INFLUENCE OF BOUS MED BALL EXERCISES ON SELECTED MOTOR FITNESS VARIABLES AMONG ACTIVE SCHOOLBASKETBALL PLAYERS

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ABSTRACT: The purpose of the study was to find out the influence of bosu med ball exercises on selected motor fitness variables among active school basketball players. To achieve the purpose of the study thirty school girl basketball players were selected randomly as subjects from PasumponThever High School, Mamsapuram, Virudhunagar District, Tamilnadu state, India and their age were ranged from 12 to 15 years. The subjects divided into two groups in equal numbers (N=15). Group I underwent bosu med ball exercises and group II acted as control group who did not attended any special training other than their daily school schedule curriculum. The duration of the training period was restricted into six weeks. The selected criterion motor fitness variables abdominal strength, back strength, balance, core strength, flexibility, leg strength and shoulder strength were assessed by bent knee sit ups, isometric back strength, stroke balance stand, plank, sit & reach, wall sit and push-ups tests respectively. The collected data from the two groups prior to and after the experimental treatments on abdominal strength, back strength, balance, core strength, flexibility, leg strength and shoulder strength were statistically analyzed by using the statistical technique of dependent't' test and analysis of covariance (ANCOVA). In all the cases level of confidence was fixed at 0.05. The result of the study indicated that bosu med ball exercises group had shown significantly improved in motor fitness variables among active school basketball players. However the control group did not shown any significant improvement on selected variables such as abdominal strength, back strength, balance, core strength, flexibility, leg strength and shoulder strength.

Index words: Bosu Med Ball Exercises, abdominal strength, back strength, balance, core strength, flexibility, leg strength, shoulder strength**,** Basketball players

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I. INTRODUCTION

     A bosu balance trainer, or bosu ball as it is often called, is a fitness training device, invented in 1999 by David Weck, consisting of an inflated rubber hemisphere attached to a rigid platform measuring 24. 6 x 24. 6 x 6 inches. There is an evidence to show that both that is multidirectional BOSU ball balance training tools are effective in terms of improving balance in basketball players but there are fewer studies comparing the effectiveness of these two measures in basketball player so as to provide the best available training and improve skills (1&2).

     Basketball is a multidirectional sport that involves explosive activities such as sprinting, rapid changes of direction and jumping; all which occur in a confined area amid multiple competitors (3). Recently various forms of balance exercises have become a part of both athletic training & rehabilitation (4). Unstable surface training or bosu ball training has become popular in the past few years as a supplementary workout for competitive athletes.

     Balance is one of the important co-ordination abilities in the field of sport in general & basketball in particular (5). Women's basketball began in the winter of 1892 at Smith College. Senda Berenson, an instructor at Smith, taught basketball to her students, hoping the activity would improve their physical health (6).

II. STATEMENT OF THE PROBLEM

     The purpose of this study was to find out the influence of bosu med ball exercises on selected motor fitness variables among active school basketball players

III. METHODOLOGY

     To achieve the purpose of the study thirty active school girl basketball players were selected randomly as subjects from PasumponThever High School, Mamsapuram. Virudhunagar District, Tamilnadu state, India and their age were ranged from 12 to 15 years. The school girl basketball players were assigned at random into two groups of each fifteen (N=15). Group-I underwent bosu med ball exercises and Group–II acted as control group who did not attended any special training other than their regular daily school schedule curriculum. The duration of the training period was restricted to six week for three alternative days per week. The selected criterion motor fitness variables abdominal strength, back strength, balance, core strength, flexibility, leg

strength and shoulder strength were assessed by bent knee sit-ups, isometric back strength, stroke balance stand, plank, sit & reach, wall sit and push-ups tests respectively. The pre and post data were collected before and after the training period. The pre and post-test scores were statistically examined by the Analysis of Co-Variance (ANCOVA) for selected variables. The level of significance was fixed at .05 level of confidence, which was considered as appropriate.

