

**EFFECT OF RESISTANCE TRAINING AND SWISS BALL RESISTANCE TRAINING
ON SELECTED PHYSICAL FITNESS VARIABLES AMONG INTERCOLLEGIATE
MALE HANDBALL PLAYERS**



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Abstract:

The main objective of this study was to find out the Effect of Resistance Training and Swiss Ball Resistance Training on selected Physical Fitness variables among Intercollegiate Male Handball Players. To achieve the purpose of the study, thirty male handball players were randomly selected as subjects from Sitapur Shiksha Sansthan, Sitapur of Uttar Pradesh State. The age of the subjects were ranged between 18 to 25 years. The study was formulated as pre and post test random group design, in which forty five subjects were divided into three equal groups. Experimental Group-I (n=10; RT Group) performed the Resistance training Group. The Experimental Group-II (n=10, SBRT group) performed Swiss ball resistance training programme. Control group (n=10; CG) did not undergo any specific training programmed but there practiced the regular game. The following physical fitness parameters are muscular strength, flexibility and balance. The analysis of covariance was used to analyze the significant difference, if any among the groups. Since, three groups were compared, whenever they obtained 'F' ratio for adjusted post test was found to be significant, the Scheffe's test to find out the paired mean differences, if any. The 0.05 level of confidence was fixed as the level of significance to test the 'F' ratio obtained by the analysis of covariance, which was considered as an appropriate. The result of the study indicates due to training on muscular strength, flexibility and balance has been improved significantly.

Keywords: Resistance Training, Swiss ball training, Flexibility & ANACOVA.

Introduction:

The Swiss ball has two primary functions in a workout program: instability and support. Instability during an exercise forces you to engage your core muscles to maintain your balance, making the exercise more difficult. Training the core with instability helps develop a strong support system for your legs and back, which prevents injuries and helps you get the most out of your exercise routine. The Swiss ball can also be used to support your back as you work on developing core stability. For instance, you can place the ball against the wall and lean your back against it as you do a squat. To add lower back support to an abdominal crunch, sit on the

ball, walk your feet out in front of you until you are lying back on the ball with a neutral spine, and do crunches from there. Rutherford and Jones (1986) suggested that adaptations from Swiss ball training resulted in better coordination of synergistic and stabilizer muscles. Behm (2002) and colleagues reported the effect of unstable conditions, as induced by sitting on Swiss ball on force production of the knee extenders. Robert examined the effect of Swiss ball exercises on core stability and stated that there is a improvement in core strength among the subjects.

Objective of the Study:

The main objective of this study was to find out the Effect of Resistance Training and Swiss Ball Resistance Training on selected Physical Fitness variables among Intercollegiate Male Handball Players

Methodology:

Selection of Subjects:

Thirty male handball players were selected from Sitapur Shiksha Sansthan who have represented at inter collegiate tournament were randomly selected as subjects for the study. This experimental study was administered to only two experimental groups and one control group of 10 subjects each. The age of subjects ranged from 18 to 25 years only.

Experimental Design:

This experimental study was administered to only two experimental groups and one control group of 10 subjects each. For this purpose Group I underwent Resistance training, Group II underwent Swiss ball resistance training in three alternative days for twelve weeks. Group III acted as control group.

**Training Programme
I Three weeks - Resistance Training**

Sl.no	Name of the exercise	Repetition	Set	Intensity	Rest
1.	Bench press	8-10	3 set	60% (1RM)	3 mins
2.	Half squad	8-10	3 set	60%	3 mins
3.	Leg press	8-10	3 set	60%	3 mins
4.	Leg curl	8-10	3 set	60%	3 mins
5.	Chest press	8-10	3 set	60%	3 mins

**Training Programme
II Three weeks - Resistance Training**

Sl.no	Name of the exercise	Repetition	Set	Intensity	Rest
1.	Bench press	8-10	4 set	70%	2 mins

2.	Half squad	8-10	4 set	70%	2 mins
3.	Leg press	8-10	4 set	70%	2 mins
4.	Leg curl	8-10	4 set	70%	2 mins
5.	Chest press	8-10	4 set	70%	2 mins

Training Programme

III Three weeks - Resistance Training

Sl.no	Name of the exercise	Repetition	Set	Intensity	Rest
1.	Bench press	10-12	4 set	80%	2 mins
2.	Half squad	10-12	4 set	80%	2 mins
3.	Leg press	10-12	4 set	80%	2 mins
4.	Leg curl	10-12	4 set	80%	2 mins
5.	Chest press	10-12	4 set	80%	2 mins

