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The effect of a training program using concentric/overload eccentric exercises on maximum strength, achievement record and some dynamic variables of snatch lift

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Abstract. This research aimed to find the effect of using Concentric/Overload Eccentric Exercises (Co/OvEc-Exs) to improve maximum strength (MS) level in the weightlifting training program on both of (M.S.) level, achievement record of snatch lift (ARSF). In addition, dynamic variables of Time (Ti), acceleration (Ac), work (Wo), and power (Po), through the two phases of (drop & turnover under the barbell) and (catch & stable standing) of snatch lift. The researcher used the experimental method by the design of per – post measurements of two equal groups, one of them was the control group (Cl group) and the other was the experimental group (El group), each group consisted of 5 weightlifters. Equality between the two groups was conducted in variables of age – height – weight – training age, MS variables of the performance level on tests of Clean – Jerk – Power Squat – Front Squat – Snatch Pull, ARSF, and those dynamic variables. To achieve the research purpose, a training program was applied for 10 weeks on the two groups. It included 30 training units – 3 units weekly, MS exercises for Cl group were performed in the traditional mode – concentric/eccentric exercises Co/Ec-Exs, in which the concentric and eccentric portions of the exercise cycle was performed with a constant weight which was equivalent 80-90٪ of the weightlifter's maximum load. While the same exercises were performed for the (El group) in the intended non-traditional mode of the research – (Co/Ov Ec-Exs) in which the concentric portion was performed with 80 - 90٪ load but the eccentric portion was performed with an equivalent load to 110 - 120٪ of the weightlifter's maximum load and this portion must be performed in a period of 3-5 sec. This was with taking into account that the concentric portion of all exercises for the two groups must be performed explosively. The research results indicated that there were statistically significant differences between the post-measurements of the two groups in all of the experimental variables. Based on these results, it was concluded that the Co/OvEc-Exs are more efficient than Co/Ec-Exs in improving the level of MS which leads to improve the dynamic variables of performing snatch lift, and all of these in turn leads to improve ARSF.

Keywords. Concentric/overload eccentric, maximum strength, snatch lift.

Introduction

Improving the maximum strength MS is considered one of the most important training tasks of the training programs in all sports in general but in the training programs of weightlifting sport in particular. And it is the most important factor affecting the level of explosive power (Dietmar, 2010), which is in turn the most important factor affecting the success of performing the Olympic lifts in weightlifting sport especially for the snatch lift (Ikeda et al., 2012; Kristof & Chad, 2015; Pat, 2014; Schilling, 2002). Since it is a single maximal performance, in which the weightlifter raises. The bar from the ground to the position of stretched arms over the head in one continuous motion without any interruption (Benjamin et al., 2014; Jones & John, 2010; Kalichova, 2016; Zachary, 2010).

During the performance of strength exercises, the muscles work in three types of actions, which are the concentric, overcoming, or positive action in which the muscle shortens and overcomes. The resistance it faces, the eccentric, yielding or negative action in which the muscle lengthens under the stress of the

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resistance it faces, and the isometric or constant action in which the muscle doesn't change its length & neither overcome the resistance it faces nor permits it to be overcome (AbouGamil, 2015; Christian, 2007). Eccentric muscular action is characterized by its nature that the athlete's ability to exert force through it is greater than his ability to exert force during any of the other two types of muscular action; it attains greater muscular stimulation in order to gain strength (AbouGamil, 2015; Christian, 2003; Farthing & Chilibeck, 2003; Friedmann-Bette et al. 2010; Higbie et al. 1996; Kramer & Goodyear, 2007; Nosratollah & Deborah, 2015). It recruits the fast fibers of the muscle in the action than the other two types of muscular actions (Christian, 2007; Farthing & Chilibeck, 2003; Hortobágyi et al., 1996; Kramer & Goodyear, 2007). In addition, it is also less energy consuming than both eccentric and isometric muscular actions (LaStayo et al.; Nosratollah & Deborah, 2015). This is called for the creation of non-traditional modes of performing strength exercises. That rely mainly on eccentric muscular action, during which the resistance, which the muscle faces, can be greater than the maximum concentric contraction of the muscle, these exercises are known as the eccentric exercises (AbouGamil, 2015; Cronin & McNair & Marshall, 2003; Johnny & Guillaume & Karim, 2013; Kramer & Goodyear, 2007; Michael & Hans, 2014; Nosratollah & Deborah, 2015). In contrast, some researchers found that these exercises can raise the total level of concentric and eccentric strength together to a higher level than exercises which rely mainly on concentric muscular action. Which are known as the concentric or traditional exercises (Hilliard et al., 2003), but the eccentric exercises rise the level of concentric strength to a lower level. Than the concentric exercises, because the nervous system doesn't respond to the eccentric exercises in the effective neurotic pattern to exert force through the concentric contraction, while the concentric contractions are the most important to achieve the motor tasks in sports (Fang et al., 2011; Grabiner & Owings, 2002).

