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ORIGINAL ARTICLE

COMPARATIVE EFFECT OF SWISS BALL CORE EXERCISES OVER TRADITIONAL CORE EXERCISES IN IMPROVING THE AGILITY AND BALANCE IN BASKET BALL PLAYERS	Search engine: www.ijmaes.org

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Abstract

Back ground of the study: Core muscle activation during Swiss ball and traditional abdominal exercise, were done priory in some studies. A study of core stability and athletic Performance was described in other studies. The aim of this study is to find out the effectiveness of core muscle strengthening for basketball players by using the traditional core exercises and Swiss ball exercises to improve their performance level. ***Methodology:*** A total of 30 male subjects were divided into two groups A and B, selected for this study. Among them in group 'A' assigned to follow the traditional method and in other group 'B' were to follow the Swiss ball exercises, in which both the groups were to concentrate on core strengthening program. The exercises included 10 repetition, 3 to 4 set, everyday for 5 weeks program, along with their routine warm ups and stretching. Statistical tool used in this study is t-test. ***Results:*** The pre and post test values of mean table values shows that group B exercises DLLT, t-test for swiss ball exercises having better result than DLLT for traditional core exercises and t-test for traditional core exercises in group A. ***Conclusion:*** The result of this comparative study indicates that Swiss ball core exercises are more beneficial than traditional core exercises among basketball players. Overall this study show that core strengthening and agility training method are improving not only the strength and agility but also improves the performance level among basketball players.

Keywords: Core muscle, Swiss ball exercises, traditional exercises, Inclinometer, Double leg lowering test (DLLT).

INTRODUCTION

One of the most overlooked areas in the body with regards to exercising the muscles that make up your midsection is known as core. Core strength and stability are vital in many activities. The important role of the trunk plays in force production by the extremities. It is often over looked during training to the determent of optimal athletics performance.[2]

One off the most important part in Basketball players to improve the Agility and Balance training depends on core strengthening. Core strengthening could be brought by many methods. In this study, it makes comparing the effects of core strengthening by Swiss ball exercises and Traditional core strengthening exercises in improving the Agility & Balance training in Basketball players. . Core strength techniques will help you to improve the overall balance, as well as reduce the chances of getting injury while swinging, pitching, and throwing[3]. . These core strength training tips can help the player to become a great power hitter and help them to stay healthy and have a long lasting career.

The core consists of abdomen and lower back muscles[1]. This particular group of muscles works together to help stabilize your body and help in the transferring of power from the legs to your upper body , and from your upper body back down to your legs. The core training begins with low intensity, low volume work out and gradually progress to higher difficult routines.

Swiss ball exercises program designed to improve core stability[5]. In recent years, health and fitness practitioners have given greater emphasis to core strength training for injury prevention, rehabilitation and performance enhancement. Core strength exercises improve athletic performance as rapid and controlled limb movement is directly related to the ability of the core muscles to stabilize the spine[7.] Agility is the ability to change the direction with minimal deceleration. It will allow the players to react fastly and to play longer and stronger than the opponents. Better balance can provide that extra instant that will allow you to track down that loose ball or get into proper defensive position.

METHODOLOGY

Comparative study design conducted at Physical education department, vels university, Chennai. The study Population was basket ball players'. Sample size was a total of 30 male subjects , among them 15 subjects assigned to follow the traditional method while the other 15 were to follow the Swiss ball exercises in which both the groups were to concentrate on core strengthening program. Simple random sampling method used to allocate the samples in two groups.

Inclusion criteria: Male basketball players, Aged between 18-25 years with no history of back pain or abdominal pain were included for the study

Exclusion criteria: Decreased range of motion in Knee joints, participated in any prior core training program, undergone for any abdominal surgeries, suffering respiratory infections and cerebral contusions were excluded from the study.

Outcome Measures: Measurement of Agility test and core strength is taken by double leg lowering test (DLLT).

Equipments Used: Mat, Swiss ball, Stop watch, Score sheet, Note pad, Tape measure, Cones , Inclinometer, Couch or Table.

Procedure

A total of 30 male subjects were divided into two groups A and B, for this study. Among them in group 'A' assigned to follow the

traditional method and in the group 'B' were to follow the Swiss ball exercises, in which both the groups were to concentrate on core strengthening program. The exercises included 10 repetition, 3 to 4 set, everyday for 5 weeks program, along with their routine warm ups and stretching.

Pre Test:

Both groups are assisted by agility (t- test) and Double leg lowering test (DLLT) for core strengthening measurement before the exercises were taught.

Post Test:

After giving the 5 weeks of exercises program to the both groups of players the agility tests (t-Test) and the double leg lowering test (DLLT) data were tabulated.

