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*Translated from the original in Spanish*

*Original article*

## *Theoretical conception to favor the transfer of the speed of technical movements in the hammer throw*

*Concepción teórica para favorecer la transferencia de la rapidez de movimientos técnicos en el lanzamiento del martillo*

*Conceito teórico para promover a transferência da velocidade do movimento técnico no lançamento do martelo*

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### **ABSTRACT**

The present article was carried out from the detection of theoretical-methodological and practical insufficiencies in the process of technical preparation of the school category hammer thrower; For this reason, it was proposed as a general objective to develop a theoretical conception to favor training in the transfer of the speed of technical movements of the turns to the final moment of the hammer throw, in school category athletes of the Eide "Pedro Batista Fonseca" of Granma province. To achieve the aforementioned objective, scientific research methods such as theoretical, analysis and synthesis, hypothetical-deductive and structural-functional systemic were used; within the empirical, the analysis of documents, observation and measurement and as a mathematical-statistical method descriptive statistics, in addition, the interview was used as a research technique. The proposal allowed the systematization of those elements directly related to the transfer in sport and the training process of the hammer thrower; In this way, with its application, the technical improvement of the athletes involved in the research was foreseen, as well as an increase in their performance and sports results.



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**Keywords:** Theoretical conception, hammer throwing, speed of technical movements, transfer.

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### RESUMEN

El presente artículo se realizó a partir de detectar insuficiencias teórico-metodológicas y prácticas en el proceso de preparación técnica del lanzador de martillo categoría escolar; por tal razón, se propuso como objetivo general elaborar una concepción teórica para favorecer el entrenamiento en la transferencia de la rapidez de movimientos técnicos de los giros al instante final del lanzamiento del martillo, en atletas categoría escolar de la Eide "Pedro Batista Fonseca" de la provincia de Granma. Para el logro del objetivo antes expuesto se emplearon métodos de la investigación científica como los teóricos, el análisis y síntesis, el hipotético-deductivo y el sistémico estructural funcional; dentro de los empíricos, el análisis de documentos, la observación y la medición y como método matemático-estadístico la estadística descriptiva, además, se utilizó como técnica de investigación la entrevista. La propuesta permitió la sistematización de aquellos elementos relacionados directamente con la transferencia en el deporte y el proceso de entrenamiento del lanzador de martillo; de tal manera se previó, con su aplicación, el perfeccionamiento técnico de los atletas implicados en la investigación, así como un incremento en su rendimiento y resultados deportivos.

**Palabras clave:** Concepción teórica, lanzamiento del martillo, rapidez de movimientos técnicos, transferencia.

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### RESUMO

O presente artigo foi realizado a partir da detecção de insuficiências teórico-metodológicas e práticas no processo de preparação técnica do arremessador de martelos da categoria escola; por esta razão, foi proposto como objetivo geral elaborar uma concepção teórica para favorecer o treinamento na transferência da velocidade dos movimentos técnicos das voltas para o instante final do arremesso do martelo, na categoria escola atletas do Eide "Pedro Batista Fonseca" da província de Granma. Para alcançar o objetivo acima mencionado, foram utilizados métodos de pesquisa científica, tais como métodos teóricos, de análise e síntese, hipotéticos-dedutivos e estruturais-funcionais sistêmicos; dentro dos métodos empíricos, análise de documentos, observação e medição, e estatística descritiva como método matemático-estatístico; além disso, a entrevista foi utilizada como técnica de pesquisa. A proposta permitiu a sistematização daqueles elementos diretamente relacionados com a transferência no esporte e o processo de treinamento do martelo lançador; de tal forma que, com sua aplicação, foi previsto o aperfeiçoamento técnico dos atletas envolvidos na pesquisa, bem como um aumento de seu desempenho e resultados esportivos.

**Palavras-chave:** Conceção teórica, lançamento do martelo, velocidade dos movimentos técnicos, transferência.

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### INTRODUCTION

For many researchers, the transference is a term little used in the throwing of the hammer, however, since the origins of this athletic test, the technique of the act of throwing has been implicit. The above, is corroborated to a large extent with the creation and evolution of the



different schools of hammer throwing up to the present, always looking to increase the length of the shipments based on the improvement of said technique.