The mode of performing the traditional or concentric/eccentric exercises Co/Ec-Exs is through which the muscles repeat the exercise cycle in two portions, one performed by the concentric muscular action, the other performed by the eccentric muscular action, and the two portions is performed against a constant degree of resistance. This has led many researchers to critique this mode because the degree of resistance which faces the muscle during the concentric portion may be appropriate for this portion, but it is less than achieving the appropriate muscular stimulation during the eccentric portion because of the muscle capability to exert force during this portion is higher, than during the concentric portion. In addition, this limits the development of strength during the exercises performed in this traditional mode (Christian, 2007, 2003), thus a non-traditional mode of performing strength exercises was created to achieve greater muscular stimulation during the eccentric portion of the exercise. This was the mode of the concentric/overload eccentric exercises (Co/Ov Ec-Exs), in which the muscles perform the same exercise cycle in the traditional mode, but with a higher degree of resistance which faces the muscles during the eccentric portion of the exercise cycle than that resistance degree which faces the muscles during the concentric portion of the cycle (AbouGamil, 2015; Christian, 2007). The researcher suggested that using this non-traditional mode in weightlifters training programs can increase the effectiveness of the program to develop the (MS) more than the traditional mode. Which motivated the researcher to investigate the effect of using Co/OvEc-Exs in a training program for weightlifters through this research on MS and the level of achievement record of snatch lift ARSF.

The snatch lift is considered the most demanding competition for proper technique in weightlifting sport due to the necessity of performing it in a single explosive movement (Erbil & Ahmet, 2014; Gourgoulis et al., 2000; Owen et al., 2016). The variables of time Ti, acceleration Ac, work Wo, and power Po, are the most dynamic variables affecting the success of snatch lift (Anthony, 2009; Benjamin et al., 2014 ; Dietmar, 2010; Gregory & Sophia, 2012; Haff, 2005; Kawamori & Haff, 2004; Newton & Dugan, 2002; Owen et al., 2016; Sato & Sands & Stone, 2012; Stone et al., 2002). And the two phases of (drop & turnover under the barbell) and (catch & stable standing) are the two most important phases of the snatch lift performing (Paul et al., 2014; Schilling, 2002). Since the non-traditional mode to perform MS exercises which is intended of this research can have an effect to develop MS which is turn one of the most important factors affecting these variables (Aly, 1990), the researcher suggested that it is important to recognize the effect of using that mode on those variables in these two phases.

From the above, this research aimed to find the effect of using Co/OvEc-Exs for improving MS level

in the weightlifting training program on both of MS level, ARSF, and dynamic variables of Ti, Ac, Wo, and Po, through the two phases of (drop & turnover under the barbell) and (catch & stable standing) of snatch lift.

Materials & Methods

The researcher used the experimental method by using of per - post-measurements of two groups. The sample was selected purposely from weightlifters of El-saha El-shabia Club at Port Said in Egypt, which were Registered in the Egyptian Federation of weightlifting, sample was divided into two groups, one was the control group (Cl group) and the other was the experimental group (El group), each group consisted of five weightlifters. The two groups were characterized as follows: The Cl group (age 16.00 ± 1.78 years, length 155.60 ± 10.21 cm, weight 65.20 ± 17.79 kg). The El group (age 16.40 ± 1.81 years, length was 158.80 ± 1.09 cm, weight is 66.40 ± 17.24 kg).

