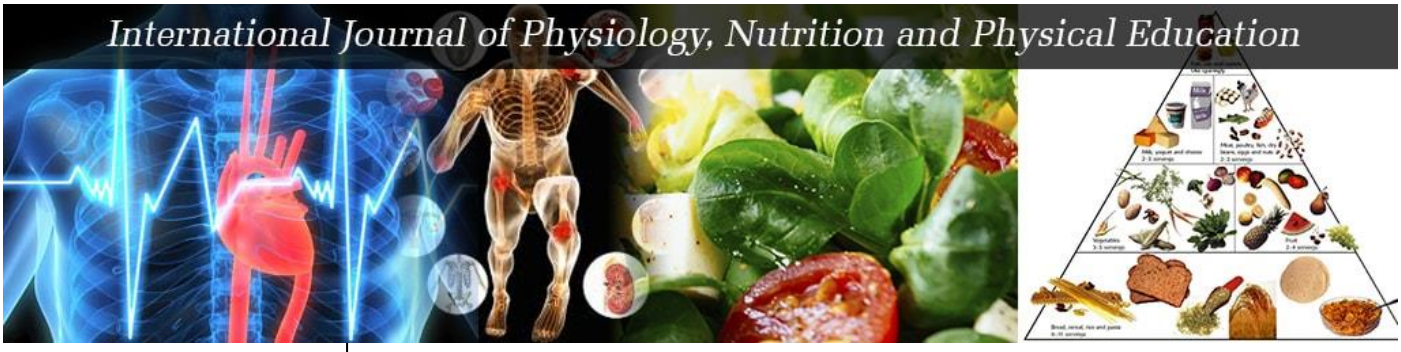

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Effect of yogic practices and swissball training on flexibility among adolescent boys

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Abstract
The purpose of the study was to find out the effect of yogic practices and swissball training on flexibility among adolescent boys. To achieve the purpose of this study, forty-five (45) adolescent boys were randomly selected as subjects from Government Schools in and around Chidambaram, Tamil Nadu, India. Their age ranged from 13 to 18 years. The selected participants were randomly divided into three groups such as group 'A' yogic training group (n=15), group 'B' swissball training (n=15) and group 'C' acted as control group (n=15). Group 'A' underwent yogic training for three alternative days per week and each session lasted for an hour for six weeks. Group 'B' underwent swissball training for three alternative days per week and each session lasted for an hour for six weeks and Group 'C' acted as control. Flexibility was assessed by sit and reach test (centimetres). . The data obtained from the experimental groups before and after the experimental period were statistically analyzed by analysis of covariance (ANCOVA) .Whenever the f-ratio for the adjusted post test means was found to be significant, the Scheffe's Post hoc test was applied to determine the paired mean differences. The level of confidence was fixed at 0.05 level for all the cases. It was concluded that the yogic practices group and swissball training group had shown significant improvement in flexibility. However control group did not show any significant improvement on flexibility.

Keywords: Yogic practices, swissball training, flexibility, adolescent boys

Introduction
Yoga is a very ancient discipline that is recognized as India's valuable heritage. Yoga is an art, science and philosophy, which influence the life of man at each level. Yoga is a way to achieve total health, peace, bliss and wisdom. Physical, mental and spiritual aspects of yoga help to make one's life purposeful, useful and noble. Yoga is a unique Indian tradition of ancient origin for health and happiness. It imparts both sound body and sound mind to the practitioner. Yoga is a Sanskrit term. It represents yoke, which symbolically means to join or to unite. Yoga is intended for union or harmony of mind and the body. Yoga is the science of physical and mental health. This synchronizes the functions of the muscle and the mind. It is the only path that can lead to holistic health. Charles Batch, (1987) [1].