Not all coaches and researchers grant the transfer of the speed of technical movements of turns, at the final moment of the hammer throw, the required importance; since pitchers can be very fast running short distances, which does not mean that it happens in the same way in the act of throwing, an issue that affects performance and sports results.

Several authors like Vallodoro (2009), Bondarchuk (2013) and Aliaga (2018) have exposed in their research concepts related to transfer and its use in the theory and methodology of sports training. Villanueva, Sánchez, Junquera and Bordón authors of the Comprehensive Preparation Program for the Cuban Athlete PPID (2013) state that there is a tendency to comply in each session of technical launches, with "(...) two purposes: one. Transfer to the complete movement the actions of the movement in parts. Two. Avoid losing fluidity or continuity in the act of launching" (p. 67). However, they do not expose the methods and tests to determine these objectives in the act of launching and it is prudent to mention that these theoretical inconsistencies are not dealt with in the PPID Comprehensive Athlete Preparation Program (2017-2020).

In this sense, Guerra (2014) makes a proposal for a set of coordination exercises, aimed at improving the technical transfer from the first to the second spin, to achieve greater efficiency in the practice of hammer throwing. It is necessary to insist that an athlete can achieve that technical transfer and be slow in the act of launching, an issue that affects the length of the deliveries; For this reason, it is crucial to develop the speed of technical movements and their transfer in the hammer throw.

Bermejo (2014) provides a biomechanical description of the hammer throw (pp. 124-130) in which he explains the incidence of transfer of angular momentum and the use of the transfer of impulses of the muscular kinetic chain. Later on, Calá, Lanz, Vila, and Ramos (2017) expose parameters in the technical preparation of the hammer hammers of the Cuban national team, to achieve greater speed, coordination, and technical transfer (pp. 20-23); It is considered that this research is convenient, but its use in the lower categories requires a methodological adaptation and definition of the training load to facilitate this technical transfer in the execution of the hammer throw.

From another perspective, Aliaga (2018) exposes special exercises for the transfer of speed in the technical movements of the turns to the final moment of the hammer throw (pp. 262-272); Despite this, it is necessary to specify in a logical order the integration and development of the training directions for each of the preparation stages that allows the transfer to the act of launching. In this same context, Estrada (2020) makes a diagnosis of the current situation that presents the transfer of speed of technical execution in the hammer throw in athletes category 13-14 years of the province of Granma (pp. 708-717).

The authors Villa, Sterling, Moreno, Osorio and Romero of the Comprehensive Athletics Athlete Preparation Program (2020) declare in the a lactic anaerobic direction and speed development that the exercises provided by this program do not transfer directly to the act of throwing the hammer, so the special speed is developed by the throwing act itself (p. 18).



However, this limitation could be solved by a phased treatment of transfers to the act of throwing the hammer.

Finally, García (2020) specifies what in the pedagogy of sports training, there are questions that have not yet been fully resolved, such as, for example, which exercises are most effective in transferring their development to the mechanical performance model in competition? (pp. 15-17).

The extraordinary value of the contributions made to science by the authors cited in the preceding paragraphs is unquestionable; However, there is no clear solution to the training in the transfer of the speed of technical movements of the turns to the final moment of the hammer throw, the methodological treatment is insufficient and an integrated treatment that improves the above mentioned is not perceived either. These elements demonstrate the need for a theoretical systematization of transfer in sport.

It is necessary to highlight that the athletes of the EIDE *Pedro Batista Fonseca* Comprehensive School of School Sports in the province of Granma who practice hammer throwing are not exempt from the aforementioned; For this reason, it has been possible to verify some problems in training, an issue that affects performance and sports results.

The present investigation had as general objective: to elaborate a theoretical conception to favor the training in the transfer of the speed of technical movements of the turns, at the final moment of the hammer throw, in school category athletes of the EIDE *Pedro Batista Fonseca* of the province from Granma.

## MATERIALS AND METHODS

The research was carried out from 2013 to 2018, with a population of five athletes from the Eide Pedro Batista Fonseca Integral School of School Sports in the province of Granma, belonging to the school category 13-14 years old, all male, with an average height of 175, 5 cm and a body weight of 64, 8 kg, they have three years with six months of sports experience; in addition, six coaches who worked in the area of athletics throwing of the aforementioned institution with good sports results participate.

