 and 2 are located were scored by left-handed players.

The study developed allows us to infer from the figures discussed, that the Water Polo players during this championship prefer to play the ball through positions 3,4, 5 and 6, seeing through them the greatest chances of successfully shooting at the goal. This preference with respect to playing for some positions and areas is the product of conditions that occur in the game systems in numerical equality, which is that the players

located in these positions are regularly right-handed, so they are located in areas known as strong (they receive the ball on their strong side). The shortage of left-handed players in the sports world is not an exception for our sport.

Data was taken in the study that continued to ratify the effectiveness achieved in positions and zones. Regarding the reception achieved by the players to, in a continuous sequence, make the throw as a way of ending the action, the highest percentages of receptions made from the hand were attributed to the players located in positions 3, 4 and 5, while that the behavior of this category in the area where positions 1 and 2 belong was of greater recurrence from the water.

The foregoing may be caused by the difficulty of receiving from most players in these positions (they receive on their weak side), which sometimes forces them to take the ball into the water to resume their technical gesture as a way of readjusting the sequence or protection of the ball from the defensive work of the players in that role.

It is true that the fact that the attacking player often needs to take the ball into the water to resume the chain of movements or, in the best of cases, receive it in the hand and make a turn to cushion the speed of the mobile in its trajectory, It facilitates defensive work and also the movement of the goalkeeper in the goal, which allows a better position to stop the ball and thus avoid scoring. These are reasons that justify the percentages obtained by the players in these areas in terms of the effectiveness of the completion.

It should be noted that the behavior of this category with respect to the left-handed players located in positions 1 and 2 corresponded to that obtained by the right-handed players in positions 3, 4 and 5. A greater number of positive actions are achieved from zones 3 , 4 and 5 that are attributed to the position in which the movement is made and the players located in these zones remain after the movement.

Conclusions

- The use of the observational methodology and its references allowed the elaboration of a reliable observation instrument that allows characterizing the behavior of the shot on goal from zones 1 and 2.
- The zones that are formed in the game systems based on the roles and positions that the players occupy within this organization of a tactical nature are classified based on the laterality that the athletes that structure them present.
- The functionality achieved by each of these zones shows that different combinations could be formed: two strong zones, and one strong and one weak. Zones are strong if the

players that make them up are capable of receiving the ball from their strong side and reach the referential category of weak when one or both of their members receive the ball from their weak side.

- It is commendable to note that when there is at least one left-handed player in that studied area, the effectiveness in the behavior of the completion improves, although for the analyzes carried out it remains classified as a weak area.
- The preference of the teams in carrying out actions and finishing maneuvers refer to a distinction for positions 3, 4 and 5.

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