

Training Loads of Boxers in Individual Lessons on "Paws" and Their Evaluation

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Abstract: The purpose of the study: to determine methodological ways to improve the special performance of qualified boxers in the process of an individual lesson on the "paws". Materials and methods. The study and generalization of the experience of best practices was carried out with the help of a questionnaire survey and conversations with leading coaches and athletes of Uzbekistan and the Surkhandarya region. With the help of these methods, opinions were revealed on a number of theoretical, methodological and practical issues of individual learning. Accounting for the volume and intensity of training loads in the individual lessons of boxers on the "paws" in the process of sports training was carried out using video surveillance. The functional state of the boxers was assessed by the values of heart rate, fixed by means of "Polar H10 M-XXL", before the load and after each individual type of load. To process the data and the results of the study, we used the SPSS Statistics program ("Statistical Package for the Social Sciences"), designed for applied research in the social and pedagogical sciences.

Key words: boxer, individual lesson, load, heart rate, strokes, movements, dose, pause.

Introduction. On a global scale, the process of sports training is increasingly becoming the subject of special scientific research. The growth of sports achievements of boxers and the increasing competition in international competitions poses a number of new urgent tasks for coaches. One of them is the improvement of the technique of individual training on the "paws", as an important form and method of training qualified boxers.

Work on the "paws" is one of the most important aspects in the training of athletes not only in boxing, but also in other types of martial arts. Working on the "paws" is a creative process for the coach, and for the boxer is an integral part of his preparation in the training process (2,3,5)

In our republic, at present, the issues of the methodology of individual lessons on the "paws" are widely developed in relation to its content. At the same time, the vast majority of methodological works and experimental studies are aimed at revealing the means, methods and methodological techniques used in the process of individual learning. At the same time, in the special methodological and scientific literature on boxing, there are no works related to the issue of building an individual lesson on the "paws", its scientifically based organization aimed at maintaining a high level of the athlete's special performance (meaning not only endurance, but and a wider range of specialized qualities and skills of a boxer).

The acuteness of the issue is related to the fact that the development of this sport occurs with a constant increase in the volume of work, the intensity of motor activity and the mental tension of boxers' training loads (1,4,6). The lack of experimental research on the issues raised leads to the fact that the regulation of loads, including in individual lessons on the "paws", occurs without taking into account the response of the athlete's body to the work performed.

In this regard, it is relevant to assess the training loads of boxers in individual lessons on the "paws" and ways to improve their specialized activities. The results of such a study will make it possible to develop some recommendations that give the coach the opportunity to more purposefully influence the improvement of the boxer's performance in an individual lesson.

The purpose of the study: to determine methodological ways to improve the special performance of qualified boxers in the process of an individual lesson on the "paws".

Research objectives:

- to study the modes of work and rest of a boxer used by coaches in an individual lesson on the "paws" (the number and duration of individual loading doses of continuous work, rest pauses between them and micro-pauses);
- to determine the volume of the load performed by the athlete during the lesson (working time of the lesson, the total number of strokes and their varieties, and in some cases the number of meters covered, including steps, jumps, "side-steps", etc.).

Research methods: analysis of special literature, pedagogical observations, generalization of experience, registration of heart rate using "Polar H10 M-XXL", methods of mathematical statistics.

Research results. In the world sports literature, there are no evidence-based data on the assessment of the training loads of boxers in individual lessons on the "paws". Coaches working with a different contingent of trainees, including boxers who have reached a high level of sportsmanship, do not have clear criteria that determine the level of performance of athletes in the process of special training.

The studies were carried out from 2020 to 2022.

Before the start of an individual lesson, a brief survey of the trainer was conducted about the focus of the lesson and its main tasks. During the lesson and after its completion, we were interested in the well-being of the athlete. All studies, especially in the initial stages, were carried out by two, and sometimes by three experimenters, without any distraction of the coach and athlete from the work being done. All activities of the trainer in the process of an individual lesson on the "paws" (the applied mode of work and rest, the magnitude of the load) were carried out solely on the basis of his personal pedagogical experience, without any intervention and advice from the experimenter.

