PODIUM
REVISTA DE CIENCIA Y TECNOLOGÍA EN LA CULTURA FÍSICA
ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

Translated from the original in spanish

The interconnection of the loads in the planning of the training, in the sport of boxing

La interconexión de las cargas en la planificación del entrenamiento, en el deporte de boxeo

Lázaro Alberto Pastor Chirino,[1] Lázaro de la Paz Arencibia,[2] María de Lourdes Rodríguez Pérez[3]

[1]Dirección Provincial de Deportes (INDER). Pinar del Río, Cuba. E-mail: lazarop@inder.cu
[2]Universidad de Ciencias de la Cultura Física y el Deporte. La Habana, Cuba.
[3]Centro de estudio del entrenamiento Deportivo en el Alto Rendimiento (CEEDAR). Universidad de Pinar del Río "Hermanos Saíz Montes de Oca". Facultad de Cultura Física "Nancy Uranga Romagoza". Pinar del Río, Cuba. E-mail: lourdes.rodriguez@upr.edu.cu

Received: March 31th, 2019.
Accepted: April 29th, 2019.

ABSTRACT

The present work is framed in the context of the alternatives related to the planning of the sport training, from the ATR models (accumulation-transformation-realization). In correspondence with the conceptions used today in training planning, the importance of the interconnection of the contents in the preparation of boxers is evident, from the conjugation of loads whose metabolic routes are fundamentally phosphagenic, alactic anaerobic and lactic anaerobic glycolithic. The objective of the research is to assess the situation of the training planning, based on the most current trends related to the interconnection of the loads and the ATR model in the preparation of the boxers of the Provincial Academy of Pinar del Río. For the study it was selected a sample, consisting on 13 athletes and 7 coaches from the Provincial Boxing Academy of Pinar del Río. Different methods and techniques such as the interview, the observation and the measurement were used. This study was carried outin correspondence with the most advanced conceptions regarding training planning. It reveals the importance of the interconnection of the contents in the preparation of the boxers from the combination of lactic anaerobic loads and lactic ones. However, the documents and guidelines of the National Boxing Commission still do not meet all the expectations of the pedagogical groups of trainers of the academy, which leaves a margin for interpretation by the Technical Commissions of the territories as regards alternatives, the planning of training and the definition of the directions and interconnection of these. It is necessary to find a mechanism that, at the didactic level, better orients the trainer in this sense.

Keywords: boxing; loads contents; training; interconnection; planning.

PODIUM
REVISTA DE CIENCIA Y TECNOLOGÍA EN LA CULTURA FÍSICA
ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

RESUMEN

El presente trabajo se enmarca en el contexto de las alternativas relacionadas con la planificación del entrenamiento deportivo, a partir de los modelos ATR (acumulación-transformación-realización). En correspondencia con las concepciones que hoy se utilizan en materia de planificación del entrenamiento, se evidencia la importancia de la interconexión de los contenidos en la preparación de los boxeadores, a partir de la conjugación de cargas cuyas rutas metabólicas son fundamentalmente la fosfagénica, anaerobia aláctica y la glicolitica, anaerobia láctica. El objetivo de la investigación radica en valorar el estado de la planificación del entrenamiento, en función de las tendencias más actuales, relacionadas con la interconexión de las cargas y el modelo ATR en la preparación de los boxeadores de la Academia Provincial de Pinar del Río. Para el estudio, se utilizó una muestra conformada por 13 atletas y 7 entrenadores de la Academia Provincial de boxeo de Pinar del Río. Se emplearon diferentes técnicas y métodos como la entrevista a entrenadores, la observación y la medición. No obstante, los documentos y orientaciones de la Comisión Nacional de boxeo aún no cubren todas las expectativas de los colectivos pedagógicos de entrenadores de la academia, lo que deja un margen a la interpretación, por parte de las Comisiones Técnicas de los territorios en cuanto a las alternativas, a la planificación del entrenamiento y la definición de las direcciones e interconexión de estas. Resulta necesario encontrar un mecanismo que, en el plano didáctico, oriente mejor al entrenador en este sentido.

Palabras clave: boxeo; contenidos de la carga; entrenamiento; interconexión; planificación.

INTRODUCTION

Sport, like other expression of man, has evolved with him and it is this evolution that makes training processes more rigorous, more specific and more diversified, based on specific needs, although this diversification can lead to confusion when deciding which model is the most suitable and which presents the best characteristics for a given context, since each model has its points for and against, as well as bringing good and bad results. Sierra, J. and others, (2018).

Competitive success in sport has its fundamental basis in terms of the complex process of preparation of athletes. One of the links in the process of directing sports training is planning, since, in consideration of it, it will be known what a coach is looking for with his athlete, what are the particular characteristics of the athlete, the sport in question, the place where he is going to train, among other factors to be taken into account, when starting a training. Padilla, J. (2017).

Various authors have defined the planning of sports training. For Ramírez, J. (2015), it is nothing more than the rational and logical distribution in time of all the components of preparation (physical, technical, tactical, psychic and integral), considering compatibility and applicability as unappealable principles and/or conditions that point towards the perspective and intimate interrelationship that should exist between the decisions taken and the objectives set, in relation to the available means and the desired technical-sporting results.

ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

In his text "Periodización y planificación del entrenamiento" Navarro, F. (2011) states that,

> "training planning "should integrate all aspects of preparation; including knowledge of the design of meso cycles, microcycles and sessions, as well as the systems of a season's design" (p. 17).