VI. ANALYSIS OF THE DATA

Theinfluence of bosu med ball exercises on selected motor fitness variables among active school basketball players were analyzed and presented below,

4.1 Abdominal strength

The t-test on abdominal strength (bent knee sit–up test)of the pre and post test scores of bosu med ball exercise group and control group have been analyzed and presented in table 4.1.

Table-4.1: the pre test and post test scores of experimental and control group on abdominal strength (Numbers)

Group	Pre Mean	Post Mean	MD	t-values
Experimental	16.46	24.66	8.2	4.88
Control group	16.13	16.26	0.13	

Significant at .05 level. (The table value required for 0.05 level of significance with df 14 is 2.14)

The table-4.1 shows that the pre-test mean value of experimental group and control group on abdominal strength are 16.46 and 16.13 respectively and the post test means are 24.66 and 16.26 respectively. The obtained dependent t-ratio values between the pre-and posttest means of bosu med ball exercises group and control group is 4.88. The table value required for significant difference with df 14 at 0.05 level is 2.14. From the above table the dependent't'-test values of abdominal strength between the pre and post tests means of experimental groups were greater than the table value, it is concluded that experimental group had significant improvement onabdominal strength when compared to control group.

4.2 Back strength

The t-test on back strength (isometric back strength test)of the pre and post test scores of bosu med ball exercise group and control group have been analyzed and presented in table 4.2.

Table-4.2:The pre test and post test scores of experimental and control group on back strength (Seconds)

Group	Pre mean	Post mean	MD	t-values
Experimental	57.00	92.46	35.46	3.73*
Control group	56.86	56.93	0.07	

Significant at .05 level. (The table value required for 0.05 level of significance with df 14 is 2.14)

The table-4.2 shows that the pre-test mean value of experimental group and control group on back strength are 57.00 and 56.86 respectively and the post test means are 92.46 and 56.93 respectively. The obtained dependent t-ratio values between the pre-and post test means of bosu med ball exercises group and control group is 3.73. The table value required for significant difference with df 14 at 0.05 level is 2.14. From the above table the dependent't'-test values of back strength between the pre and post tests means of experimental groups were greater than the table value, it is concluded that experimental group had significant improvement on back strength when compared to control group.

4.3Balance

The t-test on balance (stroke stand balance test)of the pre and post test scores of bosu med ball exercise group and control group have been analyzed and presented in table 4.3.

Table-4.3: the pre test and post test scores of experimental and control group on balance (Seconds)

Group	Pre Mean	Post Mean	MD	t-values
Experimental	14.46	30.86	16.4	5.14*
Control group	14.06	15.46	1.4	

Significant at .05 level. (The table value required for 0.05 level of significance with df 14 is 2.14)

The table-4.3 shows that the pre-test mean value of experimental group and control group on balanceare 14.46 and 14.06 respectively and the post test means are 30.86 and 15.46 respectively. The obtained dependent t-ratio values between the pre-and post test means of bosu med ball exercises group and control group is 5.14. The table value required for significant difference with df 14 at 0.05 level is 2.14. From the above table the dependent't'-test values of balance between the pre and post tests means of experimental groups were greater than the table value, it is concluded that experimental group had significant improvement on balancewhen compared to control group.

4.4Core strength

The t-test on core strength (Plank test)of the pre and post test scores of bosu med ball exercise group and control group have been analyzed and presented in table 4.4.

Table-4.4: The pre test and post test scores of experimental and control group on core strength (Seconds)

Group	Pre Mean	Post Mean	MD	t-values
Experimental	88.60	135.73	47.13	3.22*
Control group	88.26	89.26	1.00	

Significant at .05 level. (The table value required for 0.05 level of significance with df 14 is 2.14)

The table-4.4 shows that the pre-test mean value of experimental group and control group on core strength are 88.60 and 88.26 respectively and the post test means are 135.73 and 89.26 respectively. The obtained dependent t-ratio values between the pre-and post test means of bosu med ball exercises group and control group is 3.22. The table value required for significant difference with df 14 at 0.05 level is 2.14. From the above table the dependent't'-test values of core strength between the pre and

post tests means of experimental groups were greater than the table value, it is concluded that experimental group had significant improvement on core strength when compared to control group.