When processing each recorded lesson, the method of graphical representation of the received data was used. On the selected scales, the duration of individual loading doses, rest pauses and the lesson as a whole is plotted horizontally. Above each rest pause (also on the selected scales), points were plotted corresponding vertically to the level of heart rate of the "taking" boxer. All these points were connected by a broken line. The curve thus obtained characterized the dynamics of changes in the boxer's heart rate throughout the lesson. In a similar way, the pulse rate in the recovery phase was displayed (every minute). In addition, above each dose of work in the figure, the number of hits performed (U), with a step (W), jump (S), "side-step" (SS), with a lunge (B) was indicated. In some lessons, the path in meters passed by the boxers in the process of activity was also recorded. This graphical method of processing the received data was used for all lessons recorded by us.

Such arrangement of training loads in the lessons more clearly enabled coaches to receive urgent information, compare different modes of work and rest of a boxer in individual lessons on the "paws", and also made it much easier to understand the mutual dependence of the load and the level of the athlete's heart rate during certain periods of training.

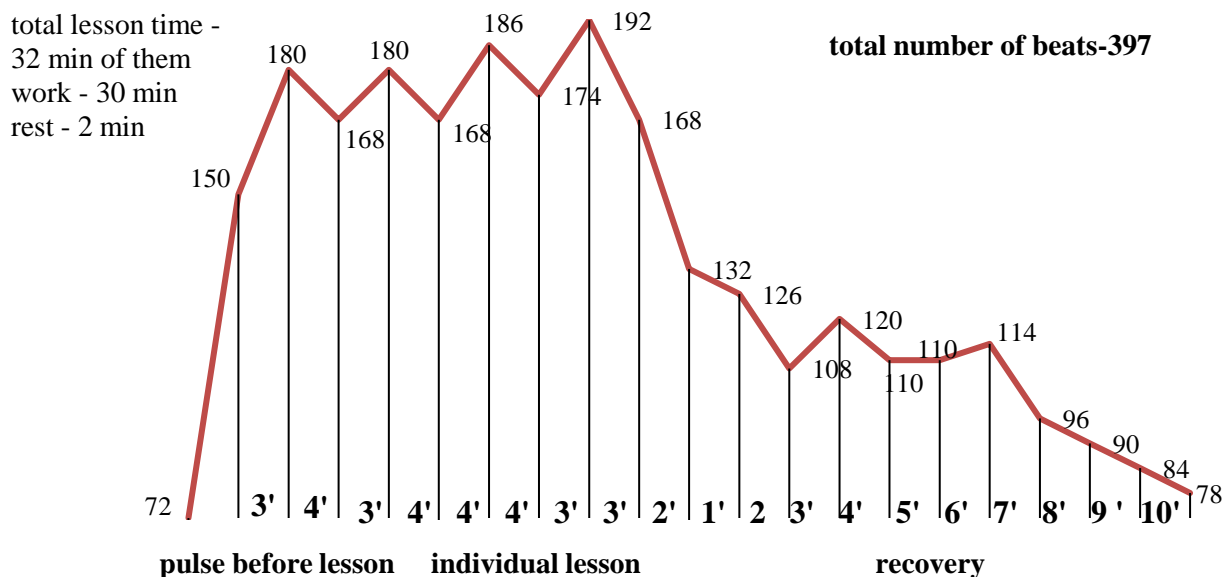
On the basis of the conducted researches and received data, we made an attempt to group individual lessons according to different modes of work and rest of boxers in the course of their activity. In particular, individual lessons were divided into three main groups (modes).

