

# TRAINING AND COMPETITIVE RANKING OF EXERCISES ACCORDING TO THE LOAD INTENSITY IN THE CLAY PIGEON SHOOTING



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**Keywords:** *clay target shooting, skeet shooting, target, training load, load intensity, distribution of load, visualization, visual-mental rehearsal of the shot, training without cartridges.*

**Abstract.** A questionnaire has been developed and a survey of athletes, specializing in clay pigeon shooting on issues related to the training process has been carried out. We established the athletes load intensity in different training periods. It was determined a well-balanced training structure for shooters with different qualifications.

## РАНЖИРОВАНИЕ ТРЕНИРОВОЧНЫХ И СОРЕВНОВАТЕЛЬНЫХ УПРАЖНЕНИЙ ПО ИНТЕНСИВНОСТИ НАГРУЗКИ В СТЕНДОВОЙ СТРЕЛЬБЕ

**Ключевые слова:** *стендовая стрельба, стрельба на круглом стенде, мишень, тренировочная нагрузка, интенсивность нагрузки, распределение нагрузки, визуализация, зрительно-мысленная репетиция выстрела, холостая тренировка.*

**Аннотация.** Разработана анкета проведено анкетирование спортсменов, специализирующихся в стендовой стрельбе по вопросам, связанным с тренировочным процессом. Установлена интенсивность тренировочных нагрузок спортсменов на разных этапах их подготовки. Определена среднестатистическая сбалансированная структура тренировок для стрелков, различного уровня мастерства.

**Topicality.** Clay pigeon shooting – is a complex of sports exercises, based on a large volume of training load that requires concentration and accuracy of muscular efforts from the athlete. Great physical loads are accompanied with high psychophysiological efforts. Therefore, high and stable shooting effectiveness can be achieved when properly structured training process is optimized with exercise selections, intensity and a rhythm of their performance.

**The aim.** The aim of investigation is to determine athletes training structure, considering their load intensity by analyzing training load of athletes of different qualifications in a skeet shooting during their basic training for the competitions, as well as in their precompetitive cycle.

**Research procedure.**

- A questionnaire development and survey of athletes, specializing in clay pigeon shooting on issues related to the training process. 45 athletes of different qualification were involved in the survey;
- An analysis of data obtained as a result of questionnaire, as well as the main parameters of the training process, which are given in the basic M.I. Polyakov educational-methodical manual in skeet shooting «Strel'ba po letyashim misheniyam» (hereinafter – the Polyakov manual).

**Discussion of research results.** The load intensity volume in the clay pigeon shooting is estimated by the following parameters:

- a) A number of shots, fired at a certain stage (at the certain training, precompetitive period, in basic training period, during the year, etc.);
- b) A number of symbolic shots, made on simulators or directly on the shooting site, or the shots mentally made by a shooter;
- c) Time spent for performing the work mentioned above.

In doing so, six people team spend for 1 series shooting about 25-30 minutes for both skeet and trap shooting. Relaxing and preparation for the following series is approximately the same. Thus, for a daily training consisting of one hundred targets shooting, a MS (Master of Sport) spend not less than 3.5-4 hours.

If we know the intensity volume on a number of shots with and without cartridges as well as a total time spent for performing this action, one can exactly determine the athlete's load intensity both for daily and any training period, as well as we can plan it due to the problems being solved on a certain stage of shooters' preparation.

The intensity of a training exercise is estimated in another way. To determine the intensity of the

Table 1

*Training and competitive ranking of exercises according to the load intensity (by the Polyakov manual)*

Type of exercise	Subtypes of exercises	Scores
Training without gun	1. General physical training 2. Special physical training 3. Active recreation (tourism, hunting, fishing)	1
Training without cartridge	1. Training on simulators 2. Warming up 3. Training with a symbolic shot on the site 4. Mental rehearsal of the shot	2
Training without considering firing results	1. Work on shooting technique 2. Working out of the firing on certain flight trajectories targets 3. Testing sites, guns, cartridges, shooting vest, glasses, etc.	3
Training considering firing results	1. Testing a reliability the individual elements of shooting technique 2. Checking the development shooting degree 3. Self-assessment of the shooting results 4. Assessing shooting results by a coach	4
Checking firing	1. Screening the competition groups 2. Screening a scoring team 3. Transferable tests 4. Offset participation in the competitions	5
Medium level competitions	All competitions for a year (except for highest rank competitions)	6
High level competitions	The main competitions of the year	7

