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SHARE OF TECHNICAL TRAINING IN THE PRE-COMPETITIVE PERIOD OF PERFORMANCE WEIGHTLIFTING

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Abstract

The purpose of this paper is to highlight the share of technical training means throughout the preparatory period, pre-competitive stage, in performance weightlifting.

Methods and procedures. This scientific approach has led to a study conducted in Sports Club „Olimpia" of Bucharest, along a period of 9 micro-cycles (12.III – 12.V.2012), with the performance target to participate in the National Championships for Seniors – qualifications. In this research we used the method of bibliographic study, method of pedagogic observation, method of experimental study, statistical-mathematical method (KyPlot) and graphical representation method (Excel). In order to highlight the share of technical training means, we analyzed the training programs of the pre-competitive stage, monitoring statistically the development of planning and performance parameters.

Results. The highlighting of the share of technical training means during the pre-competitive stage focused on the details of means planning content per each training micro-cycle in terms of number of reps, relation of specific means of technical training and strength within the training micro-cycles and the dynamics of effort parameters in each micro-cycle as well.

*Conclusions.*The share of effort parameters during the pre-competitive mezzo-cycle points out the number and the reps per each training micro-cycle, the relation of technical training and strength means assigned for the snatch style and the clean and jerk style, plus workouts for squats and back.

The study results reveal that ensuring an optimum relationship between the specific means of technical training and strength and the effort parameters in the pre-competitive stage leads to the improvement of execution technique in accordance with the development level of muscle strength of lower limbs and back, fact that confirms the hypothesis proposed by the results achieved in competition.

*Key words***:** weightlifting, technical training, planning, performance.

Introduction

One of the main problems in performance weightlifting refers to the gradual training of athletes for the execution of competition exercises in snatch style and clean & jerk style with a certain weight of the barbell, when athlete's body condition must be maximal. The factor that ensures optimum conditions for solving these problems is the rational sports technique (without violating competition rules) that helps the athlete to use efficiently the possibilities of the physical functional and psychological traits when he lifts a barbell with maximum weight (Dvorkin, 2005).

Physical training is one of the most important factors and in some cases, the most important ingredient of sports training in achieving great performance. The main objectives of physical training are to increase the athlete's physiological potential and to develop biometrical skills at the highest level (Bompa, 2002).

Specific physical training content is mostly oriented towards the development of the capacity for effort specific to a sports branch and of the motor skills involved, combined in a priority and differentiated manner, leading - ultimately – to specific efficiency. In some branches of sports the performance is strictly determined by the development of motor skills (in weightlifting - the strength, in rowing - the endurance) or by a complex of motor skills (in the case of sports games, combat sports, etc.) (Dragnea, 1996). Skilful use of strength exercises help restore the capacity for effort, alternating the muscle groups less engaged with the ones fully stressed, conditioning the effectiveness of training (Nicu, 1993).

Learning the technique of various branches of sport is generally characterized by the laws and acts and stages of the motor acts and actions, of course, with some differential specific notes, determined by the particularities of sport branches. (Dragnea, 1996). Relationships between technical components and technical styles are not present in all branches of sport, some of them have only technical styles (weightlifting) (Dragnea, Mate-Teodorescu, 2002).

The analysis of weightlifters' long-term training, at

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different levels of sports training, allows the discovery and study of individual characteristics. The data of the pedagogical control are basic for making decisions in terms of organization of athlete's training process. Thanks to their application, the prognostication of sports results improvement becomes more precise, there are highlighted the best models for the specific physical training, the elaboration of the transition stage of athlete's body, models that serve as checkpoints in the achievement of the main objectives. The effectiveness of coach's activity for the development of the training program increases significantly. This fact is manifested in the election of training cycles structure, physical exercises, their use in training sessions and the determination of the load (Marchenko; Dvorkin; Rogozjan, 1998).