Theoretical level methods were applied, among them the analysis and synthesis allowed the study of the particularities of the technical preparation and training in the transfer of the speed of technical movements from the turns to the final instant of the hammer throw and to reveal relationships and general characteristics between the above-mentioned elements present in the research. The hypothetical-deductive, was used with the purpose of reaching the answers that gave solution to the existing limitations of the training in the transfer of the speed of technical movements of the hammer thrower, through the hypothesis statement and the logical application of the deduction that allowed its corroboration and the systemic-structural-functional was directed to model the theoretical conception, from the determination of its components, as well as the relationships between them that determine on the one hand, the structure and hierarchy of each component and on the other, its dynamics and its operation.



At the empirical level, the following:

Observation, was used to verify the limitations that affect the training of the hammer thrower school category during the research stage, with the dimension transfer of the speed of technical movements that had the following indicators:

- Application of means that allow the simultaneous development of physical preparation with respect to technical preparation and vice versa.
- Mastery of the execution of the technical phases of the hammer throw.
- Variety of exercises planned in the main part of the training unit.
- Integration of the directions of sports training to achieve the transfer of the speed of technical movements in the hammer throw.

The analysis of documents, was specified in the analysis of documents established in athletics, specialized bibliography, as well as existing guidelines of the national commission of athletics to verify the treatment to the transfer of the speed of technical movements of the hammer throw in athletes category 13-14 years and referred the following indicators:

- Presence of treatments to the training in the transfer of the speed of technical movements in the hammer throw.
- Methodological treatment to favor training in the transfer of the speed of technical movements in the hammer throw.
- Presentation of procedures to favor the training in the transference of the speed of technical movements in the hammer throw.

The measurement allowed quantifying the results obtained in the test to determine the transference of the speed of technical movements from the turns to the final instant of the hammer throw, applied to the athletes who practice this sport modality in the EIDE "Pedro Batista Fonseca" of the province of Granma. The indicators for this test are shown below (Table 1), (Table 2), (Table 3) and (Table 4).

**Table 1.** - Time of the technical execution of the hammer throw

Tiempo	Evaluación cualitativa	Evaluación cuantitativa
Menor 2,00 sg	Excelente	5
2,00-2,20 sg	Muy Bien	4
2,20-2,30 sg	Bien	3
2,30-2,35 sg	Regular	2
2,35-2,40 sg	Mal	1





**Table 2.** - *Technical execution of the hammer throw*

Elementos técnicos	Evaluación Cuantitativa	Evaluación cualitativa
Cuando ejecuta los giros sin que aparezcan faltas que alteren el sentido general de la estructura del movimiento	5 puntos	Excelente
Cuando realice la ejecución técnica de los giros, pero al menos comete un error y no interfieren en la estructura del movimiento	4 puntos	Muy Bien
Cuando realice la ejecución técnica de los giros, pero comete dos errores técnicos sin interferir en la estructura del movimiento	3 puntos	Bien
Cuando aparecen faltas esenciales, pero conserva la estructura de la ejecución técnica de los giros	2 puntos	Regular
Cuando el atleta no realiza la técnica	Sin puntuación	Mal

**Table 3.** - *Linear path through the center of the launch circle*

Apoyos	Evaluación cualitativa	Evaluación cuantitativa
6	Excelente	5
5	Muy Bien	4
4	Bien	3
3	Regular	2
2	Mal	1

**Table 4.** - *Initial angle of departure of the implement*

Ángulo de salida	Evaluación cualitativa	Evaluación cuantitativa
41-44	Excelente	5
38-41	Muy Bien	4
35-38	Bien	3
30-35	Regular	2
Menos de 30	Mal	1



The interview technique was carried out to verify the level of knowledge that the coaches have about transference in sport and its applicability in the practice of hammer throwing. The indicators of the interview were:

- Knowledge of tests to determine the transfer of the speed of technical movements in the throw of the hammer.
- Treatment of the bibliography of sports training to transfer in sport.
- The importance of transferring the speed of technical movements in the hammer throw.
- Methodological treatment to favor the transfer of the speed of technical movements in the hammer throw.
- Knowledge of the relationship that must exist between the technical phases and their transfer in the act of throwing the hammer.

From the mathematical-statistical level, we used descriptive statistics to establish the arithmetic mean, the maximum and minimum value and the percentage calculation to analyze and interpret the results obtained.