Swissball is a ball which is loaded with air and it has a versatile stage which gives bouncy impact to the body there by the body ought to adjust and keep up while performing exercise. Swissball develops abdominal muscles, stabilizes lower back as well as improves posture. The Swissball is also called in various names, for example, gym ball, exercise ball, stability ball, flexibility ball, flex ball, stretch ball, therapy ball, balance ball, yoga ball, fitness ball and work ball. The swissball provides a wide range of exercises that are based on the ability of the people to move with the motion of the ball while performing the exercise, the ball helps in both supporting the body during the movement as well as to afford a measure of resistance to the muscles engaged in the movement. The classic swissball exercises involves the abdominal muscles, with corresponding responses from the groin and the stabilizers of the lower back, the oblique muscles that run parallel to the spine above the pelvis. The athlete positioned on top of the ball, can take the abdominals through a complete range of motion through the performance of crunches, twisting crunches, where the upper body twists in opposite directions during the crunch to extend the muscular effect across the abdomen; and the flexion of the thoracic spine, the vertebrae of the mid-back to improve overall flexibility. Swissball movements need a great degree of coordination than other floor stretches.

Swissball also permits the execution of both static stretches as well as dynamic stretches, which directs force into or through the extended joint. Swissball exercises have both aerobic and anaerobic benefits, depending on the intensity, duration, and the frequency. The swissball is the supreme supplement to an existing training program like yoga or Pilates, which promotes greater strength and flexibility in safe and controlled physical environment.

Flexibility is the range of movement in a body joint or the ability of muscles and tendons to lengthen without damage. M. L. Kamlesh, (2009) [6].

Flexibility is defined as the ability of an individual to move the body and its parts through a wide range of motion without strain to the articulations and muscle attachment. Johnson and Nelson, (1984) [4].

Methodology

The purpose of the study was to find out the effect of yogic practices and swissball training on flexibility among adolescent boys. To achieve the purpose of this study, forty-five (45) adolescent boys were randomly selected as subjects from Government Schools in and around Chidambaram, Tamil Nadu, India. Their age ranged from 13 to 18 years. The selected participants were randomly divided into three groups such as group 'A' yogic practices group (n=15), group 'B' swissball training group (n=15) and group 'C' acted as control group (n=15). Group 'A' underwent yogic practices for three alternative days per week and each session lasted for an hour for six weeks. Group 'B' underwent swissball training for three alternative days per week and each session lasted for an hour for six weeks and Group 'C' acted as control. Flexibility was assessed by sit and reach test (centimetres). The pre and post-tests data were collected on selected criterion variable prior to and immediately after the training program. At the end of the six weeks of training post-tests were taken. The significant differences between the means of experimental group and control group for the pre-test and post-test scores were determined by analysis of covariance (ANCOVA). The Scheffe's post hoc test was used to find the paired mean difference if any. The level of significance was fixed at 0.05 level of confidence for the degrees of freedom.

Statistical Analysis

Analysis of Covariance (ANCOVA) was applied. When the f-ratio of adjusted post-test mean was found to be significant, Scheffe's post hoc test was employed to find out paired mean differences. The level of confidence was fixed, at 0.05 level of significance.

Analysis of flexibility

The data collected from three groups on flexibility were statistically analyzed by ANCOVA and the results are presented in Table 1.

Table 1: Analysis of Covariance on flexibility of Experimental and Control groups

Test	Yogic Practices Group	Swissball Training Group	Control Group	SOV	SOS	df	M.S	f-ratio
Pre-test Means S.D(±)	12.13 1.06	12.06 1.09	12.00 1.06	BG	0.133	2	0.06	0.05
				WG	48.66	42	1.15	
Post-test Means S.D(±)	15.60 0.98	15.13 1.06	12.20 1.01	BG	101.91	2	50.95	48.93*
				WG	43.73	42	1.04	
Adjusted Post-Test Means	15.54	15.13	12.25	BG	96.10	2	48.05	202.02*
				WG	9.75	41	0.23	

*****Significant, table value,2 to 42&2 to 41 is 3.22 &3.23

Table 1, shows that pre-test mean values on flexibility of yogic practices group, swissball training group, and control group are 12.13, 12.06 and 12.00 respectively. The obtained f-ratio of 0.05 pre-test score was lesser than the required table value of 3.22 for df 2 and 42 for significance at 0.05 level of confidence on flexibility.

The post-test mean values on flexibility of yogic practices group, swissball training group, and control group are 15.60, 15.13, and 12.20 respectively. The obtained f- ratio value of 48.93 for the post-test score was greater than the required table value of 3.22 for the df of 2 and 42 for significance at 0.05 level of confidence on flexibility.