I. Mode of almost continuous operation (Fig. 1). Such lessons are held with a high density of working (active) time and intensity of motor activity, where the boxer mainly works at maximum stress. In these cases, doses of continuous work are combined only with micro-pauses of rest, created through explanations and setting new tasks. The duration of such lessons on average ranges from 25 to 35 minutes. The highest heart rate, with this mode of operation, was 180-196 or more beats per minute, and the lowest (in rest pauses) 144-156 beats/min.

In these lessons, we observed a significant number of micropauses that spontaneously arise on the part of the student, the frequency and duration of which increased towards the end of the lesson. Such behavior of an athlete should be considered as a result of the onset of fatigue associated with a decrease in his performance. The specified mode of conducting an individual lesson can take place when the main task is to develop the special endurance of a boxer. For individual coaches, however, such a construction of a lesson turns into a template and is permanent, once and for all established, which negatively affects the level of training of an athlete and his state of health.

If the number of all lessons analyzed by us is taken as 100%, then the number of lessons with this mode of operation will be 27%.

2. COMPOSITE MODE OF WORK (Fig. 2). With this mode of operation, an individual lesson consists of two, and sometimes three independent parts, but interconnected by common tasks.



Picture. 1. The mode of almost continuous work and rest of a boxer in an individual lesson on the “paws” and the dynamics of changes in the heart rate (1st category athlete)

The duration of each such part varies on average from 10 to 15 minutes, with breaks between them up to 5-10 minutes. and more. Separate doses of continuous work in these parts last on average from 2 to 4 minutes, interspersed with short rest pauses (from 30 seconds to 1-1.5 minutes). According to the data we have, the heart rate in such lessons has the following range of fluctuations: in the process of work from 140 to 180 beats / min; in rest pauses from 96 to 132 beats / min. Such a construction of an individual lesson is sometimes used in the pre-competitive period, in order to prepare the athlete's body for the specific conditions of work in competitions, where the boxer's intense motor and neuro-emotional activity during the fights is constantly combined with relatively long rest intervals between them. This method of conducting an individual lesson has not yet found wide application in the practical activities of trainers and makes up 12% of all lessons recorded by us.

3. Intermittently-repeated mode of operation (Fig. 3). In this lesson, small doses of continuous work (from 1 to 6 minutes each) alternate with short doses of rest (from 30 seconds to 3 minutes). Due to the fact that the intermittent-repeated mode of conducting individual lessons is the most typical for most domestic trainers (61%), we will dwell on its options in more detail, depending on the period of preparation and the focus of the lesson.

All the above data (based on a generalization of the experience of best practice and our own research) testify to the great variability of the work and rest regimes used in individual lessons of athletes and the training loads given in them.