## ***RESULTS AND DISCUSSION***

The observation was made to a total of 45 hammer throwing training sessions in the investigative stage where the following were found as fundamental aspects:

- Isolated treatment of physical preparation with respect to technical preparation and vice versa.
- Lack of coordination on the part of the athletes in the execution of some technical movements, mainly in exercises that include turns and the final effort.
- Little variety of exercises planned in the conditioning and determinant directions of performance, which involve the complete technique or part of it of the hammer throw.
- An integrated treatment to train the transfer of speed of technical movements in the act of hammer throwing was not appreciated.

Document analysis revealed that in The PPID (2013), the PIPD (2017-2020) and the PPID (2020) do not show a clear way of how to train the hammer throw with the proper transfer and speed of technical movements, since the exercises provided by these programs They were only directed at the development of physical condition and not at the transfer of the hammer throw where special quickness is developed by the act of throwing itself.





Another interesting aspect was the little variety of methods for the treatment of the technique in the 1314-year-old category, in the aforementioned programs, since only the repetition and synthetic methods were exposed and, in the opinion of the authors of the present work, to the extent that the athletes were getting closer to the fundamental competence, there must have been a variety of methods that allowed said improvement.

A procedure was found in the PPID (2013) to work on the speed of the act of launching, which consisted of launching with controlled time and working on reducing it; however, it was considered advisable to work this anaerobic direction by percentages in each stage of preparation of the hammer thrower category 13-14 years.

The measurement was used to evaluate the transfer of the speed of technical movements of the turns to the final instant of the launch; it was executed, according to the IAAF Competition Rules (2018-2019) for the hammer throw (pp. 186-194).

For the time of the technical execution of the hammer throw, an average of 2, 29 were carried out if to grant an evaluation of good; however, difficulties were observed in the speed of the execution of the technical movements from one turn to the next and from the last one, to the final moment, as well as a shortening of the distances that should have existed between the turns, which contrasted with the time reached average.

In the technical execution of the hammer throw, in general, 2.6 points were reached and it was evaluated as regular. The main errors were the little flexion of the left leg, which was practically at the same height as the right leg at the start of the turn, the head was not kept straight, the little inclination of the trunk backwards in the support of the turns; In addition, there was a lack of coordination of the technical movements between the last turn and the final moment. The pull to release the implement was made below the hip, as well as the arms in the release were not extended and some throws were fouls.

In the linear route through the center of the hammer throw circle, a marked deviation to the left side between one turn and the other was perceived, as well as little distance between the double supports of the first turn with respect to the second and from this to the third, which expressed little utilization of the launch area for the boost. In addition to these aspects, only 2, 2 supports were placed correctly on average, for a bad evaluation.

initial angle of departure of the hammer was marked by launches with a low departure angle, of 25.2 degrees on average for a bad evaluation, which had a negative impact on the length of the shots.

The interview revealed that:

- The 100 of the interviewees do not know of a specific test to determine the transfer of the speed of technical movements in throwing.
- The 100 % of the coaches affirmed that the specialized bibliography approached the subject of transfer in sport with a very general character and when articles were consulted on the internet, they did not explain how this process is carried out.



The importance of the transfer of the speed of technical movements in the hammer throw was considered in the orientation of the technical execution in the shortest possible time so that it could be transferred to the implement at the final moment of the sending. In these criteria 83.3 % of the coaches agreed.

For them it was not clear from the methodological point of view which methods of sports training could give a solution to the training in the transfer of the speed of technical movements from the turns to the final instant of the hammer throw, means and load for this purpose.

Finally, 100 % of the interviewees did not relate, in the training, the technical execution of the hammer throw, the rapidity of technical movements and how this is transferred from the turns to the final instant, without taking into account the linear path within the throwing area and based on the placement of the supports of the turns and the optimization of the exit angle.

The theoretical, methodological and practical limitations analyzed previously, were demonstrated in the knowledge for the training in the transfer of the speed of technical movements from the turns to the final instant of the hammer throw; elements that propitiated the need to elaborate a conception that contributes to the solution of the problems presented by the athletes in the practice of this sport modality.