For Matveev, L. (1983) the planning of training is essentially a pedagogically organized process, with the aim of directing the evolution of the athlete and his sporting improvement.

The planning process requires the periodization of training in order for athletes to reach their maximum performance. Training periodization is the way in which training planning achieves its priority objectives. It systematically encompasses the organization of the complex process of the sports training loads and in common tuning with the planning units. Padilla, J. (2017).

In order to correctly improve the process of a sports training, it is necessary to be able to appreciate the modifications of the functional state that it determines. The control of the training process is a determining factor, along with other factors that intervene in this process, such as: planning, organization, preparation contents, training and competition loads, methodology, socio-political and environmental conditions, among others. Videaux, J. (2018).

The improvement of the planning models, the periodization and the search for methodological alternatives that guide the sportsman-coach binomial, in the achievement of the best competitive result, have always been current topics in high performance sport and every day the interest to discover new competitive prowess in sportsmen and women is multiplied. Diaz, P. (2015)

The history of the periodization of sports training is as old as humanity. Thus it has that the periodization of training was used by the Romans and the Chinese for military preparation. The Greeks, on the other hand, were the first to initiate the periodization directed to the sport training, with concrete objectives in the framework of the ancient Olympic Games.

From the above, it is noted that the first steps in the periodization of sports training originated in the Greeks and that they used the previous preparation for the Olympic Games for several months and used the so-called "tetras" for the short term. Padilla, J. (2017).

In this regard, Bompa and Haff (2012) stress that in order to acquire the necessary adaptations in competencies and achieve competitive results, it is necessary to structure training planning in periods and stages (periodizing).

According to existing literature, it is possible to characterize the historical evolution of sports training and its planning in three stages: The first, from the origin of training until the beginning of the 1950s, where training procedures are centered on individual experiences and the first attempts at systematization occur; the second, from the 1950s to the 1970s, where the development of scientifically based training systems and the affirmation of the training school of socialist countries is identified; and finally, the third stage, from the 1980s, where a series of initiatives are identified

ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

that characterize a tendency to overcome classical training theories, originating in socialist countries.

The model of Matveev's Classical Periodization (1964) can be considered as the initial frame of reference, from which a series of alternative models to planning were established. Martin Dantas and others, (2011). From this, other types of traditional periodization were elaborated with different ways of organizing the training loads.

On the basis of these classical or traditional models of periodization, several authors appear with the so-called modern programming systems, among which are: block training model with concentrated loads by Verjoschanki, Y. (1979); the integrating model by Bondarchuk, A. (1979). (1984), related to the periodization of training in athletic sport pitchers; the ATR (accumulation, transformation and realization) of Issurin, V & Kaverin, V. (1985) and that of Bompa T & Halff G. (1989) with its extended model of the state of performance. Similarly, the integrated macrocycle with accentuated loads of Navarro, F. (1991), the logical organigrams of García Manso, J. (1994), from the current situation of sports training. Also the structural bells of Forteza, A. (1997); model of selective loads of periodization of Gomes, A. (2002), among others.

Each model of periodization has its own characteristics, whose development has the objective of allowing the concretion of a process of controlled evolution of the athlete and his team, with the rational intervention in the alteration of the factors that condition its effectiveness.

The current demands of sport, which includes boxing, its dynamics, the daily influence of advances in science, technology, new rules, the improvement of current sports results, require a fundamental step as is the improvement of the same, both the level of preparation of athletes, as the entire technical, tactical and methodological system of preparation. Hernandez et al. (2018).

Training plans are increasingly called for improvement, the characterization of sport by each category and weight division, the study of history, the scientific foundations referring to physical, technical, tactical, psychological, social, among others; they have traditionally been treated without a multidisciplinary and transdisciplinary depth, where, in the center of the problem, the system of integral formation of boxers is located. López, B. (2013).

These valuations support precisely the criterion of attributing to the interconnection of the loads a qualitatively superior step in the organization, programming and distribution of the main tasks to be fulfilled in the process of sports training because they represent a regularity, to which authors such as Weineck, J. (1994), grant the category of principle of sports training, based on the subjection with which the training contents behave.

Related to the genesis of the term interconnection is, Verjoschanki, Y. (1990), who adopts it for the first time. However, previous studies have shown the relationship between the technique and the need to develop physical capabilities for such purposes and reveal the existence of this phenomenon long before it is treated as such. Other authors study it using terminologies such as:

ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

sujeción, Weineck, J. (2005) and Transferencia, Román, I. (2015), taken from the digital portal of the sports weekly Jit. In this direction, it is possible to establish the relation of loads that are regulated by the same or different functional orientation, which in fact offers the possibility of organizing a training with much more personalized bases and in correspondence with the physical and functional potentialities of the athlete.

In this research, the term interconnection is interpreted as an inseparable link in the contemporary planning of sports training, if we take into account the way in which competitive exercise is manifested and the increasing tendency of competition calendars; in addition, it is something that is inherent to sports practice, considering the continuity of actions, which are sustained with various orientations, mainly in combat disciplines. This requires the orientation of a training where efforts are combined with different orientations, always in interrelation with the methodological systems of preparation that are selected.

Taking into account all these transformations, together with the new characteristics of the competitive system, more and more demanding, the search for solutions has been provoked, from all the prisms of the phenomenon, with the objective of being every day more precise in the attainment of a boxing athlete, more prepared to obtain superior results, according to the current moments, bearing in mind the prediction and results of Cuba in this sport.