The creation of the training process within mezzo-cycles raises topical questions in the specific strength training of the athletes. In the previous studies, the authors focused on some methodological approaches on the use of the mezzo-cycles oriented towards strength development. Special interest of the authors was directed to the characteristics of strength training throughout a longer period of preparation. The review of specialized literature has allowed establishing the fact that this part of sports theory and practice has been the subject of special attention from the specialists of the field. The determined objectives, the structure and contents of mezzo-cycles indicate the place of each one in various stages of the training (Bojko,1987; Verhoshanskij, 1985; Marchenko, Rogozjan, 1995; Matveev, 1991).

Weightlifters training is built in the form of training cycles, aimed at achieving high sports results at some point of time. Each training cycle is formed of periods meant to develop the specific fitness, to stabilize it and to lose it temporarily. These periods of the training are called preparatory, competitive and transitional periods. All together, these three periods form the training cycle or, by its other name, the big cycle (macro-cycle) (Roman, 1986).

One of the basic conditions in planning the weights for training is variety. The gradual increase of weights volume can be made only in classes of beginners and children, also in the case of the athletes ranked after the transition period, when a new annual training cycle (Roman, 1986).

The organization of training on the basis of mezzo-cycles allows systematic training in accordance with the main objective of the preparation period and stage; it makes possible an optimum dynamics of loads, the combination of different means and methods of training between the factors of pedagogical impact and the recovery activities. The number and structure of the competitive mezzo-cycles in athletes' training highlight the specific character of sports branch, the features of the competition calendar, the degree and level of the training for qualification. The combinations and total load of the micro-cycles that form mezzo-cycles depend often on the multi-annual training stage (Platonov, 2004).

In order to find correctly the main result in the strength workouts of the next mezzo-cycle, one must give necessarily the objective score for the special training level achieved by the athlete. It is very important to know the characteristics of the recovery indicators in various exercises. During this stage are made the decisions on the adaptation capacities of the athlete and his qualification, in accordance with the results obtained by choosing the means that have the best results presented earlier (Marchenko, Dvorkin, Rogozjan, Rudenko, 1997).

Effort parameters show the increase of effort parameters from one micro-cycle to another by increasing the loads, the number of series and reps; the progressive increase of effort parameters, maintaining their maximum level; diminution of volume before competitive period; dynamics of effort parameters as for the relationship between technical and physical training (Potop, 2010).

The fundamental structure of training sessions is based on certain physiological, psychological and pedagogical principles. The duration of the training sessions is outlined by the optimization of the training factors and depends on the specific character of the sports branch and on athlete's individual capacities. Three structural levels can be identified in the training process: microstructure – structure of separate workouts and micro-cycles; mezzo-structure- structure of medium cycles and the training stages, including a series of different types of micro-cycles; macro-structure – structure of large cycles (macro-cycle) (Dvorkin, 2005).

The means of training or lesson consist of the physical exercises assembly that ensures transformations and improvements of different performance factors. The specific means have an increasing share in the macro-cycles, meaning that their presence is reduced in the first micro-cycles, then they are more and more often repeated in proportion as the middle of the pre-competitive period gets closer. During the competitive period, the specific means are diminished, leaving the main place to the means of competitive nature. (Dragnea, Teodorescu, 2002).

The purpose of this paper is to highlight the share of technical training means throughout the preparatory period, pre-competitive stage, in performance weightlifting.

Methods

Hypothesis of the paper. We consider that an optimum relationship between the specific training means for technique and strength and the effort parameters in competitive period will lead to the improvement of execution technique, in conformity with the development level of muscle strength of the lower limbs and of the back.

This scientific approach has led to a study conducted in Sports Club „Olimpia" of Bucharest, along a period of 9 micro-cycles (12.III – 12.V.2012), with the performance target to participate in the National Championships for Seniors – qualifications. In this research we used the method of bibliographic study, method of pedagogic observation, method of experimental study, statistical-mathematical method (KyPlot) and graphical representation method (Excel). In order to highlight the share of technical training means, we analyzed the training programs of the pre-competitive stage, monitoring statistically the development of planning and performance parameters.