Double Leg Lowering Test:

The aim of this research was to investigate the relationship between core stability, measured by the double leg lowering test (DLL).The DLL test has excellent intra-tester reliability, thus providing further evidence for the use of the test in the current study & critically evaluated the relationship between a core stability test and athletic performance measures

Double Leg Lowering Measurement:

All DLLT measurement was completed by a team of 2 examiners. I selected the DLLT as described by Kendall, in which abdominal muscles are used to maintain the pelvis in a posterior tilted position while the extended legs are lowered from a vertical position. Subjects wore shorts and removed their shoes to avoid additional external loads. When performing the test, each subject lay supine on a wooden table with a 1-cm-thick felt pad with the arms folded across the chest. Two trials were performed with a 1 –minute rest between trials, Figure1.
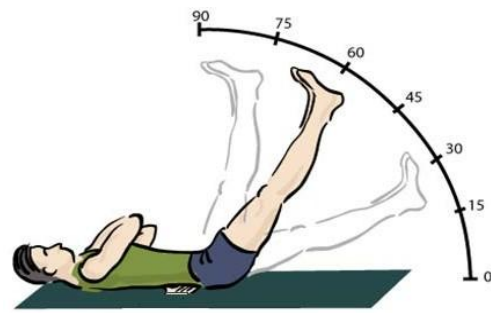

Figure1 Double Leg Lowering Test

Examiner 1

The test began with an examiner helping the subject to place his legs in a vertical position with the knees extended and allowed the flexibility of the hamstrings. Each subject was instructed to keep the pelvis posteriorly rotated, so the lumbar spine was held firm to the table, while slowly lowering the legs to a horizontal position. Examiner 1 monitored the position of the low back from the subject's right side by placing pressure cuff between the low back (L4-5 area). We deviated from the Kendall technique by counting aloud to pace the rate of leg lowering. Counting was paced at a rate so it would take approximately 10 seconds to lower the legs from a 90° vertical position to a 0° horizontal position. Examiner 1 verbally signaled examiner 2 when the subject back to lift from the monitoring pressure cuff, this represented the end of the test.

Examiner 2

Examiner 2 recorded the subject's performance with a digital inclinometer witch place along the long axis of the femur. The inclinometer remained parallel contact with the subject's left femur during leg lowering. At the signal to end the test, a stop button was pressed on the inclinometer to record the position of the legs (in degrees). To assess the accuracy of the inclinometer, and measure the display

T-Test Procedure

The t-test is a measure of leg power, speed, and agility In order to produce what is perceived as a quality performance or good time in the T-test an athlete must have explosive power during direction changes, speed to cover the course, and agility to maneuver the course. The t-test is a great way to determine someone's agility at speed.[7.]

Purpose: The t-test is a test of agility for athletes, and includes forward, lateral, and backward running, Figure 2.
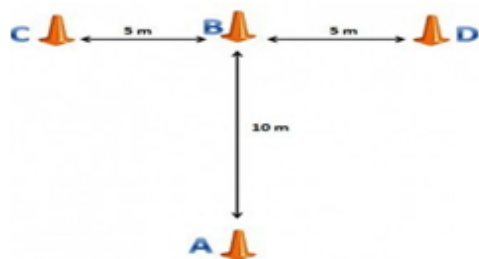

Figure 2 T test procedure

Procedure

The subject starts at cone A. on the command of the timer, the subject sprints to cone B and touches the base of the cone with their right hand. They then turn left and shuffle sideways to cone C, and also touch its base, this time with their left hand. Then shuffle sideways to the right to cone D and touching the base with the right hand. Then they shuffle back to cone B touching with the left hand, and run backwards to cone A. The stopwatch is stopped as they pass cone A.

Exercises Protocol

[A] For Traditional Core Exercises

Long arm crunch , Bicycle crunch, Vertical crunch, Captain chair, V- sit exercises , extension bench, Plank , Side plank, Reveres plank , Single leg bridging , Superman

[B] For Swiss Ball Exercises

Decline pushups Bridging, Bridging on Swiss ball, Oblique crunch, Ball crunch, Pike on Swiss ball, Knee tuck, Back extension, Superman.

Statistical Analysis

Statistical Method: The collected data were tabulated and analyzed by using descriptive and interferential statistics. The data was analyzed by paired t-test. The Statistical package was used to calculate and analyze the above mentioned descriptive and inferential statistics. The calculated values t – values is then compared with standard tabulated t a n-1 value where a is the level of significance which is usually maintained at 95.

RESULT

Description of Statistical Analysis

The following tables 1 shows the Mean, Standard Deviation and Variance values for the DLLT traditional core exercises and DLL Swiss ball exercises and T test for traditional core exercises and T test for Swiss ball exercises

Paired Samples Correlations

Inference: The following table 2 shows the Pair 1 and Pair 2 have the high level positive correlation between the pre –test and post – test values for the DLLT traditional core exercises and DLLT Swiss ball exercises. The remaining two Pairs positively correlated with their T test traditional core exercises and t test Swiss ball exercises Pre –test and Post – test values respectively.