The dynamics of contemporary competitive practice has brought with it the adoption of alternatives in the preparation of our sports reserves at all levels. Romero, R and Becali, A. (2014), consider that, "under the idea of concentrating and accentuating loads, making better use of time and adapting to the competitive calendar, the idea of the ATR was born".

The Cuban Boxing Federation, as a result of the new group of orientations, established, as an indication, to elaborate the ATR system (accumulation, transformation, realization) for the control of the preparation in the provincial academies, with the purpose of incorporating modifications that, beyond attempting against the preparation and its efficiency, will be directed to raise the quality of the training process.

The foregoing allows us to foresee that, from now on, the path that will guide the preparation of the teams, in the provincial academies, will be conditioned, to a great extent, by the implementation of a mentality open to change, which allows transformations to be introduced in the attainment of the objectives of the preparation. For this purpose, training with an interconnection approach represents an alternative to guarantee a preparation that is as similar as possible to competitive modes of action, where an adequate methodological structure is combined with aerobic and anaerobic loads in its two phases.

In view of the above, the objective of this research is to assess the state of training planning, based on the most current trends, related to the interconnection of loads and ATR systems in the preparation of the boxers of the Provincial Academy of Pinar del Rio.

PODIUM
REVISTA DE CIENCIA Y TECNOLOGÍA EN LA CULTURA FÍSICA
ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

MATERIALS AND METHODS

The research was developed in the Provincial Boxing Academy of Pinar del Rio, a sample composed of 13 outstanding athletes from different categories was considered, representing 52% in relation to the total population of 25 athletes who are in it. In addition, the seven coaches working at the Academy were considered.

Methods were used at the theoretical level such as documentary analysis, historical-logical, induction-deduction, systemic structural approach and modeling, as well as empirical level such as: interview, observation and measurement.

The interview was applied to the group of seven coaches of the boxing selection of the province, in order to verify the dominion over the subject and its subsequent application. The observation was made to six training units (two general preparation meso cycles, two special preparation meso cycles and two special preparation meso cycles to obtain the sports form) to appreciate in practice the form and direction of the preparation under the effect of the planned load structures. It must be taken into account that the duration of the meso cycles, related to the traditional model, obeys to the characteristics of the preparation, considering the traditional model, not the ATR.

For this purpose, a five-indicator guide was developed with the participation of three evaluators. The indicators observed were:

1. Control of load components: volume, intensity, recovery, density, magnitude.
2. Relationship of the objectives of the meso cycles with the methodological treatment of the training content.
3. Directions that respond to the moment and type of preparation.
4. Contents tempered to the objectives of the training.
5. Control of loads according to functional systems.
6. Conception in the selection of the training content.
7. Logical sequence in the distribution of training tasks.
8. Complexity and demands, taking into account the characteristics of the selected tasks.
9. Application of loads with one or different functional orientation. (Interconnection), taking into account the characteristics of the temporality of the training.
10. Lactic anaerobic aerobia).
11. (Alactic Anaerobic Aerobia).
12. (Anaerobic Lactic Anaerobic Alactic Anaerobic).
13. Relationship of recovery to the type of effort made.
14. Complete recovery-alactic anaerobia, rapidity and rapid strength.
15. Incomplete-aerobic recovery, lactic anaerobia, aerobic endurance, resistance to strength and resistance to speed.

In addition, measurements were made on the sample of 13 athletes, starting from the obtaining of pulse values, where stability was guaranteed in the execution of the work at constant rates of execution, in correspondence with the characteristics of the directions selected to assess the effect of the contents of the load structures applied in the training. (Table 1).

PODIUM
REVISTA DE CIENCIA Y TECNOLOGÍA EN LA CULTURA FÍSICA
ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

In this sense, the following directions were selected: aerobic, endurance to strength, endurance to rapidity, rapidity and rapid strength; according to the groups of divisions; statisticians such as arithmetic mean, standard deviation and coefficient of variation were used. For the choice of these indicators, determined by the directions, it was necessary the consultation and criteria of a group of experts who, with their valuations, made possible the concretion of the same ones.

Table 1.- Characteristics of the tests carried out on the basis of the behaviour of the controlled intensities as a function of the execution rhythm

Tests	Methodogy
Speed (95 – 100%)	(Hanging bag hit with 8 ounce gloves or gloves, five rounds for ten seconds). One-minute break between rounds The pulse is measured in ten seconds and the average value is determined.
Rapid speed (95 – 100%)	(Hit on the hanging bag with 16 ounce hit gloves and overweight representing a ballast, five rounds X 20 seconds. One-minute break between rounds. The pulse is taken in ten seconds after each round and the average value is determined.
Endurance to rapidity (85 – 90%)	(Hitting the hanging sack with eight-ounce gloves or gloves, three rounds for two minutes). One-minute break between rounds The pulse is measured after each round in ten seconds and the average value is determined.
Endurance to strength (85 – 90%)	(Hitting the hanging bag with 16 ounce gloves and overweight representing one ballast, three rounds for three minutes). One-minute pause for one and a half minutes between rounds. The pulse is measured after each round in ten seconds and the average value is determined.
Aerobic endurance (70 -80%)	Displacements with maneuvers of trunk and arms, in nine minutes. It replaces Peter's test which establishes the continuous race. This test is designed by the Cuban school of boxing. In this case, the beats were only made at the end of the activity, but also in the same time of 10 seconds.