The training program [Annex (1)] was applied for 10 weeks from 6/2 to 15/4/2016 and included 30 training units with weekly 3 training units, these were on Saturday, Monday& Wednesday for the Cl group, and were on Sunday, Tuesday & Thursday for the El group. The MS exercises for Cl group were performed in the traditional mode – Co/Ec-Exs – in which the concentric and eccentric portions of the exercise cycle was performed, with a constant weight, which was equivalent 80-90٪ of the weightlifter's maximum load. While the same exercises were performed for the (El group) in, the intended non-traditional mode of the research – Co/OvEc-Exs – in which the concentric portion was performed with 80 - 90٪ load but the eccentric portion was performed with an equivalent load to 90 - 120٪ of the weightlifter's maximum load. In addition, this portion must be performed in a period of 3-5 sec; this was with taking into account that the concentric portion of all exercises for the two groups must be performed explosively.

The per-measurements were conducted for the weightlifters of the two groups in the period of 30/1-5/2/6/ 2016. The basic variables, which were measured [age, height, weight & training age]. In addition, the experimental variables, which were the SM variables, represented in the performance level on [Clean – Jerk – Power Squat – Front Squat – Snatch Pull] tests. Which had been used in many researches with age groups matching the research sample (Ebada, 2013, 2011; Ebada & Abd-El-Hady, 2013). And the dynamic variables under the research [Ti, Ac, Wo, & Po] through the two phases of (drop & turnover under the barbell) and (catch & stable standing) of snatch lift using a device (Damas 7 - 3D) for motor analysis at the Faculty of Physical Education in Port Said, in additional to (ARSF).

The post-measurements were conducted for the weightlifters of the Co & El groups in the period of 16-22/4/2016 after the completion of applying the training program of the research, using the same tests and devices which mentioned previously in the per-measurements.

Statistical analyses

Statistical analysis was carried out using the SPSS package to calculate the statistical differences between the pre & post-measurements of the Cl group and El group using the Mann-Whitney and Wilcoxon tests.

Results

The following table shows the per-measurements data of the two groups in each of the experimental variables and the parity between them.

In table 1, it is clear that the statistical significance of the Mann-Whitney Test of the differences between the two groups in the per-measurements in the performance level on the MS tests, in the level of the dynamic variables under the research. In addition, in the level of ARSF were all statistically insignificant, where $P>0.05$ was to all these differences. In addition, this indicates the parity of the two groups before the applying of the training program of the research.

The following table shows the results of pre & post-measurements of the Cl group in all the experimental variables, the differences between these measurements, and their statistical significances.

In Table 2, it is clear that the statistical significance of the Wilcoxon Signed-Ranks Test of the differences between per & post-measurements in the performance level on the MS tests, in the level of dynamic variables under the research. In addition, in the level of ARSF were all in favor of the post-measurements, as they were all statistically significant, where $P\leq0.05$ was to all these differences, this indicates that the traditional training program of the Cl group affected positively in improving this group levels in all these variables.

Table 1.
Data of the per-measurements of Cl & El groups and statistical significance of the differences between them.

	Variables		Cl Group (n=5)		El Group (n=5)		Diff.	Z	p
			Mean	SD	Mean	SD			
1	SM variables	Clean (kg)	52.80	10.35	51.00	14.19	1.80	-0.733	0.463
2		Jerk (kg)	51.50	8.94	46.40	13.22	5.10	-0.649	0.517
3		Power Snatch (kg)	63.50	7.20	74.90	7.99	-11.40	-1.786	0.074
4		Front Squat (kg)	83.00	7.79	96.10	13.83	-13.10	-1.366	0.172
5		Back Squat (kg)	90.50	12.04	107.60	12.60	-17.10	-1.370	0.171
6		Snatch Pull(kg)	80.50	3.71	84.90	4.48	-4.40	-1.504	0.133
7	Dynamic variables of drop & turnover under the barbell phase	Ti.1 (sec)	0.55	0.05	0.54	0.04	1.00	-0.649	0.517
8		Ac.1 (m/s2)	2.92	1.15	3.74	0.51	-0.82	-1.156	0.240
9		Wo.1 (J)	414.4	56.57	421.66	71.23	-7.22	-0.525	0.599
10		Po.1 (kg.sec)	750.3	100.2	774.2	113.6	23.90	-0.736	0.462
11	Dynamic variables of catch & stable Standing phase	Ti.2 (sec)	0.67	0.03	0.66	0.02	0.01	-0.750	0.448
12		Ac.2 (m/s2)	2.00	0.51	2.44	0.42	-0.44	-1.366	0.172
13		Wo.2 (J)	456.8	65.19	464.8	71.75	-7.95	-0.946	0.344
14		Po.2 (kg.sec)	706.9	30.24	714.6	34.45	-7.59	-0.946	0.344
15	ARSF (kg)		83.70	6.72	84.50	7.58	0.00	-0.964	0.335

Table 2.
Data of the pre & post-measurements of the Cl group and statistical significance of the differences between them.