Table 2

*The questionnaire*

Sex (M/F)	
Year of birth	
Qualification	
Experience in clay pigeon shooting	
Event	
Achievements	
When 1, 2, 3-ranks, CMS, MS performed?	
Amount of training per week/month	
Average time of training (in hours)	
Amount of series of 25 targets per month considering firing results	
Amount of cartridges/targets used in a month without considering firing results	
Amount of physical training per week/month	
Amount of training camps (per last year, in days)	
Amount of competitions (per last year, in days)	
Theoretical lessons per week/month, in hours	
Practice per week/month, in hours	
Out of shooting range per week/month, in hours	
Training without cartridge per week/month, in hours	
Visual-mental rehearsal of the shot per week/month, in hours	
Training on shooting equipment per week/month, in hours	
Experience of new range, gun, cartridges, goggles, etc. per month/year, in hours	
How long visualization is used?	
Time spent for shooting technique	

completely training cycle we can use Keller and Saychik formula for estimation of psychological load intensity, which was applied by Godick in the shooting sport in 1980:

$$I = \frac{\sum I_i t_i}{\sum t_i},$$

where  $I_i$  – stress intensity,  $t_i$  – performing time.

By this formula, the load intensity can be estimated both in scores and in percentages.

Further, you can see a table with training and competitive ranking of exercises according to the load intensity created basing on the Polyakov manual (table 1). The load intensity in skeet shooting is worth estimating in scores. (Scores from 1 to 7).

When preparing for competitions, the training process should consist of no less than 3-5 exercises with different load intensity.

The proposed questionnaire included issues concerning mainly a distribution of the training load (for a time unit there were taken weeks / months in hours),

45 athletes of different qualification were involved in the survey (table 2).

According to survey results and Polyakov manual, the training load was determined by types, intensity, and athletes' qualification (table 3).

When processing of questionnaires data, we failed to identify stable regularities between the competitive load and athlete's qualification. Therefore, the load distribution in the competitive period we analyzed according to Polyakov manual, which also does not have a similar distribution. A table of load distribution on clay pigeon shooters in the competitive period is represented below (table 4).

A diagram of the total volume of load on clay pigeon shooters in the basic training period depending on their qualification (figure 1) was made based on the tables mentioned above. As we expected, the more the total volume of load the more athlete's qualification. It varies from 25 to 120 hours per month.

The Figure 2 represents a modification of the temporary different load intensity in the training process

Table 3

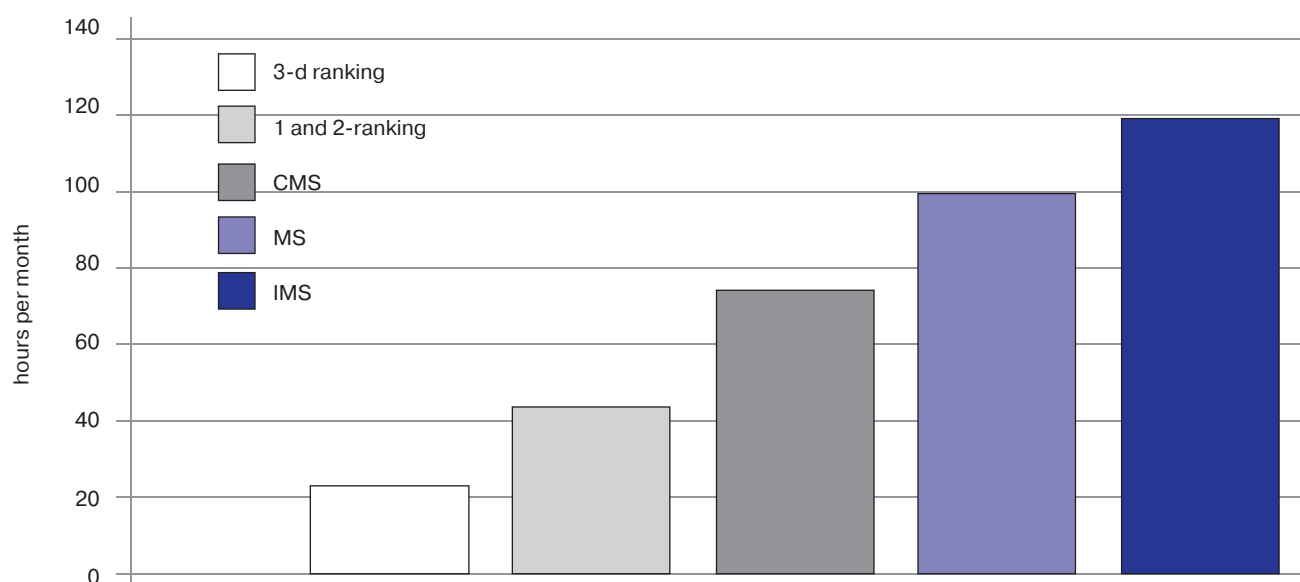
*Training and competitive ranking of exercises according to the load intensity (by the Polyakov manual)*