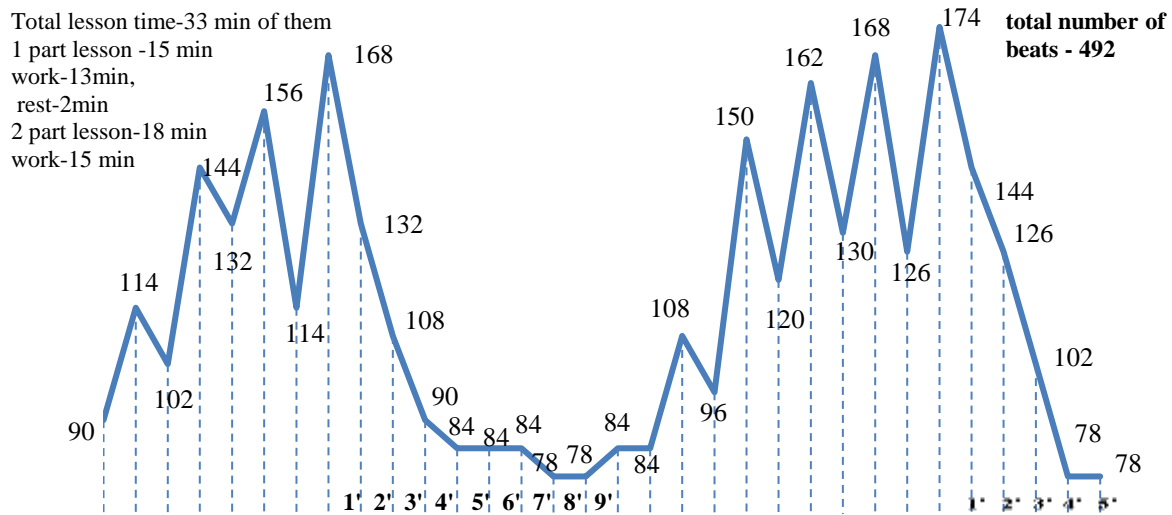


Figure.2. Composite mode of work and rest of a boxer in an individual lesson on the "paws" and the dynamics of changes in heart rate (athlete master of sports)

To analyze the intermittent-repeated mode of work, we took individual lessons with a predominantly technical and tactical orientation, conducted in the preparatory period of the preparation of the annual cycle, as well as lessons with a predominantly tactical and combat orientation, conducted in the pre-competitive period.

At the same time, pedagogical observations were carried out on the same coaches and athletes (the latter also recorded heart rate) during various periods of preparation of the national team of the Surkhandarya region for the Championship of the Republic of Uzbekistan in 2021.

Statistical processing of the data obtained allowed us to significantly supplement our understanding of the organization of work and rest regimes of qualified boxers in these types of individual lessons and the nature of training loads. The knowledge and skills of many trainers on the issues raised, based on extensive practical experience, have not yet been generalized and have not been reflected in the boxing literature.

It was revealed that individual lessons with a predominantly technical and tactical orientation, conducted in the preparatory period for the preparation of the annual cycle, have a duration of 20 to 35 minutes. (absolute data) depending on the time of their holding (beginning, middle or end of the season). The lesson consists of separate doses of "continuous" work, the number of which varies from 6 to 15, which is mainly determined by the duration of the lesson. The duration of these doses ranges from 2 to 7 minutes. each. Rest pauses between them range from 30 sec. up to 3 min.