These physical parameters were used to offer the trainer a guide about the fundamental directions in which the boxing activity is developed, appreciating that, except aerobics, the rest is directly proportional for the establishment of the interconnection since functional systems of different orientation interact in them.

The test proposal made by Sagarra (2011) and Domínguez (2007) was also taken into account, as well as the orientations of the Integral Program of preparation of the sportsman (2013).

This was possible with the application of a maximum effort test, consisting of three rounds of three minutes of free work, with gloves in pairs, according to the characteristics of the groups of divisions, that is to say, in real conditions of competition. The maximum pulsations of each athlete in the sample are then determined. This responds to the individual particularities of the athlete and the rhythms imposed during the fights. Se recomienda el control de cada dirección seleccionada en relación con las intensidades que aparecen en la tabla de la estandarización de las pruebas realizadas al respecto. Las pruebas se aplicaron en días alternos para aprovechar el efecto regenerativo de la recuperación; se comenzó por aquellas que propician un menor gasto energético y una respuesta de adaptación favorable, valorada en función de la recuperación, una vez culminada la actividad.

ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

For the processing of the obtained data, the statistical package SPSS was used, as well as the determination of the arithmetic mean, the standard deviation and the coefficient of variation.

RESULT AND DISCUSSION

First of all, a documentary review was carried out with the purpose of verifying the existence of information related to the interconnection and the existing planning systems, in relation to the preparation of the boxers.

The analysis of the various normative documents issued by the Cuban Boxing Federation (FCB), in particular the Integral Programs for the preparation of the sportsman, Inder, (2007, 2013, 2016) which stipulate the entire projection of methodological work at the different levels of the performance pyramid, today constitute a tool for the management of the professional performance of pedagogical groups. However, the scope, which these documents issue at the level of the guidelines, lacks depth in their assessments of the implementation of the ATR planning systems, as well as that related to the interconnection of training contents.

At first, these orientations, Inder (2007), contemplated the traditional way of programming and distributing the fundamental contents of the preparation, based above all on the components of the process of sports preparation, an aspect which, considering the scenarios with which they were manifested in that context, still offered arguments for fulfilling the objectives of the preparation on the basis of the behaviour of the competitive calendars in force at the time. (Table 2).

Table 2.-Traditional planning structure

Periods	Preparatory			Competitive		Transit
Months						
Meso cycles	MPG	MPEV	MPE	MOFD	MEFD	
Micro cycles						
Vol. Meso cycle						
Vol. Micro cicle						
General physical preparation						
Special physical preparation						
Tactic technical preparation						
Theoretical preparation						
Psycological preparation						
Preparatory comp.						
Fundamental comp.						
Medical tests						

Source: Integral program of the athlete preparation preparación of 2007. Inder (2007).

It is not a question of criticizing the planning model implemented until then by the national leadership of this discipline, but rather of tempering ourselves to the current reality and retaking from it the positive aspects, achieving a better complementation of the current structure.

PODIUM
REVISTA DE CIENCIA Y TECNOLOGÍA EN LA CULTURA FÍSICA
ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

Dominguez, J. (2007) and Sagarra, A. (2011) have very similar perceptions in this respect, when they establish the distribution of the contents and attend to the particularities of the components of the preparation. From this point of view, the essential was sustained in the aspect of the motor structure, according to the type of component where the content was programmed, not in its adaptation effect since, if the composition of each component is analyzed, the contents have different orientations. This, taking into account the current competitive models, brings with it significant variations in the adaptation processes, conditioned by alterations in the homeostasis.

Closer in time and by guidance of the governing body of boxing in the country, is implemented the Comprehensive Program to prepare the athlete 2013 Inder, (2013), which introduces a series of changes in the structural aspect of planning, which achieved to some extent, as transformations in the planning of training.

The structure proposed in the previous model (PIPD, 2007) is replaced and the ATR system, perfected by García, and others, is incorporated. (1996), allusions are made to micro cycles and meso cycles, an issue that until then had not been dealt with in the guidelines of the Cuban Boxing Federation, however, the main training directions to be considered in the planning of an ATR system are not defined, nor is the classification of the micros and meso cycles that identify this structure.

Related to the above, Pastor Chirino, L. (2003), in his Master's Thesis, was able to determine, base and distribute in the planning macro-structure, the directions of the training, an issue very related to the purposes that, years later (2016), the governing body of sport in the country, in its desire to introduce transformations from the technical-methodological point of view.

Forteza, in his work: "Las direcciones del entrenamiento" (The Directions of Training), leaves very explicit what is related to the determining and conditioning character of the same. Forteza, A. (2002). More recently, in 2016, as part of continuous improvement, a new PIPD Inder (2016) appears, which, although it represents a step forward as it contains elements not reflected in the previous ones, still does not meet all the expectations for which it was designed. Carefully analyzing the structure of the graphic plan proposed as an example, in this PIPD program (2016), there is no logical and proportional distribution of the different types of microcycles that structure it. (Table 3).

Table 3.- Structure design of the ATR (example)

Month	Septiembre					Octubre				Noviembre		
Mesos	Acumulaction					Transformation				Performance		
Date	1/7	8/14	15/21	22/28	29/5	6/12	13/19	20/26	27/2	3/9	10/16	17/23
Micros	C	C	C	C	R	C	C	C	C	R	C	C
Intensity	Medium					High				Maximun		
Activity	T/P					3/9						
Direction	Aerobic					Anaerobia lactic				Anaerobic. alactic		
Direction	Technical - Tactic					Technical - Tactic				Technical - Tactic		

Source: Integral program of the athlete preparation (PIPD): boxeo (2016).