Results

Table no. 1. Share of the number of reps in pre-competitive stage (2012)

Mc No.	Date	No of reps	Technique / strength %	Snatch / Clean&Jerk %	Squats / Back Ex. %	Chest squats / Back squats %	Pulls / bending %
1	19-24.III	600	30 / 70	40/ 60	60 / 40	55 / 45	70 / 30
2	26-31.III	500	30 / 70	40 / 60	60 / 40	50 / 50	70 /30
3	2-7.IV	600	30 / 70	45 / 55	55 /45	40 / 60	60 /40
4	9-14.IV	500	30 / 70	45 / 55	55 / 45	45 / 55	65 /35
5	16- 21.IV	600	30 / 70	50 / 50	50 / 50	40 / 60	60 /40
6	23- 28.IV	500	30 / 70	50 /50	55 / 45	45/55	65/35
7	30.IV- 5.V	600	30 / 70	45/55	60/40	50 /50	60/ 40
8	7- 12.V	500	30 / 70	45 /55	65/ 35	45/ 55	60 /40
9	14- 19.V	400	30 / 70	50 / 50	60 / 40	45 / 55	65 /35

Table no. 1 shows the share of the number of reps in the pre-competitive stage of training of the junior weightlifters subjects of the study, in terms of number of micro-cycles, period of training conduct, total number of reps per each micro-cycle, share and number of reps of the technical and strength training.

Table no. 2. Relationship of the number of reps of the technical and strength training means in pre-competitive period.

MiC No.	Reps no.	Technique / strength %		Reps	
1	600	30	70	180	420
2	500	30	70	150	350
3	600	30	70	180	420
4	500	30	70	150	350
5	600	30	70	180	420
6	500	30	70	150	350
7	600	30	70	180	420
8	500	30	70	150	350
9	400	30	70	120	280
Mean	**533.33**			**160.00**	**373.33**
SEM	23.57			7.07	16.49
SD	70.71			21.21	49.49
Cv%	13.25			13.25	13.25
Sum	4800			1440	3360

Note: MiC no.– number of micro-cycle, SEM – standard errors deviation, SD – standard deviation, Cv – coefficient of variability.

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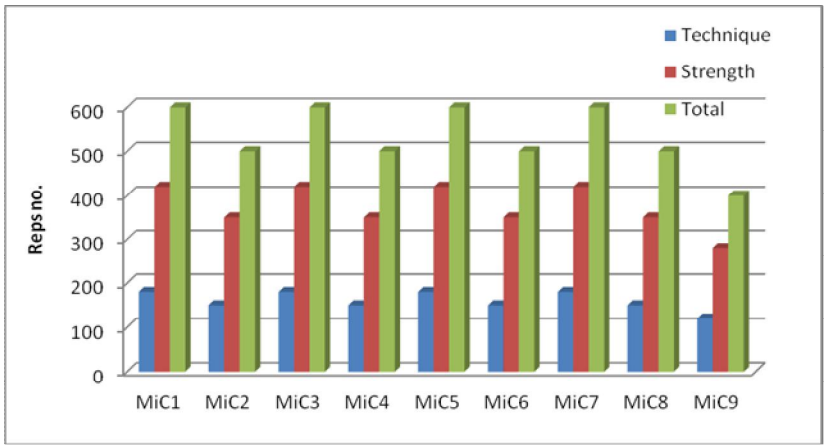

Fig.no. 1. Dynamics of reps number of technical and strength training means in pre-competitive stage

Table no. 2 and figure no. 1 show the relationship and the dynamics of technical and strength training means in the pre-competitive period of junior weightlifters.