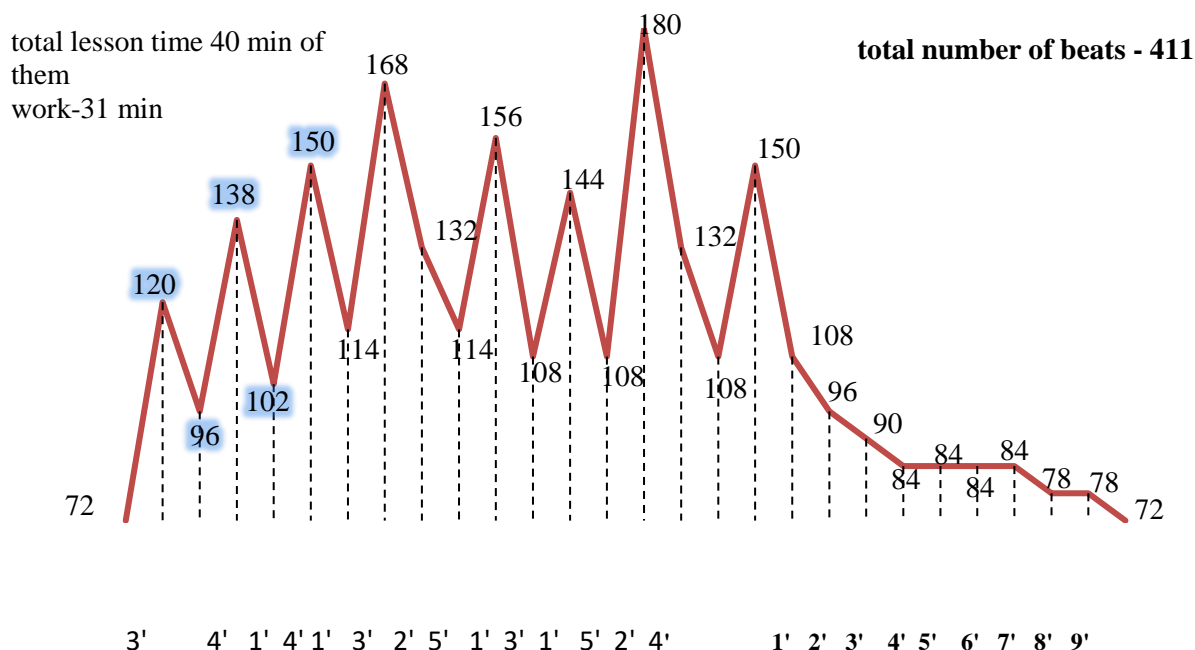


Figure 3. Mode of intermittent work and rest of a boxer in an individual lesson on the "paws" and the dynamics of changes in heart rate (athlete candidate master of sports)

Analysis of the collected materials showed the presence of a significant number of micropauses (MP) in doses of continuous work - rest intervals of less than 30 seconds. At the same time, the vast majority of them fall on microbreaks carried out by the athlete spontaneously (from 8 to 50), which averages 18 MP. A significantly smaller number of M.P. falls on specially created by the coach (from 4 to 20), on average 10 micropauses. Observations revealed that spontaneous M.P. shorter than specially created by the coach (the first ones are from 4 to 15 seconds, the second ones are from 5 to 24 seconds).

As a result, the total time spent on both MPs is almost the same (1 min 50 sec and 1 min 31 sec - average data). The number of M.P. (specially created and spontaneous) has a range of 14 to 58, with a total time of 2 to 5 minutes.

Thus, the total rest time during the lesson (including relatively long pauses and M.P.) ranges from 6 to 22 minutes, accordingly, the active (working) time of the lesson is from 24 to 37 minutes. The data density of individual lessons ranges from 55% to 83%.

Turning to the characteristics of the boxer's motor activity during the lesson (meaning the number and methods of punches), it should be noted that the largest number of punches delivered by a boxer in an individual lesson falls on punches with a step back - from 100 to 280, while Forward (backward) beats have a range of 15 to 99.

Strikes performed with hands, without combination with footwork - from 56 to 223, with a lunge - from 50 to 250, with a jump - from 9 to 40 and blows with a jump - from 7 to 36.

The total number of strokes inflicted by an athlete in a lesson ranges from 350 to 700, i.e. from 12 to 23 beats per minute (average data). This last indicator (indirectly) also characterizes the motor activity of a boxer in the process of activity.

An analysis of the heart rate of athletes, which characterizes the complex effect of the training load on the body, showed that this physical quantity fluctuates constantly during the lesson and has a huge range of differences for individual boxers. For example, in individual doses of work, this figure ranged from 108 beats to 190 beats / min, and in rest breaks from 96 to 168 beats / min.

All the above data (based on a generalization of the experience of best practice and our own research) testify to the great variability of the work and rest regimes used in individual lessons of athletes and the training loads given in them. If, based on these averaged data, an approximate (typical) lesson is constructed, conducted with a predominantly technical and tactical orientation in the preparatory period of training with a highly qualified boxer, then this lesson will look like this (see Table 1)

Table 1
 Characteristics of individual lessons on the "paws" with a predominantly technical-tactical and tactical-combat orientation