PODIUM
REVISTA DE CIENCIA Y TECNOLOGÍA EN LA CULTURA FÍSICA
ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

It should be pointed out that the duration of each meso-cycle, characteristic of the ATR model, is tempered to the characteristics of the competitive dynamics of Cuban boxing. All models are flexible without implying a radical transformation of their essence; consequently, the conception for which the aforementioned planning model was created is maintained. In addition, this source of information offered by the PIPD represents the sustenance of the study that was carried out and that includes modifications according to the particularities of this discipline in the boxing academy.

In keeping with the above, emphasis is placed on the need to delve deeper into the particularities of the model, based above all on the interdependence that must exist at the time of selecting the different models of training planning, based on the characteristics of the sport and the athlete, where medullar aspects of the models, traditional and cognitive, are conjugated, as warned by Mayorga, B. and Niño, L. (2017) and Sierra, J. and others (2018).

Summarizing what has been discussed so far, it can be pointed out that the documents and methodological guidelines issued by the National Boxing Commission, despite their improvement, still leave a margin for interpretation by the technical commissions of the territories, as they do not present alternatives to training planning in terms of the definition of addresses and their interconnection.

Interview results

The interview applied to the group of coaches, six in total, of the selection of boxing of the province allowed to evaluate the level of dominion of the interviewees on the importance of the interconnection of the contents in the training process, based on the information offered by the integral programs of preparation of the sportsman (2013 and 2016) and the normative documents of the system of technical-methodological work, established by the national direction of high performance. According to the analysis of the answers, the levels of acceptance of the answers are relatively low and demonstrate that there are gaps in the knowledge and mastery of coaches in relation to the subject matter discussed here. (Table 4)

Table 4.- Quantitative results of the interviews

Responses	Questions					
	1	2	3	4	5	6
	3	2	3	7	2	3
% de Aceptances	43%	28%	43%	100%	28%	43%

The questions that form part of the questionnaire are reflected in the explanation of each one of them, which express the behaviour and acceptance of the interviewees when answering them.

The lowest percentages are recorded in questions two and five referring to the planning of the contents from the directions or components of the preparation. In this sense, a series of variables were not taken into account that today modify the conception of planning, as is the case of competitive dynamics, as well as the modes of action in the competencies, always changing because they are adjusted to the international competitive calendar and its demands.

ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

For this reason, the main training tasks, related to the content, should be aimed at strengthening the variants of combat school, both directed, with a personalized character based on the characteristics of the athlete, as well as free work with gloves, always regulating the intensity parameter that guides the functional direction that prevails at that moment, according to the particularities of each moment of preparation.

Therefore, by establishing the control and planning of the contents in correspondence with the addresses, greater flexibility is achieved in the handling of the load indicators, with a conception more tempered to the competitive formats that today govern the boxing destinations in the country.

In the second case, question number five, it was not known that interconnection today represents a regularity from which no sporting discipline escapes, much less boxing, due to the changing nature of the actions and their tendency to increase intensity in a sustained manner.

In this sense, it should be pointed out that the interconnection does not represent a rigid alternative to the planning of the training contents, its use obeys a series of elements, where the systematic practice is the one that conditions, to a great extent, the application of its variants.

Regardless of the fact that questions number one, three and six showed tendencies towards an increase in the levels of acceptance, they are not considered to be in line with the requirements needed in the field of knowledge in order to dominate the aforementioned subject matter, nor are differences of significance established between the traditional planning systems and the current proposal of the ATR model. Similarly, there is insufficient information regarding interconnection combinations and the handling of parameters for their control. This is the direction in which the above-mentioned questions are focused.

Deepening, in this sense, represents the direction that the boxing commission should adopt today in the territory, in its desire to consolidate the knowledge and mastery of this subject, since they constitute orientations of the Cuban Boxing Federation.

100 % of the interviewees answered question number four about the controls according to the content of the preparation, they suggested the realization of the tests under the selection of exercises of special and competitive structure, and not as traditionally they were realized, as well as the functional field tests, that, under the direction of the Provincial Center of Sports Medicine, are applied to evaluate the effect of the loads in the performance of the athlete. However, this last aspect remains a pending subject in the context of preparation in the academy, due to the almost total lack of means to evaluate the biomedical control of preparation, so necessary at the present time to know the real effect of adaptation to training loads.

In the same way, there is a need for more in-depth study and awareness of the advantages that today guarantee a change in the concepts of training and interaction with those systems that best meet the requirements of contemporary practice.

Results of the observation

PODIUM
REVISTA DE CIENCIA Y TECNOLOGÍA EN LA CULTURA FÍSICA
ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

In chart 5, the general results of the visits to training units can be seen; in practice, the form and direction of the organization of the load structures could be seen, through the moments through which the preparation passes, in addition, the most relevant elements observed by each one of the indicators are reflected. (Table 5)

Table 5.- General results of the observations to the training units. They were carried out when in essence the traditional planning model predominated; hence the nominations of the referred cycles still persist

Indicators	Good	So so	Bad	Remarks
1		X		There is no strict control of the heart rate in the general and special preparation cycles.
2	X			Little correspondence between the addresses selected with the time and type of preparation in the meso cycle of obtaining the sports form.
2.1		X		
2.2	X			
2.3	X			
3	X			There were no observations of relevance
3.1	X			
3.2	X			
4			X	There is no correspondence between the orientation of the load and the typology of the meso cycles, both in the general and special preparation meso cycle.
4.1		X		
4.2		X		
4.3			X	
5		X		There is no guarantee that the body will fully recover from anaerobic-alactic loads in the meso cycles of special preparation and obtaining the sports form.
5.1		X		
5.2	X			

Note: The indicators in the table appear together with their descriptions.