Type of training load	Scores (according to the table of ranking)	The athlete's qualification				
		3-d ranking	1 and 2 ranking	CMS	MS	IMS
1. Total volume of training load, hour/month (%)	-	25 (100%)	45 (100%)	75 (100%)	100 (100%)	120 (100%)
2. Physical training, hour/month (%)	1	12.5 (50%)	18 (40%)	24 (32%)	30 (30%)	35 (29%)
3. Training without cartridge, hour/month (%)	2	3 (12%)	5.5 (12%)	14.5 (19%)	20 (20%)	24 (20%)
4. Training without considering firing results, hour/month (%)	3	5 (20%)	12 (27%)	18 (24%)	21 (21%)	24 (20%)
5. Training considering firing results, hour/month (%)	4	4 (16%)	8 (18%)	16 (21.5%)	24 (24%)	31 (25.5%)
6. Checking firing, hour/month (%)	5	0.5 (2%)	1.5 (3%)	2.5 (3.5%)	5 (5%)	7 (5.5%)

Table 4

*The load distribution on clay pigeon shooters in their competitive period*

Type of training load	Scores (according to the table ranking)	Volume of load, hour	Proportion of load, %
1. Total volume of training load	-	70	100
2. Physical training	1	15	22
3. Training without cartridge	2	15	22
4. Training without considering firing results	3	6	9
5. Training considering firing results	4	26	36
6. Competitions	6	8	11



*Figure 1. The total volume of load on clay pigeon shooters in the basic training period depending on their qualification*