Table no. 3. Distribution of reps number for strength training in pre-competitive stage

MiC	Reps no.	Squats (reps no.)			Back exercises (reps no.)			
		Total	Front barbell	Back barbell	Total	Pulls snatch	Pulls clean&jerk	Bending
MiC1	420	252	138	114	168	50	66	52
MiC2	350	210	105	105	140	40	58	42
MiC3	420	231	92	139	189	50	62	77
MiC4	350	192	87	105	158	45	57	56
MiC5	420	210	95	115	210	55	71	84
MiC6	350	182	82	100	168	52	60	56
MiC7	420	252	126	126	168	46	56	67
MiC8	350	227	102	125	123	32	42	49
MiC9	280	168	75	93	112	30	42	40
Mean	**373.33**	**213.78**	**100.22**	**113.56**	**159.56**	**44.44**	**57.11**	**58.11**
SEM	16.49	9.86	6.83	4.84	10.27	2.92	3.26	5.03
SD	49.49	29.58	20.48	14.52	30.84	8.77	9.76	15.09
Cv%	13.25	13.83	20.43	12.79	19.75	17.09	17.09	25.97
Sum	3360	1924	902	1022	1436	400	514	523

Fig. no. 2. Number of reps of strength exercises in pre-competitive stage

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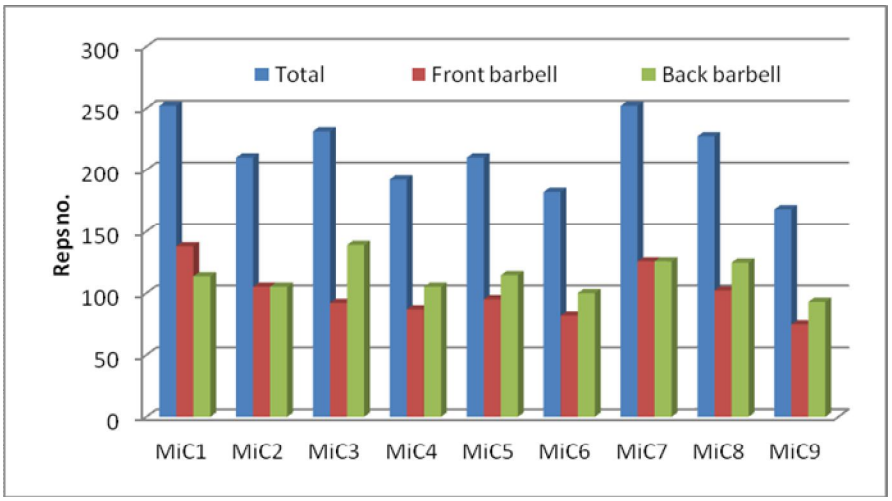

Fig. no. 3. Number of reps of squats exercises in pre-competitive stage

Table no. 2 and figures 2, 3 and 4 show the distribution of reps number of the means for strength training in pre-competitive stage in terms of number of micro-cycles, number of reps of front and back squats, exercises for back in snatch style and in clean and jerk style; there are also listed the results of the statistical indicators of the means for strength training.

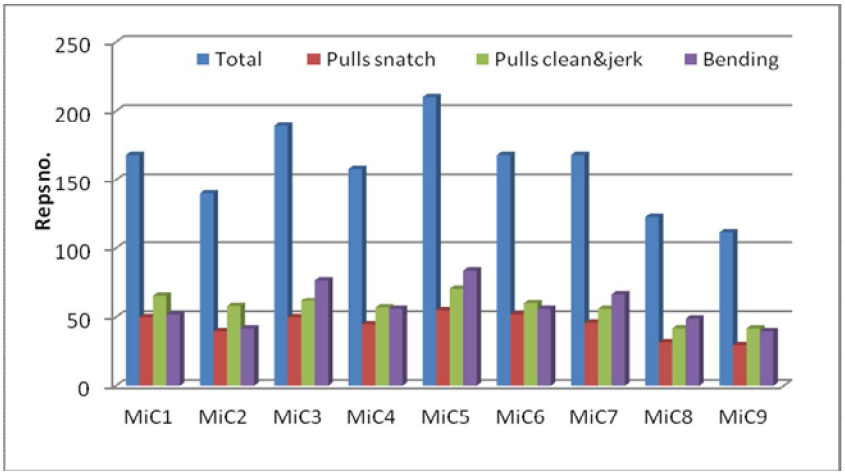

Fig.no. 4. Number of reps of back exercises in pre-competitive stage

Table no. 3. Distribution of reps number for technical training in pre-competitive stage