In indicator number one, in relation to the behaviour of the components of the load, irregularities are reflected, although not significantly, with the control of the heart rate, mainly due to the low demand and follow-up in the control of this training parameter, which makes it possible to assess work zones when establishing the interconnection of contents, especially in the transit from one content to another, if we take into account the different directionality of these.

This appreciation related to the control of the heart rate was detected because there was no sustained character, by the trainers, with this important parameter of the load. In consideration of this, the contents with orientation, preferably aerobic, typical of the general preparation meso cycle, did not have the necessary follow-up to verify the real effect of this work on the athlete's adaptation mechanisms, which could be evaluated, not only in the pulse dynamics but also in the rhythm of the actions. It was used as training content, very adjusted to the characteristics of the meso cycle, the continuous race and predeportive games; on a smaller scale, displacement exercises with maneuvers.

Another proper orientation of the referred meso cycle is the lactic anaerobia, expressed in this moment of the preparation, from contents of rapid force, for which natural exercises were used with weights and also in the apparatuses with ballast.

ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

Consequently, indicator number two, related to the correspondence between the objectives of the meso cycles for obtaining the sports form and the methodological treatment given to the content, could confirm that only the sub-indicator "Directions that respond to the moment and type of preparation" was affected, due to the fact that the selected contents did not respond to the moment and type of preparation for which they were programmed in the meso cycle for obtaining the sports form, since they lacked the depth and rigour with which they should be treated at that moment of preparation. This meso cycle has as an indispensable element that the contents of the preparation have a preferably anaerobic orientation, both lactic and lactic, since they are the bioenergetic sources that guarantee the sustainability of the actions carried out during the combat.

The use of loads of an anaerobic lactic nature, such as endurance to strength and endurance to speed, partly responds to the relationship between the content and the type of meso-cycle, above all because both have the same functional and metabolic basis. In the case of the former, the residual effect is basically used, but not in the latter, which is the basis of this sport. However, the endurance to speed maintains its condition of determining direction of performance and conditioning to endurance, to strength.

The contents selected in this sense, such as: work on hanging devices with gloves, directed combat school with sustained increase in intensity and shadow with dumbers, are adjusted to the requirements of this moment of preparation.

The results of the observations ratify the criterion of stability in the behavior of indicator number three by not considering signals of significance, all of which corroborates that both the logical sequence in the distribution, and the complexity and demands, are adjusted to the characteristics of the selected tasks.

In addition, there was a logical structuring in the distribution of the content, as well as in the complexity and demands of the planned tasks. The special preparation mesocycle is the end of the preparatory period and the beginning of the competitive period. Hence, the determination of the training content has as its genesis the characterization of the competitive exercise.

From the point of view of the positive transfer, the meso cycle of varied special preparation will guarantee the transition of the effects of adaptation through own works of endurance to the strength and aerobic, both maximum and submaximum, supported in displacements of continuous form, school of boxing to low rhythm of execution of the actions, as well as work in the apparatuses with ballast and natural exercises.

In relation to indicator number four, the lack of correspondence, sometimes expressed intermittently between the orientation of the load and the typology of the meso cycles, in this case those of general and special preparation, is fundamentally due to the superficiality shown by the trainers when establishing the characteristics and basis of the elements that structure them, whether in training contents or in the micros to be used, depending on the type of meso cycle.

It emerged during the observations that in the general preparation mesocycle were used shock micros with certain frequency and in them, aerobic loads with moderate intensities and regenerative and non-anaerobic effects, which are those that guarantee relatively high volumes and intensities of similar magnitudes, as

ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

established by the characterization of the aforementioned mesocycle. When it refers to this medium planning cycle, it is on the basis of the study carried out when the traditional planning model still prevailed. Therefore, it is unacceptable to use charges that lead to oxidative phospholiration that generate a non-specific adaptation of the organism to the effort.

Similar situation could be appreciated in the special preparation cycle mesos with predominance of loads with anaerobic orientation in the ordinary micro cycles, besides applying incomplete recovery intervals, that is, they did not guarantee the total recovery of the organism before the effect of the planned loads and this was verified with the taking of the pulse, after each activity, where it still remained with tendency to the anaerobic threshold, all of which affected the total recovery of the athlete so that the intensity parameters did not behave in the ranges established for this type of effort.

Summarizing, the results of indicator number five, related to the recovery from the effect of anaerobic alactic loads in the meso cycles of special preparation and obtaining the sports form, it was possible to verify that the essential regularity of the training in the referred meso cycles is to stimulate the recovery of the athlete. For this reason, the working directions, at this moment of preparation, must be directed to the use of the transference that other directions facilitated depending on the interconnection of their contents in previous meso cycles, as well as the regenerative effect of the organism with the application of loads, which, although they do not have the determining character, help the recovery.