For such reason, a theoretical conception aimed at solving the limitations detected was proposed; to correspond to this proposal, the work of Capote (2012) was taken as a reference, which presented a format to elaborate a theoretical conception as a scientific result (p. 5); likewise, the premises for the use of conceptions in scientific research were presented by (Breijo, 2019, pp. 1-3).

Format.

I. Objective: it was indicated what is intended to be achieved with its elaboration, that is, how the object was transformed after its practical implementation.

II. Justification: the essential elements of the theory or theories that served as the basis and foundation were included and that it was intended to enrich, based on the limitations detected, both theoretically and empirically. Of course, it became opportune to point out these insufficiencies.

III. Structural components of the conception: the system of scientific ideas was raised, as well as the concepts (definitions, categories), judgments (principles, laws, requirements, among others), and other elements that formed it. The interrelationships, qualities and level of hierarchy between them were revealed and the system character of the set of scientific ideas was justified.

IV. Graphic representation: the relationships between its components were illustrated, by means of a graph or diagram, in such a way that the existence of a true system of ideas was justified.

V. Objectification of the conception: the general considerations necessary for the conception to be implemented in practice were established. In addition, some concrete forms of



materialization were suggested, such as: a methodology, a strategy, a system, among others. None of them was made explicit because that was left for the practical result.

*Theoretical conception to favor training in the transfer of the speed of technical movements of the turns to the final instant of the hammer throw*

The conception that was presented consisted of a set of ideas to favor training in the transfer of the speed of technical movements of the turns to the final instant of the hammer throw that were systematized around the Theory and Methodology of Sports Training (TMED), while they constituted the theoretical body on which their praxis was based (Figure 1).

In this way, within a functional and operational context in the training macrocycle, it was explained how the relationships between the theoretical and the methodological were established, which was abstracted from the disciplinary nucleus of the conception in the form of concepts, laws, principles, methods and means, unavoidable aspects when explaining, in an ideal way, the training for the transfer of the speed of technical movements; this represented the improvement of school athletes, for which said clarification became their livelihood. The conception was manifested in a context that ratified the application in the process of technical preparation of a macrostructure of double periodization of the school category hammer thrower.

Its main objective was to favor training in the transfer of the speed of technical movements of the turns to the final moment of the hammer throw, in athletes of the school category, of the Eide *Pedro Batista Fonseca* from the province of Granma.

It was characterized by the use of transfer phases, methods, means and procedures for its determination, where the technical preparation is one more component of the athlete's preparation that is closely linked to all the development of the technical actions of the launch, particularly with the technical phases that compose them such as grip, bowling, turns, and unloading.

There was a theoretical-methodological core of the conception that is TMED as a scientific discipline. It began with this discipline as a theoretical node that served as a link to the relationships that were established between the theoretical and methodological elements that made up this conception and presented a systemic, integrating, particularized, and simultaneous character. These elements particularized and allowed the systematization of those aspects more directly related to the transfer of the speed of technical movements in the act of throwing and its training process.

*Theoretical component of the conception: concepts, laws and principles*

Taking into account the limitations from the theory and the need to clarify it, the transfer of the speed of technical movements was preliminarily exposed as the way to perform the technique correctly, without deforming the structure of the selected sport modality at a high level of speed; which was transferred from the turns to the final instant of the throw, with the objective of increasing the initial speed of exit of the implement.



This component did not fail to mention the law of bio-adaptation of sports training (Selye, 1936, p.1), the principle of transfer (Alvarez, 1993, cited in Collazo and Betancourt, 2006), as well as the principle of systematization (Harre, 1973, cited in Collazo and Betancourt, 2006); in addition, the principle of accessibility (Klingberg, 1972, p. 255) and its didactic rules were included, among which were the transition from the simple to the complex, from the near to the distant, from the known to the unknown, from the easy to the difficult, and from the concrete to the abstract.

### *Methodological component of conception*

The methods used to transfer the speed of the technical movements of the turns to the final instant of the hammer throw were those applied in the TMED. They were the analytical-associative-synthetic, synthetic, standard repetition, variables, combined, and competencies, among others.

The means used for this purpose were those exercises that were found within the classification of technical throws, special throws, general throws, as well as multilateral training, but these in their execution, resembled technical movements that integrated turns and instant. final of the hammer throw; for this reason, they were trained within the Performance Conditioning Directions (DCR) and Performance Determining Directions (DDR).

Phases in the transfer of the speed of technical movements of the hammer throw.

