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Influence of Medicine Ball Training on Selected Strength and Power Parameters among Volleyball Players

Dr. R.Chinnaiyan

Assistant Professor, Department of Physical Education and Sports Sciences, Annamalai University, Tamilnadu, India.

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Abstract

The purpose of the study was to find out the effect of medicine ball training on selected strength and power parameters among volleyball players. To achieve the purpose 20 volleyball players were randomly selected as subjects from the department of physical education, Annamalai University. The subject were divided into two groups each comprising of 10 each as experimental and control groups. The average age, height, and weight of the experimental group were 19.3 +/- 2.7 years, 168 +/- 4.1 cm and 59.8 +/- 3.6 kg. The average age, height, and weight of the control group were 19.7 +/- 3.1 years, 166.5 +/- 3.9 cm and 61.5+/- 4.3 kg respectively. Apart from regular volleyball practice the experimental group had undergone 40 minutes of medicine ball training 5 days in a week for 6 weeks. The criterion variables confined to this study were Arm strength, Strength endurance, Explosive power and these parameters were measured before and after the training programme. The collected data were statistically analysed by using analysis of co variance (ANCOVA) .On the basis of the result, it was found that there was significant improvement on strength and power parameters among volleyball players of experimental group.

Keywords: Medicine ball Training, Strength Endurance, Explosive Power .

Introduction

The ability to generate strength and power is a very important component for success in many sports, particularly in those involving explosive movements. Medicine ball training, in conjunction with a program of weight training and circuit training, can be used to develop strength and power. Medicine ball training is one of the best ways to improve overall strength, power, speed, rotational strength, and to burn calories efficiently while producing high levels of athleticism. Certain medicine ball exercises can also be used as part of a plyometric training program to develop explosive movements. While researchers have investigated the effects of different modes of resistance training including weight machines, free weights, and body weight exercises on youth (Faigenbaum, Westcott, LaRosa Loud, & Long, 1999; Pfeiffer & Francis, 1986; Sailors & Berg, 1987; Siegal, Camaione, & Manfredi, 1989), published research investigating the effects of medicine ball training on muscular fitness in high-school physical education students seems to be lacking. Since quality physical education programs should help students develop health-related fitness and physical competence (National Association for Sports and Physical Education, 2004), physical education teachers who use medicine balls need assurance that medicine ball training is safe, beneficial, and worthwhile. Moreover, proven methods for incorporating medicine ball training into the high school physical education curriculum are needed, as adolescence is a critical period for promoting physical activity as a lifetime behavior (Rowland, 1999).

Resistance training is a specialized method of physical conditioning that involves the progressive use of a wide range of resistive loads from medicine balls to high intensity plyometrics that enhance or maintain muscular fitness (i.e. muscular strength, muscular power, and local muscular endurance). Research into the effects of resistance exercise on youth has increased over the past decade, and the qualified acceptance of youth resistance training by medical and fitness organizations is becoming universal (American Academy of Pediatrics, 2001; American College of Sports Medicine, 2000; Faigenbaum et al.,1996). The interest in resistance training among youth is supported by findings from the Youth Risk Behavior Survey which indicate that 52% of high school students reported that they performed exercises to "strengthen or tone" their muscles on three or more days in the week before the survey (Centers for Disease Control and Prevention,2003).In addition to enhancing motor skills and sports performance, regular participation in a youth resistance training program has the potential to positively influence several measurable indices of health. It helps strengthen bone, facilitate weight control, enhance psychosocial well-being and improve one's

Correspondence
Dr.R.Chinnaiyan
Annamalai University

cardiovascular risk profile (Faigenbaum, 2001). Moreover, a stronger musculoskeletal system will enable boys and girls to perform daily activities with more energy and vigor, and may help to enhance functional abilities and reduce the likelihood of developing some chronic diseases such as osteoporosis later in life (Turner & Robling, 2003). Therefore, the importance of resistance training needs be emphasized early in life as part of a multifaceted approach to lifetime health and fitness. Physical education lessons that include resistance training typically include body weight exercises (e.g., chin-ups and push-ups), free weight exercises (e.g., barbell squat and dumbbell curl) and weight machine exercises (e.g., chest press and lat pulldown). Some physical education teachers, however, have started to incorporate medicine ball training into their lessons. Medicine balls are relatively inexpensive weighted balls that are available in a variety of colors, shapes and sizes (ranging from the size of a baseball to larger than a basketball). Physical education teachers are now rediscovering the many benefits that can be achieved by incorporating medicine balls in their classes. Unlike other approaches to resistance training, medicine ball training provides students the opportunity to strength their bodies through dynamic movements that require balance and coordination. Furthermore, body weight resistance exercises such as chin-ups may be too challenging for some youth who are sedentary and overweight. In that regard, medicine ball training programs that involve throwing, catching, and rotational movements can be structured in a way that is appropriate for all students.At present, there is a paucity of data available about the effects of medicine ball training on health, fitness, and sports performance.