Training Programme

IV Three weeks - Resistance Training

Sl.no	Name of the exercise	Repetition	Set	Intensity	Rest
1.	Bench press	12-14	5 set	90%	2 mins
2.	Half squad	12-14	5 set	90%	2 mins
3.	Leg press	12-14	5 set	90%	2 mins
4.	Leg curl	12-14	5 set	90%	2 mins
5.	Chest press	12-14	5 set	90%	2 mins

Training Programme

I Three weeks - Resistance Training With Swiss ball

Sl.no	Name of the exercise	Repetition	Set	Intensity	Rest
1.	Bench press	6-8	3 set	60%	3 mins
2.	Half squad	6-8	3 set	60%	3 mins
3.	Leg press	6-8	3 set	60%	3 mins
4.	Leg curl	6-8	3 set	60%	3 mins
5.	Chest press	6-8	3 set	60%	3 mins

Training Program

II Three weeks - Resistance Training With Swiss ball

Sl.no	Name of the exercise	Repetition	Set	Intensity	Rest
1.	Bench press	6-8	4 set	70%	2 mins
2.	Half squad	6-8	4 set	70%	2 mins
3.	Leg press	6-8	4 set	70%	2 mins
4.	Leg curl	6-8	4 set	70%	2 mins
5.	Chest press	6-8	4 set	70%	2 mins

Training Programme

III Three weeks - Resistance Training With Swiss ball

Sl.no	Name of the exercise	Repetition	Set	Intensity	Rest
1.	Bench press	8-10	4 set	80%	2 mins
2.	Half squad	8-10	4 set	80%	2 mins
3.	Leg press	8-10	4 set	80%	2 mins
4.	Leg curl	8-10	4 set	80%	2 mins
5.	Chest press	8-10	4 set	80%	2 mins

Training Programme

IV Three weeks - Resistance Training With Swiss ball

Sl.no	Name of the exercise	Repetition	Set	Intensity	Rest
1.	Bench press	12-14	5 set	90%	2 mins
2.	Half squad	12-14	5 set	90%	2 mins
3.	Leg press	12-14	5 set	90%	2 mins
4.	Leg curl	12-14	5 set	90%	2 mins
5.	Chest press	12-14	5 set	90%	2 mins

Statistical Technique:

The data was analyzed by using ANACOVA find out the significance of the mean difference between the groups. The **repeated analysis of variance** was used to find out the significance of the mean difference between the pre and post test.

Results:

Muscular Strength:

	Resistance Training	Swissball Training	Control Group	Source of Variance	Sum of Square	DF	Mean Square	F
Pre Test	84.3	88.5	84.5	Between Within	112.26 649.1	2 27	56.13 24.04	2.33
Post Test	126.7	98	84.8	Between Within	9178.46 1285.7	2 27	4589.23 47.61	96.37
Adjusted PostMean	127.35	96.77	85.33	Between Within	9306.22 1156.22	2 26	4653.11 44.47	104.63

F Value 3.34

Resistance Training	Swissball Training	Control Group	Mean Difference	Confidence Interval Value
127.35	96.77	-	30.58	7.92
127.35	-	85.33	42.02	7.92
-	96.77	85.33	11.44	7.92

Table I (a) shows the Scheffe's post-hoc test result. The ordered adjusted final mean difference for Muscular strength of experimental groups I, II and control group were tested for significant at 0.05 level of confidence against confidential interval value. The mean difference between experimental group I, experimental group II, I and control group were 30.58, 42.02 and 11.44 respectively and it were seen to be greater than the confidential interval value of 7.73 Hence the above comparisons were significant

II. Flexibility:

	Rasistance Training	Swissball Training	Control Group	Source of Variance	Sum of Square	DF	Mean Square	F
Pre Test	23.2	23.5	23.2	Between Within	0.6 129.7	2 27	0.3 4.80	0.06
Post Test	27.9	31.7	23.4	Between Within	345.26 109.4	2 27	172.63 4.05	42.60
Adjusted PostMean	27.98	31.53	23.48	Between Within	324.33 17.96	2 27	162.16 0.69	234.71

Resistance Training	Swissball Training	Control Group	Mean Difference	Confidence Interval Value
27.98	31.53	-	3.5	0.98
27.98	-	23.48	4.5	0.98
-	31.5	23.48	8.02	0.98