	Variables		Pre-Measurements		Post-Measurements		Diff.	Z	p
			Mean	SD	Mean	SD			
1	SM variables	Clean (kg)	52.80	10.35	60.00	7.91	7.20	-2.032	0.042*
2		Jerk (kg)	51.50	8.94	57.80	7.36	6.30	-2.032	0.042*
3		Power Snatch (kg)	63.50	7.20	69.50	7.75	6.00	-2.032	0.042*
4		Front Squat (kg)	83.00	7.79	87.00	6.71	4.00	-2.070	0.038*
5		Back Squat (kg)	90.50	12.04	89.50	5.76	8.00	-2.041	0.041*
6		Snatch Pull (kg)	80.50	3.71	90.50	3.71	10.00	-2.060	0.039*
7	Dynamic variables of drop & turnover under the barbell phase	Ti.1 (sec)	0.55	0.05	0.46	0.08	-0.09	-1.971	0.050*
8		Ac.1 (m/s2)	2.92	1.15	3.12	1.13	0.20	-2.032	0.042*
9		Wo.1 (J)	414.4	56.57	449.0	28. 31	34.58	-2.032	0.042*
10		Po.1 (kg.sec)	750.3	100.2	823.7	78.45	73.38	-2.201	0.028*
11	Dynamic variables of catch & stable Standing phase	Ti.2 (sec)	0.67	0.03	0.66	0.03	-0.01	-2.070	0.038*
12		Ac.2 (m/s2)	2.00	0.51	2.18	0.43	0.18	-2.032	0.042*
13		Wo.2 (J)	456.8	65.19	495.8	25.12	38.95	-2.032	0.042*
14		Po.2 (kg.sec)	706.9	30.24	828.2	14.73	121.3	-2.032	0.042*
15	ARSF (kg)		83.70	6.72	87.50	4.33	3.80	-2.121	0.034*

The following table shows the results of pre & post-measurements of the El group in all the experimental variables, the differences between these measurements, and their statistical significances.

It is clear from the Table 3 that the statistical significance of the Wilcoxon Signed-Ranks Test of the differences between per & post-measurements in the performance level on the MS tests, in the level of dynamic variables under the research, and in the level of ARSF. Were all in favor of the post-measurements, as they were all statistically

significant, where P≤0.05 was to all these differences, this indicates that the experimental training program of the El group affected positively in improving this group levels in all these variables.

The following figure shows the percentages of progress from the per-to-post measurements of each of the two research groups in all experimental variables.

It is clear from the Figure 1 that the progress percentages of the Ex-group exceeded the progress percentages of the Co-group in all variables, and that the progress of the time variables was in the opposite direction of the other variables, which is consistent with the nature of the time variables.

Table 4 shows the results of the post-measurements of the two research groups regarding each of the experimental variables, the differences between the two measures regarding each of these variables, and their statistical significances.

Table 3.

Data of the pre & post-measurements of the El group and statistical significance of the differences between them.

	Variables		Pre-Measurements		Post-Measurements		Diff.	Z	p
			Mean	SD	Mean	SD			
1	SM variables	Clean (kg)	51.00	14.19	76.40	7.89	25.40	-2.023	0.043*
2		Jerk (kg)	46.40	13.22	71.20	6.30	24.80	-2.023	0.043*
3		Power Snatch (kg)	74.90	7.99	8580	11.04	10.90	-2.060	0.039*
4		Front Squat (kg)	96.10	13.83	125.00	28.28	28.90	-2.032	0.042*
5		Back Squat (kg)	107.6	12.60	119.50	7.98	11.90	-2.032	0.042*
6		Snatch Pull (kg)	84.90	4.48	105.0	7.71	20.10	-2.032	0.042*
7	Dynamic variables of drop & turnover under the barbell phase	Ti.1 (sec)	0.54	0.04	0.44	0.04	-0.10	-1.981	0.050*
8		Ac.1 (m/s2)	3.74	0.51	6.41	1.40	2.67	-2.032	0.042*
9		Wo.1 (J)	421.7	71.23	569.1	78.27	174.4	-2.032	0.042*
10		Po.1 (kg.sec)	774.2	113.1	1240.9	156.3	466.6	-2.032	0.042*
11	Dynamic variables of catch & stable Standing phase	Ti.2 (sec)	0.66	0.02	0.54	0.08	-0.12	-2.032	0.042*
12		Ac.2 (m/s2)	2.44	0.42	3.34	0.51	0.90	-2.032	0.042*
13		Wo.2 (J)	464.8	71.75	657.9	82.36	193.1	-2.032	0.042*
14		Po.2 (kg.sec)	714.6	34.45	1240.4	257.3	525.8	-2.032	0.042*
15	ARSF (kg)		84.50	7.85	102.9	8.38	18.40	-2.121	0.034*