4.5Flexibility

The t-test on flexibility (sit & reach test)of the pre and post test scores of bosu med ball exercise group and control group have been analyzed and presented in table 4.5.

Table-4.5: the pre test and post test scores of experimental and control group on flexibility (Centimeters)

Group	Pre Mean	Post Mean	MD	t-values
Experimental	13.93	22.60	8.67	5.68*
Control group	13.86	14.06	0.20	

Significant at .05 level. (The table value required for 0.05 level of significance with df 14 is 2.14)

The table-4.5 shows that the pre-test mean value of experimental group and control group on flexibility are 13.93 and 13.86 respectively and the post test means are 22.60 and 14.06 respectively. The obtained dependent t-ratio values between the pre-and post test means of bosu med ball exercises group and control group is 5.68. The table value required for significant difference with df 14 at 0.05 level is 2.14. From the above table the dependent't'-test values of flexibility between the pre and post tests means of experimental groups were greater than the table value, it is concluded that experimental group had significant improvement on flexibility when compared to control group.

4.6Leg strength

The t-test on leg strength (wall sit test)of the pre and post test scores of bosu med ball exercise group and control group have been analyzed and presented in table 4.6.

Table-4.6: the pre test and post test scores of experimental and control group on leg strength

Group	Pre Mean	Post Mean	MD	t-values
Experimental	42.66	82.06	39.4	4.86*
Control group	42.60	43.86	1.26	

Significant at .05 level. (The table value required for 0.05 level of significance with df 14 is 2.14)

The table-4.6 shows that the pre-test mean value of experimental group and control group on leg strength are 42.66 and 42.60 respectively and the post test means are 82.06 and 43.86 respectively. The obtained dependent t-ratio values between the pre-and post test means of bosu med ball exercises group and control group is4.86. The table value required for significant difference with df 14 at 0.05 level is 2.14. From the above table the dependent't'-test values of leg strength between the pre and post tests means of experimental groups were greater than the table value, it is concluded that experimental group had significant improvement on leg strength when compared to control group.

4.7Shoulder strength

The t-test on shoulder strength (push–up test)of the pre and post test scores of bosu med ball exercise group and control group have been analyzed and presented in table 4.7.

Table-4.7: the pre test and post test scores of experimental and control group on shoulder strength

Group	Pre Mean	Post Mean	MD	t-values
Experimental	7.26	12.53	5.27	4.05*
Control group	7.13	7.63	0.5	

Significant at .05 level. (The table value required for 0.05 level of significance with df 14 is 2.14)

The table-4.7 shows that the pre-test mean value of experimental group and control group on shoulder strength are 7.26 and 7.13 respectively and the post test means are 12.53 and 7.63 respectively. The obtained dependent t-ratio values between the pre-and post test means of bosu med ball exercises group and control group is 4.05. The table value required for significant difference with df 14 at 0.05 level is 2.14. From the above table the dependent't'-test values of shoulder strength between the pre and post tests means of experimental groups were greater than the table value, it is concluded that experimental group had significant improvement onshoulder strength when compared to control group.

Analysis of covariance (ANCOVA) of experimental and control groups on selected fitness variables have been analyzed and presented in table 4.8.

Table 4.8: Analysis of covariance (ANCOVA) of experimental group and control group on Selected motor fitness variables

Test / variables	Adjusted Post Test Means		SV	Sum of squares	df	Mean square	F – ratio
Abdominal strength	Experimental Group	Control Group	B	512.78	1	512.78	25.95
	24.60	16.33	W	533.62	27	19.76	
Back strength	92.42	56.97	B	9422.13	1	9422.13	22.39
			W	11362.24	27	420.82	
Balance	30.79	15.53	B	1744.67	1	1744.67	27.64
			W	1704.17	27	63.11	
Core strength	135.59	89.40	B	15995.17	1	15995.17	18.45
			W	23405.65	27	866.87	
Flexibility	22.60	14.06	B	546.09	1	546.09	31.20
			W	472.53	27	17.50	
Leg strength	82.07	43.86	B	10948.52	1	10948.52	23.00