Test	N	Mean	Standard Deviation	Variance
DLLT for traditional Core Exercises for Group A pre test	15	63.2667	5.35146	28.638
DLLT for traditional Core Exercises for Group A Post test	15	46.6667	5.51189	30.381
DLLT for Swiss ball Exercises for Group B Pre test	15	65.4667	3.88893	15.124
DLLT for Swiss ball Exercises for Group B Post test	15	39.6667	5.91205	34.952
T test for traditional Core Exercises for Group A Pre test	15	12.1067	.46054	.212
T test for traditional Core Exercises for Group A Post test	15	10.0000	.36253	.131
T test for Swiss ball Exercises for Group B Pre test	15	11.1133	.36227	.131
T test for Swiss ball Exercises for Group B Post test	15	9.4867	.21996	.048

Table 1 Descriptive data analysis of Group A and Group B

Paired sample Group A and Group B		N	Correlation	Sig.
Pair 1	DLLT for traditional Core Exercises for Group A Pre test& DLLT for traditional Core Exercises for Group A Post test	15	.744	.001
Pair 2	DLLT for Swiss ball Exercises for Group B Pre test& DLLT for Swiss ball Exercises for Group B Post test	15	.821	.000
Pair 3	T test for traditional Core Exercises for Group A Pre test& T test for traditional Core Exercises for Group A Post test	15	.599	.018
Pair 4	T test for Swiss ball Exercises for Group B Pre test& T test for Swiss ball Exercises' for Group B Post test	15	.316	.251

Table 2 Paired samples correlations of Group A and Group B

Tabulations with interpretation

Paired t – Test: 1

Ho: There is no significant difference between the Pre test and the Post test values for the DLLT traditional core exercises.

H1: There is a significant difference between the Pre test and the Post test values for the DLLT traditional core exercises.

Paired Samples Test								
DLLT for Group A		**Paired Differences**					t-value	Degree of freedom	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre - Post test of DLLT for traditional Core Exercises for Group A	16.60	3.888	1.004	14.447	18.753	16.537	14	.000

Table 3 Paired differences Pre test- Post test of DLLT for traditional Core Exercises for Group A

Inference: From the above table 3 clearly shows that the value p is less than 0.05. So, we reject the null hypothesis. It may be conclude that there is a significant difference exists between the Pre test and the Post test values for the DLLT traditional core exercises and also we infer the particular Exercises will be very useful for the Core Muscle Strengthening in basket ball Players.

Paired t – Test: 2
Ho: There is no significant difference between the Pre test and the Post test values for the DLLT Swiss ball core exercises.
H1: There is a significant difference between the Pre test and the Post test values for the DLLT Swiss ball core exercises.

Paired Samples Test								
T test for traditional Core Exercises for Group B		**Paired Differences**					t	Degrees of freedom	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 2	Pre - Post test of DLLT for Swiss ball Exercises for Group B	25.80	3.509	.906	23.857	27.743	28.475	14	.000

Table 4 Paired differences Pre test- Post test of DLLT for Swiss ball Exercises Group B

Inference: The above table 4 clearly shows that the value p is less than 0.05. So, we reject the null hypothesis. From this we conclude that there is a significant difference between the Pre test and the Post test values for the DLLT Swiss ball core exercises.

Paired t – Test: 3

Ho: There is no significant difference between the Pre test and the Post test values for the T test for traditional core exercises. H1: There is a significant difference between the Pre test and the Post test values for the T test for traditional core exercises.

Paired Samples Test								
			Paired Differences					
T test for traditional Core Exercises for Group A		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	Degrees of freedom	Sig. (2-tailed)
					Lower	Upper			
Pair 3	Pre - Post T test for traditional Core Exercises for Group A	2.107	.37885	.09782	1.897	2.316	21.537	14	.000

Table 5 Paired differences Pre test- Post test of DLLT for Swiss ball Exercises Group A

Inference: The above table 4 clearly shows that the null hypothesis rejected here because the value of p is less than 0.05. This may be conclude that there is a significant difference exists in the Pre and Post measurement values for the T test traditional core exercises and also we infer the particular Exercises will be very useful for the Core Muscle Strengthening in basket ball Players.

Paired t – Test: 4

Ho: There is no significant difference between the Pre test and the Post test values for the T test for Swiss ball core exercises.

H1: There is a significant difference between the Pre test and the Post test values for the T test for Swiss ball core exercises.

