EFFECT OF ISOLATED AND COMBINED SWISS BALL AND KETTLEBELL TRAINING ON UPPER BODY EXPLOSIVE POWER OF ADOLESCENT BOYS

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ABSTRACT

The aim of this investigation was to study the effect of isolated and combined Swiss ball and kettle bell training Upper Body (Arm) Explosive Power of adolescent boys. To achieve the purpose of this study, the investigator selected sixty adolescent boys as participants in the age group of 13 to 18 years from Andaman and Nicobar Island. They were divided into four groups of fifteen subjects each. Group-I underwent Swiss ball training, group-II underwent kettle bell training, group-III underwent combined Swiss ball and kettle bell training and group-IV acted as control. The data collected from the four groups prior to and post experimentation on Upper Body (Arm) Explosive Power was statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since four groups were involved, whenever the obtained 'F' ratio value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. Due to Swiss ball (STG =6.34%), kettle bell training (KTG) =14.88%) and combined Swiss ball and kettle bell training (SKTG = 10.64%) the adolescent boy's Upper Body (Arm) Explosive Power was improved greatly.

Keywords: *Swiss ball and Kettle bell training, Upper Body explosive Power, Adolescent boys*

INTRODUCTION

In the recent years, various programs in connection with strength training are evolved. They are organized to stress the importance of strengthening core muscles. These are the muscles of the trunk and pelvis in addition to the muscles of the legs, arms and shoulders. Core training specific to athletes are very much needed. Thus, for a given individual, particular muscle groups in the core become very important. Athletes have to strengthen the trunk and pelvic muscles and this is very much required for them. Exercising the lower back and abdominal muscles together is the unique feature of most of the core training programs. A huge emphasis is there to provide training for multi-plane, dynamic and multi-directional movements and it is achieved by core strength training. Significant improvement will be there in these movements if core strength training and related exercises are utilized properly.

Swissball training is purported to enhance neuromuscular and cardiovascular function. Furthermore Swissball training is reported to be superior to conventional abdominal training for the development of a stable midsection, reportedly vital for optimal function. However,

empirical data to support the claims made by clinicians, trainers and users of Swissball are lacking. Data from Swissball studies conducted thus far indicate greater activation of the abdominal musculature, when compared to other forms of abdominal training. Moreover, of the published and unpublished training studies conducted to date, it appears Swiss Ball training may lead to greater core stability; however this is not reflected by superior athletic performance. Unlike other physical parameters, there appears to be no 'Gold Standard' for quantification of core stability. This, coupled with the lack of sensitivity of athletic performance measures employed in studies to date, has likely led to the lack of significant findings. Thus, until a measure of core stability is defined, and performance outcome measures are rigorously controlled, the prescription of Swissball exercises should be viewed with caution.

The concept of swissball and kettlebell training has been the focus of controversy among sports scientists and trainers in recent years. The research literature does not provide all the answers, and practitioners report different levels of success using a variety of modes and techniques. The challenge of human muscle power enhancement for sports performance is based on the use of a variety of training approaches and it is generally agreed in the literature that some form of exercise involving near maximal efforts will improve strength and power output.

Several studies have demonstrated that physical fitness components could be improved through systematic training, however no study have been conducted to compare the effect of isolated and combined swissball and kettlebell training on Upper Body (Arm) Explosive Power of adolescent boys. Through the study of science and various sports training, researchers have developed a greater understanding on how the human body reacts to exercise, training, different environments and many other stimuli. The present scientific study is one of the efforts to explore and suggest the advantage of these three training concepts such as swissball and kettlebell training and its combination for the adolescent boys.

METHODOLOGY

To achieve the purpose of this study, the investigator selected sixty adolescent boys as participants in the age group of 13 to 18 years from Andaman and Nicobar Island. They were divided into four groups of fifteen subjects each. Group-I underwent Swiss ball training, group-II underwent kettle bell training, group-III underwent combined Swiss ball and kettle bell training and group-IV acted as control. The Swiss ball and kettle bell training groups participated in a 12 week training program performing a variety of exercises designed. The selected power parameter

Upper Body (Arm) Explosive Power was chosen as dependent variable and was assessed by conducting seated medicine ball throw test.

Training Programme

Training programme was administered to the adolescent boys for twelve weeks. The experimental group-I performed Swiss ball training, group-II performed kettlebell training, and group-III performed combined Swiss ball and kettle bell training. The training programme lasted for twelve weeks with three training units per week on alternate days. Group-IV was the control group they did not undergo any training. The total training volume for all the three groups were same however group-I performed with Swiss ball, group-II performed with kettle bell and group-III performed combined Swiss ball and kettlebell exercises. The Swiss-ball used was of a suitable size for exercise, considering the subject's height. Swiss-ball training was performed three times a week for 12 weeks. Exercise selection included Supine pelvic raises, Prone fly, Supine side rolls, Incline push-ups, Swiss ball back extension, Wall squats, Prone ball rolls and Swiss ball dips. For the kettlebell group, participants trained with a 6-kg kettlebell during the first six weeks then they performed with 8kg during the remaining six weeks. Kettle bell training was performed three times a week for 12 weeks. Exercise selection included Kettlebell Swing, Kettlebell Thrusters, Kettlebell Clean and Press, Kettlebell Snatch, Kettlebell Pistol Squat, Kettlebell Goblet Squat, Alternate Kettlebell Shoulder Press and Alternate Kettlebell Floor Press. The combined Swiss-ball and kettle bell training was performed three times a week for 12 weeks. They performed Swiss ball training during every odd numbered weeks and kettle bell training during every even numbered weeks. The work rest ratio of 1:1 between exercise and 1:2 between sets was given. Progressive overload was achieved through a combination of increased volume and an emphasis on the technique and speed of movement.