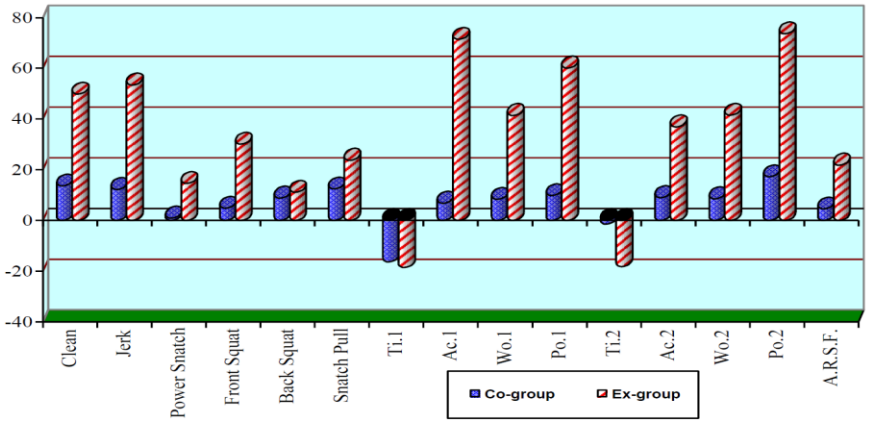

Figure 1. The progress percentages of the two research groups.

Table 4.
Data of the post-measurements of Cl & El groups and statistical significance of the differences between them.

	Variables		Cl group		El group		Diff.	Z	p
			Mean	SD	Mean	SD			
1	SM variables	Clean (kg)	60.00	7.91	76.40	7.89	16.40	-2.312	0.021*
2		Jerk (kg)	57.80	7.36	71.20	6.30	13.40	-2.522	0.012*
3		Power Snatch (kg)	69.50	7.75	85.80	11.04	16.30	-2.530	0.011*
4		Front Squat (kg)	87.00	6.71	125.0	28.28	38.00	-2.538	0.011*
5		Back Squat (kg)	98.50	5.76	119.5	7.98	21.00	-2.652	0.008*
6		Snatch Pull (kg)	90.50	3.71	105.0	7.71	14.50	-2.530	0.011*
7	Dynamic variables of drop & turnover under the barbell phase	Ti.1 (sec)	0.55	0.05	0.44	-0.04	-0.11	-2.234	0.025*
8		Ac.1 (m/s2)	3.12	1.13	6.41	1.40	3.29	-2.207	0.027*
9		Wo.1 (J)	449.0	28.31	596.1	78.27	147.1	-2.207	0.027*
10		Po.1 (kg.sec)	823.7	78.45	1240.9	156.3	417.3	-2.627	0.009*
11	Dynamic variables of catch & stable Standing phase	Ti.2 (sec)	0.66	0.03	0.54	0.08	-0.12	-3.463	0.014*
12		Ac.2 (m/s2)	2.18	0.43	3.34	0.51	1.16	-2.417	0.016*
13		Wo.2 (J)	495.8	25.12	657.9	82.36	162.1	-2.627	0.009*
14		Po.2 (kg.sec)	828.2	14.73	1240.4	257.3	412.2	-2.627	0.009*
15	ARSF (kg)		87.5	4.33	102.9	8.38	15.40	-2.652	0.008*

It is clear from the previous table that the statistical significance of the Mann-Whitney Test of the differences between the two groups in the post-measurements in the performance level on the MS tests, in the level of the dynamic variables under the research. In addition, in the level of ARSF were all statistically insignificant, where $P<0.05$ was to all these differences, and they were all in favor of the post-measurements of El group, this indicates that the experimental training program of the El group was more effective than the traditional training program of the Cl group to improve those variables. Since the only difference between the two groups was the performing of the MS exercises in the non-traditional mode under the research Co/OvEc-Exs with the El group instead of performing the same exercises in the traditional mode Co/Ec-Exs with the Cl group, then the Co/Ov Ec-Exs more improve effectively those variables which mentioned in Table 4 than Co/Ec-Exs.