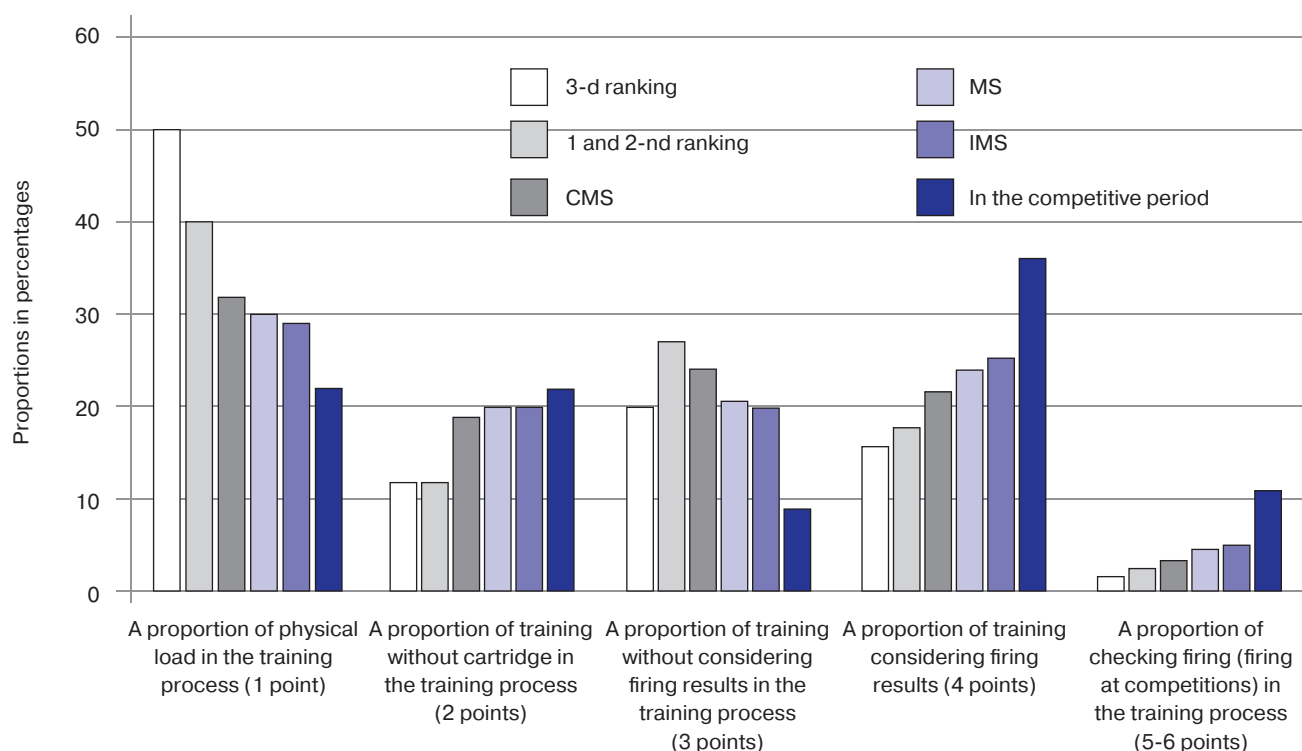


Figure 2. A modification of the temporary different load intensity in the training process with increase of athletes' level of qualification

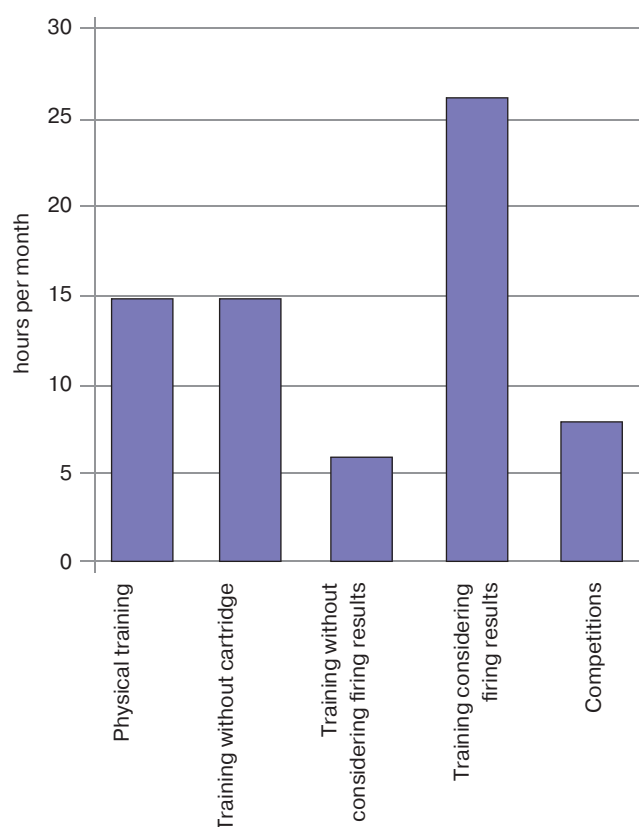


Figure 3. A distribution of load on clay pigeon shooters in the competitive period

with increase of athletes' level of qualification. Here we show a proportion of each type of training load in the total workout.

- As we can see, a proportion of physical load with a raise of athlete's qualification decreases;

- A proportion of training without cartridge significantly increases when transiting to the CMS level (Candidate to the Master of Sport) and further remains almost unchanged, During a competitive period the load proportion is slightly higher than in the basic training period;

- A Proportion of training without considering firing results curves through maximum for 1-2 – ranking athletes and in the competitive period is significantly lower than during the basic period for all athletes with different qualifications;

- A Proportion of training considering firing results increases with shooters' qualification and significantly higher in the competitive period than in the basic training process;

- A checking firing proportion is slight but a bit increases with rising of athletes' qualification. In the competitive period, it is much higher than in the basic training.

A distribution of load on clay pigeon shooters in the competitive period is represented in the figure 3.