Statistical Technique

The data collected from the experimental and control groups on Upper Body (Arm) Explosive Power was statistically analyzed by paired 't' test to find out the significant differences if any between the pre and post test. Further, percentage of changes was calculated to find out the chances in Upper Body (Arm) Explosive Power due to the impact of experimental treatment. In order to nullify the initial mean differences the data collected from the three groups prior to and post experimentation on Upper Body (Arm) Explosive Power were statistically analyzed to find out the significant difference if any, by applying the analysis of covariance

(ANCOVA). Since three groups were involved, whenever the obtained 'F' ratio value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence was fixed at 0.05 level for significance.

RESULT

The descriptive and dependent 't' test statistics results, on Upper Body (Arm) Explosive Power of adolescent boys belong to isolated and combined Swiss ball and kettle bell training and control group's is shown in table-I.

Table-I: Descriptive Analysis on Upper Body (Arm) Explosive Power of Isolated and Combined Swiss Ball and Kettle bell Training and Control Group's

Groups	Tests	No	Mean	S.D	MD	't'	Progress
Swiss Ball (STG)	Pre	15	3.47	0.69	0.22	10.41*	6.34*
	Post		3.68	0.66			
Kettle Bell (KTG)	Pre	15	3.63	0.66	0.54	6.95*	14.88*
	Post		4.17	0.62			
Combined Training	Pre	15	3.57	0.56	0.38	19.17*	10.64*
	Post		3.95	0.54			
Control (CG)	Pre	15	3.54	0.57	0.06	3.31*	1.69
	Post		3.48	0.55			

*df 14=2.14(Table value-.05level)(*significant)*

The descriptive analysis and dependent 't' test statistics results, confirm that the Upper Body (Arm) Explosive Power of adolescent boys found between pre (initial) and post (final) test of isolated and combined Swiss ball and kettle bell training and control group's differ obviously, as the 't' values (paired t- test) 10.41, 6.95 and 19.17 are more than essential table (df14=2.14) value. Due to Swiss ball (STG =6.34%), kettle bell training (KTG) =14.88%) and combined Swiss ball and kettle bell training (SKTG = 10.64%) the adolescent boy's Upper Body (Arm) Explosive Power was improved very much.

In table-II, the calculated ANCOVA statistic result on Upper Body (Arm) Explosive Power of adolescent boys belong to isolated and combined Swiss ball and kettle bell training and control group's are given.

Table – II: ANCOVA Results on Upper Body (Arm) Explosive Power of Isolated and Combined Swiss Ball and Kettlebell Training and Control Groups

Mean	Swiss Ball (STG)	Kettle Bell (KTG)	Combi-ned (SKTG)	Con-trol (CG)	S o V	SS	df	MS	'F' ratio
Adjusted Post-test	3.76	4.10	3.93	3.49	B	3.072	3	1.024	40.44*
					W	1.392	55	0.025	

*(Table value for df 3 & 55= 2.77)*Significant (.05 level)*

The applied ANCOVA statistics 'f' (40.44) value make obvious that the adjusted Upper Body (Arm) Explosive Power mean scores of Swiss ball (3.76), kettle bell (4.10), combined treatment (3.93) as well as control groups (3.49) adolescent boys belong to fluctuate from one another. Because the isolated and combined Swiss ball and kettle bell training and control group's Upper Body (Arm) Explosive Power adjusted 'F' value (40.44) is more than 2.77 for df 3 and 55.

In this table-III, the calculated post hoc test result on Upper Body (Arm) Explosive Power of isolated and combined Swiss ball and kettle bell training and control group's adolescent boys are given.

Table – III: Post Hoc Analysis Results on Upper Body (Arm) Explosive Power of Isolated and Combined Swiss Ball and Kettlebell Training and Control Group's