MiC	No. of total reps	Snatch style, (reps no.)	Clean & Jerk style (reps no.)
MiC1	180	72	108
MiC2	150	60	90
MiC3	180	81	99
MiC4	150	68	82
MiC5	180	90	90
MiC6	150	75	75
MiC7	180	81	99
MiC8	150	68	82
MiC9	120	60	60
Mean	**160.00**	**72.78**	**87.22**
SEM	7.07	3.35	4.81
SD	21.21	10.05	14.44

Cv%	13.25	13.82	16.56
Sum	1440	655	785

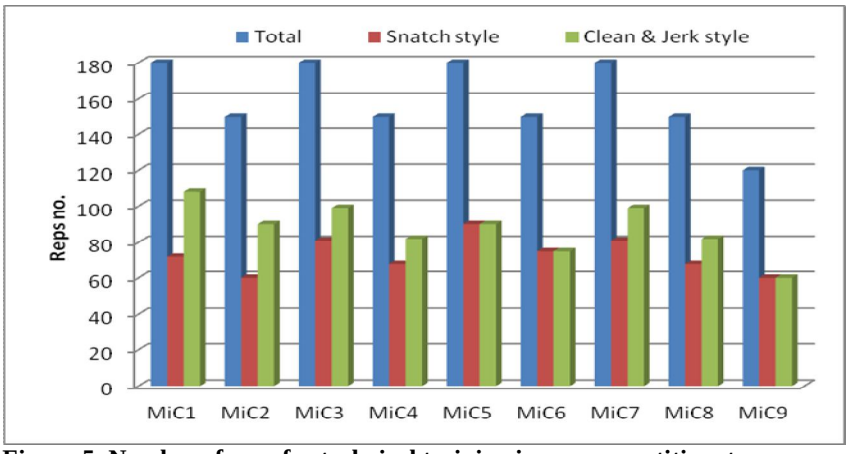

Fig.no. 5. Number of reps for technical training in pre-competitive stage

Table no. 3 and figure no. 5 show the distribution of reps number for technical training in pre-competitive stage in terms of micro-cycle number, total number of reps and statistical indicators of these ones.

Table no. 4. Results of competitive performances - N.C. for Seniors

Full name	Class (kg)	Weight in competition	Snatch	Clean and jerk	Total	Ranking Sn.	Ranking C&J	Ranking T.
V.V.	56	55.80	95	112	207	2	1	1
P.N.	62	61.70	101	126	227	5	3	5
R.R.	85	79.80	120	146	266	3	3	3
D.R	94	92.95	120	145	265	2	2	2
Mean		**72.56**	**109**	**132.25**	**241.25**			
SEM		8.50	6.47	8.17	14.58			
SD		17.00	12.93	16.34	29.17			
Cv%		23.43	11.87	12.35	12.09			