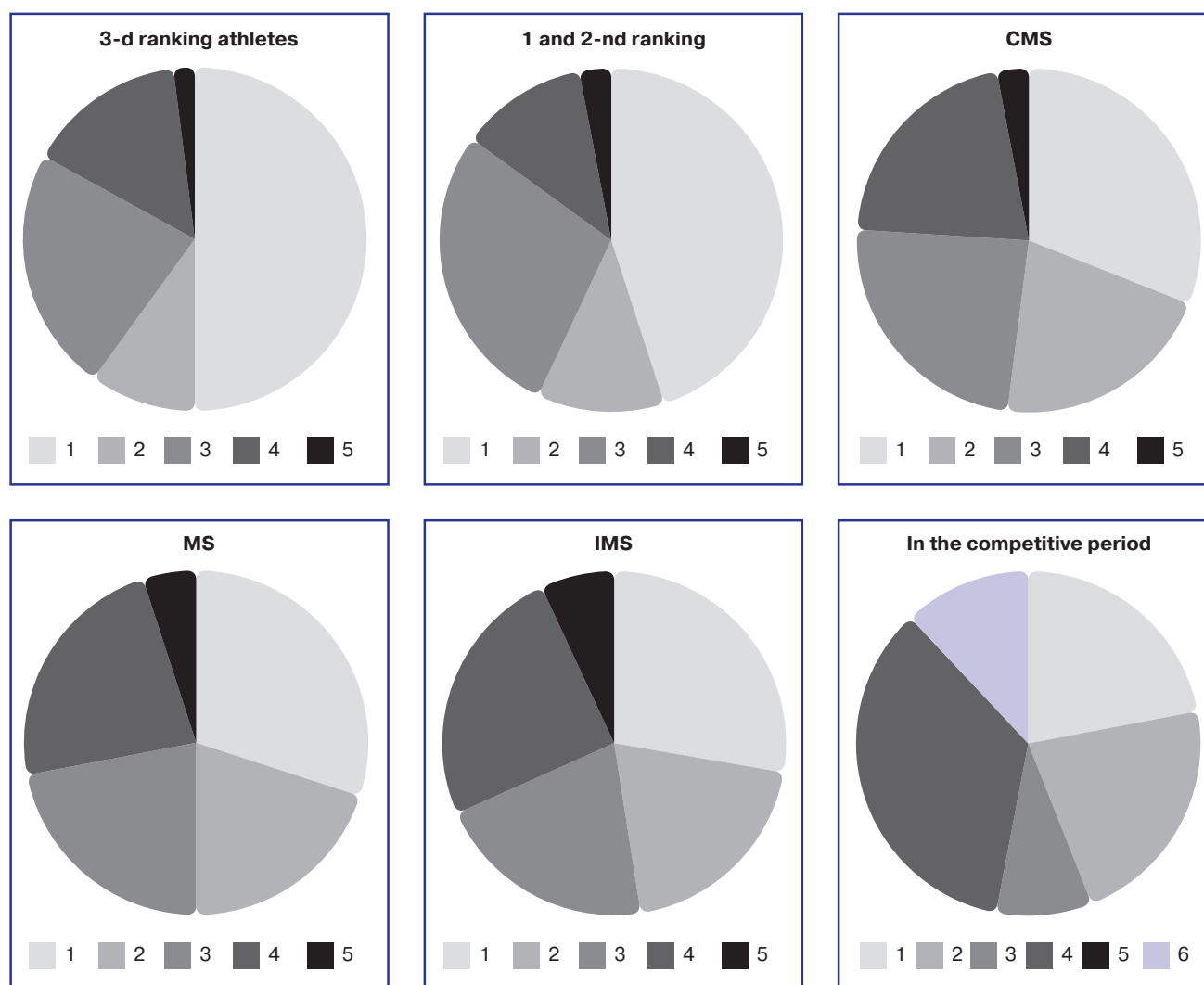


Figure 4. The average statistical training structure for athletes with different qualification

In the competitive period, we see that the main training proportion falls for workout, considering firing results. Roughly equal proportions on physical training and workout without cartridge, which are almost twice less than training considering firing results. Training without considering firing results is a small part of the total load during competitive period. Shooting in competitions is a tenth part of the total load in competitive period.

It was composed diagrams of the average statistical training structure for athletes with different qualification based on the analysis of all the data obtained (figure 4). 1, 2, 3, 4, 5, 6 – training exercises assessed according to ranking table (table 1) with 1, 2, 3, 4, 5, 6 scores, respectively.