No	Characteristics of the mode of work and rest	Technique lesson	Tactics lesson		Characteristics of the volume of work and physical activity	Technique lesson	Tactics lesson		
1.	Tot. continue. lesson	21'	21'		Number of beats	Strikes with the right and left hand	114	119	
2.	Doses of "continuous" work	amount	5	4		Normal step	194	168	
		total duration	18' 42''	16' 52''		Side steps	44	43	
3.	Rest breaks	Amount	4	3		Cross steps	41	59	
		Total duration	4' 53''	5' 40''		With a jump	113	139	
4.	micropause	Created coach	amount	5		8	Side step	20	25
			total duration	0' 45''		1' 21''	With a lung	12	16
		spontaneously	amount	9		15	Total amount	538	569
			total duration	0' 55''		1' 32''	Beats per minute	36	39,8
Total amount			14	24		heart rate per minute	in progress	154	166
total cont.			1' 40''	2' 53''	In rest breaks		124	126	
Total rest time			6' 33''	7' 11''	In rest breaks		124	126	
6.	Active lesson time			15' 07''	14' 29''				
7.	Lesson density in %			71,8	68,0	Average level	139	143	

The lesson consists of 5 doses of work (the duration of each such dose is slightly more than 18 minutes) and 4 rest pauses between them (each pause slightly exceeds 1 minute). The total number of M.P. in doses of work 14. Of them: 5 specially created by the trainer (the duration of each is about 10 seconds) and 9 spontaneously arising (the duration is about 6 seconds). Rest time attributable to all M.P. slightly more than 1 min., 40 sec. Thus, the total duration of the lesson is 21 minutes. Of these: active work - 15 minutes, rest - 6 minutes. (pauses and M.P.), i.e., the density of the lesson is 71.8%. The total number of strikes in this lesson is 538 (normal step - 194, cross step - 41, lunge - 12, right and left hand - 114, side step - 44, "side step" - 20, with a jump - 113) . Considering that the working time of the lesson is 15 minutes, we get that the motor activity of the athlete in the lesson is equal to 36 strokes per minute. The heart rate in the process of activity is at the level of 154 beats/min., and in rest pauses 124 beats/min.

Analyzing individual lessons with a predominantly tactical and combat orientation, conducted by the same coaches with the same athletes, but in the pre-competitive period of preparation of the same annual cycle, we can state the following (for comparison, only average indicators were taken, because they are in full reflect the typicality of individual data).

Lesson duration - 21 min. of which: active time -14 minutes, rest time (pauses and M.P.) - 7 minutes, i.e. lesson density was 68.0%. The timing of the lesson showed that out of 7 min. general rest in the lesson - 5 min. falls on relatively long pauses of rest, between individual doses of work and about 3 minutes. on M.P. (specially created by the coach - 8 with a total duration of 1 min 42 sec; arbitrarily created by the athlete 15 - with a total duration of 1 min. 32 sec.). The total number of strikes delivered in the lesson was 569 (with cross steps - 59, with a regular step - 168, with the right and left hand - 119, with side steps - 43, with "side step" - 25, with a jump -139, with a lunge - 16). Thus, the boxer's motor activity was 39.8 beats/min. The pulse rate during work was at the level of 166 beats/min., and in rest pauses 126 beats/min.

Analysis and comparison of the above data - lessons of technique and tactics (see Table 2) - indicate that the duration of these two typical individual lessons is almost the same - 21 minutes. (average data). This situation should probably be explained by the fact that the total time planned by the coach to conduct one or another individual lesson with a particular athlete depends on numerous factors beyond our control) planning weekly and monthly training cycle; the state of the coach himself, etc. Therefore, no clear differences in the duration of the lessons we analyzed were found.

Approximately the same situation was recorded in relation to the number and duration of the so-called doses of continuous work and rest pauses between them. The most typical doses of work, between which there are relatively long pauses of rest (in those and other lessons), are segments from 2 to 4 minutes. (on average 3 minutes), with rest pauses between them from 30 seconds to 2 minutes. (on average, slightly more than 1 min.). However, it should be noted that there is a tendency towards an increase in the duration of rest breaks in lessons with a predominantly combat orientation, compared with lessons with a predominantly technical orientation. This trend is most clearly manifested in the number and duration of all M.P. So, for example, if 14 MP were recorded in technical lessons. with a total duration of a few more than 1 minute, then 24 MP were noted in the lessons of tactics, which took about 3 minutes. Thus, the total rest time of a boxer in an individual lesson with a predominantly tactical-combat orientation (including pauses and MP) exceeds the same time in lessons with a predominantly technical orientation (in the first - about 7 minutes, in the second - more 6 min.). In accordance with this, the density of technique lessons is higher than in tactical lessons (71.8 and 68.0%, respectively). This regularity was noted in almost all the lessons we recorded.