Methodology

The purpose of this study was to find out the effect of medicine ball training on strength and power parameters. To achieve the purpose of this study 20 male students who were studying in the Department of Physical Education and Sports Sciences, Annamalai University during the academic year 2010-2011 were randomly selected as subjects. The age of the subjects were ranged from 18 to 25years. The selected subjects were divided into two groups of ten subjects each. Group I experimental group underwent medicine ball training and Group II as control group did not undergo any special training programme. The experimental group underwent medicine ball training for 5 days per week for 6 weeks. The medicine ball exercise workout includes overhead lateral flexion, kneel to pus -up, diagonal chop, squats, one-leg squat, crunches, two arm wall pass, sit-up pass, standing oblique twists, seated ball oblique twists. The control group did not participate in any special training programme or strenuous physical activities apart from their day to day activities. The experimental group underwent their medicine ball training under the instruction and supervision of the investigators.The data were collected on selected criterion variables namely strength and power parameters namely arm strength, strength endurance and explosive power were measured by using hand dynamometer, sit ups and sargent jump respectively before (pre) and after the six weeks of medicine ball training(post). Analysis of covariance (ANACOVA) was applied to find out significant difference if any between the experimental and control group.

Analysis of the Data

The collected data were analysed by using analysis of covariance and they were discussed below.

Table I. Analysis Of Covariance For Pre And Post Tests Data On Arm Strength Of Control And Experimental Groups

	Control	**Experimental**	***Source of Variance***	***Sum of Squares***	***df***	***Mean Squares***	**'F' Ratio**
Pretest Mean SD	25.00	24.50	Between	1.250	1	1.250	0.584
	1.4907	1.4337	Within	38.500	18	2.139	
Posttest Mean SD	25.10	26.10	Between	5.000	1	5.000	2.830
	1.4491	1.1972	Within	31.800	18	1.767	
Adjusted Posttest Mean	24.882	26.318	Between	9.973	1	9.973	63.964
			Within	2.651	17	.156	

Table II. Analysis Of Covariance For Pre And Post Tests Data On Strength Endurance Of Control And Experimental Groups

	Control	Experimental	*Source of Variance*	*Sum of Squares*	*df*	*Mean Squares*	'F' Ratio
Pretest Mean	46.5000	47.700	Between	7.200	1	7.200	2.464
SD	1.35401	2.002	Within	52.600	18	2.922	
Posttest Mean	47.100	50.200	Between	48.050	1	48.050	18.600
SD	.737	2.149	Within	46.500	18	2.583	
Adjusted Posttest Mean	47.443	49.857	Between	25.614	1	25.614	14.874
			Within	29.275	17	1.722	

Table III. Analysis Of Covariance For Pre And Post Tests Data On Explosive Power Of Control And Experimental Groups

	Control	Experimental	*Source of Variance*	*Sum of Squares*	*df*	*Mean Squares*	'F' Ratio
Pretest Mean	50.400	50.300	Between	.050	1	.050	.002
SD	4.477	4.522	Within	364.500	18	20.250	
Posttest Mean	50.600	54.900	Between	92.450	1	92.450	5.312
SD	3.893	4.433	Within	313.300	18	17.406	
Adjusted Posttest Mean	50.555	54.945	Between	96.382	1	96.382	126.988
			Within	12.903	17	.759	

* Significant at 0.05 level. The table value required for significance at 0.05 level of confidence with degrees of freedom 1, 17 is 4.45 and degree of freedom 1, 18 is 4.41

Results

The adjusted post test mean of experimental and control group on arm strength (26.318vs24.882) resulted in a F-ratio of 63.964, which shows a significant difference. The adjusted post test mean of experimental and control group on strength endurance (49.857vs47.443) resulted in a F-ratio of 14.874, which shows a significant difference. The adjusted post test mean of experimental and control group on explosive power (54.945vs50.555) resulted in a F-ratio of 126.988, which shows a significant difference.

Discussion

In general, it seems that boys and girls can increase their strength by about 30-50% during the first eight weeks of resistance training (Falk & Tenebaum, 1996). The progressive training program that included explosive types of medicine ball exercises resulted in gains in upper body strength and abdominal strength of 42% and 34%, respectively Faigenbaum et al.,(1999). The mechanisms responsible for these gains are not entirely understood nor were they examined in this study, but changes in motor unit activation and motor unit coordination, recruitment and firing are probable mechanisms that can explain, at least in part, these short-term training induced gains (Ramsay et al., 1990).Several studies involving youth have noted significant improvements in the long jump, vertical jump, sprint speed and agility run time following resistance training (Falk & Mor, 1996; Weltmanet al., 1986; Lillegard, Brown, Wilson, Henderson, & Lewis, 1997). However, others have noted significant gains in strength without significant improvements in motor performance skills (Faigenbaum, Zaichkowsky,Westcott, Micheli, & Fehlandt, 1993). However the above results showed a significant changes due to medicine ball training in the strength and power parameters.

Conclusion

From the results of the study it was concluded that there was a positive change in the performance of strength and power parameters due to six weeks of

medicine ball training. However the change was in favour of experimental group.

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