- For 3-d ranking athletes a half of time falls for physical training; Approximately three equal parts: training without cartridge, training without

Table 5

The load intensity distribution in training of athletes with different qualification

Athlete's qualification	3-d ranking	1 and 2 – ranking	CMS	MS	IMS	Competitive period
load intensity, (I)	2.08	2.32	2.45	2.54	2.62	3.10



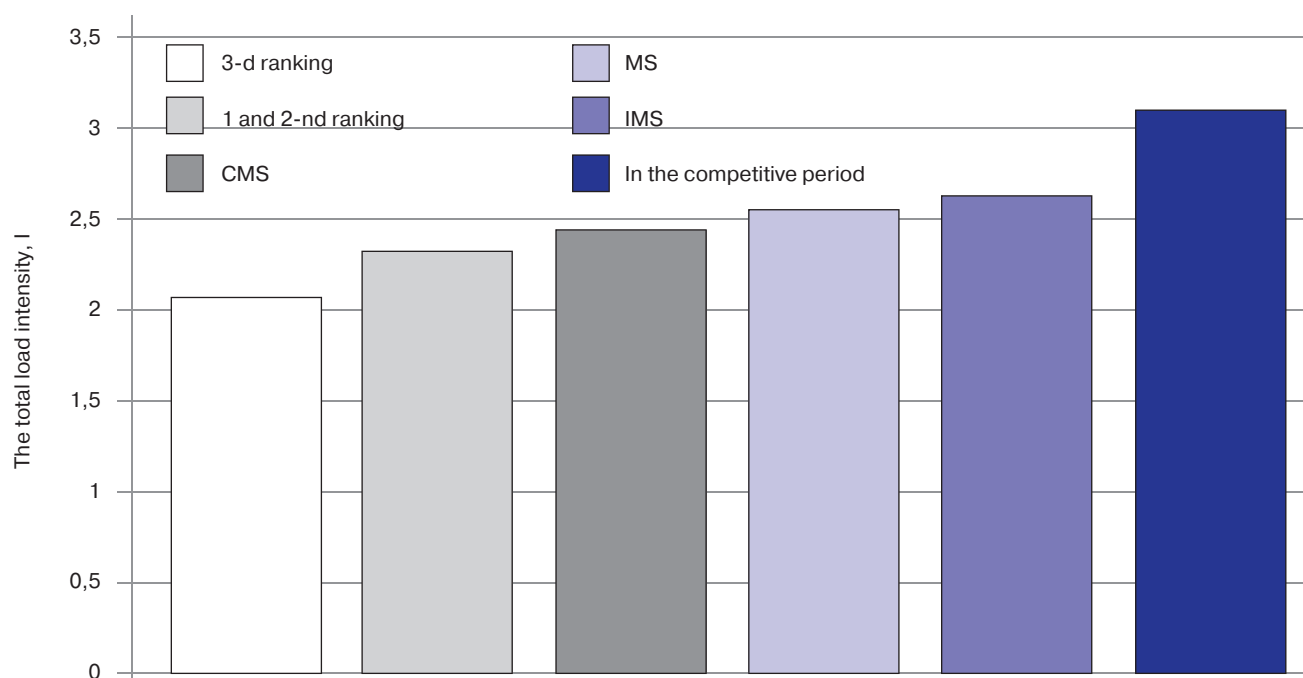


Figure 5. The total load intensity of athletes with different qualification in their training and competitive periods

considering firing results and training considering firing results; And completely slight segment – checking firing;

- In the following four diagrams, we can see a tendency of decreasing physical training proportion. In doing so the proportion of training without cartridge starts growing in the CMS level (Candidate to the Master of Sport) and further changes slightly;

- A training proportion without firing results increases for 1 and 2 ranking athletes and further decreases gradually returning to the initial value (3-d ranking);

- From the 3-d ranking to IMS (International Master of Sport) a proportion of training considering firing results gradually increases;

- A proportion of checking firing is also gradually increases;

- The distribution of load for all qualifications in competitive period is different from the athletes training structure in basic period. The training considering firing results is a major load proportion. Approximately the same load in equal parts fall for physical training and workout without cartridge. The rest of the load, approximately in equal proportions are: training without considering firing results and shooting in competitions.

We determined the total load intensity based on the training structure of athletes with different quali-

fication and according to the formula shown above (table 5).

In the figure 5 you can see a diagram showing the total load intensity of athletes with different qualification in their training and competitive periods.