This is the case of regenerative aerobic steering with intensity magnitudes below 60 % of maximum aerobic capacity, Bennaassar, M. and others (2013) warned, considering, within the classification of types of loads, those that have a recovery character.

The directions under the functional effect of the lactic anaerobic systems, i.e. speed and rapid strength, require complete recovery, while those of lactic anaerobic character are incomplete recovery, such as endurance to strength and endurance to speed.

Measurement results. The results of the tests carried out and their significance based on the behaviour of the applied statisticians are presented below:

The behaviour of the arithmetic mean can be assessed as adequate if we take into account its dynamics of change, according to the groups of divisions and the anatomical, physiological and somatic characteristics of the athletes. This allows, in the case of the different training directions, that, as indicators within the interconnection variable, a work as personalized as possible was determined, attending to the particularities of each athlete, with the following average values of pulsometry:

- The aerobic direction for the small divisions showed 160 pulsations per minute. The medium and heavy ones, 166 pulsations.
- In this sense, we can assess that the homogeneity in the behavior of the pulsations, in the case of the last 2 groups of divisions, is given, in essence, by the little contrast between the training contents of this important direction, considered vital for this discipline because it guarantees the control and

ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

stability of the athletes' body weight. For the work of this direction, means of general structure were used, not special ones.

- The directions endurance to the strength and endurance to the rapidity, for having the same functional support based on the metabolic activity of the lactic anaerobic processes, expressed values of average pulsometry that adjust to the particularities of the work of both directions of training. In the case of small divisions, pulse values ranged from 169 to 176 pulsations. The medium divisions between 177 and 184, while the weighs moved in the interval of 175 and 184. The initial values correspond to the direction resistance to force, while the seconds, to resistance, to speed.
- As an important element we mention that, in all the cases analyzed, the pulsation values correspond to the characteristics of the referred directions, oscillating between 85 and 90% depending on the scope and capacity of the functional system that regulates them.
- The directions endurance to the strength and endurance to the rapidity, for having the same functional support based on the metabolic activity of the lactic anaerobic processes, expressed values of average pulsometry that adjust to the particularities of the work of both directions of training. In the case of small divisions, pulse values ranged from 169 to 176 pulsations. The medium divisions between 177 and 184, while the weighs moved in the interval of 175 and 184. The initial values correspond to the direction resistance to force, while the seconds, to resistance, to speed.
- As an important element we mention that, in all the cases analyzed, the pulsation values correspond to the characteristics of the referred directions, oscillating between 85 and 90% depending on the scope and capacity of the functional system that regulates them.
- The small divisions established their pulse values between 185 and 188 pulsations, the medium divisions oscillated between 192 and 194, while the heavy divisions fluctuated between 180 and 194. In the latter, considering the characteristics of the heavy divisions, it is necessary to add that it is not the fast and explosive actions that predominate within the athlete's behavior, although they are considered within the planned training contents due to their importance in characterizing the competitive exercise.

The methodological triangulation of the applied instruments highlights the following elements:

- Predominance of the traditional conception in the treatment of the content; in this sense by components, in addition to poor scientific debate, related to interconnection.
- There is no correspondence between the orientation of the load and the typology of the meso-cycles, nor does the recovery guarantee the total re-establishment of the organism in the face of loads of an alactical anaerobic nature.

In all cases, the behavior of the standard deviation as well as the variation coefficient is an expression of the high degree of separation of the data regarding the average, in the case of the first; not so in the behavior of the homogeneity with which the results were manifested by group of divisions.

Summarizing what has been discussed, it can be concluded that interconnection is a need for contemporary training, given the high dynamics of competitive calendars, hence the constant redimensioning of the training process. However, from the study

ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

carried out, gaps are evident, although not of great relevance, in the knowledge about the most advanced conceptions in terms of training planning.

It is also evident that the basis of the interconnection of contents in this sport will be based on the conjugation of anaerobic loads in their two moments, i.e. lactic and lactic. It is necessary to find a mechanism for the didactic plane to better guide the trainer, in this sense.

BIBLIOGRAPHICAL REFERENCES

Bompa, T. (1989). *Periodización del entrenamiento deportivo*. Barcelona, España: Editorial Paidotribo.

Bompa, T. O. (2003). *Periodización. Teoría y metodología del entrenamiento*. Recuperado de https://books.google.com.cu/books/about/Periodizaci%C3%B3n_Teor%C3%ADa_y_metodolog%C3%ADa_de.html?id=L2yxtGPAxacC&printsec=frontcover&source=kp_read_button&redir_esc=y#v=onepage&q&f=false

Bondarchuk, A. (1984). *Periodización del entrenamiento deportivo en los lanzamientos atléticos*. Consejo científico metodológico del comité estatal de cultura física y deportes.

Dantas, E. H. M., García-Manso, J. M., Godoy, E. S. de, Sposito-Araujo, C. A., & Gomes, A. C. (2010). Aplicabilidad de los modelos de periodización del entrenamiento deportivo. Una revision sistemática. (Applicability of the periodization models of the sport training. A systematic review). *RICYDE. Revista Internacional de Ciencias del Deporte. doi:10.5232/ricyde*, *6*(20), 231-241-241. Recuperado de https://www.cafyd.com/REVISTA/ojs/index.php/ricyde/article/view/316

Díaz Benítez, P. L. (2015). *Boxing & MMA. Entrenar para ganar*. Recuperado de https://sites.google.com/site/mintpinpgrapaw/home/boxing-mma-wx9acuntigms

Domínguez, J. L. (2007). *La clase de Boxeo*. La Habana, Cuba: Editorial Deporte.