Table II (a) shows the Scheffe's post –hoc test result .The ordered adjusted final mean difference for leg explosive power of experimental groups I,II and control group were tested for significant at 0.05 level of confidence against confidential interval value. The mean difference between experimental group I, experimental group II, I and control group were 3.5, 4.5 and 8.02 respectively and it were seen to be greater than the confidential interval value of 0.98 Hence the above comparisons were significant

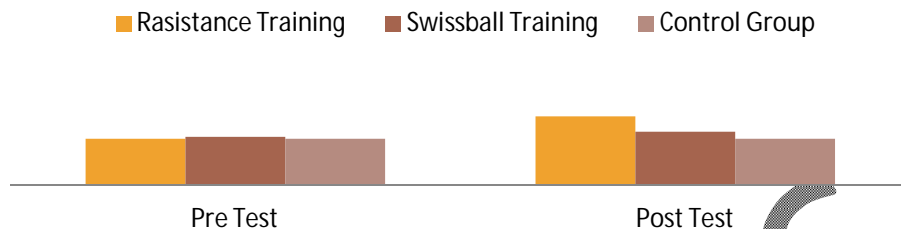
III Balance:

	Rasistance Training	Swissball Training	Control Group	Source of Variance	Sum of Square	DF	Mean Square	F
Pre Test	2.6	2.7	2.7	Between Within	0.06 6.6	2 27	0.03 0.24	0.13
Post Test	3.2	3.97	2.8	Between Within	6.81 6.42	2 27	3.40 0.23	14.32
Adjusted PostMean	3.23	3.93	2.78	Between Within	6.71 4.77	2 26	3.35 0.18	18.28

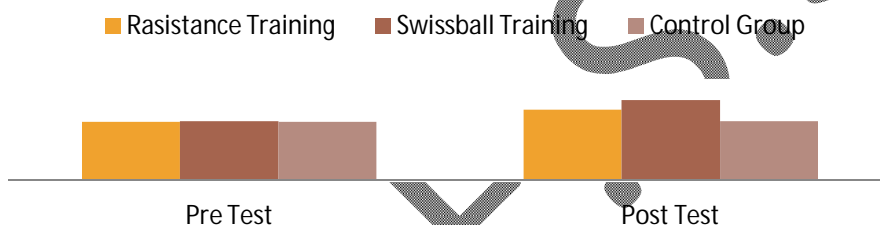
Resistance Training	Swissball Training	Control Group	Mean Difference	Confidence Interval Value
3.23	3.93	-	0.45	0.06
3.23	-	2.78	0.07	0.06
-	3.93	2.78	1.15	0.06

Table IV (a) shows the Scheffe's post –hoc test result .The ordered adjusted final mean difference for Balance of experimental groups I, II and control group were tested for significant at 0.05 level of confidence against confidential interval value. The mean difference between experimental group I, experimental group II, I and control group were 0.45, 0.07 and 1.15 respectively and it were seen to be greater than the confidential interval value of 0.06. Hence the above comparisons were significant

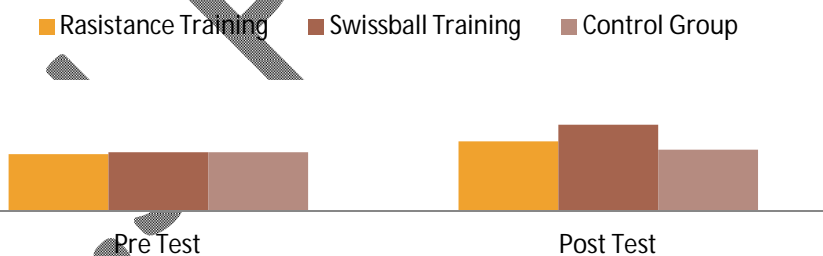
Muscular Strength



Flexibility



III BALANCE



Conclusion:

- The Resistance training and Swiss ball resistance training has produced significant improvement on performance variables namely muscular strength, flexibility and Balance greater than control group of college male handball players.
- The Muscular strength favored to Resistance training greater than Swiss ball training and control group of college male handball players.
- Flexibility and Balance were favored to Swiss ball training greater than Resistance training and control group of college male handball players.
- Control group did not produce any significant improvement on all criterion variables of college male handball players.

In the present study, the effect of both Resistance training and Swiss ball resistance training has significant improvement on the criterion variables among college male handball players.

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