The adjusted post-test mean on flexibility of yogic practices group, swissball training group, and control group are 15.54, 15.13, and 12.25 respectively. The obtained f- ratio of 202.02 for the adjusted post-test score was greater than the required table value of 3.23 for df 2 and 41 for the significance at 0.05 level of confidence on flexibility. It was concluded that differences exist among the adjusted post-test means of yogic practices group, swissball training group, and control group on flexibility. The 'f' value in the adjusted post-test means was found significant, hence Scheffe's test was applied to assess the paired mean difference and the results are presented in Table 2.

Table 2: Scheffe's test for the Differences between Adjusted Post-test Paired Means on Flexibility.

Yogic Practices Group	Swissball Training Group	Control Group	Mean Difference	CI
15.54	15.13	-	0.41*****	0.07
15.54	-	12.20	3.34*****	
-	15.13	12.20	2.93*****	

*Significant at 0.05 level of confidence.

From the Table 2, it is imperative that both the experimental groups differed significantly from the control group on flexibility. Significant differences were found between yogic practices group and swissball training group in improving flexibility of adolescent boys. Therefore, six weeks of yogic practices showed greater improvement than swissball training among adolescent boys. The findings of the study imply that both the groups improved but yogic practices had significantly improved flexibility than the other two groups in this study. The changes in flexibility are presented in Figure 1.

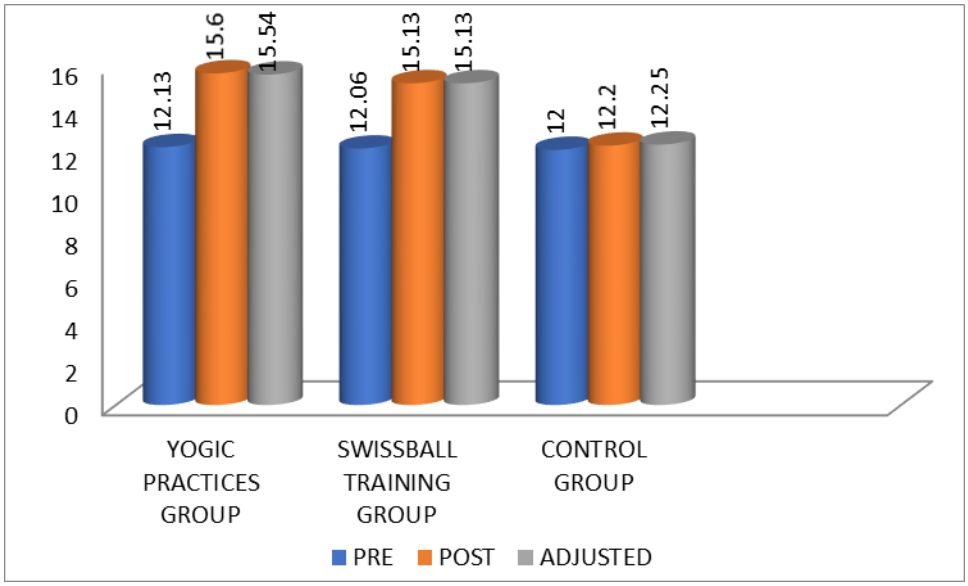

Fig 1: The Pre, Post and Adjusted Post test Means of Experimental and Control Groups on Flexibility

Discussion on findings

The result of the study indicates that the experimental groups namely yogic practices group and swissball training group had shown significant enhancement in flexibility among adolescent boys. The control group has not shown significant changes in flexibility. The analysis of the study indicates that the yogic practices group and swissball training groups had shown significant level differences in flexibility among adolescent boys. The improvement on flexibility among yogic practices group and swissball training group was due to varied intensities in training of both the experimental groups. These findings are in accordance with the findings of Singh *et al*., (2010) [9], Morton *et al*., (2011) [7], Simao *et al*., (2011) [8], Dallas *et al*., (2014) [3], Leite *et al*., (2015) [5] and Chutia *et al*., (2016) [2].

Conclusion

- The yogic practices group produced significant improvement in flexibility. The 'f' values of the selected variables have reached the significant level.
- The swissball training group produced significant improvement in flexibility. The 'f' values of the selected variables have reached the significant level.
- In the control group the obtained 'f' value on flexibility failed to reach the significant level.

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