Turning to the comparison of the boxer's motor activity in terms of the number and method of punches, it should be noted that their total number somewhat prevails in combat-oriented lessons (559) compared to technique lessons (538). The most characteristic indicators were obtained by comparing the average number of blows applied per unit of time (1 minute), i.e. by dividing the total number of strokes by the active (working) time of the lesson. In this case, in the lessons of tactics, the total average of this indicator is 39.8 beats / min., And in the lessons of technology 36 beats / min.

Considering the results of monitoring the heart rate of the same boxers, but in lessons of different directions, we have every reason to believe that with almost the same pre-working level of heart rate, this indicator in tactics lessons is usually higher than in technical lessons. Thus, a higher level of heart rate in the same athlete, but in different lessons, mainly reflects the higher intensity of his motor activity. Those cases when the number of blows in the compared lessons is less, and the level of the pulse rate is higher, should be considered as the influence of a more significant mental tension, which is quite naturally observed in lessons with a combat orientation.

The analysis of our materials showed that in most cases there is a negative correlation between the density of the lesson and the level of the pulse rate, i.e. a lower lesson density corresponds to a higher heart rate (in combat lessons) and vice versa, a higher density corresponds to a lower level (in lessons with a predominantly technical focus). So, from Table. Figure 2 shows that in the lessons of technique, with a density of working time of 71.8%, the heart rate of boxers in the process of activity was 154 bpm, and in the lessons of tactics, with a density of work of 68.0%, the level of heart rate was 166 bpm. The presented average data fully reflect the individual indicators of the analyzed indicators. Such a contradiction is explained by the fact that in technical lessons, with a significant work density, the intensity of the athlete's motor activity is lower than in tactics lessons, in which, with a lower work density, greater intensity and mental tension are found. This determines the average level of the boxer's heart rate in those and other lessons on the "paws".

Conclusions. As a result of the study of the practical activities of coaches and athletes in the process of individual lessons and personal experience, we have established the following facts:

1. There are three main (most typical) modes of organizing the work and rest of a boxer in an individual lesson on the “paws”, namely, the mode of almost continuous work, the composite mode of work and the intermittent-repeated mode, and the latter is the most common among domestic trainers.
2. There is an increased density of work in individual lessons, conducted with a predominantly tactical orientation (up to 83.2%) compared with lessons with a technical and tactical orientation (up to 71.99). Such a decrease in the density of work in the last lessons should be explained by an increase in the number and duration of micropauses that occur during their implementation.
3. There is a predominance of the intensity of the boxer's motor activity in tactics lessons (performs 21 punches per minute and travels 21 meters per minute) in comparison with technical lessons (performs 18 punches per minute and travels 9 meters per minute). Accordingly, the average level of the athlete's heart rate during work was 162 beats/min and 127 beats/min. i.e., the average heart rate in the lesson increased with an increase in the intensity of motor activity. However, not always a high level of heart rate corresponds to a high activity of motor work. Such a contradiction should be explained by the fact that in separate doses of work, with a relatively low intensity of motor activity, a significant mental activity of the boxer was observed in receiving and processing information (difficult technical and tactical tasks were solved in exercises with a choice, requiring a quick and accurate response in micro-intervals of time) , which caused a more intense reaction from the athlete's cardiovascular system. Therefore, it is quite fair that in a number of modern studies, the heart rate is used as a complex indicator of the performed load, both motor and neuro-emotional (mental).

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