Paired Samples Test								
			Paired Differences					
T test for Swiss ball Exercises for Group B		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	Degrees of freedom	Sig. (2-tailed)
					Lower	Upper			
Pair 4	Pre-Post T test for Swiss ball Exercises for Group B	1.6267	.3595	.0928	1.428	1.826	17.525	14	.000

Table 6 Paired differences Pre test- Post test of DLLT for Swiss ball Exercises Group B

Inference:

From the above table clearly shows that the value p is less than 0.05. So, we reject the null hypothesis. It may be conclude that there is a significant difference between the Pre test and the Post test values for the T test for Swiss ball core exercises.

Measurements	Mean	
	Pre -Test	Post -Test
DLLT for traditional Core Exercises for Group A	63.27	46.67
T test for traditional Core Exercises for Group A	12.11	10.00
DLLT for Swiss ball Exercises for Group B	65.47	39.67
T test for Swiss ball Exercises for Group B	11.11	9.49

Table 7 Pre and Post test mean values of Group A and Group B
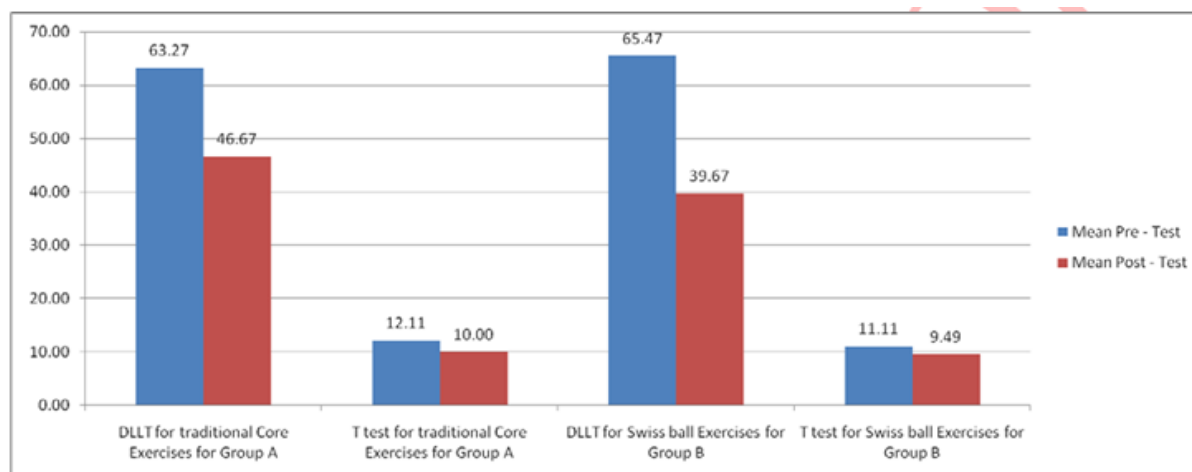
Graph 1 Graphical Representation of Pre and Post Test Mean Values

The above Table 5 and Graph 1 shows pre and post test mean values, in which Group B exercise DLLT and T test for Swiss ball exercise is having better result than DLLT for traditional core exercises and T test for traditional core exercise in Group A

DISCUSSION

Paul W. Marshall[9] suggested that performance tasks on the Swiss ball would lead to greater activation level as compare with the stable surface. CHRIS SHARROCK, Matt Johnson[2] insisted that relationship between core strength and performance levels of athletic are strongly co-related.

Anne Delextrat ,Danielcohen[8] suggested the effect of playing position on strength, power, speed, and agility performances of women basketball players.

Stability exercise principles , Core stability and its motor control have been shown to be imperative for initiation of functional limb movements, as needed in athletics. KRAUSE DA, YOUDAS JW, HOLLMAN JH, SMITH J ,[6] Abdominal muscle performance as measured by the double leg-lowering test. PAUOLE K, MADOLE K, GARHAMMER J,[7] discussed the Reliability and validity of the T-test as a measure of agility, leg power, and leg speed in college-aged men and women; In this study, the Swiss ball exercises are more effective in generating the core muscle activity comparing

to the traditional exercises. In Swiss ball exercises prone position were more effective than traditional exercises. Roll out and Pike exercises were the most effectively exercise during core muscle activation.

Double leg lowering test is supported in the literature as valid and reliable measure for core strength. This study include that agility test activity for sports specific measure such as strength , speed , agility , power , is helpful to improve the performance level . This study clearly indicates that swissball exercises are more effective in improving the core muscles strengthening the traditional exercises and results in better Agility and balance training in Basketball players. The result of this comparative study show that Swiss ball core exercises group's are more effective than the traditional core exercises group's basket ball Players.

CONCLUSSION

The result of this comparative study indicates that Swiss ball core exercises are more beneficial than traditional core exercises among basketball players. The T-test training also improved their agility performance. Overall this study shows that core muscle strengthening and agility training method are improving not only the strength and agility but also improve the performance level among basketball players.

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