Forteza, A. (1997). *Entrenamiento Deportivo. Alta Metodología: Carga y Estructuración del Entrenamiento Deportivo*. Ciudad Habana, Cuba: Editorial Científico Técnica.

Forteza, A. (2002). *Direcciones del entrenamiento*. La Habana, Cuba: Editorial Deportes.

García Manso, J. M., Navarro Valdidielso, M., & Ruiz Caballero, J. A. (1996). *Planificación del entrenamiento deportivo*. Recuperado de http://www.deposoft.com.ar/repo/publicaciones/planificacindelentrenamiento deportivo-101220051922-phpapp02.pdf

García-Manso, J. (1994). Situación actual del entrenamiento deportivo. En *Novedades del entrenamiento deportivo*. España: Escuela Canaria del Deporte.

ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

Gomes, A. C. (2009.). *Treinamento Desportivo: Estrututuração e Periodização*. Recuperado de https://books.google.com.cu/books/about/Treinamento_Desportivo_Estrututura%C3%A7%C3%A3o.html?id=YMstPwAACAAJ&redir_esc=y

Hernández, J. M. G., Santana, G. M., Jimenez, B. F., & Díaz, P. O. T. (2018). La preparación técnico-táctica de los boxeadores espirituanos. *PODIUM - Revista de Ciencia y Tecnología en la Cultura Física*, *13*(2), 150-159. Recuperado de http://podium.upr.edu.cu/index.php/podium/article/view/772

INDER. (2007). *Programa Integral de preparación del deportista boxeo*. La Habana, Cuba: Editorial Deportes.

INDER. (2013). *Programa Integral de preparación del deportista boxeo*. La Habana, Cuba: Editorial Deportes.

INDER. (2016). *Programa Integral de preparación del deportista boxeo*. La Habana, Cuba: Editorial Deportes.

Issurin, V., & Kaverin, V. (1985). *Planning and desing of annual preparation cycle in canoe-kayak paddling*. Moscú: Fizkulturai Sport.

Matveev, L. (1964). *Problem of periodization the sport training*. Moscú, Rusia: FiS Publisher.

Matveev, L. (1983). *Fundamentos del entrenamiento deportivo*. Moscú, Rusia: Editorial Raduga.

Mayorga Barrera, J. P., & Niño López, D. J. (2016). Modelos de planificación del entrenamiento deportivo y su asociación con el resultado deportivo en Santander. *instname: Universidad Santo Tomás*. Recuperado de http://repository.usta.edu.co/handle/11634/4893

Navarro, F. (1991). *Tendencias actuales en la Planificación del entrenamiento deportivo*. Presentado en Seminario sobre Tendencias actuales en Ciencias y Metodología del Entrenamiento Deportivo.

Navarro, F. (2011). *Periodización y planificación del entrenamiento. Tomado del curso a distancia: Actualización en Métodos de Entrenamiento*. Grupo sobreentrenamiento.com.

Padilla, J. (2017). *Planificación del entrenamiento deportivo*. Venezuela: Editorial Episteme.

Pastor Chirino, L. A. (2003). *Estructuración de las divisiones del entrenamiento en el sistema de planificación en la preparación de los boxeadores de primera categoría de Pinar del Río* (Thesis, Instituto Superior de Cultura Física Manuel Fajardo. Facultad de Cultura Física Nancy Uranga Romagoza). Recuperado de https://rc.upr.edu.cu/jspui/handle/DICT/1973

ISSN: 1996–2452 RNPS: 2148
May – August. 2019 Vol. 14(2): 181-203

Ramírez, J. (2015). *Directrices Prioritarias. Metodología del entrenamiento deportivo. Condiciones varias*. Maracay, Venezuela: Cuentahilos.

Román, I. (2015, mayo 10). *La transferencia en el trabajo de la fuerza explosiva*. 3. La Habana, Cuba.

Romero, R., & Becali, A. (2014). *Metodología del entrenamiento deportivo. La Escuela Cubana*. La Habana, Cuba: Editorial Deportes.

Sagarra, A. (2011). *Escuela cubana de boxeo*. La Habana, Cuba: Editorial Deportes.

Sierra, J. H., Santana, G. M., & Quian, Y. R. (2018). La mesoestructura, modelo de entrenamiento contemporáneo de la escuela cubana de boxeo. *PODIUM - Revista de Ciencia y Tecnología en la Cultura Física*, *13*(1), 4-15. Recuperado de http://podium.upr.edu.cu/index.php/podium/article/view/742

Verjoschanki, Y. (1979). *Bases de la preparación física especial de los deportistas*. Moscú, Rusia: Fisicultura y Deporte.

Verjoschanki, Y. (1990). *Entrenamiento deportivo: planificación y programación*. Barcelona, España: Editorial Martínez Roca.

Videaux, J. L. P. (2018). Modelo evaluativo de preparación física general y especial para boxeadores de la categoría de mayores. *EmásF: revista digital de educación física*, (51), 104-116. Recuperado de https://dialnet.unirioja.es/servlet/articulo?codigo=6360326

Weineck, J. (1994). *Entrenamiento Óptimo*. Barcelona, España: Editorial Hispano Europea.

Weineck, J. (2005). *Entrenamiento total*. Barcelona, España: Editorial Paidiotribo.