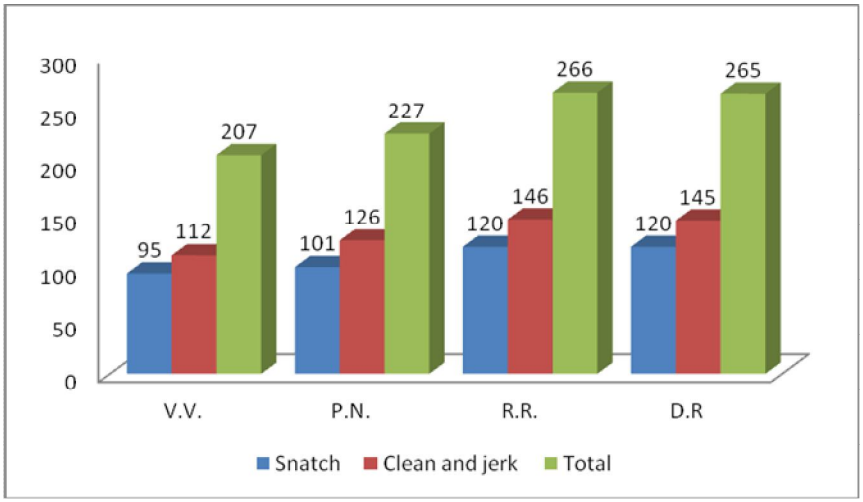

Fig.6. Results of competitive performances - N.C. for Seniors

In table no. 4 and figure no. 6 are listed the results achieved in competition during the National Championship for seniors regarding the competition classes, weight in competition, performances achieved in competition at snatch style, clean and jerk style and total of styles.

Discussions

The Bulgarian training approach is unique in that it does not deal with percentages of maximum or expected maximum lifts, a procedure common to weightlifting training for at least the last four decades (Abadjiev, I. 1989). The Soviet-derived system may be even more diversified than it appears to be on the surface due to the aforementioned geopolitical factors. The widely dispersed elite-level coaches tended to develop and emphasize the successes of their own training methods, albeit within fairly narrow limits. This situation may lead to more variation in training programme design, especially when considering the lack of prolonged strong leadership that Bulgaria has enjoyed under former national coach Ivan Abadjiev (Paavo V. Komi, 2003)

Two or more complete cycles (preparatory + competition) may fit into a training year. Stone *et al*. (1981) have proposed and successfully tested a periodized model of strength–power training with sequential phases that change rather drastically. For example, a phase to increase muscle size (5 sets of 10 repetitions in squat and pulling exercises), a phase to improve basic strength (3–5 sets of 5 repetitions), a phase to improve speed–strength (3–5 sets of 3 repetitions), and a phase to 'peak' for competition (1–3 sets of 1–3 repetitions). The use of 10 repetitions per set is higher than typically recommended in the early preparation phase but has proved to be successful in a number of studies (e.g. Stone *et al*. 1982).

Regarding the share of reps number in pre-competitive stage, we notice: 9 training micro-cycles, a total number of 4800 reps per stage with a mean of 533.33 reps, a relationship of 30 / 70% of the share of technical and strength training means, with a total number of 1440 reps and an average of 160 reps per stage at technical training and a total amount of 3360 reps and an average of 373.33 reps per stage at strength means.

As for the distribution of reps number during the strength training, we notice a total amount of 1924 reps for squats exercises divided as follows: 902 front barbell squats and 1022 back barbell squats. In the case of back exercises, the total number of reps is 1436 divided into 400 reps pulls exercises for snatch style, 514 reps for jerk pulls and 523 reps for bending.

Concerning the distribution of technical training means in pre-competitive period, we notice a total number of 1440 reps and an average of 160 reps per stage, divided as follows: at snatch style - a total of 655 reps and 785 reps at clean and jerk style.

In terms of effort parameters planning throughout the training macro-cycle for the National Championships for seniors, one can highlight that the athletes-subjects of the research have an average weight in competition of 72.56 kg, a mean of the performances in snatch style of 109kg, 132.25kg in clean and jerk and a total of 241.25kg. These results led to the ranking on 1st, 2nd, 3rd and 5th places at the total of the two styles.

Conclusions

We highlighted the number of reps during pre-competitive stage by providing a ratio of 30/70 % of the technical and strength training means, expressed by the total number of reps and their average throughout training period.

We pointed out the distribution of reps number by dividing the strength exercises by front barbell squats and exercises for the back divided into pulls exercises for snatch style and for clean and jerk style and bending exercises.

The share of effort parameters during the pre-competitive mezzo-cycle points out the number and the reps per each training micro-cycle, the relation of technical training and strength means assigned for the snatch style and the clean and jerk style, plus workouts for squats and back.

The study results reveal that ensuring an optimum relationship between the specific means of technical training and strength and the effort parameters in the pre-competitive stage leads to the improvement of execution technique in accordance with the development level of muscle strength of lower limbs and back, fact that confirms the hypothesis proposed by the results achieved in competition.

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