Discussion

The researcher attributes the higher effectiveness of Co/OvEc-Exs than Co/Ec-Exs in improving the level of the MS to that the eccentric muscular action more works effectively to acquire strength. Than the concentric muscular action if the muscular stimulation is achieved in appropriate degrees (AbouGamil, 2015; Christian, 2003; Farthing & Chilibeck, 2003; Friedmann-Bette et al., 2010; Higbie, 1996; Kramer & Goodyear, 2007; Nosratollah & Deborah, 2015). These exercises achieve a higher muscular stimulation during the performing of the eccentric portion of the exercise movement, which – by its nature – the athlete is more capable to exert force during it (Christian, 2007, 2003; Friedmann-Bette, 2010). This requires increasing the degree of resistance against which the muscles work during this portion of the exercise movement, and that the program which includes exercises provide the appropriate muscular stimulation during the eccentric portions of exercises movements maximize the positive impact of the resistance training to improved strength level .

The researcher attributes the superiority of the El group on the Cl group in all the dynamic variables under the research to that the higher level of the MS, the more these variables are impacted positively (Anthony, 2009; Hadi et al., 2012). Since the MS improved with the El group than with the Cl group, the level of these dynamic variables in turn get more improving with the El group than with the Cl group.

The researcher also attributes the more superiority of the El group on the Cl group in ARSF to the superiority of the El group on the Cl group in the MS level, which is the most important factor affecting the explosive power. Which in turn is one of the most important factors affecting the ARSF, in

additional to the superiority of the El group on the Cl group in the levels of Ti, Ac, Wo, and Po, which also lead to more superiority in ARSF.

Conclusions

Within the framework of the research objectives, sample. In addition, results it can be concluded that the performing of the MS exercises in the mode of Co/OvEc-Exs is more efficient to improve the level of both of MS & the variables level of Ti, Ac, Wo, Po, of the snatch lift performance, and ARSF, than performing those exercises in the traditional mode. Within the limits of the research community and its results, the researcher can recommend the following: Inclusion of Co/OvEc-Exs in weightlifting training programs in order to increase the effectiveness of these programs to improve the level of weightlifters ARSF. Keeping in mind that the performance of MS exercises in the mode of Co/OvEc-Exs improves the MS more effectively than performing these exercises in the traditional mode. Keeping in mind that the performance of MS exercises in the mode of Co/OvEc-Exs. Affects positively the variables level of Ti, Ac, Wo, and Po, by its effectiveness in improving the MS level.

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Appendix 1.

The Concentric/Overload Eccentric Exercises program to the development of the Maximum Strength for Experimental group for the snatch lifting (Steiner et al., 2004; Ebada 2013).