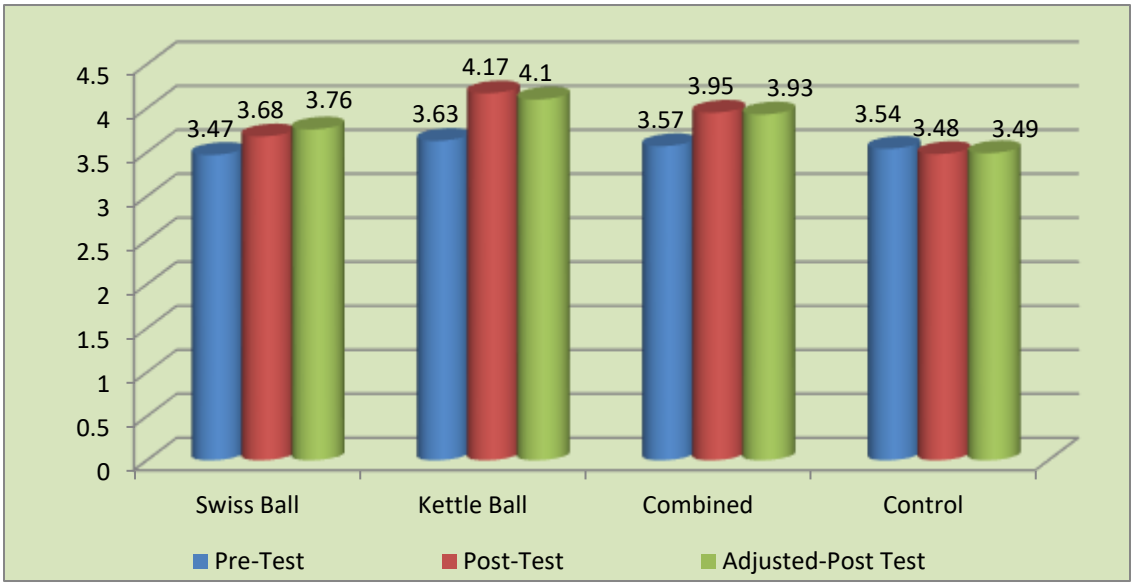
Swiss Ball (STG)	Kettle Bell (KTG)	Combined (SKTG)	Control (CG)	M.D	C.I
3.76	4.10			0.34*	0.16
3.76		3.93		0.17*	0.16
3.76			3.49	0.27*	0.16
	4.10	3.93		0.17*	0.16
	4.10		3.49	0.61*	0.16
		3.93	3.49	0.44*	0.16

**Significant (.05)*

It makes obvious that because of Swiss ball (0.27), kettle bell (0.61) and combined treatment (0.44) the adolescent boy's Upper Body (Arm) Explosive Power was enhanced immensely, because when comparing these treatment groups with control groups (0.27, 0.61 & 0.44) the MD are superior to 0.16 (CI value). It proved that, kettle bell training (SKTG) was better to combined training (SKTG) and isolated Swiss ball training (STG), however, when comparing combined training with Swiss ball training combined treatment (SKTG) was significantly better.

The Figure-I, showing Upper Body (Arm) Explosive Power of adolescent boys belong to isolated and combined Swiss ball and kettle bell training and control groups.

Figure – I: Graph Showing the Upper Body (Arm) Explosive Power of Isolated and Combined Swiss Ball and Kettle Bell Training and Control Groups



DISCUSSION

Both men and women, younger and elderly, and individuals with and without pain benefitted equally from Swiss ball with elastic resistance exercises (Sundstrup *et al*., 2012). Resistance training in an unstable environment at intensity sufficient to elicit strength gains (Drinkwater, Pritchett & Behm, 2007), increase in work capacity and abdominal power (Cowley, Swensen & Sforzo, 2007). Similar enhancement of power was found in concentric phase of countermovement squats on stable and unstable support surface regardless of weights lifted (Zemkova & Hamar, 2013). Based on the current literature, prescription of core stability exercises should vary based on the phase of training and the health status of the athlete. Preseason and in-season free weight exercises performed on a stable and unstable support surface are recommended for increases in core strength and power.

The use of kettlebells in training programs has been shown to enhance muscular strength and muscular power (Jay et al., 2011; Jay et al., 2013; Manocchia et al., 2013; Otto et al., 2012). Other investigations have concluded that kettlebell training can improve muscular power and rate of force development (Jay et al., 2013) as well as muscular strength (Jay et al., 2011); however, kettlebell training seems to have a greater effect on power compared to strength (Otto et al., 2012). The selection of kettlebell exercises for a training program

would have a significant influence on the specific muscular adaptations experienced by the participants. This might help to explain why kettlebell training seems to have a greater effect on muscular power, as much of the research that has been done with kettlebells has involved primarily ballistic movements performed at higher movement velocities as opposed to traditional resistance exercises performed at lower movement velocities.

Significant changes in selected strength and power parameters were found as a result of combined Swiss ball and kettlebell training. This approach has been suggested to be a more effective strategy than either swiss ball and kettle bell training performed alone because of the potential to impact upon multiple components of fitness simultaneously. Recent observational data support this assertion as adolescent boys who meet both the swiss ball and kettle bell muscle-strengthening activity guidelines perform significantly better on measures of muscular and functional fitness.

CONCLUSION

Due to Swiss ball (STG =6.34%), kettle bell training (KTG) =14.88%) and combined Swiss ball and kettle bell training (SKTG = 10.64%) the adolescent boy's Upper Body (Arm) Explosive Power was improved greatly. Kettle bell training (SKTG) was better to combined training and isolated Swiss ball training (STG), however, when comparing combined treatment with Swiss ball training combined treatment was better. Strength and conditioning experts, therefore, seek for the most effective and most efficient exercises like Swiss ball and kettle bell to improve the Upper Body (Arm) Explosive Power.

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