First moment: in a logical order and with a marked interest, he trained in a transfer phase from the physical to the technical that coincided with the general preparation stage, of the double periodization macrostructure of the aforementioned modality, for having two fundamental competitions: the first, qualifying zone competition and the second, national school games.

This phase had the objective of executing the physical means, based on the acquisition of the hammer throwing technique. In this way, they trained with those directions that conditioned the athlete from the physical point of view, with a direct incidence on the technique in which the (DCR) and (DDR) were present, it was also necessary to highlight that, in the training of the DCR, in this phase, were above the DDR, in terms of load parameters and training frequency.

In the alactic anaerobic direction (development of the speed of technical movements in the act of launching, between 60 and 79 % of their real time was worked).

In a second moment, he trained in a transfer phase from the coordinative to the technical that coincided with the special preparation stage. The objective of this phase was to coordinate the technical movements that make up the turns and the final moment acquired so far, based on an improvement in the technique of throwing the hammer.



Aspect in which the DCR and the DDR were trained, with a marked interest in the coordinative movements in each of the exercises that contained the technique of the modality under study, it was also necessary to highlight that, in the training of the DCR, in this phase were above the DDR, in terms of load parameters and frequency of training, as a fundamental characteristic of this phase, bilaterality was worked on in each of the physical exercises.

In the alactic anaerobic direction (development of the speed of technical movements in the act of launching, you work between 80 and 89% of your real time).

Finally, they trained in a phase of transfer from the technical to the competitive performance that coincided with the competitive stage. The objective of this phase was to achieve the main results in the competitive stage, based on the benefits of the technique acquired so far, in order to achieve the greatest possible length in the hammer shipments. In such a way that the training was directed towards the DDR, above the DCR, in terms of load parameters and training frequency.

In the alactic anaerobic direction (development of the speed of technical movements in the act of launching), they worked between 90 and 100 % of their real time.

In addition, the authors of the present work considered that, in each of these aforementioned phases, as well as in the physical exercises to be applied in the training unit for the transfer of the speed of technical movements, a close relationship between the following aspects:

- Technique: correct execution of the number of technical movements that make up the turns, the final moment and its optimal starting angle.
- Displacement: correct placement of the supports in which there is no deviation to the left or right of the turns and maximum use of the linear path in the launching circle.
- Execution time of the technical phases of the hammer throw: perform the number of technical movements that make up the technical phases in the shortest possible time.

Therefore, when the athlete was able to relate these three mentioned aspects, in an indissoluble way, the transfer of the speed of technical movements was present.

### *Conception character*

Systemic, because components of the preparation of the athlete were interrelated with their main training directions that, when related to each other, each element is related to the other and a common objective directed towards a specific purpose, in such a way that it allowed its effective and it made it possible for each technical movement, in a logical order, to transfer the speed of technical movements in the hammer throw.

Integrative, because it integrated the contents that made possible the process of technical preparation of the hammer thrower, since, from the application of physical exercises that involved the complete technique or part of it, they allowed the development of the physical condition on the technical basis and the individual characteristics of the athletes selected for





this research were taken into account, this provided better levels of specialization of the hammer thrower.

Particularized, because it allowed solving details of the technical execution of the turns and the final moment of the hammer throw that affected its overall structure and, consequently, the performance and sporting result.

Simultaneous, because it simultaneously integrated the development of physical condition and sports technique, in such a way that it facilitated the improvement of the transfer of the speed of technical movements of the hammer throw.

In addition, this theoretical conception manifested as properties being contextualized, ordered and flexible.

Theoretical conception for the transfer of the speed of technical movements in the hammer throw (Figure 1). It was considered pertinent to mention that this version was put into practice using a methodology set forth in (A li a ga, 2019, pp. 106 -115).



*Fig. 1. - Theoretical conception for the transfer of the speed of technical movements in the hammer throw*

**Legend:** SGA. General Adaptation Syndrome. RCD. Performance Conditioning Direction. DDR. Determining Direction of Performance

## CONCLUSIONS

Finally, this work deserved a great importance since it favored the training in the transfer of the speed of technical movements of the turns to the final moment within the process of technical preparation of the school category hammer thrower, in which relations between the different phases emerged. of training transfers, which led to a transformative praxis in the subjects involved in this project.





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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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