Weeks	Day	Exercises	Intensity Co. EX.	Repetition	sets	Rest between exercises	Terminal rest
Week 1	Saturday	Back Squat, Cheat curl, Overhead squat, Snatch pull, Snatch	80% 90%	3	2	35 sec.	1 min
	Monday	Bench press, Leg press, Front squat, Power Clean, Snatch	90% 100%	1	4	35 sec.	2 min
	Wednesday	Half squat, Bicep curl, Back squat, Power jerk, Snatch	80% 90%	3	2	35 sec.	1 min
		Warm-up : Exercises in unit intensity 35% -4 repetitions- 2 groups from Maximum weightlifter (1) time lift					
Week 2	Saturday	Bench press, Leg press, Front squats, Power Clean, Snatch	83% 90%	2	3	35 sec.	1 min
	Monday	Half squat, Bicep curl, Back squat, Power jerk, Snatch	87% 105%	1	5	35 sec.	1 min
	Wednesday	Back Squat, Cheat curl, Overhead squat, Snatch pull, Snatch	86% 103%	1	4	35 sec.	1 min
		Warm-up : Exercises in unit intensity 40% - 3 repetitions- 2 groups from Maximum weight player (1) time lift					
Week 3	Saturday	Half squat, Bicep curl, Back squat, Power jerk, Snatch	85% 106%	2	4	35 sec.	1 min
	Monday	Bench press, Leg press, Front squat, Power Clean, Snatch	90% 108%	1	5	35 sec.	1 min
	Wednesday	Back Squat, Cheat curl, Overhead squat, Snatch pull, Snatch	89% 110%	2	3	35 sec.	1 min
		Warm-up : Exercises in unit intensity 40% - 3 repetitions- 2 groups from Maximum weight player (1) time lift					
Week 4	Saturday	Half squat, Bicep curl, Back squat, Power jerk, Snatch	80% 100%	1	4	35 sec.	1 min
	Monday	Back Squat, Cheat curl, Overhead squat, Snatch pull, Snatch	90% 105%	1	6	35 sec.	1 min
	Wednesday	Bench press, Leg press, Front squats, Power Clean, Snatch	95% 110%	1	5	35 sec.	1 min
		Warm-up : Exercises in unit intensity 50% - 3repetitions- 2 groups from Maximum weightlifter (1) time lift					
Week 5	Saturday	Back Squat, Cheat curl, Overhead squat, Snatch pull, Snatch	85% 90%	2	3	35 sec.	1 min
	Monday	Bench press, Leg press, Front squats, Power Clean, Snatch	90% 120%	1	5	35 sec.	2 min
	Wednesday	Half squat, Bicep curl, Back squat, Power jerk, Snatch	85% 90%	2	3	35 sec.	1 min
		Warm-up : Exercises in unit intensity 35% - 4 repetitions-2 groups from Maximum weightlifter (1) time lift					
Week 6	Saturday	Bench press, Leg press, Front squats, Power Clean, Snatch	85% 90%	2	3	35 sec.	1 min
	Monday	Half squat, Bicep curl, Back squat, Power jerk, Snatch	90% 115%	1	6	35 sec.	2 min
	Wednesday	Back Squat, Cheat curl, Overhead squat, Snatch pull, Snatch	85% 90%	2	3	35 sec.	1 min
		Warm-up : Exercises in unit intensity 40% - 4 repetitions- 2 groups from Maximum weightlifter (1) time lift					
Week 7	Saturday	Half squat, Bicep curl, Back squat, Power jerk, Snatch	90% 120%	1	4	35 sec.	1 min
	Monday	Back Squat, Cheat curl, Leg press, Snatch pull, Snatch	85% 90%	2	6	35 sec.	1 min
	Wednesday	Bench press, Leg press, Front squats, Power Clean, Snatch	90% 95%	1	5	35 sec.	2 min
		Warm-up : Exercises in unit intensity 50% - 4 repetitions- 1 groups from Maximum weightlifter (1) time lift					
Week 8	Saturday	Back Squat, Cheat curl, Leg press, Snatch pull, Snatch	80% 100%	2	4	35 sec.	1 min
	Monday	Half squat, Bicep curl, Back squat, Power jerk, Snatch	80% 110%	1	5	35 sec.	1 min
	Wednesday	Bench press, Leg press, Front squats, Power Clean, Snatch	90% 100%	1	6	35 sec.	1 min
		Warm-up : Exercises in unit intensity 40% - 6 repetitions- 2 groups from Maximum weightlifter (1) time lift					
Week 9	Saturday	Half squat, Bicep curl, Back squat, Power jerk, Snatch	85% 90%	2	4	35 sec.	1 min
	Monday	Back Squat, Cheat curl, Leg press, Snatch pull, Snatch	90% 105%	1	6	35 sec.	2 min
	Wednesday	Bench press, Leg press, Front squats, Power Clean, Snatch	90% 120%	1	5	35 sec.	1 min
		Warm-up : Exercises in unit intensity 45 % -5 repetitions- 1 groups from Maximum weightlifter (1) time lift					
Week 10	Saturday	Half squat, Bicep curl, Back squat, Power jerk, Snatch	85% 90%	2	4	35 sec.	1 min
	Monday	Bench press, Leg press, Front squats, Power Clean, Snatch	90% 110%	1	7	35 sec.	2 min
	Wednesday	Back Squat, Cheat curl, Leg press, Snatch pull, Snatch	95% 100%	1	5	35 sec.	1 min
		Warm-up : Exercises in unit intensity 50% - 5 repetitions- 1 groups from Maximum weightlifter (1) time lift					