A figure of dependence between the load intensity and athlete's qualification is represented according to the table 5 (figure 6). It shows three lines:

1-st – Load intensity in the training period, I<sub>1</sub>

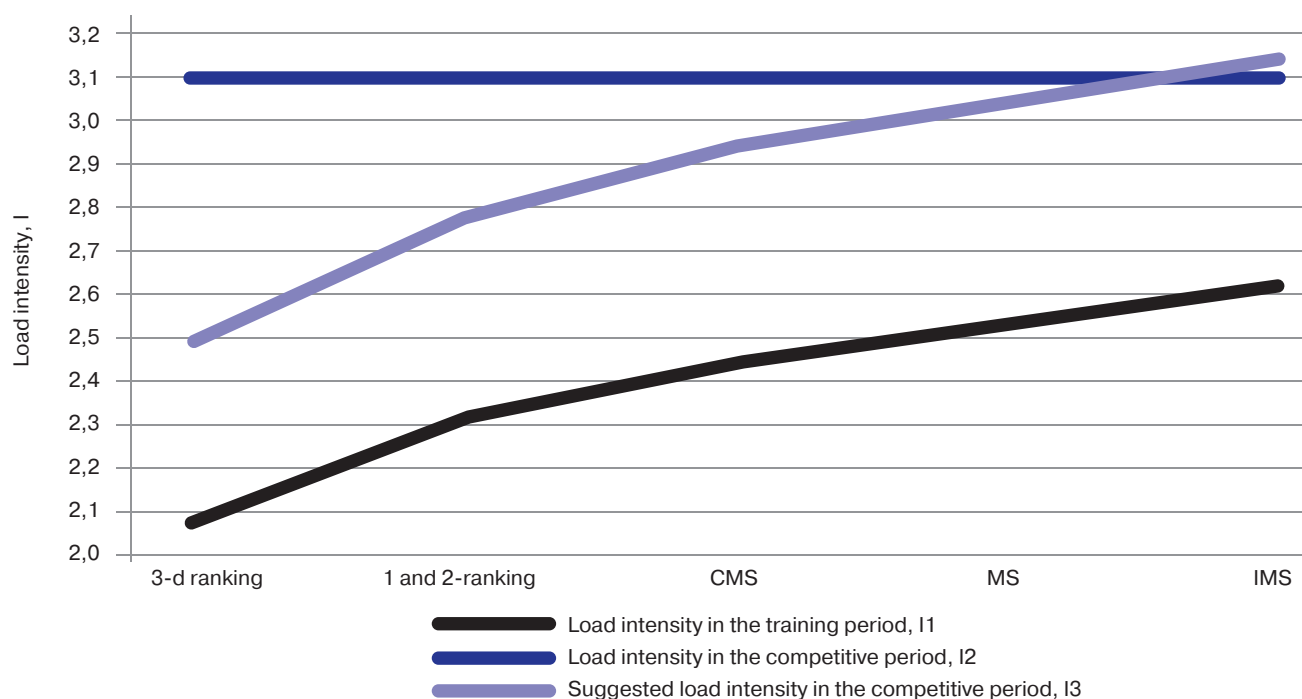
2-nd – Load intensity in the competitive period, I<sub>2</sub>

3-d – Suggested load intensity in the competitive period, I<sub>3</sub>

Thus, the load intensity in the competitive period increases relatively to the load intensity of the normal training for MS (Master of Sport) and IMS (International Master of Sport) by about 20% (18-22%).

For athletes with lower qualifications this growth is: 27%, 34% and 49% for CMS, 1 and 2 ranking athletes and 3 ranking athletes respectively. Such an increasing of intensity exhausts athletes, reduces physical condition, and can lead to worse results.

We do not recommend to increase the load intensity during competitive period by more than 20% relatively to the normal training cycle, as it observed in cases with athletes of MS and IMS qualifications. In this case, the load intensity decreases up to 2.5 – for 3-d ranking athletes, 2.8 – for 1 and 2 ranking athletes and 2.9 – for CMS (line I<sub>3</sub>, figure 6).



*Figure 6. Load intensity changes of clay pigeon shooters during training and competitive periods, depending on their qualification*

### Conclusion

1. Based on the ranking of load intensity exercises as well as survey data of athletes, specializing in clay pigeon shooting; with the help of the main recommendations of the basic educational-methodical manual in skeet shooting, it was determined a well-balanced training structure for shooters with different qualifications.

2. We established the athletes load intensity in different training periods. In the main training period it is about 2.1 – 2.6, and can rise to 20% in the competitive period. Depending on athletes' qualification, it is suggested to follow the obtained data on the load intensity levels in the training and competitive cycles.

3. A structure and load intensity levels determined make it possible to optimize the training process on physical and psycho-physiological efforts of an athlete to avoid overtraining and mental tiredness as well as to achieve high stable effectiveness in skeet shooting.

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