			W	12850.69	27	475.95	
Shoulder strength	12.54	7.52	B	189.07	1	189.07	16.13
			W	316.60	27	11.72	

* Significant at 0.05 level. (The table value required for significance at 0.05 levels with df 1 and 17 is 4.21)
(B-between, W- within, SV-Source of Variance)

Table 4.8 shows that the adjusted post test means values on abdominal strength, back strength, balance, core strength, flexibility, leg strength and shoulder strength. The obtained F- ratio of 25.95, 22.39, 27.64, 18.45, 31.20, 23.00 and 16.13 for adjusted post test mean is greater than the table value 4.21 with df 1 and 27 required for significance at 0.05 level of confidence. The results of the study are indicates that there is a significant mean difference exist between the adjusted post test means of bosu med ball exercise and control groups on abdominal strength, back strength, balance, core strength, flexibility, leg strength and shoulder strength.

Figure 4.1The bar diagram shows the mean values of adjusted post test on abdominal strength, back strength, balance, core strength, flexibility, leg strength and shoulder strength test of bosu med ball exercise and control groups.
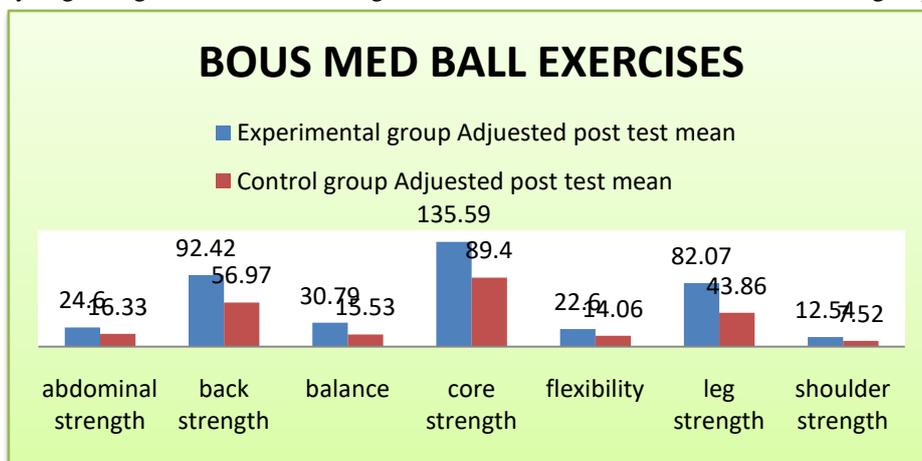

Fig-4.1:Adjusted post testmean values of bosu med ball exerciseand control groups on abdominal strength, back strength, balance, core strength, flexibility, leg strength and shoulder strength

V. Discussion ON FINDINGS

The result of the present study was significant improvement on abdominal strength, back strength, balance, core strength, flexibility, leg strength and shoulder strength due to the influence of bosu met ball exercise among basketball players.

The following studies also produced the same result of this study, Satheesh Kumar, K. &Arumugam, S. (2017) influence of plyo pushup exercises on shoulder strength and explosive power among sports participants. It concluded that significant improvement on shoulder strength and explosive power. AviSaraswat , Deepak Malhotra &Sivaram, C. (2015) Effect of dynamic balance training on agility in male basketball players.Its concluded his study on Four weeks of dynamic balance training significantly improved agility as detected by T test. Thus it can be concluded that the used protocol can be incorporated in the training regimes to reduce the risk of injury as well as improve the performance.

VI. Conclusions
1. There was significant improvement on abdominal strength, back strength, balance, core strength, flexibility, leg strength and shoulder strength due to the influence of bosu met ball exercise among basketball players.
2. However the control group had not shown any significant improvement on any of the selected variables.

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